WDR Socket Communication
Sample Program
(Windows C#)

Contents

1. Overview

The following is an overview of sample programs to control the WDR via socket communication.

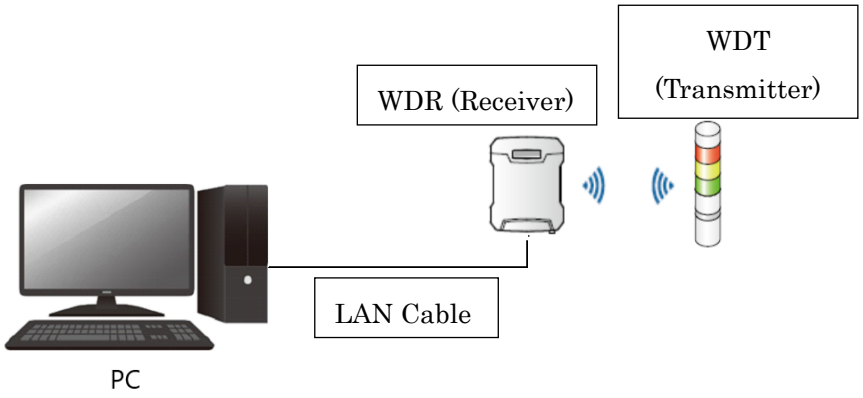
This programs are intended to be controlled with Microsoft Visual C#.

Since the programs are just samples, it is necessary to design your own unique system separately

1.1. System Overview

The system configuration diagram of this program is as follows.

In this program, one WDR device is controlled by socket communication.



2. Development Environment

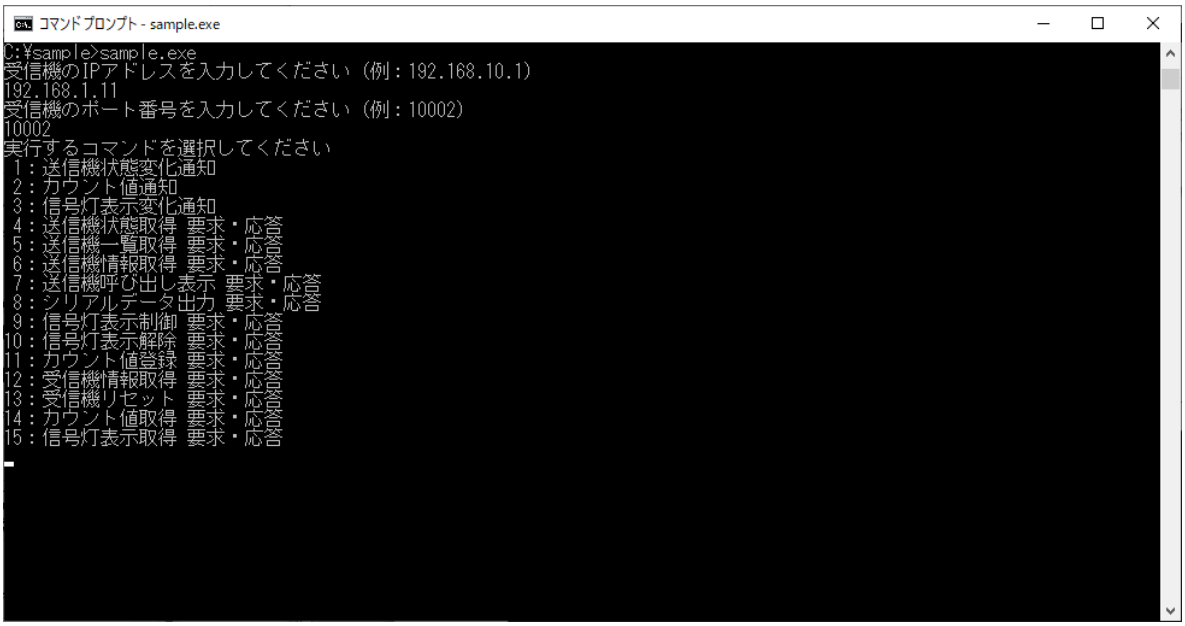
The development environment of the sample program is shown below.

Development Environment		Remarks
Development OS	Windows 10 64bit	Development OS
Development Language	C#	Development Language
App type	CUI application	App type
Development Tools	Visual Studio 2019 Professional	Development Tools

3. Application Overview

3.1. Command Operation

On the command prompt, navigate to the location of the sample.exe file created at build time and execute it. After entering the IP address and port number of the receiver, you will be prompted to select a command to execute. After selecting a command, follow the instructions to enter parameters.



3.1.1. Command List

Command Name	Contents
Transmitter Status Change Notification	Receives commands that notifies you when the transmitter status changes.
Count Value Notification	Receives a command notifying when the transmitter count value is updated.
Signal Tower Display Change Notification	Receives notification command when the transmitter's control of the display (LED Unit) is released (cancelled).
Transmitter Status Acquisition Request / Response	Acquires transmitter status information (change information).
Transmitter List Acquisition Request / Response	Gets a list of transmitters managed by the receiver.
Transmitter Information Acquisition Request / Response	Acquires information for a specified transmitter.
Transmitter Call Display Request / Response	The specified transmitter lights up when called.
Serial Data Output Request / Response	Outputs serial data from the RS232C interface of the specified transmitter.
Signal Tower Display Control	Controls the Signal Tower display of the specified transmitter.

Request / Response	
Signal Tower Display cancellation Request / Response	Cancels the Signal Tower display control of the specified transmitter.
Count Value Registration Request / Response	Registers the count value of the specified transmitter.
Receiver Information Acquisition Request / Response	Gets receiver information.
Receiver Reset Request / Response	Resets receiver.
Count Value Acquisition Request / Response	Gets the count value for the specified transmitter.
Signal Tower Display Acquisition Request / Response	Acquires the Signal Tower display status of the specified transmitter.

3.1.2. Transmitter Status Change Notification Command

Specify the following command ID and execute.

No.	Input Value	Value
1	Command ID	1

3.1.3. Count Value Notification Command

Specify the following command ID and execute.

No.	Input Value	Value
1	Command ID	2

3.1.4. Signal Tower Display Change Notification Command

Specify the following command ID and execute.

No.	Input Value	Value
1	Command ID	3

3.1.5. Transmitter Status Acquisition Request / Response Command

Specify the following command ID and parameters and execute.

No.	Input Value	Value
1	Command ID	4
2	IEEE Transmitter Address	IEEE address of transmitter whose status is to be acquired

3.1.6. Transmitter List Acquisition Request / Response Command

Specify the following command ID and execute.

No.	Input Value	Value
1	Command ID	5

3.1.7. Transmitter Information Acquisition Request / Response Command

Specify the following command ID and parameters and execute.

No.	Input Value	Value
1	Command ID	6
2	IEEE Transmitter Address	IEEE address of transmitter whose information is to be acquired

3.1.8. Transmitter Call Display Request / Response Command

Specify the following command ID and parameters and execute.

No.	Input Value	Value
1	Command ID	7
2	IEEE Transmitter Address	IEEE address of transmitter to be called and have it light up

3.1.9. Serial Data Output Request / Response Command

Specify the following command ID and parameters and execute.

No.	Input Value	Value
1	Command ID	8
2	IEEE Transmitter Address	IEEE address of transmitter outputting serial data
3	Serial Number	Number to determine whether or not infomration was resent
4	Output Information	Data to be output

3.1.10. Signal Tower Display Control Request / Response Command

Specify the following command ID and parameters and execute.

No.	Input Value	Value
1	Command ID	9
2	IEEE Transmitter Address	IEEE address of the transmitter that controls the display of the Signal Tower
3	Control Time	Time to control the display of the Signal Tower
4	Red Unit Lighting Pattern	LED Unit control method 00: Control by control line 10: Off 11: Continuous on 12: Blinking 13: Triple flash
5	Amber Unit Lighting Pattern	
6	Green Unit Lighting Pattern	
7	Blue Unit Lighting Pattern	
8	White Unit Lighting Pattern	
9	Alarm Pattern	Buzzer Unit control method 00: Control by control line 10: Silent 11: Continuous sound 12: Intermittent sound

3.1.11. Signal Tower Display Cancellation Request / Response Command

Specify the following command ID and parameters and execute.

No.	Input Value	Value
1	Command ID	10
2	IEEE Transmitter Address	IEEE address of the transmitter that cancels the display control of the Signal Tower

3.1.12. Count Value Registration Request / Response Command

Specify the following command ID and parameters and execute.

No.	Input Value	Value
1	Command ID	11
2	IEEE Transmitter Address	IEEE address of the transmitter that sets the count value
3	Count Registration Value	Count value to register

3.1.13. Receiver Information Acquisition Request / Response Command

Specify the following command ID and execute.

No.	Input Value	Value
1	Command ID	12

3.1.14. Receiver Reset Request / Response Command

Specify the following command ID and execute.

No.	Input Value	Value
1	Command ID	13

3.1.15. Count Value Acquisition Request / Response Command

Specify the following command ID and parameters and execute.

No.	Input Value	Value
1	Command ID	14
2	IEEE Transmitter Address	IEEE address of transmitter from which to get count value

3.1.16. Signal Tower Display Acquisition Request / Response Command

Specify the following command ID and parameters and execute.

No.	Input Value	Value
1	Command ID	15
2	IEEE Transmitter Address	IEEE address of transmitter to acquire Signal Tower control status

3.2. Function Description

3.2.1. Function List

Function Name	Explanation
SocketOpen	Connect to WDR
SocketClose	Close the socket
RecvDatagujde	Divide received data into commands
SendCommand	Send a request command and receive a response command
RecvCommand	Receive notification command
WDR_StatusChangeNoticeCommand	Receive transmitter status change notification
WDR_CountNoticeCommand	Receive count value notification
WDR_SignalLightChangeNoticeCommand	Receive Signal Tower display change notification
WDR_TransmitterStatusRequest	Send transmitter status acquisition request and receive transmitter status acquisition response
WDR_TransmitterListRequest	Send transmitter list acquisition request and receive transmitter list acquisition response
WDR_TransmitterDataRequest	Send transmitter information acquisition request and receive transmitter information acquisition response
WDR_TransmitterCallRequest	Send transmitter call display request and receive transmitter call display response
WDR_SerialOutputRequest	Send a serial data output request and receive a serial data output response
WDR_SignalLightControlRequest	Send a Signal Tower display control request and receive a Signal Tower display control response
WDR_SignalLightLiftRequest	Send a Signal Tower display cancellation request and receive a Signal Tower display cancellation response
WDR_SignalLightCountSetRequest	Send a count value registration request and receive a count value registration response
WDR_ReceiveDataRequest	Send receiver information acquisition request and receive receiver information acquisition response
WDR_ReceiverResetRequest	Send a receiver reset request and receive a receiver reset response
WDR_SignalLightCountGetRequest	Send a count value acquisition request and receive a count value acquisition response
WDR_SignalLightDataGetRequest	Send a Signal Tower display acquisition request and receive a Signal Tower display acquisition response

3.2.2. Connect to WDR

Function Name	public static int SocketOpen(string ip, int port)	
Parameters	string ip	WDR IP address
	int port	WDR port number
Return Value	int	Success: 0, Failure: Other than 0
Explanation	Connect to the WDR with the specified IP address and port number by socket communication	
How to Use	// Define socket class variables private static Socket sock = null; // Main function static void Main() { // Connect to WDR ret = SocketOpen("192.168.10.1", 10002); if (ret == -1) { return; } }	
Remarks	See "4.1 Connect to WDR" for an overview of the program	

3.2.3. Close Socket

Function Name	public static void SocketClose()
Parameters	none
Return Value	none
Explanation	Close the socket connected to the WDR
How to Use	// Main function static void Main() { // Connect to WDR ret = SocketOpen("192.168.10.1", 10002); if (ret == -1) { return; } // Close socket SocketClose(); }
Remarks	See "4.2 Closing Socket" for an overview of the program

3.2.4. Divide Received Data into Commands

Function Name	public static bool RecvDatagujde(byte[] recvdata, int recvSize, ushort mode, out int startPos, out int getSize)	
Parameters	byte[] recvdata	Received data
	int recvSize	Size of received data
	ushort mode	Command mode to be acquired
	out int startPos	Data start position for specified command mode
	out int getSize	Data size for specified command mode
Return Value	bool	With data: true, without data: false
Explanation	Searches for the response data of the specified command mode from the received data, and returns the presence / absence of data, start position, and size.	
How to Use	// Receive function static int RecvCommand(ushort mode , out byte[] recvData) { // Connect to WDR Int recvSize = sock.Receive(bytes); if (recvSize < 0) { return; −1 } // Get response command data if (true == RecvDatagujde(bytes, recvSize, mode, out pos, out recvSize)) { return −1; } recvData = new byte[recvSize]; Array.Copy(bytes, pos, recvData, 0, recvSize); }	
Remarks	See "4.3Divide Received Data into Commands" for an overview of the program.	

