HVAC Protocol

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1.0.0	Glen	2013-6-8	HVAC

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1 Commands Shared

Address Detection

1.1.1 Detect Address

Remark: Detect address by pressing broadcast address button

Supported Device: All modules which have broadcast button

Operation Code: **0x E5F5**		
Target Subnet ID:	Broadcast address	0xFF
Target Device ID:		
Additional Content		
LEN of additional content:: 0 byte		

Response

Operation Code: **0x E5F6**		
Target Subnet ID:	Broadcast address	0xFF
Target Device ID:		0xFF
Additional Content		
LEN of additional content::2 bytes		
Index of Additional	**Remark**	**Value**

Content		
0	Subnet ID of target device	1byte
1	Device ID of target device	1byte

1.1.2 Modify Address

Supported Device: All modules which have address broadcast button

Operation Code: **0xE5F7**		
Target Subnet ID:	Specify old subnet ID of target device	scope 1-254
Target Device ID:	Specify old device ID of target device	scope 1-254
Additional Content		
LEN of additional content::2 bytes		
Index of Additional Content	**Remark**	**Value**
0	New Subnet ID	1byte , scope 1-254
1	New Device ID	1byte , scope 1-254

Response

Operation Code: **0x E5F8**		
Target Subnet ID:	Broadcast address	0xFF
Target Device ID:		0xFF
Additional Content		
LEN of additional content::1byte		
Index of Additional Content	**Remark**	**Value**
0	Flag for success or Failure	1byte Success =0xF8 Failure=0xF5

1.2 Device Backup

1.2.1 Request Total QTY of packages from PC to target Device

Supported Device: All G4 Modules

Operation Code: **0xDC10**		
Target Subnet ID:	Specify subnet ID of target device	1byte, scope 1-254
Target Device ID:	Specify device ID of target device	1byte, scope 1-254
Is Big UDP Package format : No		
Additional Content		
LEN of additional content:0 byte		

Response

Operation Code: **0x DC11**		
Target Subnet ID:	Specify subnet ID of target device	1byte,scope 1-254
Target Device ID:	Specify device ID of target device	1byte,scope 1-254
Is Big UDP Package format: No		
Additional Content		
LEN of additional content:3bytes		
Index of Additional Content	**Remark**	**Value**
0	Flag of success or failure	1byte Success=0xF8 Failure=0xF5
1	High 8 bits of Total QTY of packages	Total QTY of Packages : 2 bytes
2	Low 8 bits Total QTY of packages	

1.2.2 Request Current Small Package from PC to target device

Supported Device: all G4 modules

Operation Code: **0xDC14**		
Target Subnet ID:	Specify subnet ID of target device	1byte, scope 1-254
Target Device ID:	Specify device ID of target device	1byte, scope 1-254
Is big UDP Package format :No		
Additional Content		
LEN of additional content::2 bytes		
Index of Additional Content	**Remark**	**Value**
0	High 8 bits of current Package No	Current Package No: 2 bytes
1	Low 8 bits of current Package No	

Response

Operation Code: **0x DC15**		
Target Subnet ID:	Specify subnet ID of target device	1byte,scope 1-254
Target Device ID:	Specify device ID of target device	1byte,scope 1-254
Is big UDP Package format : **No**		
Additional Content		
LEN of additional content: MAX. 65 bytes (Max. Flash data is 59 bytes)		
Index of Additional Content	**Remark**	**Value**
0	High 8 bits of current package No	Current Package No : 2 bytes
1	low 8 bits of current package No	
2	Flag of external flash or inner memory	1byte external flash=1 inner memory=0
3	High 8 bits of flash Start Address	3 bytes
4	Medium 8 bits of flash Start Address	
5	Low 8 bits of flash Start Address	
6	Flash data start	
…		
64 (MAX.)	Flash data end	

