



MSA EDFA Frame Command Comment

1. Setup of serial port

Baud rate	Data bit	Stop bit	Checksum	Flow control
9600	8 bits	1 bit	None	none

2. Data format

All communications are in Master-slave reply mode. Host computer acts as Master and sends command. EDFA as slave replies it. The data format is HEX and in Big-Endian mode. The format of frame command is as below for detail:

Frame Head	Frame ID	CMD ID	Data length	Data	checksum
2 bytes	4 bytes	1 byte	1 byte	N bytes	1 byte

Frame head: 1st byte is 55, 2nd byte is AA, fixed

Frame ID: xx xxxxxx, 4 bytes HEX data, MSB first

CMD ID: 1 byte

Data length: 1 byte, max length is 255(DEC). If Data length is zero then it's followed directly by checksum

Data: data to send

Checksum: add all data (except the frame head), subtract it from 0xFF and add 0x01

Example:

Master command is: 55 AA 24 FF 6F 15 0C 00 (not include checksum)

Checksum: $0x24 + 0xFF + 0x6F + 0x15 + 0x0C + 0x00 = 0xB3$ (use single-byte to add)
Subtract it from 0xFF, $0xFF - 0xB3 = 0x4C$, then add 0x01,
and the result Checksum is 0x4D.

Complete command is: 55 AA 24 FF 6F 15 0C 00 4D

Checksum algorithm is presented as below:

```
U8 FRAME_CreateChkSum(U8 *pucStr, U8 ucLen)
{
    U8 ucSum = 0x00;
    U8 ucChkSum = 0xFF;
    U8 i = 0;

    /* Check if input string is valid. */ if
    (NULL == pucStr)
    {
        return FALSE;
    }
    /* Create the CheckSum. */
    for (i = 0; i < ucLen; i++)
    {
        ucSum += pucStr[i];
    }
    ucChkSum = (0xFF - ucSum + 1);
    return ucChkSum;
}
```

3. The frame command of slave

Frame Head		Frame ID				CMD ID	Data Length	Data		checksum
2 bytes		4 bytes				1 byte	1 byte	N bytes		1 byte
MSB	LSB	MSB			LSB			MSB	LSB	
AA	55	01	02	03	04	xx	xx	xx ... xx		xx

Note: 'xx' indicates real data, 'NC' indicates that data is not required. All data are HEX format

Data decode method: Physical quantity = digital quantity * Scale

Data is in Big-Endian mode.

4. CMD ID

4.1 Module serial number

Frame Head			Frame ID				CMD ID	Data Length	Data		checksum
length	2bytes		4bytes				1byte	1byte	N bytes		1byte
Byte order	MSB	LSB	MSB			LSB			MSB	LSB	
Master	55	AA	01	02	03	04	0A	02	NC		xx
Slave	AA	55	01	02	03	04	0A	02	xx	xx	xx
Data type									Char		

Note: Slave replies 16 bytes, SN is ASCII in HEX.

4.2 All parameter

Frame Head			Frame ID				CMD ID	Data Length	Data		checksum
length	2bytes		4bytes				1byte	1byte	N bytes		1byte
Byte order	MSB	LSB	MSB			LSB			MSB	LSB	
Master	55	AA	01	02	03	04	0C	00	NC		xx
Slave	AA	55	01	02	03	04	0C	14	xx	xx	xx
Data type											

Note: Slave replies 20 bytes, see below for details:

Byte0 ~ 1: unsigned short data type, pump current, MSB first, scale is 0.1, unit is mA.

Byte 2 ~ 3: short data type, pump temp, MSB first, scale is 0.1, unit is °C.

Byte4 ~ 5: short data type, pump TEC current, MSB first, scale is 0.1, unit is mA.

Byte6 ~ 7: short data type, pump power, MSB first, scale is 0.01, unit is dBm.

Byte8 ~ 9: short data type, input power, MSB first, scale is 0.01, unit is dBm. If the value is 0xE890, it indicates that the input power is low.

Byte10 ~ 11: short data type, output power, MSB first, scale is 0.01, unit is dBm. If the value is 0xE890, it indicates that the output power is low.

Byte12 ~ 13: short data type, GAIN, MSB first, scale is 0.01, unit is dB. If the value is 0x7FFF, it indicates that the GAIN is invalid.

Byte14 ~ 15: short data type, module temperature, MSB first, scale is 0.1, unit is °C.

Byte16 ~ 17: unsigned short data type, module power voltage, MSB first, scale is 0.01, unit is V.