3.2.5. Send a Request Command and Receive a Response Command

Function Name	public static int SendCommand(ushort mode, byte[] sendData, out byte[] recvData, int recvTimeout)	
Parameters	ushort mode	Response command mode
	byte[] sendData	Request command data
	out byte[] recvData	Response command data
	int recvTimeout	Response command wait time
Return Value	int	Success: 0, Failure: Other than 0
Explanation	Send a request command to the connected WDR and return response data	
How to Use	// Main function static void Main() { // Connect to WDR ret = SocketOpen("192.168.10.1", 10002); if (ret == −1) { return; }	

	`` // Create transmission data byte[] sendData = new byte[7]; byte[] recvData; sendData[0] = 0x41; sendData[1] = 0x42; sendData[2] = 0x54; sendData[3] = 0x00; sendData[4] = 0x00; sendData[5] = 0x00; sendData[6] = 0x01; // Send and receive commands ret = SendCommand(WDR_COMMAND_MODE_TRANSMITTER_STATUS_REQUEST, sendData, out recvData, WDR_TRANSMITTER_STATUS_REQUEST_TIMEOUT); if (ret != 0) { Debug.WriteLine("failed to send data"); return -1; } // Close socket SocketClose(); } ```
Remarks	See "4.4 Sending Request Commands and Receiving response Commands" for an overview of the program

3.2.6. Receive Notification Commands

Function Name	public static int RecvCommand(ushort mode, out byte[] recvData, int recvTimeout)	
Parameters	ushort mode	Notification command mode
	out byte[] recvData	Notification command data
	int recvTimeout	Notification command wait time
Return Value	int	Success: 0, Failure: Other than 0
Explanation	Receives the notification command of the connected WDR and returns the data	
How to Use	``` // Main function static void Main() { // Connect to WDR ret = SocketOpen("192.168.10.1", 10002); if (ret == -1) { return; } // Receive command ret = RecvCommand(WDR_COMMAND_MODE_STATUS_CHANGE_NOTICE, out recvData, WDR_STATUS_CHANGE_NOTICE_TIMEOUT); if (ret != 0) { ```	

	Debug.WriteLine("failed to send data"); return -1; } // Close socket SocketClose(); }
Remarks	See "4.5 Receiving Notification Commands" for an overview of the program

3.2.7. Receive Transmitter Status Change Notification

Function Name	public static int WDR_StatusChangeNoticeCommand(out WDR_STATUS_CHANGE_NOTICE_RECV_DATA Data)	
Parameters	out WDR_STATUS_CHANGE_NOTICE_RECV_DATA Data	Received data
Return Value	int	Success: 0, Failure: Other than 0
Explanation	Receives transmitter status change notification command and returns data	
How to Use	// Main Function static void Main() { //Connect to WDR ret = SocketOpen("192.168.10.1", 10002); if (ret == -1) { return; } // Receive transmitter status change notification command WDR_STATUS_CHANGE_NOTICE_RECV_DATA Data; Data = new WDR_STATUS_CHANGE_NOTICE_RECV_DATA(); WDR_StatusChangeNoticeCommand(out Data); // Close socket SocketClose(); }	
Remarks	See "4.6 Receiving Transmitter Status Change Notification" for an overview of the program.	

3.2.8. Receive Count Value Notification

Function Name	public static int WDR_CountNoticeCommand(out WDR_COUNT_NOTICE_RECV_DATA Data)	
Parameters	out WDR_COUNT_NOTICE_RECV_DATA Data	Received data
Return Value	int	Success: 0, Failure: Other than 0
Explanation	Receives count value notification command and returns data	
How to Use	// Main function static void Main()	

	{ // Connect to WDR ret = SocketOpen("192.168.10.1", 10002); if (ret == -1) { return; } // Receive count value notification command WDR_COUNT_NOTICE_RECV_DATA Data; Data = new WDR_COUNT_NOTICE_RECV_DATA(); WDR_CountNoticeCommand(out Data); // Close socket SocketClose(); }
Remarks	See "4.7 Receiving Count Value Notifications" for an overview of the program

3.2.9. Receive Signal Tower Display Change Notification

Function Name	public static int WDR_SignalLightChangeNoticeCommand(out WDR_SIGNAL_LIGHT_CHANGE_NOTICE_RECV_DATA Data)	
Parameters	out WDR_SIGNAL_LIGHT_CHANGE_NOTICE_RECV_DATA Data	Received data
Return Value	int	Success: 0, Failure: Other than 0
Explanation	Receives Signal Tower display change notification command and returns data	
How to Use	// Main function static void Main() { // Connect to WDR ret = SocketOpen("192.168.10.1", 10002); if (ret == -1) { return; } // Receive Signal Tower display change notification command WDR_SIGNAL_LIGHT_CHANGE_NOTICE_RECV_DATA Data; Data = new WDR_SIGNAL_LIGHT_CHANGE_NOTICE_RECV_DATA(); WDR_SignalLightChangeNoticeCommand(out Data); // Close socket SocketClose(); }	
Remarks	See "4.8 Receiving the Signal Tower display change notification" for an overview of the program.	

3.2.10. Send Transmitter Status Acquisition Request and Receive Transmitter Status Acquisition Response

Function Name	public static int WDR_TransmitterStatusRequest(ulong IEEEAddress, out WDR_TRANSMITTER_STATUS_REQUEST_RES_DATA Data)	
Parameters	ulong IEEEAddress	IEEE address of the target transmitter
	out WDR_TRANSMITTER_STATUS_REQUEST_RES_DATA Data	Received data
Return Value	int	Success: 0, Failure: Other than 0
Explanation	Sends the transmitter status acquisition request command, receives the transmitter status acquisition response command, and returns the data.	
How to Use	// Main function static void Main() { // Connect to WDR ret = SocketOpen("192.168.10.1", 10002); if (ret == -1) { return; } // Send and receive transmitter status acquisition command WDR_TRANSMITTER_STATUS_REQUEST_RES_DATA Data; Data = new WDR_TRANSMITTER_STATUS_REQUEST_RES_DATA(); WDR_TransmitterStatusRequest(IEEEAddress, out Data); // Close socket SocketClose(); }	
Remarks	See "4.9 Sending the transmitter status acquisition request and receiving the transmitter status acquisition response" for an overview of the program..	

3.2.11. Send Transmitter List Acquisition Request and Receive Transmitter List Acquisition Response

Function Name	public static int WDR_TransmitterListRequest(out WDR_TRANSMITTER_LIST_REQUEST_RES_DATA Data)	
Parameter	out WDR_TRANSMITTER_LIST_REQUEST_RES_DATA Data	Received data
Reurn Value	int	Success: 0, Failure: Other than 0
Explanation	Sends the transmitter list acquisition request command, receives the transmitter list acquisition response command, and returns the data.	
How to Use	// main function static void Main() { // Connect to WDR ret = SocketOpen("192.168.10.1", 10002); if (ret == -1) { return;	

	} // receive transmitter list acquisition command WDR_TRANSMITTER_LIST_REQUEST_RES_DATA Data; Data = new WDR_TRANSMITTER_LIST_REQUEST_RES_DATA(); WDR_TransmitterListRequest(out Data); // Close socket SocketClose(); }
Remarks	See "4.10Send a Transmitter List Acquisition Request and Receive a Transmitter List Acquisition Response" for an overview of the program.

3.2.12. Send Transmitter Information Acquisition Request and Receive Transmitter Information Acquisition Response.

Function Name	public static int WDR_TransmitterDataRequest(ulong IEEEAddress, out WDR_TRANSMITTER_DATA_REQUEST_RES_DATA Data, out WDR_TRANSMITTER_DATA_REQUEST_RES_ADD_DATA addData)	
Parameters	ulong IEEEAddress	IEEE address of the target transmitter
	out WDR_TRANSMITTER_DATA_REQUEST_RES_DATA Data	Received data
	out WDR_TRANSMITTER_DATA_REQUEST_RES_ADD_DATA addData	Extended received data
Return Value	int	Success: 0, Failure: Other than 0
Explanation	Sends the transmitter information acquisition request command, receives the transmitter information acquisition response command, and returns the data.	
How to Use	// Main function static void Main() { // Connect to WDR ret = SocketOpen("192.168.10.1", 10002); if (ret == -1) { return; } // receive transmitter information acquisition command WDR_TRANSMITTER_DATA_REQUEST_RES_DATA Data; WDR_TRANSMITTER_DATA_REQUEST_RES_ADD_DATA addData; Data = new WDR_TRANSMITTER_DATA_REQUEST_RES_DATA(); addData = new WDR_TRANSMITTER_DATA_REQUEST_RES_ADD_DATA(); WDR_TransmitterDataRequest(IEEEAddress, out Data, out addData); // Close socket SocketClose();	

	}
Remarks	See "4.11Send a Transmitter Information Acquisition Request and Receive a Transmitter Information Acquisition Response" for an overview of the program.

3.2.13. Send Transmitter Call Display Request and Receive Transmitter Call Display Response

Function Name	public static int WDR_TransmitterCallRequest(ulong IEEEAddress, out WDR_TRANSMITTER_CALL_REQUEST_RES_DATA Data)	
Parameters	ulong IEEEAddress	IEEE address of the target transmitter
	out WDR_TRANSMITTER_CALL_REQUEST_RES_DATA Data	Received data
Return Value	int	Success: 0, Failure: Other than 0
Explanation	Sends transmitter call display request command, receives transmitter call display response command, and returns data	
How to Use	// Main function static void Main() { // Connect to WDR ret = SocketOpen("192.168.10.1", 10002); if (ret == -1) { return; } // Send and receive transmitter call display command WDR_TRANSMITTER_CALL_REQUEST_RES_DATA Data; Data = new WDR_TRANSMITTER_CALL_REQUEST_RES_DATA(); WDR_TransmitterCallRequest(IEEEAddress, out Data); // Close socket SocketClose(); }	
Remarks	See "4.12Send a Transmitter Call Display Request and Receive a Transmitter Call Display Response" for an overview of the program.	

3.2.14. Send Serial Data Output Request and Receive Serial Data Output Response

Function Name	public static int WDR_SerialOutputRequest(WDR_SERIAL_OUTPUT_REQ_DATA outputData, out WDR_SERIAL_OUTPUT_RES_DATA Data)	
Parameters	WDR_SERIAL_OUTPUT_REQ_DATA outputData	Transmission data
	out WDR_SERIAL_OUTPUT_RES_DATA Data	Received data
Return Value	int	Success: 0, Failure: Other than 0
Explanation	Sends a serial data output request command, receives a serial data output response command, and returns data	
How to Use	// Main function static void Main() { // Connect to WDR ret = SocketOpen("192.168.10.1", 10002);	

	if (ret == -1) { return; } // Send and receive serial data output commands WDR_SERIAL_OUTPUT_REQ_DATA sendData; WDR_SERIAL_OUTPUT_RES_DATA Data; sendData = new WDR_SERIAL_OUTPUT_REQ_DATA(); Data = new WDR_SERIAL_OUTPUT_RES_DATA(); sendData.IEEEAddress = 0x6CE4DAFFFE010101; sendData.serialNumber = 0x01; sendData.outputData = {0x01, 0x02, 0x03, 0x04, 0x05}; WDR_SerialOutputRequest(sendData, out Data); // Close socket SocketClose(); }
Remarks	See "4.13Send a Serial Data Output Request and Receive a Serial Data Output Response" for an overview of the program.

