

# Dashboard Specification

## Reference Guide

The screenshot displays the 'Innovation First Dashboard Viewer' window. The title bar includes 'PortSettings', 'Options', and 'About'. The main interface features a gear icon with 'IF' inside, the title 'Innovation First Dashboard Viewer', and a green 'RC Data' label. The 'From RC to OI' section lists PWM values (01-08) and their corresponding functions (Port 1 Y, Port 2 Y, Port 3 Y, Port 4 Y, Port 1 X, Port 2 X, Port 3 X, Port 4 X). Below this, LED BYTE and USER BYTE values are shown with their functions (PwM/Relay, Switch 1-3, Redefinable, USER BYTE 03-06, USER CMD). The 'BREAKER PANEL' section shows a grid of breakers (1-19) with status indicators. At the bottom, 'CHANNEL 13', 'TEAM NUMBER 8', 'BATTERY VOLTAGE MAIN 12.7', and 'BACKUP 0.0' are displayed. The status bar at the bottom indicates 'Receiving Data' and 'COM1 19200'.

PWM	Value	Function
PWM 01	55	Port 1 Y
PWM 02	127	Port 2 Y
PWM 03	127	Port 3 Y
PWM 04	127	Port 4 Y
PWM 05	94	Port 1 X
PWM 06	127	Port 2 X
PWM 07	127	Port 3 X
PWM 08	127	Port 4 X

LED BYTE	Value	Function
LED BYTE 01	2	PwM/Relay
LED BYTE 02	0	Switch 1-3
USER BYTE 01	0	Redefinable
USER BYTE 02	0	Redefinable
USER BYTE 03	0	Redefinable
USER BYTE 04	0	Redefinable
USER BYTE 05	0	Redefinable
USER BYTE 06	0	Redefinable
USER CMD	0	Redefinable

Breakers	Tripped
1	19
2	10
3	11
4	12
5	13
6	14
7	15
8	16
9	17
10	20
11	21
12	22
13	40-1
14	40-2
15	40-3
16	40-4
17	40-5
18	40-6

PACKET NUMBER 151 MASTER VERSION 7

CHANNEL 13 TEAM NUMBER 8 BATTERY VOLTAGE MAIN 12.7 BACKUP 0.0

Receiving Data COM1 19200

The screenshot displays the 'Innovation First Dashboard Viewer' window. The title bar includes 'PortSettings', 'Options', and 'About'. The main interface features a gear icon with 'IF' inside, the title 'Innovation First Dashboard Viewer', and a green 'OI Data' label. The 'From OI to RC' section lists values for PORT 1, PORT 2, PORT 3, and PORT 4, including Y, X, WHEEL, AUX, TRIG, TOP, and AUX 1/AUX 2. Each value is accompanied by a 'Redefinable' button. The 'PACKET NUMBER' is 41, 'CHANNEL' is 8, and 'TEAM NUMBER' is 40. The status bar at the bottom indicates 'Receiving Data' and 'COM1 19200'.

Port	Y	X	WHEEL	AUX	TRIG	TOP	AUX 1	AUX 2
PORT 1	58	97	127	68	●	●	●	●
PORT 2	127	127	127	127	●	●	●	●
PORT 3	127	127	127	127	●	●	●	●
PORT 4	127	127	127	127	●	●	●	●

PACKET NUMBER 41

CHANNEL 8 TEAM NUMBER 40

Receiving Data COM1 19200

**Data Packet structure for the Dashboard Port.**

Innovation First does not have the technical staff to answer questions about writing a program to use this data. We are supplying the following data spec as a courtesy to the teams involved in the FIRST competition. Code at your own risk.

The data sent out the Dashboard port is a stream of bytes. There are 26 bytes in a packet. The packets are transmitted approximately 40 times per second. The start of each packet is identified by a unique 0xff, 0xff (255, 255) marker. Data packets are sent out the Dashboard port exactly as they are received by the Radio Modem and may contain transmission errors. The data is, however, passed through a RS-232 driver chip to set it to proper levels for general use.

**Notes:**

1. The IFI Dashboard Viewer now interprets the incoming data and changes the display window depending on the OI/RC jumper setting (located on the OI).
2. The firmware in the Robot Controller (2004 or later) interlaces data packets.
3. RS-232 port settings: 19200 baud, No Parity, 8 data, 1 stop
4. Both CHECKSUM A and CHECKSUM B bytes are IFI proprietary

**The following is the data specification for the packets from the OI to the RC:**

Byte 1,2	0xFF, 0xFF	(ATTENTION, start of packet)
Byte3	PORT 2 X-AXIS	
Byte4	SWITCHES_A	
Byte5	PORT 1 X-AXIS	
Byte6	SWITCHES_B	
Byte7	PORT4 X-AXIS	
Byte8	CTRL_A	(see details below)
Byte9	PORT 3 X-AXIS	
Byte10	CTRL_B	(see details below)
Byte11	PORT 2 Y-AXIS	
Byte12	CTRL_C	(see details below)
Byte13	PORT1 Y-AXIS	
Byte14	PACKET NUMBER	
Byte15	PORT 4 Y-AXIS	
Byte16	CHECKSUM_A	
Byte17	PORT 3 Y-AXIS	
Byte18	CHECKSUM_B	
Byte19	PORT 2 WHEEL	
Byte20	PORT 1 WHEEL	
Byte21	PORT 4 WHEEL	
Byte22	PORT 3 WHEEL	
Byte23	PORT 2 AUX	
Byte24	PORT 1 AUX	
Byte25	PORT 4 AUX	
Byte26	PORT 3 AUX	

