3rd Part Interface Communication Protocol

Technical Specification

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Revision History

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0.1	Initial version	2011-Aug-22

Table of Contents

1. Introduction

This specification is to define a standard transmission protocol between fire control unit and a third part equipment. The basic way for communication is point-to-point serial connection.
Requirements for:

- Monitoring panel by third part equipment
- Third part equipment
- Trouble shooting tools

2. Definition and Statement

2.1 Centre Station

Centre station, the third part equipment, is the device used to receive the information such as fire alarm and fault from user terminal unit and handle corresponding data automatically.

2.2 User Terminal Unit

User terminal unit, known as fire control panel here, the device is used to monitor the fire alarm devices and send the data to centre station via RS232 port.

2.3 Monitor (Up) Direction

The direction is from fire control panel (user terminal unit) to third part equipment (centre station).

2.4 Control (Down) Direction

The direction is from third part equipment (centre station) to fire control panel (user terminal unit).

2.5 Multi-bytes Data

For all multi-byte data, the byte sequence is big endian. For example, a double-word data 0x12345678 will be saved in the frame like the following:

00h			04h
0x12	0x34	0x56	0x78

2.6 Reserved Bit

All reserved bits should be set to 0.

3. Physical Layer

The third part equipment and fire control unit are connected directly by serial port cable. It basically confirms to the EIA RS232C standard.

Baud rate (bps): 115200, 57600, 38400, 19200, 14400, 9600, 4800, 2400, 1200. Figure 3.1 shows the physical deployment between centre station and user terminal unit.

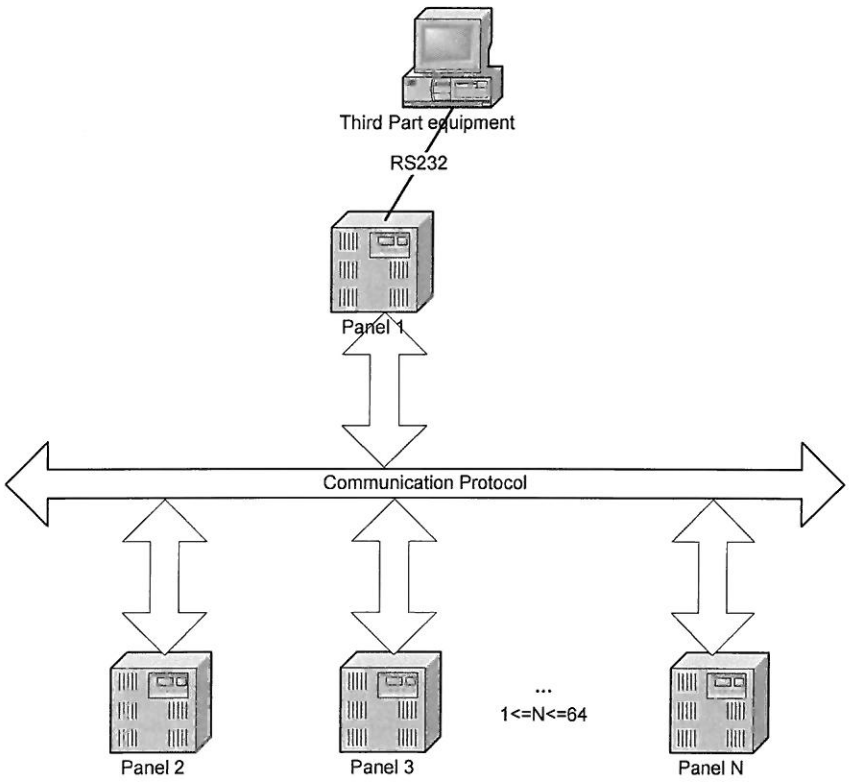
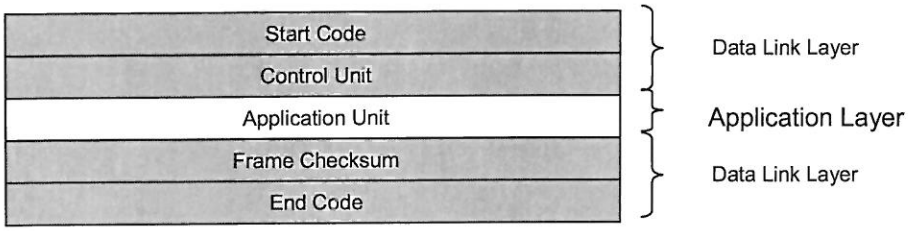


Figure 3.1

4. Data Package Overview

The third Interface communication protocol data package can be divided into two layers: The Data Link Layer and the Application Layer.