3.2.15. Send a Signal Tower Display Control Request and Receive a Signal Tower Display Control Response

Function Name	public static int WDR_SignalLightControlRequest(WDR_SIGNAL_LIGHT_CONTROL_REQ_DATA controlData, out WDR_SIGNAL_LIGHT_CONTROL_RES_DATA Data)	
Parameter	WDR_SIGNAL_LIGHT_CONTROL_REQ_DATA controlData	Transmission data
	out WDR_SIGNAL_LIGHT_CONTROL_RES_DATA Data	Received data
Return Value	int	Success: 0, Failure: Other than 0
Explanation	Sends a Signal Tower display control request command, receives a Signal Tower display control response command, and returns data.	
How to Use	// Main function static void Main() { // Connect to WDR ret = SocketOpen("192.168.10.1", 10002); if (ret == -1) { return; } // Send and receive Signal Tower display control commands WDR_SIGNAL_LIGHT_CONTROL_REQ_DATA sendData; WDR_SIGNAL_LIGHT_CONTROL_RES_DATA Data; sendData = new WDR_SERIAL_OUTPUT_REQ_DATA(); Data = new WDR_SIGNAL_LIGHT_CONTROL_RES_DATA(); sendData.IEEEAddress = 0x6CE4DAFFFE010101;	

	sendData.controlTime= 0x00; sendData.redUnit= 0x11; sendData.yellowUnit= 0x11; sendData.greenUnit= 0x11; sendData.blueUnit= 0x11; sendData.whiteUnit= 0x11; sendData.buzzerUnit= 0x11; WDR_SignalLightControlRequest(sendData, out Data); // Close socket SocketClose(); }
Remarks	See "4.14Send a Signal Tower Display Control Request and Receive a Signal Tower Display Control Response" for an overview of the program.

3.2.16. Send a Signal Tower Display Cancellation Request and Receive a Signal Tower Display Cancellation Response

Function Name	public static int WDR_SignalLightLiftRequest(ulong IEEEAddress, out WDR_SIGNAL_LIGHT_LIFT_RES_DATA Data)	
Parameters	ulong IEEEAddress	IEEE address of the target transmitter
	out WDR_SIGNAL_LIGHT_LIFT_RES_DATA Data	Received data
Return Value	int	Success: 0, Failure: Other than 0
Explanation	Sends Signal Tower display cancellation request command, receives Signal Tower display cancellation response command, and returns data.	
How to Use	// Main funtion static void Main() { // Connect to WDR ret = SocketOpen("192.168.10.1", 10002); if (ret == -1) { return; } // Send and receive the Signal Tower display cancellation command WDR_SIGNAL_LIGHT_LIFT_RES_DATA Data; Data = new WDR_SIGNAL_LIGHT_LIFT_RES_DATA(); WDR_SignalLightLiftRequest(IEEEAddress, out Data); // Close socket SocketClose(); }	
Remarks	See "4.15Send a Signal Tower Display Cancellation Request and Receive a Signal Tower Display Cancellation Response" for an overview of the program.	

3.2.17. Send Count Value Registration Request and Receive Count Value Registration Response

Function Name	public static int WDR_SignalLightCountSetRequest(WDR_SIGNAL_LIGHT_COUNT_SET_REQ_DATA setData, out WDR_SIGNAL_LIGHT_COUNT_SET_RES_DATA Data)	
Parameters	WDR_SIGNAL_LIGHT_COUNT_SET_REQ_DATA setData	Transmission data
	out WDR_SIGNAL_LIGHT_COUNT_SET_RES_DATA Data	Received data
Return Value	int	Success: 0, Failure: Other than 0
Explanation	Sends a count value registration request command, receives a count value registration response command, and returns data.	
How to Use	// main function static void Main() { // Connect to WDR ret = SocketOpen("192.168.10.1", 10002); if (ret == -1) { return; } // Send and receive count value registration commands WDR_SIGNAL_LIGHT_COUNT_SET_REQ_DATA sendData; WDR_SIGNAL_LIGHT_COUNT_SET_RES_DATA Data; sendData = new WDR_SIGNAL_LIGHT_COUNT_SET_REQ_DATA(); Data = new WDR_SIGNAL_LIGHT_COUNT_SET_RES_DATA(); sendData.IEEEAddress = 0x6CE4DAFFFE010101; sendData.setCount = 0x01; WDR_SignalLightCountSetRequest(sendData, out Data); // Close socke SocketClose(); }	
Remarks	See "4.16Send a Count Value Registration Request and Receive a Count Value Registration Response" for an overview of the program.	

3.2.18. Send Receiver Information Acquisition Request and Receive Receiver Information Acquisition Response

Function Name	public static int WDR_ReceiveDataRequest(out WDR_RECEIVER_DATA_REQUEST_RES_DATA Data)	
Parameters	out WDR_RECEIVER_DATA_REQUEST_RES_DATA Data	Received data
Return Value	int	Success: 0, Failure: Other than 0
Explanation	Sends receiver information acquisition request command, receives receiver information acquisition response command, and returns data	
How to Use	// Main function static void Main() { // Connect to WDR ret = SocketOpen("192.168.10.1", 10002);	

	if (ret == -1) { return; } // Send and receive receiver information acquisition commands WDR_RECEIVER_DATA_REQUEST_RES_DATA Data; Data = new WDR_RECEIVER_DATA_REQUEST_RES_DATA(); WDR_ReceiveDataRequest(out Data); // Close socket SocketClose(); }
Remarks	See "4.17Send a Receiver Information Acquisition Request and Receive a Receiver Information Acquisition Response" for an overview of the program.

3.2.19. Send a Receiver Reset Request and Receive a Receiver Reset Response

Function Name	public static int WDR_ReceiverResetRequest(out WDR_RECEIVER_RESET_RES_DATA Data)	
Parameters	out WDR_RECEIVER_RESET_RES_DATA Data	Received data
Return Value	int	Success: 0, Failure: Other than 0
Explanation	Sends a receiver reset request command, receives a receiver reset response command and returns data	
How to Use	// main function static void Main() { // Connect to WDR ret = SocketOpen("192.168.10.1", 10002); if (ret == -1) { return; } // Send and receive receiver reset commands WDR_RECEIVER_RESET_RES_DATA Data; Data = new WDR_RECEIVER_RESET_RES_DATA(); WDR_ReceiverResetRequest(out Data); // Close socket SocketClose(); }	
Remarks	See "4.18 Sending Receiver Reser Request and Receiver Reset Response" for an overview of the program	

3.2.20. Send a Count Value Acquisition Request and Receive a Count Value Acquisition Response

Function Name	public static int WDR_SignalLightCountGetRequest(ulong IEEEAddress, out WDR_SIGNAL_LIGHT_COUNT_GET_RES_DATA Data)	
Parameters	ulong IEEEAddress	IEEE address of the target transmitter
	out WDR_SIGNAL_LIGHT_COUNT_GET_RES_DATA Data	Received data
Return Value	int	Success: 0, Failure: Other than 0
Explanation	Sends a count value acquisition request command, receives a count value acquisition response command, and returns data.	
How to Use	// Main function static void Main() { // Connect to WDR ret = SocketOpen("192.168.10.1", 10002); if (ret == -1) { return; } // Send and receive count value acquisition commands WDR_SIGNAL_LIGHT_COUNT_GET_RES_DATA Data; Data = new WDR_SIGNAL_LIGHT_COUNT_GET_RES_DATA(); WDR_SignalLightCountGetRequest(IEEEAddress, out Data); // Close socket SocketClose(); }	
Remarks	See "4.19Send a Count Value " for an overview of the program.	

3.2.21. Send Signal Tower Display Acquisition Request and Receive Signal Tower Display Acquisition Response

Function Name	public static int WDR_SignalLightDataGetRequest(ulong IEEEAddress, out WDR_SIGNAL_LIGHT_DATA_GET_RES_DATA Data)	
Parameters	ulong IEEEAddress	IEEE address of the target transmitter
	out WDR_SIGNAL_LIGHT_DATA_GET_RES_DATA Data	Received data
Return Value	int	Success: 0, Failure: Other than 0
Explanation	Sends a Signal Tower display acquisition request command, receives a Signal Tower display acquisition response command, and returns data.	
How to Use	// Main function static void Main() { // Connect to WDR ret = SocketOpen("192.168.10.1", 10002); if (ret == -1) { return; }	

	// Send and receive Signal Tower display acquisition commands WDR_SIGNAL_LIGHT_DATA_GET_RES_DATA Data; Data = new WDR_SIGNAL_LIGHT_DATA_GET_RES_DATA(); WDR_SignalLightDataGetRequest(IEEEAddress, out Data); // Close socket SocketClose(); }
Remarks	See "4.20Send a Signal Tower Display Acquisition Request and Receive a Signal Tower Display Acquisition " for an overview of the program.

3.3. Constant Description

3.3.1. Receive Timeout Code

Constant Name	Value	Explanation
WSAETIMEDOUT	10060	Receive timeout judgment code

3.3.2. Product Category

Constant Name	Value	Explanation
WDR_PRODUCT_ID	0x5842	WDR product category

3.3.3. WDR Identifier

Constant Name	Value	Explanation
WDR_COMMAND	0x01	WDR コマンド識別子コード

3.3.4. Expansion

Constant Name	Value	Explanation
WDR_EXPANSION	0x00	WDR command extension code

3.3.5. Command Type

Constant Name	Value	Explanation
WDR_COMMAND_KIND_NOTICE	0x10	Notification command
WDR_COMMAND_KIND_REQUEST	0x20	Request command
WDR_COMMAND_KIND_RESPONSE	0x30	Response command

3.3.6. Command Mode

Constant Name	Value	Explanation
WDR_COMMAND_MODE_STATUS_CHANGE_NOTICE	0x2001	Transmitter status change notification
WDR_COMMAND_MODE_COUNT_NOTICE	0x2007	Count value notification
WDR_COMMAND_MODE_SIGNAL_LIGHT_CHANGE_NOTICE	0x2008	Signal Tower display change notification
WDR_COMMAND_MODE_TRANSMITTER_STATUS_REQUEST	0x2002	Transmitter status acquisition
WDR_COMMAND_MODE_TRANSMITTER_LIST_REQUEST	0x2003	Get transmitter list
WDR_COMMAND_MODE_TRANSMITTER_DATA_REQUEST	0x2004	Transmitter information acquisition
WDR_COMMAND_MODE_TRANSMITTER_CALL_REQUEST	0x4010	Transmitter call display
WDR_COMMAND_MODE_SERIAL_OUTPUT_REQUEST	0x9011	Serial data output

WDR_COMMAND_MODE_SIGNAL_LIGHT_CONTROL_REQUEST	0xE001	Signal Tower display control request
WDR_COMMAND_MODE_SIGNAL_LIGHT_CONTROL_RESPONSE	0xE000	Signal Tower display control response
WDR_COMMAND_MODE_SIGNAL_LIGHT_LIFT_REQUEST	0xE0FF	Signal Tower display cancellation
WDR_COMMAND_MODE_SIGNAL_LIGHT_COUNT_SET_REQUEST	0x6001	Count value registration
WDR_COMMAND_MODE_RECEIVER_DATA_REQUEST	0x2005	Receiver information acquisition
WDR_COMMAND_MODE_RECEIVER_RESET_REQUEST	0x2006	Receiver reset
WDR_COMMAND_MODE_SIGNAL_LIGHT_COUNT_GET_REQUEST	0x2009	Get count value
WDR_COMMAND_MODE_SIGNAL_LIGHT_DATA_GET_REQUEST	0x200A	Get Signal Tower display

3.3.7. Receive Timeout Time by Command Mode

Constant Name	Value	Explanation
WDR_STATUS_CHANGE_NOTICE_TIMEOUT	60*1000	For transmitter status change notification
WDR_COUNT_NOTICE_TIMEOUT	60*1000	Count value notification
WDR_SIGNAL_LIGHT_CHANGE_NOTICE_TIMEOUT	60*1000	Signal Tower display change notification
WDR_TRANSMITTER_STATUS_REQUEST_TIMEOUT	2*100	Transmitter status acquisition
WDR_TRANSMITTER_LIST_REQUEST_TIMEOUT	2*1000	Get transmitter list
WDR_TRANSMITTER_DATA_REQUEST_TIMEOUT	2*1000	Transmitter information acquisition
WDR_TRANSMITTER_CALL_REQUEST_TIMEOUT	15*1000	Transmitter call display
WDR_SERIAL_OUTPUT_REQUEST_TIMEOUT	15*1000	Serial data output
WDR_SIGNAL_LIGHT_CONTROL_TIMEOUT	15*1000	For Signal Tower display control
WDR_SIGNAL_LIGHT_LIFT_TIMEOUT	15*1000	Signal Tower display cancellation
WDR_SIGNAL_LIGHT_COUNT_SET_TIMEOUT	2*1000	Count value registration
WDR_RECEIVER_DATA_REQUEST_TIMEOUT	2*1000	Receiver information acquisition
WDR_RECEIVER_RESET_REQUEST_TIMEOUT	2*1000	Receiver reset
WDR_SIGNAL_LIGHT_COUNT_GET_TIMEOUT	2*1000	Get count value
WDR_SIGNAL_LIGHT_DATA_GET_TIMEOUT	2*1000	Get Signal Tower display