1.3 Device Restore

1.3.1 Send Total QTY of Packages from PC to Target Device

Supported Device: All Modules

Operation Code: **0xDC16**		
Target Subnet ID:	Specify subnet ID of target device	1byte, scope 1-254
Target Device ID:	Specify device ID of target device	1byte, scope 1-254
Is Big UDP Package format : No		
Additional Content		
LEN of additional content:2 bytes		
Index of Additional Content	**Remark**	**Value**
0	High 8 bits of total QTY of packages	Total QTY of packages : 2 bytes
1	Low 8 bits total QTY of packages	

Response

Operation Code: **0xDC17**		
Target Subnet ID:	Specify subnet ID of target device	1byte,scope 1-254
Target Device ID:	Specify device ID of target device	1byte,scope 1-254
Is Big UDP Package format: No		
Additional Content		
LEN of additional content:1byte		
Index of Additional Content	**Remark**	**Value**
0	Flag of success or failure	1byte Success=0xF8 Failure=0xF5

1.3.2 Send Small Package from PC to Target Device

Supported Device: All modules

Operation Code: **0xDC1A**

Target Subnet ID:	Specify subnet ID of target device	1byte, scope 1-254
Target Device ID:	Specify device ID of target device	1byte, scope 1-254
Is Big UDP Package format : **No**		
Additional Content		
LEN of additional content: MAX. 65 bytes (Max. Flash data is 59 bytes)		
Index of Additional Content	**Remark**	**Value**
0	High 8 bits of current package No	Current Package No : 2 bytes
1	low 8 bits of current package No	
2	Flag of external flash or inner memory	1byte external flash=1 inner memory=0
3	High 8 bits of flash start address	3 bytes
4	Medium 8 bits of flash Start Address	
5	Low 8 bits of flash start address	
6	Flash data start	
…		
64 (MAX.)	Flash data end	

Response

Operation Code: **0xDC1B**		
Target Subnet ID:	Specify subnet ID of target device	1byte,scope 1-254
Target Device ID:	Specify device ID of target device	1byte,scope 1-254
Is Big UDP Package format: No		
Additional Content		
LEN of additional content::3bytes		
Index of Additional Content	**Remark**	**Value**
0	Flag of success or failure	1byte Success=0xF8 Failure=0xF5
1	High 8 bits of current package No	Current Package No : 2 bytes
2	Low 8 bits of current package No	

1.4 MAC Address

1.4.1 Read MAC Address

Supported Device: All modules

Operation Code: **0x F003**		
Target Subnet ID:	Specify subnet ID of target device	1byte, scope 1-254
Target Device ID:	Specify device ID of target device	1byte, scope 1-254
Is Big UDP Package format : **No**		
Additional Content		
LEN of additional content: 0 byte		
Index of Additional Content	**Remark**	**Value**

Response

Operation Code: **0xF004**		
Target Subnet ID:	Specify subnet ID of target device	1byte,scope 1-254
Target Device ID:	Specify device ID of target device	1byte,scope 1-254
Is Big UDP Package format: No		
Additional Content		
LEN of additional content: If is not hotel devices ,8 bytes, more bytes no use		
Index of Additional Content	**Remark**	**Value**
0	MAC 1st byte	1byte
1	MAC 2nd byte	1byte
2	MAC 3rd byte	1byte
3	MAC 4th byte	1byte
4	MAC 5th byte	1byte
5	MAC 6th byte	1byte
6	MAC 7th byte	1byte
7	MAC 8th byte	1byte
8	1st byte of Remark	20bytes, If the length of remark is less than 20, please use ASCII of space.
9	2nd byte of remark	
10	3rd byte of remark	
11	4th byte of remark	

1.4.2 Modify MAC Address

Supported Device: All modules

Operation Code: **0x F001**		
Target Subnet ID:	Specify subnet ID of target device	1byte, scope 1-254
Target Device ID:	Specify device ID of target device	1byte, scope 1-254
Is Big UDP Package format : **No**		
Additional Content		
LEN of additional content: 8 bytes		
Index of Additional Content	**Remark**	**Value**
0	MAC 1st byte	1byte
1	MAC 2nd byte	1byte
2	MAC 3rd byte	1byte
3	MAC 4th byte	1byte
4	MAC 5th byte	1byte
5	MAC 6th byte	1byte
6	MAC 7th byte	1byte
7	MAC 8th byte	1byte