Byte18 ~ 19: unsigned short data type, system alarm, MSB first, MSB type is invalid. The bit field

of LSB is shown as below:

Bit0: input power LOS alarm

Bit1: output power LOS alarm

Bit2: module temp alarm

Bit3: pump current alarm

Bit4: pump temp alarm

4.3 Get pump state

Frame Head			Frame ID				CMD ID	Data Length	Data		checksum
length	2bytes		4bytes				1byte	1byte	N bytes		1byte
Byte order	MSB	LSB	MSB			LSB			MSB	LSB	
Master	55	AA	01	02	03	04	1B	00	NC		xx
Slave	AA	55	01	02	03	04	1B	02	xx	xx	xx
Data type									unsigned short		

Note: Slave replies 2 bytes. MSB byte is invalid. LSB byte is 0x00 when pump is on, and it is 0x01 when pump is off.

4.4 Set pump state

Frame Head			Frame ID				CMD ID	Data Length	Data		checksum
length	2bytes		4bytes				1byte	1byte	N bytes		1byte
Byte order	MSB	LSB	MSB			LSB			MSB	LSB	
Master	55	AA	01	02	03	04	1A	02	xx	xx	xx
Slave	AA	55	01	02	03	04	1A	02	xx	xx	xx
Data type									unsigned short		

Note: Master sends 2 bytes to slave. MSB byte is invalid. LSB byte is 0x00 when set pump to on and LSB byte is 0x01 when set pump to off.

4.5 Get work mode

Frame Head			Frame ID				CMD ID	Data Length	Data		checksum
length	2bytes		4bytes				1byte	1byte	N bytes		1byte
Byte order	MSB	LSB	MSB			LSB			MSB	LSB	
Master	55	AA	01	02	03	04	41	00	NC		xx
Slave	AA	55	01	02	03	04	41	02	xxxx		xx
Data type									unsigned short		

Note: Slave replies 2 bytes. MSB byte is invalid. LSB byte is as below:
0x00----ACC mode, 0x02----APC mode, 0x03----AGC mode

4.6 Set work mode

Frame Head		Frame ID				CMD ID	Data Length		Data		checksum
length	2bytes		4bytes				1byte	1byte	N bytes		1byte
Byte order	MSB	LSB	MSB			LSB			MSB	LSB	
Master	55	AA	01	02	03	04	42	02	xx	xx	xx
Slave	AA	55	01	02	03	04	42	02	xx	xx	xx
Data type									unsigned short		

Note: Master sends 2 bytes to slave. MSB byte is invalid. LSB byte is as below:

0x00----ACC mode, 0x02----APC mode, 0x03----AGC mode

4.7 Get output power target

Frame Head		Frame ID				CMD ID	Data Length		Data		checksum
length	2bytes		4bytes				1byte	1byte	N bytes		1byte
Byte order	MSB	LSB	MSB			LSB			MSB	LSB	
Master	55	AA	01	02	03	04	44	00	NC		xx
Slave	AA	55	01	02	03	04	44	02	xxxx		xx
Data type									short		

Note: Slave replies 2 bytes. Scale is 0.01. Unit is dBm.

4.8 Set output power target

Frame Head		Frame ID				CMD ID	Data Length		Data		checksum
length	2bytes		4bytes				1byte	1byte	N bytes		1byte
Byte order	MSB	LSB	MSB			LSB			MSB	LSB	
Master	55	AA	01	02	03	04	45	02	xx	xx	xx
Slave	AA	55	01	02	03	04	45	02	xx	xx	xx
Data type									short		

Note: Master sends 2 bytes to slave. Scale is 100. Unit is dBm.

4.9 Get gain

Frame Head		Frame ID				CMD ID	Data Length		Data		checksum
length	2bytes		4bytes				1byte	1byte	N bytes		1byte
Byte order	MSB	LSB	MSB			LSB			MSB	LSB	
Master	55	AA	01	02	03	04	47	00	NC		xx
Slave	AA	55	01	02	03	04	47	02	xxxx		xx
Data type									short		

Note: Slave replies 2 bytes. Scale is 0.01. Unit is dB.

4.10 Set gain

Frame Head		Frame ID				CMD ID	Data Length		Data		checksum
length	2bytes		4bytes				1byte	1byte	N bytes		1byte
Byte order	MSB	LSB	MSB			LSB			MSB	LSB	
Master	55	AA	01	02	03	04	48	02	xx	xx	xx

Slave	AA	55	01	02	03	04	48	02	xx	xx	xx
Data type									short		

Note: Master sends 2 bytes to slave. Scale is 100. Unit is dB.