3.3.8. PNS Command Response Data

Constant Name	Value	Explanation
PNS_ACK	0x06	Normal response
PNS_NAK	0x15	Abnormal response

3.4. Structure Description

3.4.1. Version Structure

Name	WDR_VERSION_DATA
Definition	public class WDR_VERSION_DATA { // Major version public byte major = 0; // Minor version public byte minor = 0; };
Explanation	Version number structure in the response command

3.4.2. WDT Version Information Structure

Name	WDR_WDT_VERSION_DATA
Definition	public class WDR_WDT_VERSION_DATA { // Major version public byte major = 0; // Minor version public byte minor = 0; // Dummy data public byte dummy = 0;
Explanation	WDT version information structure in the response command

3.4.3. WDT Information Structure

Name	WDR_INFO_DATA
Definition	public class WDR_INFO_DATA { // Version information public WDR_WDT_VERSION_DATA version = null; // Status information public byte status = 0; };
Explanation	WDT information structure in the response command

3.4.4. Base Unit Information Structure

Name	WDR_BASEUNIT_DATA
Definition	public class WDR_BASEUNIT_DATA { // Unit format public byte format = 0; // Version information public WDR_WDT_VERSION_DATA version = null;

	// DIP switch information public byte dipSwitch = 0; };
Explanation	Base unit information structure in the response command

3.4.5. WDT Status Information Structure

Name	WDR_WDT_STATUS_DATA
Definition	public class WDR_WDT_STATUS_DATA { // WDT IEEE address public ulong IEEEAddress = 0; // WDT registration status public byte registration = 0; // WDT connection status public byte connect = 0; };
Explanation	WDT state information structure in the response command

3.4.6. RS232C Data Information Structure

Name	WDR_RS232C_DATA
Definition	public class WDR_RS232C_DATA { // Input information size public byte size = 0; // Serial number public byte serialNumber = 0; // Input information public byte[] data = new byte[60]; };
Explanation	RS232C data information structure in the response command

3.4.7. Transmitter Status Change Notification Structure

Name	WDR_STATUS_CHANGE_NOTICE_RECV_DATA
Definition	public class WDR_STATUS_CHANGE_NOTICE_RECV_DATA { // IEEE address public ulong IEEEAddress = 0; // Serial number public uint serialNumber = 0; // Time information public ulong time = 0; // Version information public WDR_VERSION_DATA version = null; // Action mode public byte actionMode = 0; // WDT information public WDR_INFO_DATA wdtData = null;

	// Base unit information public WDR_BASEUNIT_DATA baseUnitData = null; // Signal Tower information (red) public byte redUnit = 0; // Signal Tower information (amber) public byte yellowUnit = 0; // Signal Tower information (green) public byte greenUnit = 0; // Signal Tower information (blue) public byte blueUnit = 0; // Signal Tower information (white) public byte whiteUnit = 0; // Alarm information public byte buzzerUnit = 0; // WDT monitoring information public byte surveillance = 0; // External input information public byte externalInput = 0; // RS232C data public WDR_RS232C_DATA RS232CData = null; };
Explanation	Received data structure of transmitter status change notification command

3.4.8. Count Value Notification Structure

Name	WDR_COUNT_NOTICE_RECV_DATA
Definition	public class WDR_COUNT_NOTICE_RECV_DATA { // IEEE address public ulong IEEEAddress = 0; // Time information public ulong time = 0; // Version information public WDR_VERSION_DATA version = null; // Action mode public byte actionMode = 0; // WDT information public WDR_INFO_DATA wdtData = null; // Base unit information public WDR_BASEUNIT_DATA baseUnitData = null; // Count value public uint countValue = 0; };
Explanation	Received data structure of count value notification command

3.4.9. Signal Tower Display Change Notification Structure

Name	WDR_SIGNAL_LIGHT_CHANGE_NOTICE_RECV_DATA
Definition	public class WDR_SIGNAL_LIGHT_CHANGE_NOTICE_RECV_DATA { // IEEE address public ulong IEEEAddress = 0; // Time information public ulong time = 0; // Version information public WDR_VERSION_DATA version = null; // Action mode public byte actionMode = 0; // WDT information public WDR_INFO_DATA wdtData = null; // Base unit information public WDR_BASEUNIT_DATA baseUnitData = null; // Red unit public byte redUnit = 0; // Amber unit public byte yellowUnit = 0; // Green unit public byte greenUnit = 0; // Blue unit public byte blueUnit = 0; // White unit public byte whiteUnit = 0; // Alarm unit public byte buzzerUnit = 0; };
Explanation	Received data structure of Signal Tower display change notification command

3.4.10. Transmitter Status Acquisition Structure

Name	WDR_TRANSMITTER_STATUS_REQUEST_RES_DATA
Definition	public class WDR_TRANSMITTER_STATUS_REQUEST_RES_DATA { // Response status public byte controlState = 0; // Time information public ulong time = 0; // Version information public WDR_VERSION_DATA version = null; // Action mode public byte actionMode = 0; // WDT information public WDR_INFO_DATA wdtData = null; // Base unit information public WDR_BASEUNIT_DATA baseUnitData = null;

	// Signal Tower information (red) public byte redUnit = 0; // Signal Tower information (amber) public byte yellowUnit = 0; // Signal Tower information (green) public byte greenUnit = 0; // Signal Tower information (blue) public byte blueUnit = 0; // Signal Tower information (white) public byte whiteUnit = 0; // Alarm information public byte buzzerUnit = 0; // WDT monitoring information public byte surveillance = 0; // External input information public byte externalInput = 0; // RS232C data public WDR_RS232C_DATA RS232CData = null; };
Explanation	Received data structure of transmitter status acquisition command

3.4.11. Transmitter List Acquisition Structure

Name	WDR_TRANSMITTER_LIST_REQUEST_RES_DATA
Definition	public class WDR_TRANSMITTER_LIST_REQUEST_RES_DATA { // Response status public byte controlState = 0; // Number of acquisitions public byte unitCount = 0; // WDT status information public WDR_WDT_STATUS_DATA[] wdtStatus = new WDR_WDT_STATUS_DATA[70]; };
Explanation	Received data structure of transmitter list acquisition command

3.4.12. Transmitter Information Acquisition Structure

Name	WDR_TRANSMITTER_DATA_REQUEST_RES_DATA
Definition	public class WDR_TRANSMITTER_DATA_REQUEST_RES_DATA { // Response status public byte controlState = 0; // username public byte[] userName = new byte[121]; // Version information public WDR_VERSION_DATA version = null; // Action mode public byte actionMode = 0; // WDT information public WDR_INFO_DATA wdtData = null;

	// Base unit information public WDR_BASEUNIT_DATA baseUnitData = null; // ExtendedPanID public ulong extendedPanID = 0; // Frequency channel public uint frequencyChannel = 0; // Signal Tower input judgment public byte signalLightInputJudge = 0; // Power settings public byte powerSetting = 0; // Counter setting public byte counterSetting = 0; // Send mode public ushort sendMode = 0; };
Explanation	Received data structure of transmitter information acquisition command

3.4.13. Transmitter Information Acquisition Extended Structure

Name	WDR_TRANSMITTER_DATA_REQUEST_RES_ADD_DATA
Definition	public class WDR_TRANSMITTER_DATA_REQUEST_RES_ADD_DATA { // Input information transmission method public byte inputDataTranform = 0; // Signal Tower format public byte signalLightFormat = 0; // Periodic transmission public byte regularSend = 0; // Simultaneous input judgment sensitivity setting public byte concInputSensitiveSetting = 0; // Received data file format public byte recvDataFileFormat = 0; // Communication setting baud rate public byte baudrate = 0; // Communication setting data length public byte dataLength = 0; // Communication setting parity public byte parity = 0; // Communication setting stop bit public byte stopBit = 0; };
Explanation	Transmitter information acquisition command data structure received when WDT_6LR_Z2_PRO is added.

3.4.14. Transmitter Call Display Structure

Name	WDR_TRANSMITTER_CALL_REQUEST_RES_DATA
Definition	public class WDR_TRANSMITTER_CALL_REQUEST_RES_DATA { // Response status public byte controlState = 0; };
Explanation	Received data structure of transmitter call display command

3.4.15. Serial Data Output Request Structure

Name	WDR_SERIAL_OUTPUT_REQ_DATA
Definition	public class WDR_SERIAL_OUTPUT_REQ_DATA { // IEEEE address public ulong IEEEAddress = 0; // Serial number public byte serialNumber = 0; // Output information public List<byte> outputData = new List<byte>(); };
Explanation	Transmission data structure of serial data output command

3.4.16. Serial Data Output Response Structure

Name	WDR_SERIAL_OUTPUT_RES_DATA
Definition	public class WDR_SERIAL_OUTPUT_RES_DATA { // Response status public byte controlState = 0; };
Explanation	Received data structure of serial data output command

3.4.17. Signal Tower Display Control Request Structure

Name	WDR_SIGNAL_LIGHT_CONTROL_REQ_DATA
Definition	public class WDR_SIGNAL_LIGHT_CONTROL_REQ_DATA { // IEEEE address public ulong IEEEAddress = 0; // Control time public byte controlTime = 0; // Red unit public byte redUnit = 0; // Amber unit public byte yellowUnit = 0; // Green unit

	public byte greenUnit = 0; // Blue unit public byte blueUnit = 0; // White unit public byte whiteUnit = 0; // Alarm unit public byte buzzerUnit = 0; };
Explanation	Transmission data structure of Signal Tower display control command

3.4.18. Signal Tower Display Control Response Structure

Name	WDR_SIGNAL_LIGHT_CONTROL_RES_DATA
Definition	public class WDR_SIGNAL_LIGHT_CONTROL_RES_DATA { // Response status public byte recvState = 0; // Control state public byte controlState = 0; // Red unit public byte redUnit = 0; // Amber unit public byte yellowUnit = 0; // Green unit public byte greenUnit = 0; // Blue unit public byte blueUnit = 0; // White unit public byte whiteUnit = 0; // Alarm unit public byte buzzerUnit = 0; };
Explanation	Received data structure of Signal Tower display control command

3.4.19. Signal Tower Display Cancellation Structure

Name	WDR_SIGNAL_LIGHT_LIFT_RES_DATA
Definition	public class WDR_SIGNAL_LIGHT_LIFT_RES_DATA { // Response status public byte recvState = 0; // Control state public byte controlState = 0; // Red unit public byte redUnit = 0; // Amber unit public byte yellowUnit = 0; // Green unit public byte greenUnit = 0;

	// Blue unit public byte blueUnit = 0; // White unit public byte whiteUnit = 0; // Alarm unit public byte buzzerUnit = 0; };
Explanation	Received data structure of Signal Tower display cancellation command

3.4.20. Count Value Registration Request Structure

Name	WDR_SIGNAL_LIGHT_COUNT_SET_REQ_DATA
Definition	public class WDR_SIGNAL_LIGHT_COUNT_SET_REQ_DATA { // IEEEE address public ulong IEEEAddress = 0; // Count registration value public uint setCount = 0; };
Explanation	Transmission data structure of count value registration command

3.4.21. Count Value Registration Response Structure

Name	WDR_SIGNAL_LIGHT_COUNT_SET_RES_DATA
Definition	public class WDR_SIGNAL_LIGHT_COUNT_SET_RES_DATA { // Response status public byte controlState = 0; };
Explanation	Received data structure of count value registration command

