



R/W Protocol Specification

For PJM (Phase Jitter Modulation)

DUALi Inc.

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We have our development center in South Korea to provide technical support. For any technical assistance can contact our technical support team as below;

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1. Introduction

This document defines the USB communication protocol between DUALi's DE-620P and a host computer.

The protocols in this document are all for PJM(Phase Jitter Modulation) developers only.

DE-620P reader supports ISO7816, ISO14443 type A/B, ISO18092, my-d™, Mifare®, DESFire®, ISO15693 and I-CODE cards. Refer to 'Protocol Specification' for other commands.

This document is dedicated for DE-620P. So, if you use other reader products of DUALi, those readers have possibility to return code UNKNOWN COMMAND ERROR(23, 0x17), it means your reader or module doesn't support that command.

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2. Interface Specification

2.1 Communication Protocol Frame Format

2.1.1 Command frame format

(To show a Hexadecimal number, "0x" is appended to the first of the number)

Name	LEN-H	LEN-L	CMD	Data[n]
Values	0xHH	0xHH	0xHH	Data[n]
Length.	1-byte	1-byte	1-byte	n-byte

- Data length = command (It must be 1 at least) + Length of data.

LEN-H : Higher byte of data length

LEN-L : Lower byte of data length

- CMD : Command byte
- Data[n] : Data bytes

2.1.2 Response frame format

Name	LEN-H	LEN-L	Resp	Data[n]
Values	0xHH	0xHH	0xHH	Data[n]
Length.	1-byte	1-byte	1-byte	n-byte

- Data length = response (it must be 1 at least) + Length of data.

LEN-H : Higher byte of data length

LEN-L : Lower byte of data length

- Resp : Response code from reader
- Data[n] : Data Bytes

3. Command Definition

3.1 PJM Functions

3.1.1 Read PJM Tags(Command = 0x54)

This command reads all tags on antenna. Its previous command was 0xE6.

■ Command frame

LEN-H	LEN-L	CMD	Data[0]	Data[1]
4		0xE6	option	Slot Number

- Data[0] : 0- read all tags, 1- read new tags only
- Data[1] : recommend to use 8

