

# **DB-II Serial Communication Protocol**

## **Revision 0.2(English)**

Final Revision: 2005. 4. 25

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# 1. The Serial Interface

Definition of Scale and PC serial interface protocol communication

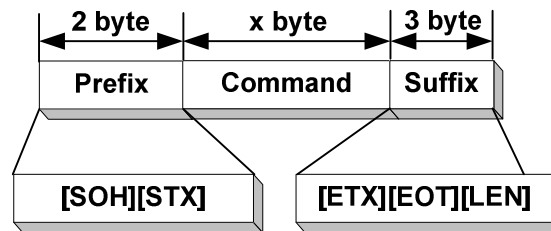
## 1.1. Transmission Control Character

Command	Value(HEX)	Description
SOH	01h	Start of heading
STX	02h	Start of text
ETX	03h	End of text
EOT	04h	End of transmission
ENQ	05h	Enquiry
ACK	06h	Acknowledge
NAK	15h	No Acknowledge
LF	0ah	Changing line
CR	0dh	Move to first cursor column
SP	20h	Space

[Table 1.1] Transmission Control Character

[Table 1.1] control character

Synchronization



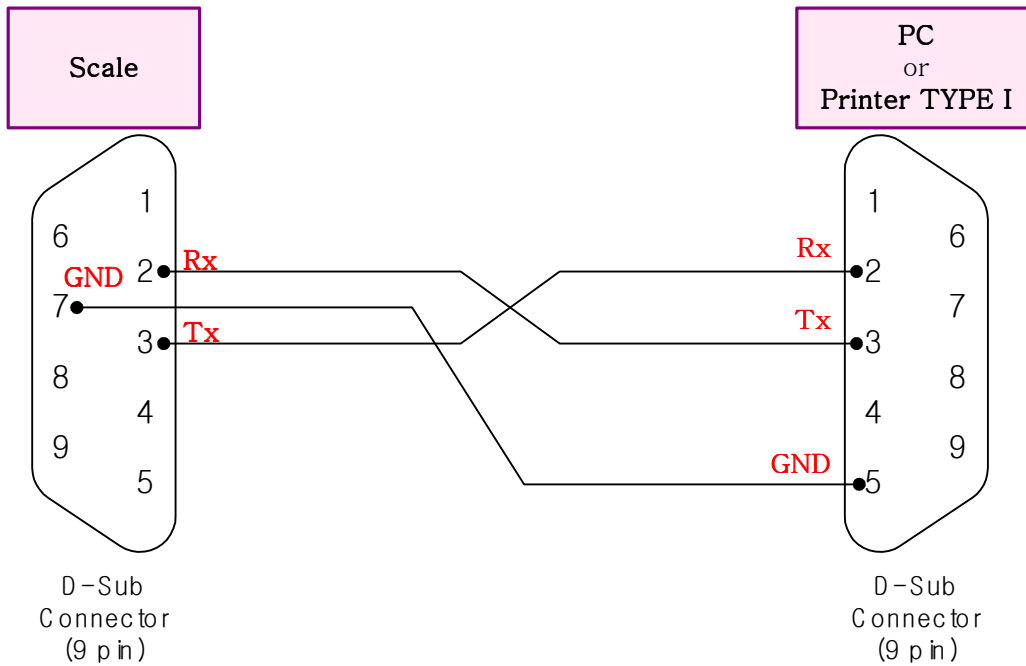
[Figure 1.1] Synchronization Packet

First and end Packet is like following [Figure 1.1]

Prefix 2 byte reads first Packet, and Suffix 3 byte reads the last part of Packet.

[LEN]Suffix is 1byte which counts [SOH] to [EOT] byte

**1.2. The Wire Connection**



**[Figure 1.2] Arrangement connector pin of Scale (DSUB)**

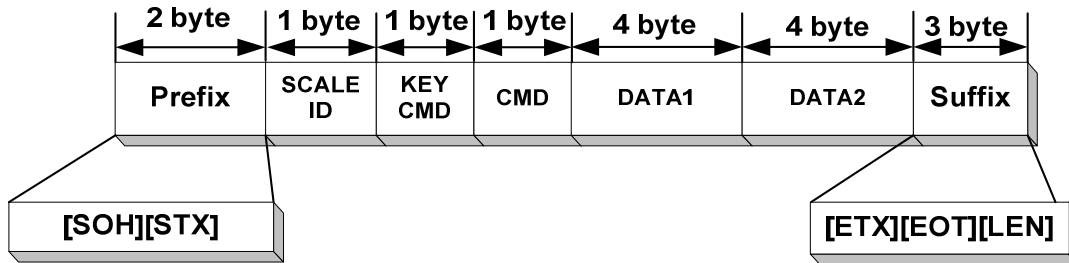
As [Figure 1.2] shown DB-II is wire connected with D-SUB connector and Main board.