3.4.22. Receiver Information Acquisition Structure

Name	WDR_RECEIVER_DATA_REQUEST_RES_DATA
Definition	public class WDR_RECEIVER_DATA_REQUEST_RES_DATA { // Response status public byte controlState = 0; // ExtendedPanID public ulong extendedPanID = 0; // Frequency channel public uint frequencyChannel = 0; // Firmware version public WDR_VERSION_DATA version = null; // Network status public byte networkStatus = 0; // How to boot the network public byte networkBoot = 0; // Running ExtendedPanID

	public ulong actionExtendedPanID = 0; // Operating frequency channel public byte actionFrequencyChannel = 0; };
Explanation	Received data structure of receiver information command

3.4.23. Receiver Reset Structure

Name	WDR_RECEIVER_RESET_RES_DATA
Definition	public class WDR_RECEIVER_RESET_RES_DATA { // Response status public byte controlState = 0; };
Explanation	Received data structure of receiver reset command

3.4.24. Count Value Acquisition Structure

Name	WDR_SIGNAL_LIGHT_COUNT_GET_RES_DATA
Definition	public class WDR_SIGNAL_LIGHT_COUNT_GET_RES_DATA { // Response status public byte controlState = 0; // Time information public ulong time = 0; // Version information public WDR_VERSION_DATA version = null; // Action mode public byte actionMode = 0; // WDT information public WDR_INFO_DATA wdtData = null; // Base unit information public WDR_BASEUNIT_DATA baseUnitData = null; // Count value public uint count = 0; };
Explanation	Received data structure of count value acquisition command

3.4.25. Signal Tower Display Acquisition Structure

Name	WDR_SIGNAL_LIGHT_DATA_GET_RES_DATA
Definition	public class WDR_SIGNAL_LIGHT_DATA_GET_RES_DATA { // Response status public byte controlState = 0; // Time information public ulong time = 0;

	// Version information public WDR_VERSION_DATA version = null; // Action mode public byte actionMode = 0; // WDT information public WDR_INFO_DATA wdtData = null; // Base unit information public WDR_BASEUNIT_DATA baseUnitData = null; // Red unit public byte redUnit = 0; // Amber unit public byte yellowUnit = 0; // Green unit public byte greenUnit = 0; // Blue unit public byte blueUnit = 0; // White unit public byte whiteUnit = 0; // Alarm unit public byte buzzerUnit = 0; };
Explanation	Received data structure of Signal Tower display acquisition command

4. Program Overview

Only the main points of the Program operation are described.

4.1. Connect to WDR

Program	Explanation
Program.cs `private static Socket sock = null;`	→ Define socket member variables
Program.cs SocketOpen() `public static int SocketOpen(string ip, int port)` `{` `  try` `  {` `  // Set IP address and port` `  IPAddress ipAddress = IPAddress.Parse(ip);` `  IPEndPoint remoteEP = new IPEndPoint(ipAddress` `  // Creating a socket` `  sock = new Socket(ipAddress.AddressFamily, Soc` `  if (sock == null)` `  {` `  Console.WriteLine("failed to create socket` `  return -1;` `  }` `  // Connect to WDR` `  sock.Connect(remoteEP);` `  }` `  catch (Exception ex)` `  {` `  Console.WriteLine("socket open error");` `  if (sock != null)` `  {` `  sock.Close();` `  }` `  return -1;` `  }` `  return 0;` `}`	→Specify device IP address and port number IP address entered from screen Port number entered from screen → Create a socket instance → Connect to the device with the socket's Connect function

4.2. Close Socket

Program	Explanation
Program.cs SocketClose() `public static void SocketClose()` `{` `  if (sock != null)` `  {` `  //Closing the socket。` `  sock.Shutdown(SocketShutdown.Both);` `  sock.Close();` `  }` `}`	→Shut down the socket and then call close

4.3. Divide Received Data into Commands

Program	Explanation
Program.cs RecvDatagujde() `public static bool RecvDatagujde(byte[] recvdata, int recvS` `{` `  bool ret = false;` `  ushort resSize = 0;` `  ushort resMode = 0;` `  startPos = 0;` `  getSize = 0;` `  // If the reception size is 0 or less, it has not been` `  if (recvSize <= 0)` `  {` `  return ret;` `  }` `  do` `  {` `  // Get the size of one response` `  resSize = (ushort)IPAddress.NetworkToHostOrder(BitC` `  // Get command` `  resMode = (ushort)IPAddress.NetworkToHostOrder(BitC` `  // Command judgment` `  if (resMode == mode)` `  {` `  // If it is the target command, set the size fo` `  getSize = resSize + 6;` `  ret = true;` `  break;` `  }` `  // Add the size of one response to startPos` `  startPos += (resSize + 6);` `  } while (recvSize > startPos);  // When startPos become` `  return ret;` `}`	→Get the data size from the received data → Get command mode from received data → If the command mode is the specified mode, set the data size and return “command exists”. → Calculate the start position of data for each command → Repeat until the start position is larger than the size.

4.4. Send a Request Command and Receive a Response Command

Program	Explanation
Program.cs SendCommand() public static int SendCommand(ushort mode, byte[] sendD { int ret; recvData = null; try { if (sock == null) { Console.WriteLine("socket is not"); return -1; } // Set timeout sock.SendTimeout = 1000; sock.ReceiveTimeout = recvTimeout; // send ret = sock.Send(sendData); if (ret < 0) { Console.WriteLine("failed to send"); return -1; } // Receive response data byte[] bytes = new byte[1024]; int recvSize = 0; int pos; while (true) { // Data reception recvSize = sock.Receive(bytes); if (recvSize < 0) { Console.WriteLine("failed to recv"); return -1; } // Get the data of the target command from the re if (true == RecvDatagujde(bytes, recvSize, mode, { break; } } recvData = new byte[recvSize]; Array.Copy(bytes, pos, recvData, 0, recvSize);	→ Send the created send data with the Send function → After sending, get response from the device with the Recive function → Determine whether the received data contains the data of the specified command, and acquire the start position and size of the data.

```
// Judgment of command error response
ushort commandSize = (ushort)IPAddress.NetworkToHostOrder(BitC
bool errorFlag = false;
string errorMessage = "";
if (commandSize == 0x000C)
{
    errorFlag = true;
    switch (recvData[17])
    {
        case 0x80:
            errorMessage = "Command error";
            break;

        case 0x81:
            errorMessage = "Mode error";
            break;

        case 0x82:
            errorMessage = "Data error";
            break;

        case 0x83:
            errorMessage = "Connection unit error";
            break;

        case 0x84:
            errorMessage = "Wireless module response error";
            break;

        case 0x86:
            errorMessage = "Data acquisition error";
            break;

        case 0xC0:
            errorMessage = "Initialization abnormality";


        case 0xFF:
            errorMessage = "Exception anomaly";
            break;

        default:
            errorFlag = false;
            break;
    }
}

if (errorFlag)
{
    Console.WriteLine(errorMessage);
    return -1;
}
```

→ Determine the size because there is a possibility of command error response

→ If the response status is one of the command error responses, a message is displayed and the error ends.

→ If the response status is not a command error response, there is no problem and the process ends normally.

```
        }
        catch (SocketException e)
        {
            if (e.ErrorCode == WSAETIMEDOUT)
            {
                Console.WriteLine("TimeOut");
                return -1;
            }
        }
        catch (Exception ex)
        {
            Console.WriteLine(ex.Message);
            return -1;
        }

        return 0;
    }
```

→Determines the communication timeout and ends with an error.

4.5. Receive Notification Commands

Program	Explanation
Program.cs RecvCommand() `public static int RecvCommand(ushort mode, out byte[] recvD` `{` `  recvData = null;` `  try` `  {` `  if (sock == null)` `  {` `  Console.WriteLine("socket is not");` `  return -1;` `  }` `  // Set timeout` `  sock.ReceiveTimeout = recvTimeout;` `  // Receive notification data` `  byte[] bytes = new byte[1024];` `  int recvSize = 0;` `  int pos;` `  while (true)` `  {` `  // Data reception` `  recvSize = sock.Receive(bytes);` `  if (recvSize < 0)` `  {` `  Console.WriteLine("failed to recv");` `  return -1;` `  }` `  // Get the data of the target command from the` `  if (true == RecvDatagujde(bytes, recvSize, mode` `  {` `  break;` `  }` `  }` `  recvData = new byte[recvSize];` `  Array.Copy(bytes, pos, recvData, 0, recvSize);`	→ Get notification from device with Recive function → Determine whether the received data contains the data of the specified command, and acquire the start position and size of the data.

```
        }
        catch (SocketException e)
        {
            if (e.ErrorCode == WSAETIMEDOUT)
            {
                Console.WriteLine("TimeOut");
                return -1;
            }
        }
        catch (Exception ex)
        {
            Console.WriteLine(ex.Message);
            return -1;
        }

        return 0;
    }
```

→ Determines the communication timeout and ends with an error.

4.6. Receive Transmitter Status Change Notification

Program	Explanation
Program.cs WDR_StatusChangeNoticeCommand() `public static int WDR_StatusChangeNoticeCommand(out WDR_STATUS_CHANGE_NOTICE_RE` `{` `  int ret;` `  Data = new WDR_STATUS_CHANGE_NOTICE_RECV_DATA();` `  // Command reception` `  byte[] recvData;` `  ret = RecvCommand(WDR_COMMAND_MODE_STATUS_CHANGE_NOTICE, out recvData, WDR_` `  // Check for response data` `  if (recvData == null)` `  {` `  // Exception error (including timeout) occurred` `  return -1;` `  }` `  // Check the response data` `  if (recvData[0] == PNS_NAK)` `  {` `  // Receive an abnormal response` `  Console.WriteLine("negative acknowledge");` `  return -1;` `  }` `  // IEEE address` `  Data.IEEEAddress = (ulong)IPAddress.NetworkToHostOrder(BitConverter.ToInt64` `  // serial number` `  Data.serialNumber = (uint)IPAddress.NetworkToHostOrder(BitConverter.ToInt32` `  // Time information` `  Data.time = (ulong)IPAddress.NetworkToHostOrder(BitConverter.ToInt64(recvDa` `  // version information` `  Data.version = new WDR_VERSION_DATA` `  {` `  major = recvData[30],  // Major version` `  minor = recvData[31],  // Minor version` `  };` `  // action mode` `  Data.actionMode = recvData[32];` `  // WDT information` `  Data.wdtData = new WDR_INFO_DATA` `  {` `  version = new WDR_WDT_VERSION_DATA  // version information` `  {` `  major = recvData[33],  // Major version` `  minor = recvData[34],  // Minor version` `  dummy = recvData[35]  // Fixed value` `  },` `  status = recvData[36],  // Status information` `  };`	→ 4.5Receive Notification Commands → Check if there is an abnormal response after reception → Store the received data in the structure

```
    // Base unit information
    Data.baseUnitData = new WDR_BASEUNIT_DATA
    {
        format = recvData[37],                  // Unit type
        version = new WDR_WDT_VERSION_DATA      // version information
        {
            major = recvData[38],               // Major version
            minor = recvData[39],               // Minor version
            dummy = recvData[40]                // Fixed value
        },
        dipSwitch = recvData[41]                // DIP switch informati
    };

    // Signal light information (red)
    Data.redUnit = recvData[47];

    // Signal light information (yellow)
    Data.yellowUnit = recvData[48];

    // Signal light information (green)
    Data.greenUnit = recvData[49];

    // Signal light information (blue)
    Data.blueUnit = recvData[50];

    // Signal light information (white)
    Data.whiteUnit = recvData[51];

    // Buzzer information
    Data.buzzerUnit = recvData[52];

    // WDT monitoring information
    Data.surveillance = recvData[53];

    // External input information
    Data.externalInput = recvData[54];


    // RS232C data
    Data.RS232CData = new WDR_RS232C_DATA();
    Data.RS232CData.size = recvData[55];
    Data.RS232CData.serialNumber = recvData[56];
    Data.RS232CData.data = new byte[60];
    Array.Copy(recvData, 57, Data.RS232CData.data, 0, Data.RS232CData.dat

    return 0;
}
```

