

This document explains how the IFJR and the IHU are communication down to the byte by byte level.

# IFJR Interface

Detailed Description of the IFJR  
and IHU Interface

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## 1 Hardware Layer

The hardware interface between the IFJR and the IHU is I<sup>2</sup>C. It is a standard implementation of I<sup>2</sup>C with a clock wire and a data wire. See [Wikipedia's I<sup>2</sup>C article](#) for details on how it works.

## 2 Software Layer

The In-Flight JTAG Reprogramming system, located at 8b address 0x0F, is a slave board to the IHU. The IFJR oversees the updating of select boards.

### 2.1 Temperature Data Request

#### 2.1.1 Request

Byte Offset	0x00	0x01	0x02	0x03	0x04	0x05	0x06	0x07
0x00	0x00: Request IFJR Temperature 0x01: Request IFHR Storage Temperature							

#### 2.1.2 Response

The IFJR responds with an 8b signed integer with 1°C/LSB.

Byte Offset	0x00	0x01	0x02	0x03	0x04	0x05	0x06	0x07
0x00	Respective Temperature							

### 2.2 Storage Capacity Data Request

This command is used to determine the total capacity used for the IFJR specific SD card.

#### 2.2.1 Request

Byte Offset	0x00	0x01	0x02	0x03	0x04	0x05	0x06	0x07
0x00	0x02: Request Storage Used							

### 2.2.2 Response

The IFJR responds with a 32b unsigned integer representing the total bytes used.

Byte Offset	0x00	0x01	0x02	0x03	0x04	0x05	0x06	0x07
0x00	Bytes Used							

## 2.3 Reprogram Select Processor

This command assumes the processor binary has already been sent and exists in the IFJR's SD card.

### 2.3.1 Command

This command requires ground control to specify a target processor, done by using a 8b unsigned integer. It also requires a binary version to be specified.

Byte Offset	0x00	0x01	0x02	0x03	0x04
0x00	0x03: Reprogram Command	0x00: ADCS 0x01: IFJR 0x02: IHU 0x03: PMIC 0x04: Comms 0x05: Payload 1 0x06: Payload 2 0x07: Payload 3	Major	Minor	Patch

### 2.3.2 Response

The IFJR responds with an 8b unsigned integer specifying whether the processor was successfully reprogrammed or if it failed. In the case where it failed, the 8b response will be the type of error.

Byte Offset	0x00	0x01	0x02	0x03	0x04	0x05	0x06	0x07
0x00	Return Code							

#### 2.3.2.1 Return Codes

0	Could not find file
1	Success
2	Reprogramming failed

### 3 Example Communication

#### 3.1 Simple Data Request

IHU: [0x0F] 0x00      [IFJR write] IFJR Processor Temperature Request  
IFJR collects the processors temperature  
IHU: [0x10]            [IFJR read]  
IFJR: 0xBEEF          120° C

#### 3.2 Simple Repeater Data Request

IHU: [0x0F] 0x01      [IFJR write] IFJR SD Card Temperature Request  
IHU: [0x0F] 0x00      [IFJR write] IFJR Processor Temperature Request  
IFJR collects the processors temperature  
IHU: [0x10]            [IFJR read]  
IFJR: 0xBEEF          120° C