4.1 Basic Frame Format



4.2 Frame Type

There are 2 types of frame, one is information frame (I Frame), the other is supervision frame (S Frame). The frame type is defined in the byte of frame type. Please refer to the description in section 5.1.3.

S Frame Type	Value	Description
Polling	00B	Control unit should send a polling message to center station periodically when no events happen. If center station can not receive any message from control unit over 3 minutes, it should report a kind of communication trouble
ACK	01B	If the received message is correct, the received side should send ACK message to the other side. This round of message is transmitted successfully.

5. Data Frame

One complement frame is composed of start code, control unit, application unit, CRC16 code and end code.

5.1 Data Frame

Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0	Description
1	1	1	0	1	0	1	1	(0xEB) Start Code
Frame Direction (1 Byte)								Control unit
Control Code (1 Byte)								
Third part equipment type(1 Byte)								
Application Data								Application Unit
CRC16(2 Bytes)								Frame Checksum
1	1	1	0	1	0	1	1	(0xEB) End Code

5.1.1 Start Code (0xEB)

Because 0xEB maybe exist in other segment except start code and end code, they should be encoded here. If 0xEB occurs, it should be encoded as two bytes "0xEC and 0xEC". If 0xEC occurs, it should be encoded as two bytes "0xEC and 0xED".

5.1.2 Frame Direction (1 Byte)

To differentiate the up and down direction, the highest bit (bit 7) is used to indicate the direction: if the bit 7 is 1, it means that the frame is from centre station to control unit, and vice versa, 0 means the frame is control unit to centre station. Other bits are reserved, should be set to zero.

5.1.3 Control Code (1 Byte)

This unit defines the frame type, here, using bit0 to indicate the transmitted frame type; It has two types: Information Frame (I Frame), Supervision Frame (S Frame). If the frame is information frame, the detail information is stored in application unit. If the frame is a supervision frame, the type of the supervision frame is defined in bit2 and bit3.
Figure 5.1 figure below shows the detail definition.

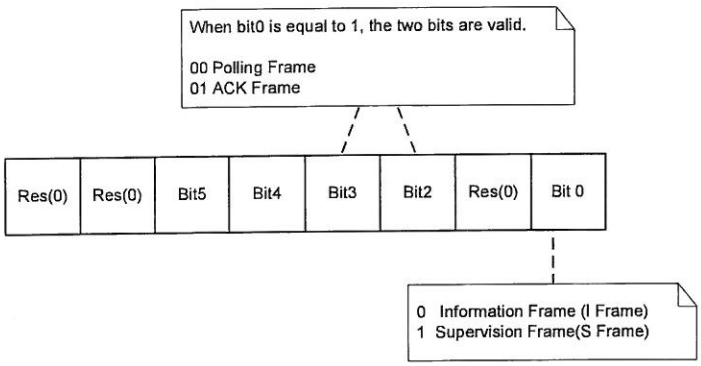


Figure 5.1

5.1.4 Third part equipment type (1 Byte)

The low 2 bits are to describe the difference third part equipments type.
01B BAS
10B ISCS

11B ATS
Other bits are reserved.

5.1.5 Application Unit

If the frame is supervision frame, only the first two bytes are valid.