TX, RX is connected to communicate with other RX, TX.

Connecting DB-II, PC, and DEP printer needs to make a cable which connected with DB-II's 7<sup>th</sup> ground cable, and PC, DEP printer's 5<sup>th</sup> cable.

### 1.3. PC to Scale (Client to Server)

#### 1.3.1. Command Format



[Figure 1.3] Command Format (PC to Scale)

As [Figure 1.3] shows PC to Scale Packet format.

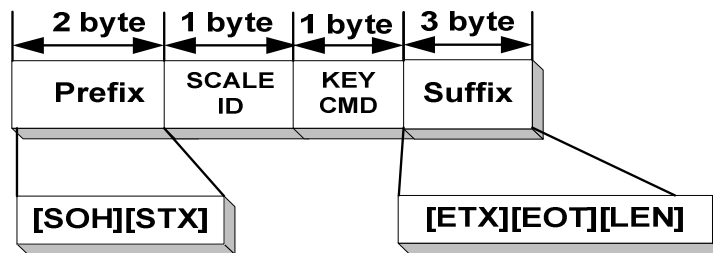
This command format organized with; Start notice Prefix 2 byte, Scale ID and Key command 1byte, general command 2byte, and Date (0) or (4) or (8) byte.

Scale setting data becomes a parameter value.

NOTE: Scale ID is 1 enter 01, and if you are trying to find out Scale ID enter FF

\* (default setting is 1)

#### 1.3.2. Key Command

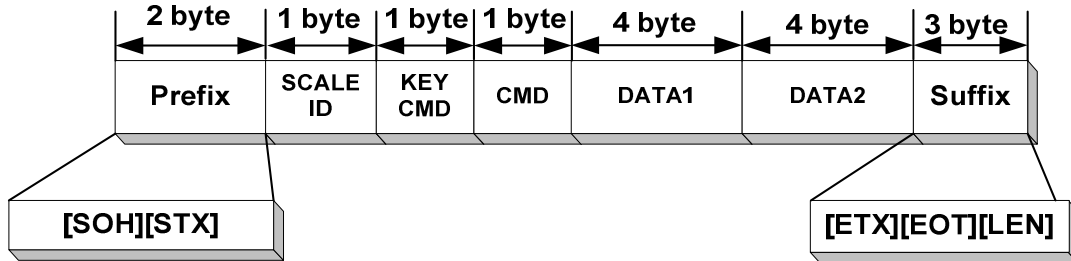


Key Command		Description
Operation	Value	
ZERO	40h	Activate ZERO Key
TARE	20h	Activate TARE Key
MODE	10h	Activate MODE Key
SET	08h	Activate SET Key
SAMPLE	04h	Activate SAMPLE Key
HOLD	02h	Activate HOLD Key
PRINT	01h	Activate PRINT Key
Download	F1h	Sending Scale setting value
Upload Req.	F2h	Request data from scale

[Table 1.2] Key Command Code

Key Command is Scale emulator for PC, (such as PC commands key function on computer and then connected scale work just like as a scale key function) other key functions like, Download, Upload Request, etc. needs a text command to function.

1.3.3. Download Command(PC → Scale)



Key Command		Command		Description	Data1	Data2
Operation	Value	Operation	Value			
Download	F1h	Weight Limit	E7h	Enter weight comparison	Low Limit Value	High Limit Value
Download	F1h	Count Limit	E8h	Enter ITEM counting comparison	Low Limit Value	High Limit Value
Download	F1h	Percent Unit	E9h	Enter 100% weight	Percent Unit Value	N/A
Download	F1h	Sample Unit	EAh	Enter Counting Sample ITEM's weight	Sample Unit Value	N/A

[Table 1.3] Download Command Code

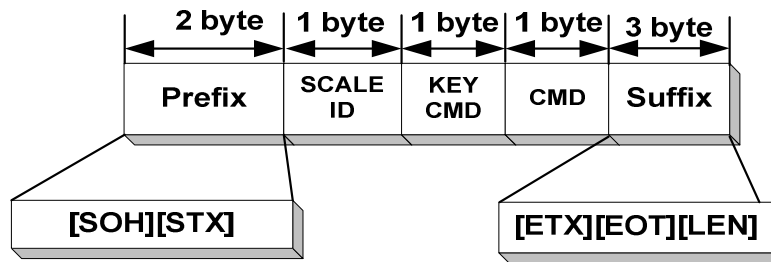
When key command is downloading, scale recognized as Parameter Packet data. This packet sends lower byte from Data1, Data2, and 4byte.