4.7. Receive Count Value Notification

Program	Explanation
Program.cs WDR_CountNoticeCommand() `public static int WDR_CountNoticeCommand(out WDR_COUNT_NOTICE_RECV_DAT` `{` `int ret;` `Data = new WDR_COUNT_NOTICE_RECV_DATA();` `// Command reception` `byte[] recvData;` `ret = RecvCommand(WDR_COMMAND_MODE_COUNT_NOTICE, out recvData, WDR` `// Check for response data` `if (recvData == null)` `{` `// Exception error (including timeout) occurred` `return -1;` `}` `// Check for response data` `if (recvData == null)` `{` `// Exception error (including timeout) occurred` `return -1;` `}` `// Check the response data` `if (recvData[0] == PNS_NAK)` `{` `// Receive an abnormal response` `Console.WriteLine("negative acknowledge");` `return -1;` `}` `// IEEE address` `Data.IEEEAddress = (ulong)IPAddress.NetworkToHostOrder(BitConverte` `// Time information` `Data.time = (ulong)IPAddress.NetworkToHostOrder(BitConverter.ToInt` `// version information` `Data.version = new WDR_VERSION_DATA` `{` `major = recvData[30], // Major version` `minor = recvData[31], // Minor version` `};` `// action mode` `Data.actionMode = recvData[32];` `// WDT information` `Data.wdtData = new WDR_INFO_DATA` `{` `version = new WDR_WDT_VERSION_DATA // version information` `{` `major = recvData[33], // Major version` `minor = recvData[34], // Minor version` `dummy = recvData[35] // Fixed value` `},` `status = recvData[36], // Status information` `};`	→ 4.5Receive Notification Commands → Check if there is an abnormal response after reception → Store the received data in the structure

```
    // Base unit information
    Data.baseUnitData = new WDR_BASEUNIT_DATA
    {
        format = recvData[37],                  // Unit type
        version = new WDR_WDT_VERSION_DATA      // version informat
        {
            major = recvData[38],               // Major version
            minor = recvData[39],               // Minor version
            dummy = recvData[40]                // Fixed value
        },
        dipSwitch = recvData[41]                // DIP switch infor
    };

    // Count value
    Data.countValue = (uint)IPAddress.NetworkToHostOrder(BitConvert

    return 0;
}
```

4.8. Receive Signal Tower Display Change Notification

Program	Explanation
Program.cs WDR_SignalLightChangeNoticeCommand() `public static int WDR_SignalLightChangeNoticeCommand(out WDR_SIGNAL_LIGH` `{` `  int ret;` `  Data = new WDR_SIGNAL_LIGHT_CHANGE_NOTICE_RECV_DATA();` `  // Command reception` `  byte[] recvData;` `  ret = RecvCommand(WDR_COMMAND_MODE_SIGNAL_LIGHT_CHANGE_NOTICE, out r` `  // Check for response data` `  if (recvData == null)` `  {` `  // Exception error (including timeout) occurred` `  return -1;` `  }` `  // Check the response data` `  if (recvData[0] == PNS_NAK)` `  {` `  // Receive an abnormal response` `  Console.WriteLine("negative acknowledge");` `  return -1;` `  }` `  // IEEE address` `  Data.IEEEAddress = (ulong)IPAddress.NetworkToHostOrder(BitConverter.` `  // Time information` `  Data.time = (ulong)IPAddress.NetworkToHostOrder(BitConverter.ToInt64` `  // version information` `  Data.version = new WDR_VERSION_DATA` `  {` `  major = recvData[30],  // Major version` `  minor = recvData[31],  // Minor version` `  };` `  // action mode` `  Data.actionMode = recvData[32];` `  // WDT information` `  Data.wdtData = new WDR_INFO_DATA` `  {` `  version = new WDR_WDT_VERSION_DATA  // version information` `  {` `  major = recvData[33],  // Major version` `  minor = recvData[34],  // Minor version` `  dummy = recvData[35]  // Fixed value` `  },` `  status = recvData[36],  // Status information` `  };`	→ 4.5Receive Notification Commands → Check if there is an abnormal response after reception → Store the received data in the Structure

```
    // Base unit information
    Data.baseUnitData = new WDR_BASEUNIT_DATA
    {
        format = recvData[37],                  // Unit type
        version = new WDR_WDT_VERSION_DATA      // version info
        {
            major = recvData[38],               // Major versio
            minor = recvData[39],               // Minor versio
            dummy = recvData[40]                // Fixed value
        },
        dipSwitch = recvData[41]                // DIP switch i
    };

    // Red unit
    Data.redUnit = recvData[47];

    // Yellow unit
    Data.yellowUnit = recvData[48];

    // Green unit
    Data.greenUnit = recvData[49];

    // Blue unit
    Data.blueUnit = recvData[50];

    // White unit
    Data.whiteUnit = recvData[51];

    // Buzzer unit
    Data.buzzerUnit = recvData[52];

    return 0;
}
```

4.9. Send a Transmitter Status Acquisition Request and Receive a Transmitter Status Acquisition Response

Program.cs WDR_TransmitterStatusRequest()

```
public static int WDR_TransmitterStatusRequest(ulong IEEEAddress,
{
    int ret;
    Data = new WDR_TRANSMITTER_STATUS_REQUEST_RES_DATA();

    try
    {
        byte[] sendData = { };

        // Product category
        sendData = sendData.Concat(BitConverter.GetBytes(WDR_PRODU

        // identifier
        sendData = sendData.Concat(new byte[] { WDR_COMMAND }).To

        // Expansion
        sendData = sendData.Concat(new byte[] { WDR_EXPANSION }).T

        // size
        sendData = sendData.Concat(BitConverter.GetBytes((ushort)(

        // Command type
        sendData = sendData.Concat(new byte[] { WDR_COMMAND_KIND_F

        // IEEE address
        sendData = sendData.Concat(BitConverter.GetBytes((ulong)IE

        // Command mode
        sendData = sendData.Concat(BitConverter.GetBytes(WDR_COMMA


        // Send request command
        byte[] recvData;
        ret = SendCommand(WDR_COMMAND_MODE_TRANSMITTER_STATUS_REQUES
        if (ret != 0)
        {
            Console.WriteLine("failed to send data");
            return -1;
        }

        // Check for response data
        if (recvData == null)
        {
            // Exception error (including timeout) occurred
            return -1;
        }

        // Check the response data
        if (recvData[0] == PNS_NAK)
        {
            // Receive an abnormal response
            Console.WriteLine("negative acknowledge");
            return -1;
        }
```

→ Create transmission data

→ 4.4Send a Request Command and Receive a Response Command

→ Check if there is an abnormal response after reception

```
        // Response status
        Data.controlState = recvData[17];

        // Time information
        Data.time = (ulong)IPAddress.NetworkToHostOrder(BitConverter.ToInt64(rec

        // version information
        Data.version = new WDR_VERSION_DATA
        {
            major = recvData[30],      // Major version
            minor = recvData[31],      // Minor version
        };

        // action mode
        Data.actionMode = recvData[32];

        // WDT information
        Data.wdtData = new WDR_INFO_DATA
        {
            version = new WDR_WDT_VERSION_DATA  // version information
            {
                major = recvData[33],   // Major version
                minor = recvData[34],   // Minor version
                dummy = recvData[35]    // Fixed value
            },
            status = recvData[36],      // Status information
        };

        // Base unit information
        Data.baseUnitData = new WDR_BASEUNIT_DATA
        {
            format = recvData[37],                  // Unit type
            version = new WDR_WDT_VERSION_DATA      // version informat
            {
                major = recvData[38],               // Major version
                minor = recvData[39],               // Minor version
                dummy = recvData[40]                // Fixed value
            },
            dipSwitch = recvData[41]                // DIP switch infor
        };

        // Signal light information (red)
        Data.redUnit = recvData[47];

        // Signal light information (yellow)
        Data.yellowUnit = recvData[48];

        // Signal light information (green)
        Data.greenUnit = recvData[49];

        // Signal light information (blue)
        Data.blueUnit = recvData[50];

        // Signal light information (white)
        Data.whiteUnit = recvData[51];
```

→ Store the received data in the structure

```
        // Buzzer information
        Data.buzzerUnit = recvData[52];

        // WDT monitoring information
        Data.surveillance = recvData[53];

        // External input information
        Data.externalInput = recvData[54];

        // RS232C data
        Data.RS232CData = new WDR_RS232C_DATA();
        Data.RS232CData.size = recvData[55];
        Data.RS232CData.serialNumber = recvData[56];
        Data.RS232CData.data = new byte[60];
        Array.Copy(recvData, 57, Data.RS232CData.data, 0, Data.RS2


    }
    catch (Exception ex)
    {
        Console.WriteLine(ex.Message);
        return -1;
    }

    return 0;
}
```

4.10. Send a Transmitter List Acquisition Request and Receive a Transmitter List Acquisition Response

Program	Explanation
Program.cs WDR_TransmitterListRequest() `public static int WDR_TransmitterListRequest(out WDR_TRANSMITTER_LIST` `{` `int ret;` `Data = new WDR_TRANSMITTER_LIST_REQUEST_RES_DATA();` `try` `{` `byte[] sendData = { };` `// Product category` `sendData = sendData.Concat(BitConverter.GetBytes(WDR_PRODUCT_` `// identifier` `sendData = sendData.Concat(new byte[] { WDR_COMMAND }).ToArra` `// Expansion` `sendData = sendData.Concat(new byte[] { WDR_EXPANSION }).ToAr` `// size` `sendData = sendData.Concat(BitConverter.GetBytes((ushort)0x0C` `// Command type` `sendData = sendData.Concat(new byte[] { WDR_COMMAND_KIND_REQU` `// IEEE address` `byte[] IEEEEdata = { 0x00, 0x00, 0x00, 0x00, 0x00, 0x00, 0x00` `sendData = sendData.Concat(IEEEEdata).ToArray();` `// Command mode` `sendData = sendData.Concat(BitConverter.GetBytes(WDR_COMMAND_` `// Send request command` `byte[] recvData;` `ret = SendCommand(WDR_COMMAND_MODE_TRANSMITTER_LIST_RE` `if (ret != 0)` `{` `Console.WriteLine("failed to send data");` `return -1;` `}` `// Check for response data` `if (recvData == null)` `{` `// Exception error (including timeout) occurred` `return -1;` `}`	→ Create transmission data → 4.4Send a Request Command and Receive a Response Command

```
        // Check the response data
        if (recvData[0] == PNS_NAK)
        {
            // Receive an abnormal response
            Console.WriteLine("negative acknowledge");
            return -1;
        }

        // Response status
        Data.controlState = recvData[17];

        // Number of acquisitions
        Data.unitCount = recvData[18];

        // WDT status information
        for (int count = 0; count < Data.unitCount; count++)
        {
            // Object creation
            WDR_WDT_STATUS_DATA setData = new WDR_WDT_STATUS_DATA()

            // IEEE address
            setData.IEEEAddress = (ulong)IPAddress.NetworkToHostOrd

            // Registration status
            setData.registration = recvData[27 + (count * 10)];

            // Connection Status
            setData.connect = recvData[28 + (count * 10)];


            // Set in an array
            Data.wdtStatus[count] = setData;
        }

    }
    catch (Exception ex)
    {
        Console.WriteLine(ex.Message);
        return -1;
    }

    return 0;
}
```

→ Check if there is an abnormal response after reception

→ Store the received data in the structure

4.11.Send a Transmitter Information Acquisition Request and Receive a Transmitter Information Acquisition Response