Byte	Description
1	Serial Number(High Byte)
2	Serial Number(Low Byte)
3	Sub Frame Type
4	Device Address ---- Station address
5	Device Address ---- Line Address(High Byte) / BAS Mode Code & Confirmation Code
6	Device Address ---- Line Address(Low Byte)
7	Device ID (Highest byte)
8	Device ID (High byte)
9	Device ID (Middle byte)
10	Device ID (Lowest byte)
11	Channel Number
12	Device Command/Status/Mode(High byte)
13	Device Command/Status/Mode(Low byte)
14	Time (Year)
15	Time (Month)
16	Time (Day)
17	Time (Hour)
18	Time (Minute)
19	Time (Second)

1) Serial Number (2 Bytes)
Serial number is the ID of current message, whose range is 0x0000 ~ 0xFFFF. It should be increased in sequence. If it is up to 0xFFFF, set it to the 0x0000. Figure 5.2 shows the usage of serial number and the procedure of transmitting message.

2) Sub Frame Type (1 Byte)
Low four bits are the definition for frame type.
0001B Device Status Frame
0010B Device Mode Frame
0011B Command Frame
0100B BAS Mode Code Frame
If current frame is BAS Mode Code Frame
The application unit of BAS is composed of
Serial number (2 Bytes)
Sub frame type (1 Byte)
Station ID (1 Byte)

Mode code (1 Byte).
0101B BAS Mode Confirmation Code Frame
If current frame is BAS Mode Confirmation Code Frame
The application unit of BAS is composed of
Serial number (2 Bytes)
Sub frame type (1 Byte)
Station ID (1 Byte)
Mode Confirmation Code (1 Byte).

Mode confirmation code is the same as the Mode code.
Just like: If Mode code is 0x01→
The Mode confirmation code of this Mode code is also 0x01

High four bits are the definition for line type.
0001B Detection Line
0010B Interlocking Line
0011B Extinguishing Line
0100B FRT Line
0101B Mimic Driver Line
Others Reserved