**The following is the interlaced data specification for the packets from the RC to the OI:**

**Data Frame 1: (Legacy) [CTRL\_C Bit 7= 0, CTRL\_A Bit 4 = 0]**

Byte01,02	0xFF, 0xFF	(ATTENTION, start of packet)
Byte03	PWM 1	
Byte04	LED BYTE 2	
Byte05	PWM 2	
Byte06	USER BYTE 2	
Byte07	PWM 3	
Byte08	CTRL_A	(see details below)
Byte09	PWM 4	
Byte10	CTRL_B	(see details below)
Byte11	PWM 5	
Byte12	CTRL_C	(see details below)
Byte13	PWM 6	
Byte14	PACKET NUMBER	
Byte15	PWM 7	
Byte16	CHECKSUM_A	
Byte17	PWM 8	
Byte18	CHECKSUM_B	
Byte19	PWM 9	
Byte20	LED BYTE 1	
Byte21	PWM 10	
Byte22	PWM 11	
Byte23	PWM 12	
Byte24	PWM 13	
Byte25	PWM 14	
Byte26	AUX_BYTE	(see details below)

**Data Frame 2: (Extended) [CTRL\_C Bit 7= 0, CTRL\_A Bit 4 = 1]**

Byte01,02	0xFF, 0xFF	(ATTENTION, start of packet)
Byte03	PWM 15	
Byte04	LED BYTE 2	
Byte05	PWM 16	
Byte06	USER BYTE 2	
Byte07	USER BYTE 3	
Byte08	CTRL_A	(see details below)
Byte09	USER BYTE 3	
Byte10	CTRL_B	(see details below)
Byte11	USER BYTE 4	
Byte12	CTRL_C	(see details below)
Byte13	USER BYTE 5	
Byte14	PACKET NUMBER	
Byte15	USER BYTE 6	
Byte16	CHECKSUM_A	
Byte17	USER BYTE 1	
Byte18	CHECKSUM_B	
Byte19	ZERO	
Byte20	LED BYTE 1	
Byte21	ZERO	
Byte22	RESERVED	
Byte23	CONFIG BYTE 1	
Byte24	USER CMD	
Byte25	CONFIG BYTE 2	
Byte26	AUX_BYTE	(see details below)

**Data Frame 3: (Status Frame) [CTRL\_C Bit 7= 1, CTRL\_A Bit 4 = 1]**

Byte01,02	0xFF, 0xFF	(ATTENTION, start of packet)
Byte03	RESERVED	
Byte04	LED BYTE 2	
Byte05	RESERVED	
Byte06	USER BYTE 2	
Byte07	RC VERSION NUMBER	
Byte08	CTRL_A	(see details below)
Byte09	RESERVED	
Byte10	CTRL_B	(see details below)
Byte11	ZERO	
Byte12	CTRL_C	(see details below)
Byte13	RESERVED	
Byte14	PACKET NUMBER	
Byte15	RESERVED	
Byte16	CHECKSUM_A	
Byte17	MAIN BAT VOLTAGE	
Byte18	CHECKSUM_B	
Byte19	BACKUP BAT VOLTAGE	
Byte20	LED BYTE 1	
Byte21	RESERVED	
Byte22	RESERVED	
Byte23	MASTER ERROR CODE	
Byte24	USER ERROR CODE	
Byte25	USER WARNING CODE	
Byte26	AUX_BYTE	(see details below)

**AUX\_BYTE (“Robot Controller” indicators on the Operator Interface):**

Bit 0    Reserved for future use  
Bit 1    Dead Main Battery  
Bit 2    Valid RX on Robot  
Bit 3    Reserved for future use  
Bit 4    Low Main Battery  
Bit 5    Code Violation  
Bit 6    Reserved for future use  
Bit 7    Low/No Backup Battery

**LED BYTE 1 (“Robot Feedback” indicators on Operator Interface):**

Bit 0    PWM1\_ Forward            (Green)  
Bit 1    PWM1\_ Reverse           (Red)  
Bit 2    PWM2\_ Forward           (Green)  
Bit 3    PWM2\_ Reverse           (Red)  
Bit 4    RLY1\_Reverse            (Red)  
  
Bit 5    RLY1\_ Forward            (Green)  
Bit 6    RLY2\_Reverse            (Red)  
Bit 7    RLY2\_Forward            (Green)

**LED BYTE 2 (“Robot Feedback” indicators on Operator Interface):**

Bit 0    Switch 1                    (Green)  
Bit 1    Switch 2                    (Green)  
Bit 2    Switch 3                    (Green)

**The TEAM number, Channel Number and Moding bits are contained in the following bytes:**

CTRL\_A= Bits 7,6,5,4 – Moding bits  
CTRL\_A= Bits 3,2,1,0 - 4 upper bits of TEAM number

CTRL\_B= 8 lower bits of TEAM number

CTRL\_C= Bits 7,6 – Moding bits  
CTRL\_C= Bits 5,4,3,2,1,0 - Channel Number