Program	Explanation
Program.cs WDR_TransmitterDataRequest() `public static int WDR_TransmitterDataRequest(ulong IEEEAddress, out WDR_TRAI` `{` `  int ret;` `  Data = new WDR_TRANSMITTER_DATA_REQUEST_RES_DATA();` `  addData = null;` `  try` `  {` `  byte[] sendData = [ ];` `  // Product category` `  sendData = sendData.Concat(BitConverter.GetBytes(WDR_PRODUCT_ID).Rev` `  // identifier` `  sendData = sendData.Concat(new byte[] { WDR_COMMAND }).ToArray();` `  // Expansion` `  sendData = sendData.Concat(new byte[] { WDR_EXPANSION }).ToArray();` `  // size` `  sendData = sendData.Concat(BitConverter.GetBytes((ushort)0x000B).Rev` `  // Command type` `  sendData = sendData.Concat(new byte[] { WDR_COMMAND_KIND_REQUEST })` `  // IEEE address` `  sendData = sendData.Concat(BitConverter.GetBytes((ulong)IEEEAddress` `  // Command mode` `  sendData = sendData.Concat(BitConverter.GetBytes(WDR_COMMAND_MODE_TI` `  // Send request command` `  byte[] recvData;` `  ret = SendCommand(WDR_COMMAND_MODE_TRANSMITTER_DATA_REQUEST,` `  if (ret != 0)` `  {` `  Console.WriteLine("failed to send data");` `  return -1;` `  }` `  // Check for response data` `  if (recvData == null)` `  {` `  // Exception error (including timeout) occurred` `  return -1;` `  }` `  // Check the response data` `  if (recvData[0] == PNS_NAK)` `  {` `  // Receive an abnormal response` `  Console.WriteLine("negative acknowledge");` `  return -1;` ` }	→ Create transmission data → 4.4Send a Request Command and Receive a Response Command → Check if there is an abnormal response after reception

```
        // Response status
        Data.controlState = recvData[17];

        // User name
        Data.userName = new byte[121];
        Array.Copy(recvData, 18, Data.userName, 0, Data.userName.Length);

        // version information
        Data.version = new WDR_VERSION_DATA
        {
            major = recvData[139],      // Major version
            minor = recvData[140],      // Minor version
        };

        // action mode
        Data.actionMode = recvData[141];

        // WDT information
        Data.wdtData = new WDR_INFO_DATA
        {
            version = new WDR_WDT_VERSION_DATA  // version information
            {
                major = recvData[142],   // Major version
                minor = recvData[143],   // Minor version
                dummy = recvData[144]    // Fixed value
            },
            status = recvData[145],      // Status information
        };

        // Base unit information
        Data.baseUnitData = new WDR_BASEUNIT_DATA
        {
            format = recvData[146],                 // Unit type
            version = new WDR_WDT_VERSION_DATA      // version informati
            {
                major = recvData[147],              // Major version
                minor = recvData[148],              // Minor version
                dummy = recvData[149]               // Fixed value
            },
            dipSwitch = recvData[150]               // DIP switch inform
        };

        // ExtendedPanID
        Data.extendedPanID = (ulong)IPAddress.NetworkToHostOrder(BitConv

        // Frequency channel
        Data.frequencyChannel = (uint)IPAddress.NetworkToHostOrder(BitCo

        // Signal light input judgment
        Data.signalLightInputJudge = recvData[168];

        // Power settings
        Data.powerSetting = recvData[169];

        // Counter setting
        Data.counterSetting = recvData[170];

        // Send mode
        Data.sendMode = (ushort)IPAddress.NetworkToHostOrder(BitConverte
```

→ Store the received data in the structure

```
        // In the case of WDT-6LR-Z2-PRO, the expansion structure is als
        if (Data.actionMode == 0xFF)
        {
            addData = new WDR_TRANSMITTER_DATA_REQUEST_RES_ADD_DATA();

            // Input information transmission method
            addData.inputDataTranform = recvData[173];

            // Signal light format
            addData.signalLightFormat = recvData[174];

            // Periodic transmission
            addData.regularSend = recvData[175];

            // Simultaneous input judgment sensitivity setting
            addData.concInputSensitiveSetting = recvData[176];

            // Received data file format
            addData.recvDataFileFormat = recvData[177];

            // Communication setting baud rate
            addData.baudrate = recvData[178];

            // Communication setting data length
            addData.dataLength = recvData[179];

            // Communication setting parity
            addData.parity = recvData[180];

            // Communication setting stop bit
            addData.stopBit = recvData[181];
        }

    }
    catch (Exception ex)
    {
        Console.WriteLine(ex.Message);
        return -1;
    }

    return 0;
}
```

4.12. Send a Transmitter Call Display Request and Receive a Transmitter Call Display Response

Program	Explanation
Program.cs WDR_TransmitterCallRequest () `public static int WDR_TransmitterCallRequest(ulong IEEEAddress, out WDR` `{` `int ret;` `Data = new WDR_TRANSMITTER_CALL_REQUEST_RES_DATA();` `try` `{` `byte[] sendData = { };` `// Product category` `sendData = sendData.Concat(BitConverter.GetBytes(WDR_PRODUCT_ID` `// identifier` `sendData = sendData.Concat(new byte[] { WDR_COMMAND }).ToArray(` `// Expansion` `sendData = sendData.Concat(new byte[] { WDR_EXPANSION }).ToArra` `// size` `sendData = sendData.Concat(BitConverter.GetBytes((ushort)0x000B` `// Command type` `sendData = sendData.Concat(new byte[] { WDR_COMMAND_KIND_REQUES` `// IEEE address` `sendData = sendData.Concat(BitConverter.GetBytes((ulong)IEEEAdd` `// Command mode` `sendData = sendData.Concat(BitConverter.GetBytes(WDR_COMMAND_MO`	→ Create transmission data

```
        // Send request command
        byte[] recvData;
        ret = SendCommand(WDR_COMMAND_MODE_TRANSMITTER_CALL_RE
        if (ret != 0)
        {
            Console.WriteLine("failed to send data");
            return -1;
        }

        // Check for response data
        if (recvData == null)
        {
            // Exception error (including timeout) occurred
            return -1;
        }

        // Check the response data
        if (recvData[0] == PNS_NAK)
        {
            // Receive an abnormal response
            Console.WriteLine("negative acknowledge");
            return -1;
        }

        // Response status
        Data.controlState = recvData[17];

    }
    catch (Exception ex)
    {
        Console.WriteLine(ex.Message);
        return -1;
    }

    return 0;
}
```

→ 4.4Send a Request Command and Receive a Response Command

→ Check if there is an abnormal response after reception

→ Store the received data in the structure

4.13. Send a Serial Data Output Request and Receive a Serial Data Output

Response

Program	Explanation
Program.cs WDR_SerialOutputRequest() `public static int WDR_SerialOutputRequest(WDR_SERIAL_OUTPUT_RE` `{` `int ret;` `Data = new WDR_SERIAL_OUTPUT_RES_DATA();` `try` `{` `byte[] sendData = { };` `// Product category` `sendData = sendData.Concat(BitConverter.GetBytes(WDR_PI` `// identifier` `sendData = sendData.Concat(new byte[] { WDR_COMMAND })` `// Expansion` `sendData = sendData.Concat(new byte[] { WDR_EXPANSION` `// size` `ushort sendSize = (ushort)(14 + outputData.outputData.` `sendData = sendData.Concat(BitConverter.GetBytes(sendS` `// Command type` `sendData = sendData.Concat(new byte[] { WDR_COMMAND_KI` `// IEEE address` `sendData = sendData.Concat(BitConverter.GetBytes((ulon,` `// Command mode` `sendData = sendData.Concat(BitConverter.GetBytes(WDR_C` `// Dummy data` `sendData = sendData.Concat(BitConverter.GetBytes((usho` `// serial number` `sendData = sendData.Concat(new byte[] { outputData.ser` `// Output information` `sendData = sendData.Concat(outputData.outputData.ToArray()).ToArray` `// Send request command` `byte[] recvData;` `ret = SendCommand(WDR_COMMAND_MODE_SERIAL_OUTPUT_REQUEST, sendData,` `if (ret != 0)` `{` `Console.WriteLine("failed to send data");` `return -1;` `}`	→ Create transmission data → 4.4Send a Request Command and Receive a Response Command

```
        // Check for response data
        if (recvData == null)
        {
            // Exception error (including timeout) occurred
            return -1;
        }

        // Check the response data
        if (recvData[0] == PNS_NAK)
        {
            // Receive an abnormal response
            Console.WriteLine("negative acknowledge");
            return -1;
        }

        // Response status
        Data.controlState = recvData[17];

    }
    catch (Exception ex)
    {
        Console.WriteLine(ex.Message);
        return -1;
    }

    return 0;
}
```

→ Check if there is an abnormal response after reception

→ Store the received data in the structure

4.14. Send a Signal Tower Display Control Request and Receive a Signal Tower Display Control Response

Program	Explanation
Program.cs WDR_SignalLightControlRequest() `public static int WDR_SignalLightControlRequest(WDR_SIGNAL_LIGHT` `{` `int ret;` `Data = new WDR_SIGNAL_LIGHT_CONTROL_RES_DATA();` `try` `{` `byte[] sendData = { };` `// Product category` `sendData = sendData.Concat(BitConverter.GetBytes(WDR_PRC` `// identifier` `sendData = sendData.Concat(new byte[] { WDR_COMMAND }).T` `// Expansion` `sendData = sendData.Concat(new byte[] { WDR_EXPANSION })` `// size` `sendData = sendData.Concat(BitConverter.GetBytes((ushort` `// Command type` `sendData = sendData.Concat(new byte[] { WDR_COMMAND_KIND` `// IEEE address` `sendData = sendData.Concat(BitConverter.GetBytes((ulong)` `// Command mode` `sendData = sendData.Concat(BitConverter.GetBytes(WDR_COM`	→ Create transmission data

```
    // Data size, data area
    byte[] data = {
        controlData.controlTime,     // Control time
        controlData.redUnit,         // Red unit lighting pa
        controlData.yellowUnit,      // Yellow unit lighting
        controlData.greenUnit,       // Green unit lighting
        controlData.blueUnit,        // Blue unit lighting p
        controlData.whiteUnit,       // White unit lighting
        controlData.buzzerUnit       // Buzzer unit pattern
    };
    sendData = sendData.Concat(data).ToArray();

    // Send request command
    byte[] recvData;
    ret = SendCommand(WDR_COMMAND_MODE_SIGNAL_LIGHT_CONTROL,
    if (ret != 0)
    {
        Console.WriteLine("failed to send data");
        return -1;
    }


    // Check for response data
    if (recvData == null)
    {
        // Exception error (including timeout) occurred
        return -1;
    }

    // Check the response data
    if (recvData[0] == PNS_NAK)
    {
        // Receive an abnormal response
        Console.WriteLine("negative acknowledge");
        return -1;
    }

    // Response status
    Data.recvState = recvData[17];

    // Control state
    Data.controlState = recvData[18];

    // Red unit
    Data.redUnit = recvData[19];

    // Yellow unit
    Data.yellowUnit = recvData[20];

    // Green unit
    Data.greenUnit = recvData[21];
```

→ 4.4Send a Request Command and Receive a Response Command

→ Check if there is an abnormal response after reception

→ Store the received data in the structure

```
            // Blue unit
            Data.blueUnit = recvData[22];

            // White unit
            Data.whiteUnit = recvData[23];

            // Buzzer unit
            Data.buzzerUnit = recvData[24];

        }
        catch (Exception ex)
        {
            Console.WriteLine(ex.Message);
            return -1;
        }

        return 0;
    }
```

4.15. Send a Signal Tower Display Cancellation Request and Receive a Signal Tower Display Cancellation Response

Program	Explanation
Program.cs WDR_SignalLightLiftRequest() `public static int WDR_SignalLightLiftRequest(ulong IEEEAd` `{` `int ret;` `Data = new WDR_SIGNAL_LIGHT_LIFT_RES_DATA();` `try` `{` `byte[] sendData = { };` `// Product category` `sendData = sendData.Concat(BitConverter.GetBytes(` `// identifier` `sendData = sendData.Concat(new byte[] { WDR_COMMA` `// Expansion` `sendData = sendData.Concat(new byte[] { WDR_EXPAN` `// size` `sendData = sendData.Concat(BitConverter.GetBytes(` `// Command type` `sendData = sendData.Concat(new byte[] { WDR_COMMA` `// IEEE address` `sendData = sendData.Concat(BitConverter.GetBytes(` `// Command mode` `sendData = sendData.Concat(BitConverter.GetBytes(` `// Send request command` `byte[] recvData;` `ret = SendCommand(WDR_COMMAND_MODE_SIGNAL_LIGHT_C` `if (ret != 0)` `{` `Console.WriteLine("failed to send data");` `return -1;` `}`	→ Create transmission data → 4.4Send a Request Command and Receive a Response Command

```
        // Check for response data
        if (recvData == null)
        {
            // Exception error (including timeout) occurred
            return -1;
        }

        // Check the response data
        if (recvData[0] == PNS_NAK)
        {
            // Receive an abnormal response
            Console.WriteLine("negative acknowledge");
            return -1;
        }

        // Response status
        Data.recvState = recvData[17];

        // Control state
        Data.controlState = recvData[18];

        // Red unit
        Data.redUnit = recvData[19];

        // Yellow unit
        Data.yellowUnit = recvData[20];

        // Green unit
        Data.greenUnit = recvData[21];

        // Blue unit
        Data.blueUnit = recvData[22];

        // White unit
        Data.whiteUnit = recvData[23];

        // Buzzer unit
        Data.buzzerUnit = recvData[24];

    }
    catch (Exception ex)
    {
        Console.WriteLine(ex.Message);
        return -1;
    }

    return 0;
}
```