**Examples:**

- Low Limit is 0.1kg, and High Limit is 5kg

	Decimal Value		Hex Value		High byte		Low byte	
Low Limit(4byte)	100		64h		00	00	00	64
High Limit(4byte)	5000		1388h		00	00	13	88
Data(8byte)	64	00	00	00	88	13	00	00

Data Request Command (Scale → PC)



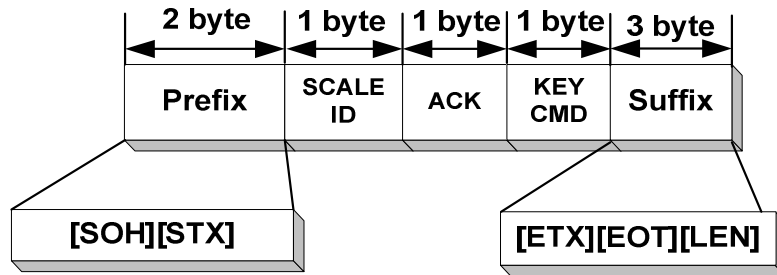
Key Command		Command		Description
Operation	Value	Operation	Value	
Upload Req.	F2h	Weight	E2h	Request weights
Upload Req.	F2h	Weight Limit	E7h	Request weights comparison
Upload Req.	F2h	Count Limit	E8h	Request sample ITEM comparison
Upload Req.	F2h	Sample Unit	EAh	Request sample ITEM weight for Counting
Upload Req.	F2h	Percent Unit	E9h	Request to input 100% of weight
Upload Req.	F2h	PCS	D1h	Request count
Upload Req.	F2h	Weight / PCS	D2h	Request weight and counting at same time

[Table 1.4] Upload Request Command Code

Your PC can get scale statues and setting value from Scale, by sending Command Packet. This point you can transmit weight, and count value continuously.

## 1.4. Scale to PC (Server to Client)

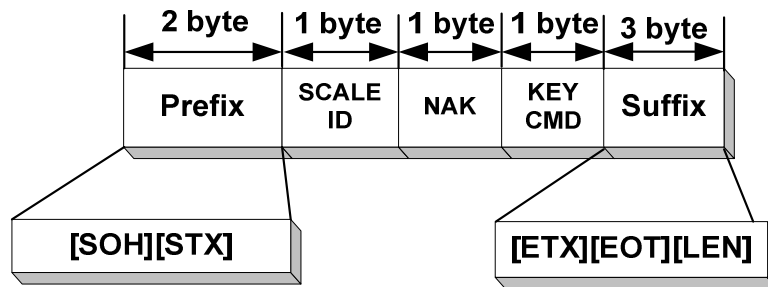
### 1.4.1. Acknowledge



[Figure 1.4] ACK Format (Scale to PC)

Scale sends back ACK Packet (acknowledgement packet) when PC's key command is successively arrived. Also, when changing settings of scale (Parameter arrived successive and complete EEPROM writing on scale)  
NOTE: ACK Packet contains transmitted Key Command

### 1.4.2. No Acknowledge

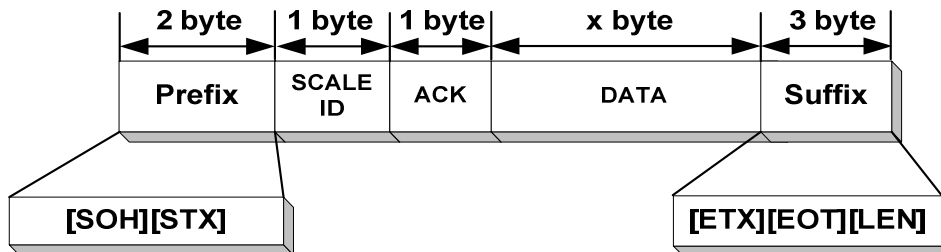


[Figure 1.5] NAK Format (Scale to PC)

NAK Packet is failure message of PC command. This packet sends back Error Code to PC for failure notice. Also, sends back failure notice to PC when scale has error on scale's Check sum error.