3) Station address

Valid Range	1~64
Others	Reserved

4) Channel Number

Channel Number	1~7	Channel number of device
	Others	Reserved

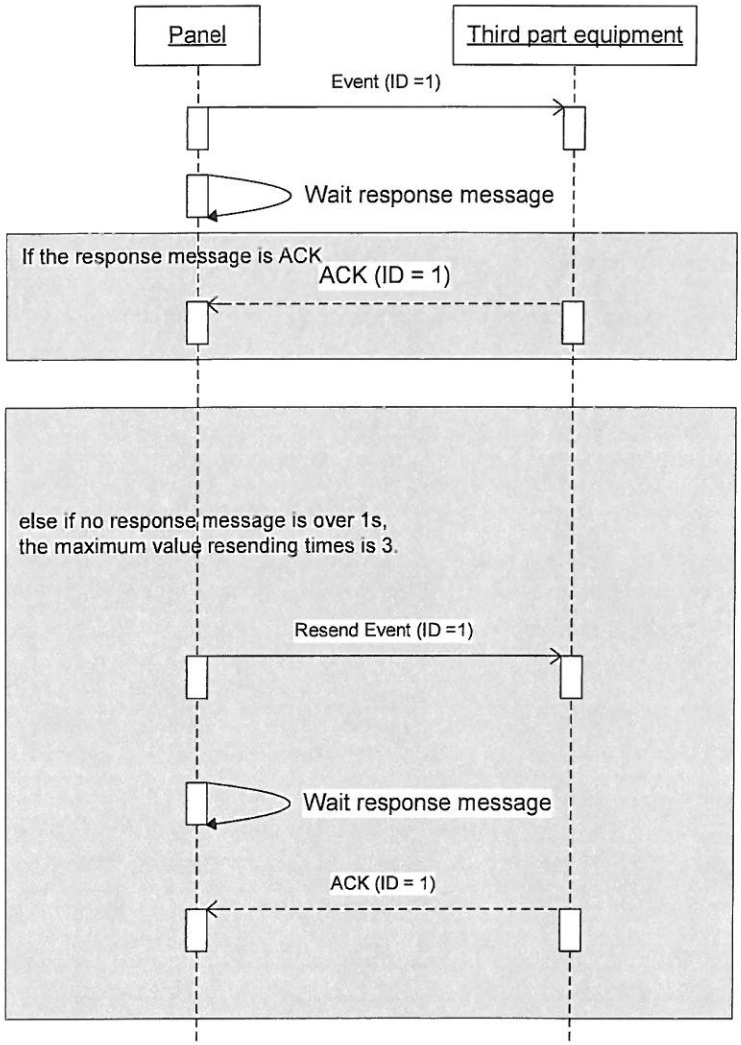


Figure 5.2

5) Command

Command Type	Code
Silence	0x0007
Reset	0x0008
Acknowledge Event	0x0030
Report All Events	0x0031
Synchronize time	0x0032

Report all events:
If the communication between centre station and panel restores, the centre station should send the "Report all events" command to panel to get all status of all field devices. If the panel starts up, it should report all status of all field devices to centre station.

Synchronize time:
If the centre station sends the "Synchronize time" command to the master panel, the time of master panel and slave panel should synchronize with the centre station.

6) Device Status

Status Type	Code
Alarm	0x0001
Trouble Short	0x000C
Trouble Open	0x0014
Trouble Grounding	0x001C
Trouble Communication	0x0024
Trouble Overload	0x002C
Trouble other	0x0034
Trouble Parameter	0x0044
Active	0x0100
Active & Confirm	0x0300
Active No Confirm	0x0500
Confirm	0x0200
Disable	0x1000
Supervision Active	0x2000
Normal	0x0000

7) Device Mode

Mode Type	Code
Normal	0x0000
Manual	0x0001
Exchange Level1	0x0002
Exchange Level2	0x0004
Exchange Level3	0x0006
Test	0x0008
Walk-test	0x0010
Un-configure	0x0040
Unknown	0x0080
Type Mismatch	0x0100
Power on	0x0200
Un-configure Normal	0x2000
Mismatch Normal	0x4000
Exchange Normal	0x8000

5.1.6 Frame checksum (2 Bytes)

CRC16 arithmetic will be used to ensure whether all data is transmitted correctly. For the two bytes of the CRC code, the high byte is behind the low byte.

5.1.7 End code (0xEB)

Frame end code is 0xEB.

5.2 Error control

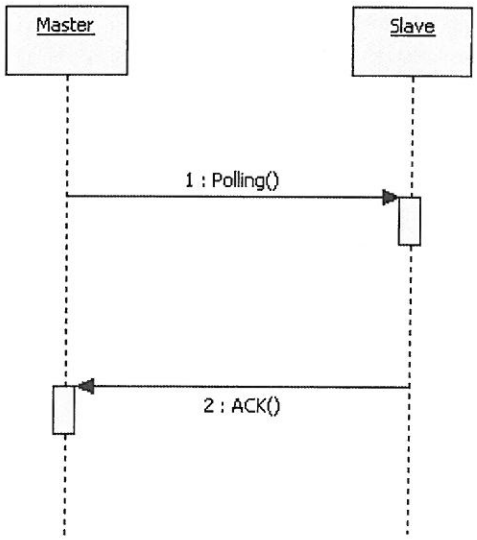
5.2.1 Error check

Error check must be executed on both sides, including:

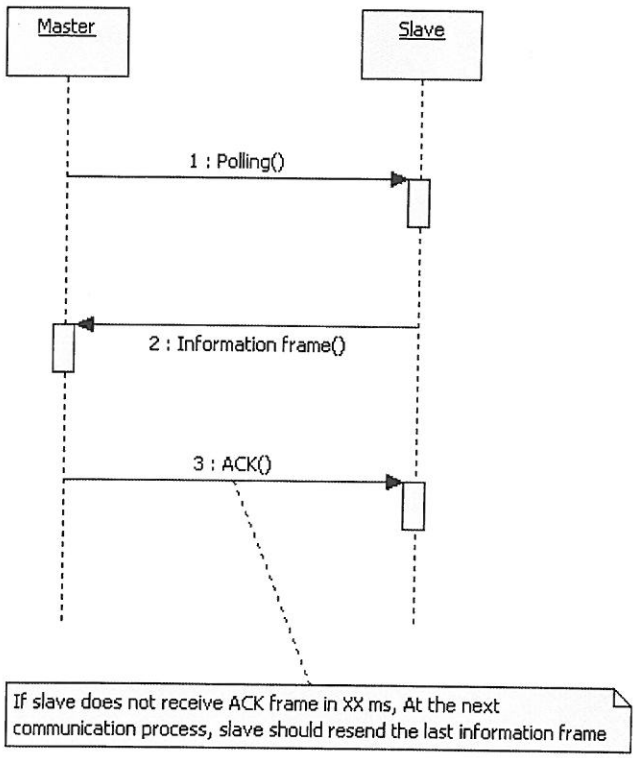
- Start code and end code check.
- CRC16 check.
- Response message check