→ Check if there is an abnormal response after reception

→ Store the received data in the structure

4.16. Send a Count Value Registration Request and Receive a Count Value Registration Response

Program	Explanation
Program.cs WDR_SignalLightCountSetRequest() public static int WDR_SignalLightCountSetRequest(WDR_SIGNA { int ret; Data = new WDR_SIGNAL_LIGHT_COUNT_SET_RES_DATA(); try { byte[] sendData = { }; // Product category sendData = sendData.Concat(BitConverter.GetBytes(W // identifier sendData = sendData.Concat(new byte[] { WDR_COMMAN // Expansion sendData = sendData.Concat(new byte[] { WDR_EXPANS // size sendData = sendData.Concat(BitConverter.GetBytes((// Command type sendData = sendData.Concat(new byte[] { WDR_COMMAN // IEEE address sendData = sendData.Concat(BitConverter.GetBytes(// Command mode sendData = sendData.Concat(BitConverter.GetBytes(W // Count registration value sendData = sendData.Concat(BitConverter.GetBytes(s	→ Create transmission data

```
        // Send request command
        byte[] recvData;
        ret = SendCommand(WDR_COMMAND_MODE_SIGNAL_LIGHT_COUNT_SET_RE
        if (ret != 0)
        {
            Console.WriteLine("failed to send data");
            return -1;
        }

        // Check for response data
        if (recvData == null)
        {
            // Exception error (including timeout) occurred
            return -1;
        }

        // Check the response data
        if (recvData[0] == PNS_NAK)
        {
            // Receive an abnormal response
            Console.WriteLine("negative acknowledge");
            return -1;
        }

        // Response status
        Data.controlState = recvData[17];

    }
    catch (Exception ex)
    {
        Console.WriteLine(ex.Message);
        return -1;
    }

    return 0;
}
```

→ 4.4Send a Request Command and Receive a Response Command

→ Check if there is an abnormal response after reception

→ Store the received data in the structure

4.17. Send a Receiver Information Acquisition Request and Receive a Receiver Information Acquisition Response

Program	Explanation
Program.cs WDR_ReceiveDataRequest() `public static int WDR_ReceiveDataRequest(out WDR_RE(` `{` `  int ret;` `  Data = new WDR_RECEIVER_DATA_REQUEST_RES_DATA()` `  try` `  {` `  byte[] sendData = { };` `  // Product category` `  sendData = sendData.Concat(BitConverter.GetE` `  // identifier` `  sendData = sendData.Concat(new byte[] { WDR_` `  // Expansion` `  sendData = sendData.Concat(new byte[] { WDR_` `  // size` `  sendData = sendData.Concat(BitConverter.GetE` `  // Command type` `  sendData = sendData.Concat(new byte[] { WDR_` `  // IEEE address` `  byte[] IEEEEdata = { 0x00, 0x00, 0x00, 0x00` `  sendData = sendData.Concat(IEEEEdata).ToArra` `  // Command mode` `  sendData = sendData.Concat(BitConverter.GetE`	→Create transmission data

```
// Send request command
byte[] recvData;
ret = SendCommand(WDR_COMMAND_MODE_RECEIVER,
if (ret != 0)
{
    Console.WriteLine("failed to send data"
    return -1;
}

// Check for response data
if (recvData == null)
{
    // Exception error (including timeout) (
    return -1;
}
```

→ 4.4Send a Request Command and Receive a Response Command

→ Check if there is an abnormal response after reception

→ Store the received data in the structure

```
        // Check the response data
        if (recvData[0] == PNS_NAK)
        {
            // Receive an abnormal response
            Console.WriteLine("negative acknowlec
            return -1;
        }

        // Response status
        Data.controlState = recvData[17];

        // ExtendedPanID
        Data.extendedPanID = (ulong)IPAddress.Net

        // Frequency channel
        Data.frequencyChannel = (uint)IPAddress.N

        // Firmware version
        Data.version = new WDR_VERSION_DATA
        {
            major = recvData[30],       // Major \
            minor = recvData[31],       // Minor \
        };

        // Network status
        Data.networkStatus = recvData[32];

        // How to boot the network
        Data.networkBoot = recvData[33];

        // Running ExtendedPanID
        Data.actionExtendedPanID = (ulong)IPAddre

        // Operating frequency channel
        Data.actionFrequencyChannel = recvData[42

    }
    catch (Exception ex)
    {
        Console.WriteLine(ex.Message);
        return -1;
    }

    return 0;
}
```

4.18. Send a Receiver Reset Request and Receive a Receiver Reset Response

Program	Explanation
Program.cs WDR_ReceiverResetRequest() `public static int WDR_ReceiverResetRequest(out WDR_RE` `{` `  int ret;` `  Data = new WDR_RECEIVER_RESET_RES_DATA();` `  try` `  {` `  byte[] sendData = { };` `  // Product category` `  sendData = sendData.Concat(BitConverter.GetBy` `  // identifier` `  sendData = sendData.Concat(new byte[] { WDR_C` `  // Expansion` `  sendData = sendData.Concat(new byte[] { WDR_E` `  // size` `  sendData = sendData.Concat(BitConverter.GetBy` `  // Command type` `  sendData = sendData.Concat(new byte[] { WDR_C` `  // IEEE address` `  byte[] IEEEEdata = { 0x00, 0x00, 0x00, 0x00,` `  sendData = sendData.Concat(IEEEEdata).ToArray` `  // Command mode` `  sendData = sendData.Concat(BitConverter.GetBy` `  // Send request command` `  byte[] recvData;` `  ret = SendCommand(WDR_COMMAND_MODE_RECEIVER_F` `  if (ret != 0)` `  {` `  Console.WriteLine("failed to send data");` `  return -1;` `  }` `  // Check for response data` `  if (recvData == null)` `  {` `  // Exception error (including timeout) oc` `  return -1;` `  }`	→ Create transmission data → 4.4Send a Request Command and Receive a Response Command → Check if there is an abnormal

```
        // Check the response data
        if (recvData[0] == PNS_NAK)
        {
            // Receive an abnormal response
            Console.WriteLine("negative acknowledge");
            return -1;
        }

        // Response status
        Data.controlState = recvData[17];

    }
    catch (Exception ex)
    {
        Console.WriteLine(ex.Message);
        return -1;
    }

    return 0;
}
```

response after reception

→ Store the received data in the structure

4.19. Send a Count Value Acquisition Request and Receive a Count Value Acquisition Response

Program	Explanation
Program.cs WDR_SignalLightCountGetRequest() `public static int WDR_SignalLightCountGetRequest(ulong Il` `{` `  int ret;` `  Data = new WDR_SIGNAL_LIGHT_COUNT_GET_RES_DATA();` `  try` `  {` `  byte[] sendData = { };` `  // Product category` `  sendData = sendData.Concat(BitConverter.GetBytes` `  // identifier` `  sendData = sendData.Concat(new byte[] { WDR_COMM.` `  // Expansion` `  sendData = sendData.Concat(new byte[] { WDR_EXPAI` `  // size` `  sendData = sendData.Concat(BitConverter.GetBytes` `  // Command type` `  sendData = sendData.Concat(new byte[] { WDR_COMM.` `  // IEEE address` `  sendData = sendData.Concat(BitConverter.GetBytes` `  // Command mode` `  sendData = sendData.Concat(BitConverter.GetBytes` `  // Send request command` `  byte[] recvData;` `  ret = SendCommand(WDR_COMMAND_MODE_SIGNAL_LIGHT_I` `  if (ret != 0)` `  {` `  Console.WriteLine("failed to send data");` `  return -1;` `  }`	→ Create transmission data → 4.4Send a Request Command and Receive a Response Command

```
        // Check for response data
        if (recvData == null)
        {
            // Exception error (including timeo
            return -1;
        }
```

→ Check if there is an abnormal response after reception

```
        // Check the response data
        if (recvData[0] == PNS_NAK)
        {
            // Receive an abnormal response
            Console.WriteLine("negative acknowled
            return -1;
        }

        // Response status
        Data.controlState = recvData[17];

        // Time information
        Data.time = (ulong)IPAddress.NetworkToHos

        // version information
        Data.version = new WDR_VERSION_DATA
        {
            major = recvData[30],       // Major v
            minor = recvData[31],       // Minor v
        };

        // action mode
        Data.actionMode = recvData[32];

        // WDT information
        Data.wdtData = new WDR_INFO_DATA
        {
            version = new WDR_WDT_VERSION_DATA  /
            {
                major = recvData[33],   // Major
                minor = recvData[34],   // Minor
                dummy = recvData[35]    // Fixed
            },
            status = recvData[36],      // Status
        };
```

→ Store the received data in the structure

```
        // Base unit information
        Data.baseUnitData = new WDR_BASEUNIT_DATA
        {
            format = recvData[37],
            version = new WDR_WDT_VERSION_DATA
            {
                major = recvData[38],
                minor = recvData[39],
                dummy = recvData[40]
            },
            dipSwitch = recvData[41]
        };

        // Count value
        Data.count = (uint)IPAddress.NetworkToHost

    }
    catch (Exception ex)
    {
        Console.WriteLine(ex.Message);
        return -1;
    }

    return 0;
}
```

4.20. Send a Signal Tower Display Acquisition Request and Receive a Signal Tower Display Acquisition Response

Program	Explanation
Program.cs WDR_SignalLightDataGetRequest() public static int WDR_SignalLightDataGetRequest(ulong { int ret; Data = new WDR_SIGNAL_LIGHT_DATA_GET_RES_DATA(); try { byte[] sendData = { }; // Product category sendData = sendData.Concat(BitConverter.GetByt // identifier sendData = sendData.Concat(new byte[] { WDR_COI // Expansion sendData = sendData.Concat(new byte[] { WDR_EXI // size sendData = sendData.Concat(BitConverter.GetByt // Command type sendData = sendData.Concat(new byte[] { WDR_COI // IEEE address sendData = sendData.Concat(BitConverter.GetByt // Command mode sendData = sendData.Concat(BitConverter.GetByt // Send request command byte[] recvData; ret = SendCommand(WDR_COMMAND_MODE_SIGNAL_LIGH if (ret != 0) { Console.WriteLine("failed to send data"); return -1; }	→ Create transmission data → 4.4Send a Request Command and Receive a Response Command

```
        // Check for response data
        if (recvData == null)
        {
            // Exception error (including timeout) occu
            return -1;
        }



        // Check the response data
        if (recvData[0] == PNS_NAK)
        {
            // Receive an abnormal response
            Console.WriteLine("negative acknowledge");
            return -1;
        }

        // Response status
        Data.controlState = recvData[17];

        // Time information
        Data.time = (ulong)IPAddress.NetworkToHostOrder

        // version information
        Data.version = new WDR_VERSION_DATA
        {
            major = recvData[30],       // Major version
            minor = recvData[31],       // Minor version
        };

        // action mode
        Data.actionMode = recvData[32];
```

→ Check if there is an abnormal response after reception

→ Store the received data in the structure

```
        // WDT information
        Data.wdtData = new WDR_INFO_DATA
        {
            version = new WDR_WDT_VERSION_DATA  /,
            {
                major = recvData[33],   // Major v
                minor = recvData[34],   // Minor v
                dummy = recvData[35]    // Fixed v
            },
            status = recvData[36],      // Status
        };

        // Base unit information
        Data.baseUnitData = new WDR_BASEUNIT_DATA
        {
            format = recvData[37],
            version = new WDR_WDT_VERSION_DATA
            {
                major = recvData[38],
                minor = recvData[39],
                dummy = recvData[40]
            },
            dipSwitch = recvData[41]
        };
```

```
            // Red unit
            Data.redUnit = recvData[47];

            // Yellow unit
            Data.yellowUnit = recvData[48];

            // Green unit
            Data.greenUnit = recvData[49];

            // Blue unit
            Data.blueUnit = recvData[50];

            // White unit
            Data.whiteUnit = recvData[51];

            // Buzzer unit
            Data.buzzerUnit = recvData[52];

        }
        catch (Exception ex)
        {
            Console.WriteLine(ex.Message);
            return -1;
        }

        return 0;
    }
```