NOTE: NAK Packet contains transmitted Key Command and Error Command Format in case of failure (0x00, Scale ID error = 0xFF)

### 1.4.3. Data Format

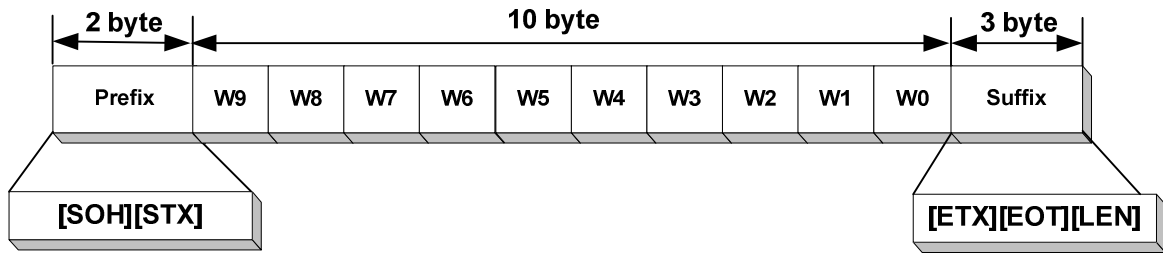


[Figure 1.6] Data Format (Scale to PC)

Scale is concept of PC's server; PC requests a data and Packet has arrived from scale, and resending packet to scale as [Figure 1.6] packet format. The data length can be changed, and recognizes packet by suffix.

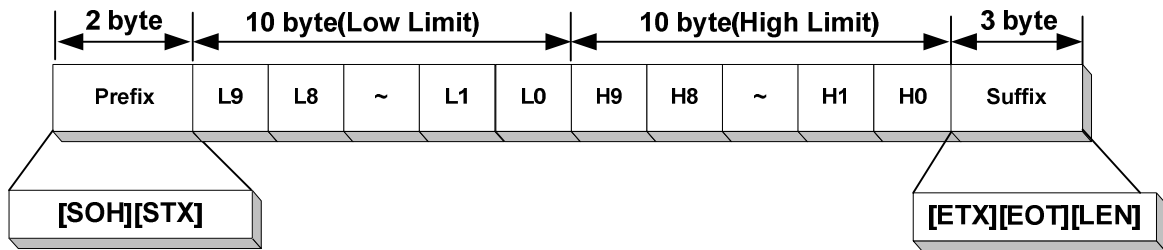


1.4.4. Examples



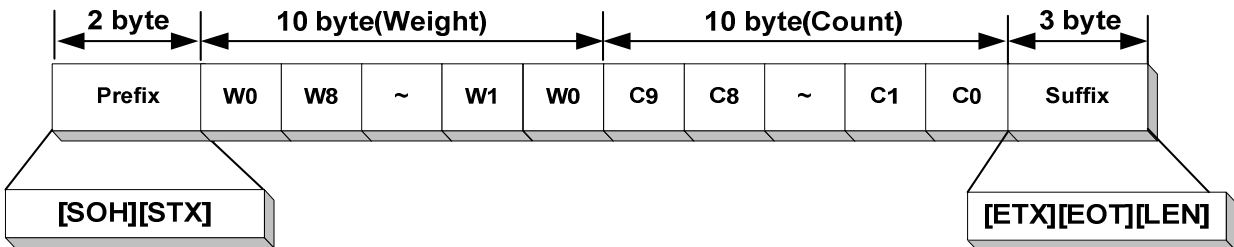
[Figure 1.7] Weight Value Data Format (Scale to PC)

A [Figure 1.7] packet show continues transmitting weight values from scale.



[Figure 1.8] High Limit, Low Limit Data Format (Scale to PC)

[Figure 1.8] shows receiving H/L limit value at same time from scale.