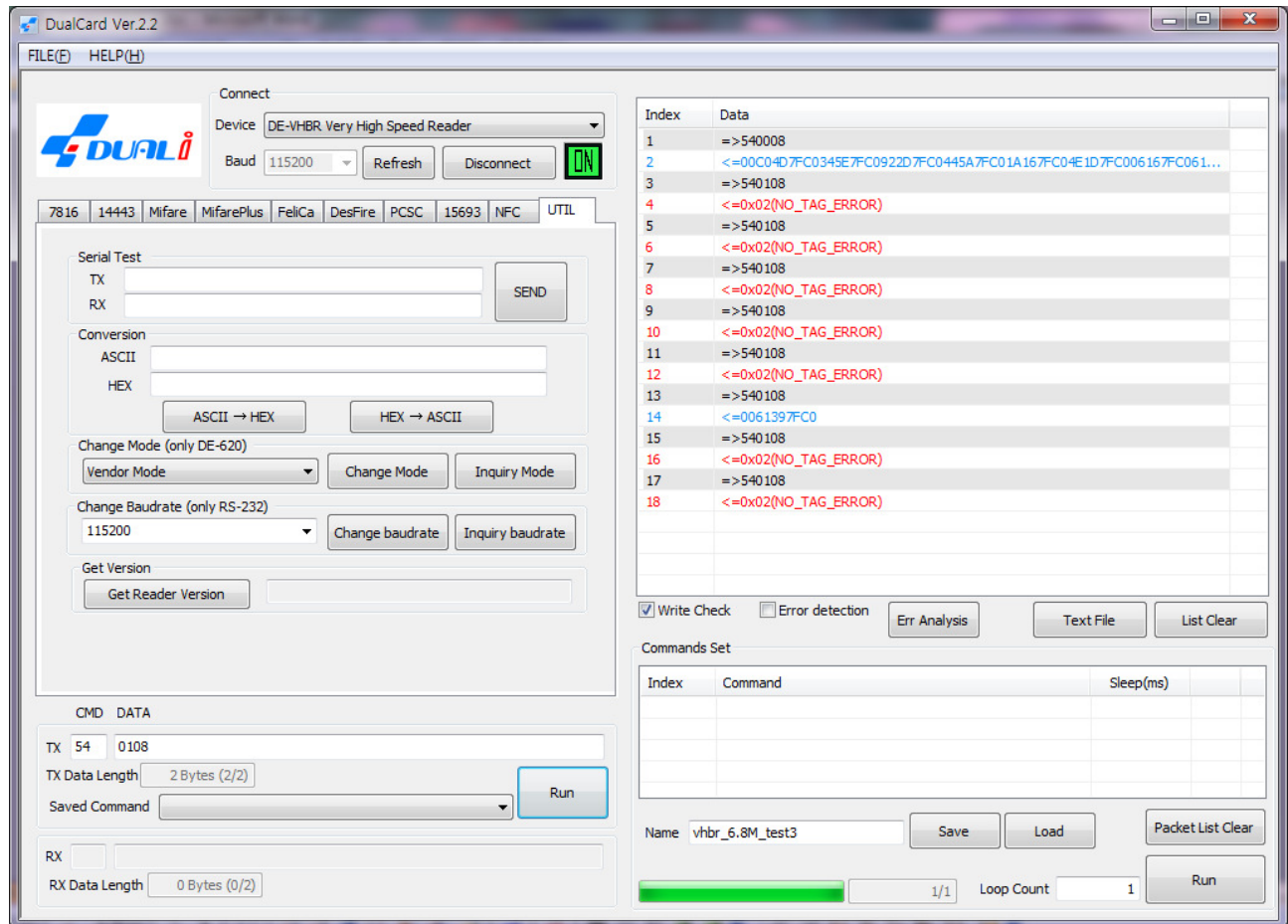
■ Response frame

LEN-H	LEN-L	Resp	Data[0..]
1+4*N		OK(0x00)	UID[4][N]

- Response : OK(0x00) or No Tag(0x02)

■ Example to read all 11 tags

```
<This log shows command and data only>
1 =>540008
2 <=00445A7FC03D157FC006167FC0C04D7FC0613F7FC061397FC03E5A7FC01A167FC04E1D7FC0922D7FC0
3 =>540108
4 <=0x02(NO_TAG_ERROR)
5 =>540108
6 <=0x02(NO_TAG_ERROR)
7 =>540108
8 <=0x02(NO_TAG_ERROR)
9 =>540108
10 <=0x02(NO_TAG_ERROR)
11 =>540108
12 <=0x02(NO_TAG_ERROR)
13 =>540108
14 <=0x02(NO_TAG_ERROR)
15 =>540108
16 <=0x02(NO_TAG_ERROR)
17 =>540108
18 <=0x02(NO_TAG_ERROR)
19 =>540108
20 <=00345E7FC0
21 =>540108
22 <=0x02(NO_TAG_ERROR)
23 =>540108
24 <=0x02(NO_TAG_ERROR)
25 =>540108
26 <=0x02(NO_TAG_ERROR)
27 =>540108
28 <=0x02(NO_TAG_ERROR)
```



3.1.2 PJM Transparent(Command = 0x55)

This command sends any data to tags and receives response. Its previous command was 0xE9.

■ Command frame

LEN-H	LEN-L	CMD	Data[0..]
4		0xE9	data

- Data[0..] : command and data to send to tags

■ Response frame

LEN-H	LEN-L	Resp	Data[0..]
1+N		OK(0x00)	data

- Response : OK(0x00) or No Tag(0x02)

535	=>5532000102FFFF0000020250
536	<=000102613F7FC0613F7FC0DD9CDBEC
537	=>5532000101FFFF0000020250
538	<=000101613F7FC0613F7FC018A056D5

4. Response Code Definition

OK	: 0 (0x00)
NO TAG ERROR	: 2 (0x02)

Refer to 'Protocol Specification' for other responses.