

PIC32 MPLAB Harmony UART3 – Qt GUI File Transfer Protocol

This document describes a complete UART3-based communication flow between a PIC32 (using MPLAB Harmony) and a Qt GUI application. The PIC32 sends a command requesting a file, receives an ACK/NACK, and then receives the file data (256 or 1024 bytes).

Frame Format (16 bytes)

```
Bytes 0-2   : Header    (0xAA 0x55 0xAA)
Bytes 3-6   : Length
Byte  7     : Message Type
Byte  8     : Interface
Bytes 9-12  : Date
Bytes 13-15 : Footer    (0x55 0xAA 0x55)
```

Message Types

```
0x01 : Request 256-byte file
0x02 : Request 1024-byte file
0x06 : ACK
0x15 : NACK
```

UART Frame Structure

```
typedef struct __attribute__((packed))
{
    uint8_t header[3];
    uint32_t length;
    uint8_t msgType;
    uint8_t interface;
    uint32_t date;
    uint8_t footer[3];
} UART_Frame_t;
```

Send File Request Command

```
void GUI_SendFileRequest(uint8_t msgType)
{
    UART_Frame_t frame;

    frame.header[0] = 0xAA;
    frame.header[1] = 0x55;
    frame.header[2] = 0xAA;

    frame.length = 1;
    frame.msgType = msgType;    // 0x01 or 0x02
    frame.interface = 0x03;     // UART3
    frame.date = 0x20250101;

    frame.footer[0] = 0x55;
    frame.footer[1] = 0xAA;
    frame.footer[2] = 0x55;

    UART3_Write((uint8_t *)&frame, 16);
}
```

Receive ACK / NACK

```
bool GUI_GetAckNack(void)
```

```

{
    uint8_t rxBuf[16];

    if (UART3_ReadCountGet() >= 16)
    {
        UART3_Read(rxBuf, 16);
        UART_Frame_t *rx = (UART_Frame_t *)rxBuf;

        if (rx->msgType == 0x06) return true;
        if (rx->msgType == 0x15) return false;
    }
    return false;
}

```

Receive File Data

```

void GUI_ReceiveFile(uint16_t fileSize)
{
    uint16_t received = 0;
    uint8_t buffer[256];

    while (received < fileSize)
    {
        if (UART3_ReadCountGet())
        {
            uint32_t rx = UART3_Read(buffer, sizeof(buffer));
            received += rx;
        }
    }
}

```

Execution Flow

1. PIC32 sends file request (0x01 or 0x02)
2. Qt GUI replies with ACK or NACK
3. If ACK, Qt sends file data
4. PIC32 receives file data via UART3