4.11 Get threshold of pump current

Frame Head		Frame ID				CMD ID	Data Length	Data	checksum	
length	2bytes	4bytes				1byte	1byte	N bytes	1byte	
Byte order	MSB LSB	MSB			LSB			MSB LSB		
Master	55 AA	01	02	03	04	5F	00	NC	xx	
Slave	AA 55	01	02	03	04	5F	02	xxxx	xx	
Data type								short		

Note: Slave replies 2 bytes. Scale is 0.1. Unit is mA.

4.12 Set threshold of pump current

Frame Head		Frame ID				CMD ID	Data Length	Data	checksum	
length	2bytes	4bytes				1byte	1byte	N bytes	1byte	
Byte order	MSB LSB	MSB			LSB			MSB LSB		
Master	55 AA	01	02	03	04	50	02	xx xx	xx	
Slave	AA 55	01	02	03	04	50	02	xx xx	xx	
Data type								short		

Note: Master sends 2 bytes to slave. Scale is 10. Unit is mA.

4.13 Get LOS threshold of input power

Frame Head		Frame ID				CMD ID	Data Length	Data	checksum	
length	2bytes	4bytes				1byte	1byte	N bytes	1byte	
Byte order	MSB LSB	MSB			LSB			MSB LSB		
Master	55 AA	01	02	03	04	51	00	NC	xx	
Slave	AA 55	01	02	03	04	51	02	xxxx	xx	
Data type								short		

Note: Slave replies 2 bytes. Scale is 0.01. Unit is dBm.

4.14 Set LOS threshold of input power

Frame Head		Frame ID				CMD ID	Data Length	Data	checksum	
length	2bytes	4bytes				1byte	1byte	N bytes	1byte	
Byte order	MSB LSB	MSB			LSB			MSB LSB		
Master	55 AA	01	02	03	04	52	02	xx xx	xx	
Slave	AA 55	01	02	03	04	52	02	xx xx	xx	
Data type								short		

Note: Master sends 2 bytes to slave. Scale is 100. Unit is dBm.

4.15 Get LOS threshold of output power

Frame Head		Frame ID				CMD ID	Data Length	Data	checksum	
length	2bytes	4bytes				1byte	1byte	N bytes	1byte	
Byte order	MSB LSB	MSB			LSB			MSB LSB		

Master	55	AA	01	02	03	04	53	00	NC	xx
Slave	AA	55	01	02	03	04	53	02	xxxx	xx
Data type									short	

Note: Slave replies 2 bytes. Scale is 0.01. Unit is dBm.

4.16 Set LOS threshold of output power

Frame Head		Frame ID				CMD ID	Data Length	Data		checksum
length	2bytes		4bytes				1byte	1byte	N bytes	1byte
Byte order	MSB	LSB	MSB			LSB			MSB	LSB
Master	55	AA	01	02	03	04	54	02	xx	xx
Slave	AA	55	01	02	03	04	54	02	xx	xx
Data type									short	

Note: Master sends 2 bytes to slave. Scale is 100. Unit is dBm.

4.17 Get threshold of no optical power

Frame Head		Frame ID				CMD ID	Data Length	Data		checksum
length	2bytes		4bytes				1byte	1byte	N bytes	1byte
Byte order	MSB	LSB	MSB			LSB			MSB	LSB
Master	55	AA	01	02	03	04	55	00	NC	xx
Slave	AA	55	01	02	03	04	55	02	xxxx	xx
Data type									short	

Note: Slave replies 2 bytes. Scale is 0.01. Unit is dBm.

4.18 Set threshold of no optical power

Frame Head		Frame ID				CMD ID	Data Length	Data		checksum
length	2bytes		4bytes				1byte	1byte	N bytes	1byte
Byte order	MSB	LSB	MSB			LSB			MSB	LSB
Master	55	AA	01	02	03	04	56	02	xx	xx
Slave	AA	55	01	02	03	04	56	02	xx	xx
Data type									short	

Note: Master sends 2 bytes to slave. Scale is 100. Unit is dBm.

4.19 Get low threshold of module temp

Frame Head		Frame ID				CMD ID	Data Length	Data		checksum
length	2bytes		4bytes				1byte	1byte	N bytes	1byte
Byte order	MSB	LSB	MSB			LSB			MSB	LSB
Master	55	AA	01	02	03	04	57	00	NC	xx
Slave	AA	55	01	02	03	04	57	02	xxxx	xx
Data type									short	

Note: Slave replies 2 bytes. Scale is 0.1. Unit is °C.