If any error occurred, this frame will be resent, the maximum value of resent times is 3.

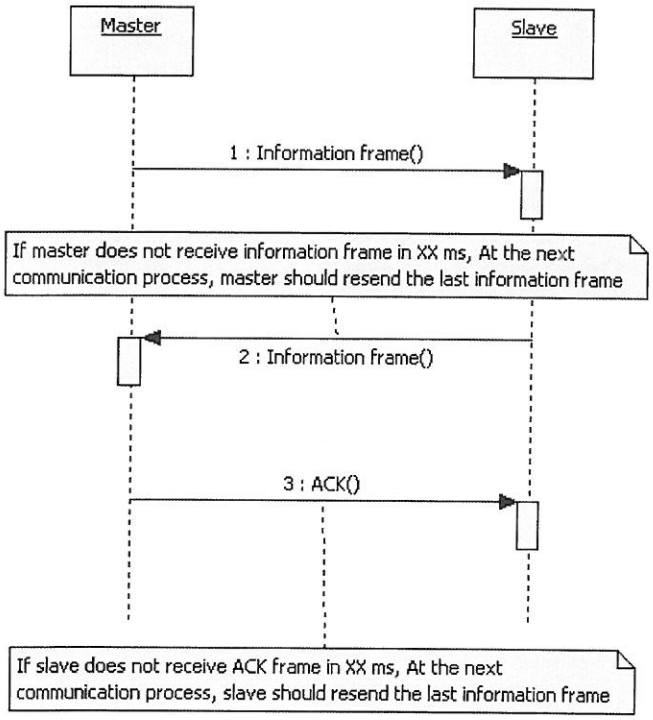
6. Classic Communication Scenario



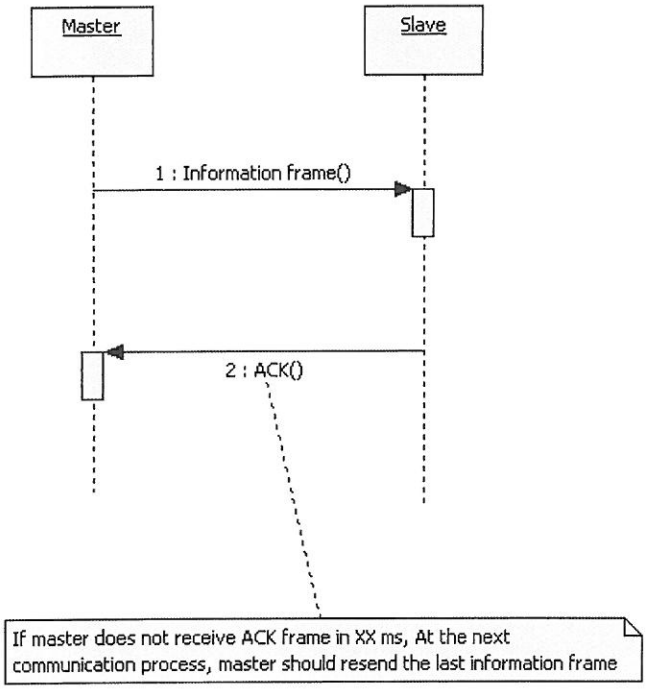
Scenario 1



Scenario 2



Scenario 3



Scenario 4