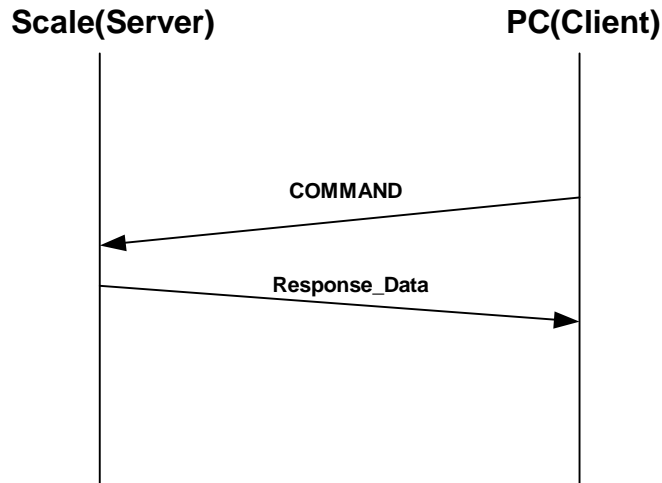


[Figure 1.9] Weight Value and Count Value Data Format (Scale to PC)

[Figure 1.9] shows receiving format of both weight and counting value continuously from scale.

## 2. Scheme

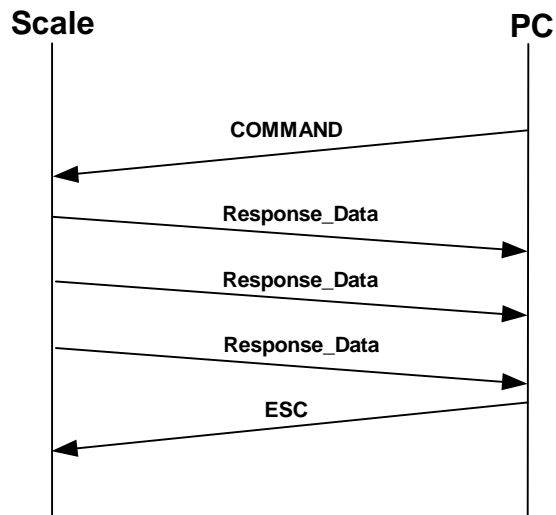
### 2.1. Normal Operation



[Figure 2.1] Normal Operation

In general operation data flow is flowing [Figure 2.1]. PC is client and the scale works as a server.

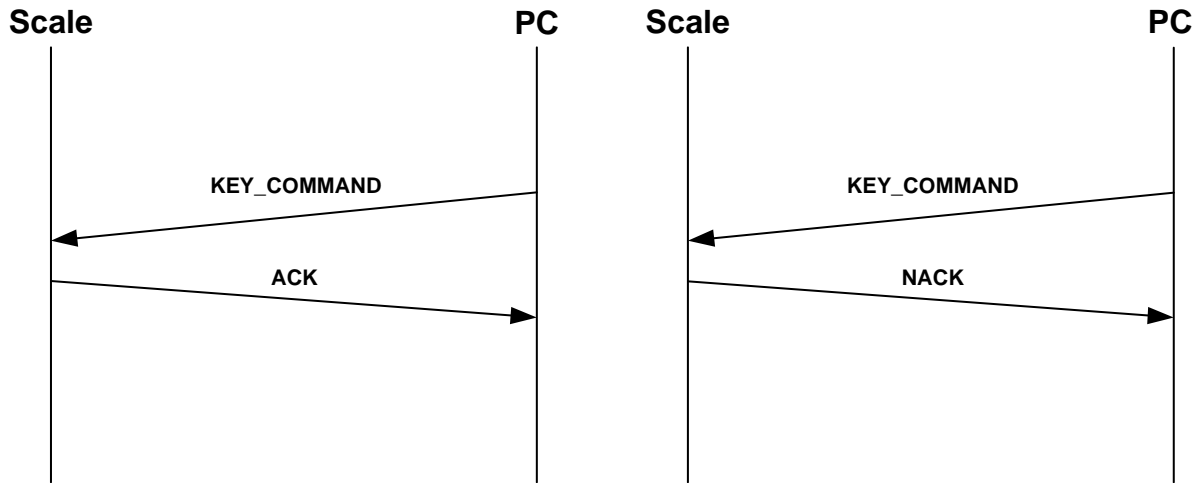
※ **Continuous Function is NOT included**



[Figure 2.2] Normal Operation (Continuous)

[Figure 2.2] shows continuous data transmission. For stopping, PC sending escape order to scale.

## 2.2. Key Command Operation



[Figure 2.3] Key Command Operation

Operating scale by key command when command works well sends back “ACK” command. For the failure command sends back “NAK and Error code” to PC