4.20 Set low threshold of module temp

Frame Head			Frame ID				CMD ID	Data Length	Data		checksum
length	2bytes		4bytes				1byte	1byte	N bytes		1byte
Byte order	MSB	LSB	MSB			LSB			MSB	LSB	
Master	55	AA	01	02	03	04	58	02	xx	xx	xx
Slave	AA	55	01	02	03	04	58	02	xx	xx	xx
Data type									short		

Note: Master sends 2 bytes to slave. Scale is 10. Unit is °C.

4.21 Get high threshold of module temp

Frame Head			Frame ID				CMD ID	Data Length	Data		checksum
length	2bytes		4bytes				1byte	1byte	N bytes		1byte
Byte order	MSB	LSB	MSB			LSB			MSB	LSB	
Master	55	AA	01	02	03	04	59	00	NC		xx
Slave	AA	55	01	02	03	04	59	02	xxxx		xx
Data type									short		

Note: Slave replies 2 bytes. Scale is 0.1. Unit is °C.

4.22 Set high threshold of module temp

Frame Head			Frame ID				CMD ID	Data Length	Data		checksum
length	2bytes		4bytes				1byte	1byte	N bytes		1byte
Byte order	MSB	LSB	MSB			LSB			MSB	LSB	
Master	55	AA	01	02	03	04	5A	02	xx	xx	xx
Slave	AA	55	01	02	03	04	5A	02	xx	xx	xx
Data type									short		

Note: Master sends 2 bytes to slave. Scale is 10. Unit is °C.

4.23 Get low threshold of pump temp

Frame Head			Frame ID				CMD ID	Data Length	Data		checksum
length	2bytes		4bytes				1byte	1byte	N bytes		1byte
Byte order	MSB	LSB	MSB			LSB			MSB	LSB	
Master	55	AA	01	02	03	04	5B	00	NC		xx
Slave	AA	55	01	02	03	04	5B	02	xxxx		xx
Data type									short		

Note: Slave replies 2 bytes. Scale is 0.1. Unit is °C.

4.24 Set low threshold of pump temp

Frame Head			Frame ID				CMD ID	Data Length	Data		checksum
length	2bytes		4bytes				1byte	1byte	N bytes		1byte
Byte order	MSB	LSB	MSB			LSB			MSB	LSB	
Master	55	AA	01	02	03	04	5C	02	xx	xx	xx
Slave	AA	55	01	02	03	04	5C	02	xx	xx	xx
Data type									short		

Note: Master sends 2 bytes to slave. Scale is 10. Unit is °C.

4.25 Get high threshold of pump temp

Frame Head			Frame ID				CMD ID	Data Length	Data		checksum
length	2bytes		4bytes				1byte	1byte	N bytes		1byte
Byte order	MSB	LSB	MSB			LSB			MSB	LSB	
Master	55	AA	01	02	03	04	5D	00	NC		xx
Slave	AA	55	01	02	03	04	5D	02	xxxx		xx
Data type									short		

Note: Slave replies 2 bytes. Scale is 0.1. Unit is °C.

4.26 Set high threshold of pump temp

Frame Head			Frame ID				CMD ID	Data Length	Data		checksum
length	2bytes		4bytes				1byte	1byte	N bytes		1byte
Byte order	MSB	LSB	MSB			LSB			MSB	LSB	
Master	55	AA	01	02	03	04	5E	02	xx	xx	xx
Slave	AA	55	01	02	03	04	5E	02	xx	xx	xx
Data type									short		

Note: Master sends 2 bytes to slave. Scale is 10. Unit is °C.

4.27 Get ACC Pump Current

Frame Head			Frame ID				CMD ID	Data Length	Data		checksum
length	2bytes		4bytes				1byte	1byte	N bytes		1byte
Byte order	MSB	LSB	MSB			LSB			MSB	LSB	
Master	55	AA	01	02	03	04	A7	00	NC		xx
Slave	AA	55	01	02	03	04	A7	02	xxxx		xx
Data type									short		

Note: Slave replies 2 bytes. Scale is 0.1. Unit is mA.

4.28 Set ACC Pump Current

Frame Head			Frame ID				CMD ID	Data Length	Data		checksum
length	2bytes		4bytes				1byte	1byte	N bytes		1byte
Byte order	MSB	LSB	MSB			LSB			MSB	LSB	
Master	55	AA	01	02	03	04	79	02	xx	xx	xx
Slave	AA	55	01	02	03	04	79	02	xx	xx	xx
Data type									short		

Note: Master sends 2 bytes to slave. Scale is 10. Unit is mA.