Response

Operation Code: **0xF002**		
Target Subnet ID:	Specify subnet ID of target device	1byte,scope 1-254
Target Device ID:	Specify device ID of target device	1byte,scope 1-254
Additional Content		
LEN of additional content: 1 byte		
Index of Additional Content	**Remark**	**Value**
0	Flag of success or failure	1byte Success=0xF8 Failure=0xF5

1.5 Read device remark

Remark:This operation has two ways to use

1 Send to specify device to get its remark

2 Broadcast to the LAN to get there devices' remark on the LAN

Supported Device: All modules

1

Operation Code: **0x 000E**

Target Subnet ID:	Specify subnet ID of target device	1byte, scope 1-254
Target Device ID:	Specify device ID of target device	1byte, scope 1-254
Is Big UDP Package format : **No**		

Response

Operation Code: **0x000F**		
Target Subnet ID:	Specify subnet ID of target device	1byte,scope 1-254
Target Device ID:	Specify device ID of target device	1byte,scope 1-254
Additional Content		
LEN of additional content: 20 byte		
Index of Additional Content	**Remark**	**Value**
0	1st byte of Remark	20bytes, If the length of remark is less than 20, please use ASCII of space.
1	2nd byte of remark	
2	3rd byte of remark	
3	4th byte of remark	
4	5th byte of remark	
5	6th byte of remark	
6	7th byte of remark	
7	8th byte of remark	
8	9th byte of remark	
9	10th byte of remark	
10	11th byte of remark	
11	12th byte of remark	
12	13th byte of remark	
13	14th byte of remark	
14	15th byte of remark	
15	16th byte of remark	
16	17th byte of remark	
17	18th byte of remark	
18	19th byte of remark	
19	20th byte of remark	

2

Operation Code: **0x 000E**		
Target Subnet ID:	Broadcast address	0xFF
Target Device ID:	Broadcast address	0xFF
Is Big UDP Package format : **No**		

Response:

Devices in the same LAN will relay a random number time to response ,

Every one response as send to specify device

1.6 Write device remark

Supported Device: All modules

Operation Code: **0x 0010**		
Target Subnet ID:	Specify subnet ID of target device	1byte, scope 1-254
Target Device ID:	Specify device ID of target device	1byte, scope 1-254
Is Big UDP Package format : **No**		
Additional Content		
LEN of additional content: 20 byte		
Index of Additional Content	**Remark**	**Value**
0	1st byte of Remark	20bytes, If the length of remark is less than 20, please use ASCII of space.
1	2nd byte of remark	
2	3rd byte of remark	
3	4th byte of remark	
4	5th byte of remark	
5	6th byte of remark	
6	7th byte of remark	
7	8th byte of remark	
8	9th byte of remark	
9	10th byte of remark	
10	11th byte of remark	
11	12th byte of remark	
12	13th byte of remark	
13	14th byte of remark	
14	15th byte of remark	
15	16th byte of remark	
16	17th byte of remark	
17	18th byte of remark	
18	19th byte of remark	
19	20th byte of remark	

Response

Operation Code: **0x0011**		
Target Subnet ID:	Specify subnet ID of target device	1byte,scope 1-254
Target Device ID:	Specify device ID of target device	1byte,scope 1-254
Additional Content		
LEN of additional content: 1 byte		
Index of Additional Content	**Remark**	**Value**
0	Flag for success/ failure	1byte,

		Success=0xF8 Failure =0xF5

1.7 Read firmware version

Supported Device: All modules

Operation Code: **0xEEFD**		
Target Subnet ID:	Specify subnet ID of target device	1byte, scope 1-254
Target Device ID:	Specify device ID of target device	1byte, scope 1-254
Is Big UDP Package format : **No**		
Additional Content		
LEN of additional content: 0 byte		

Response

Operation Code: **0xEEFE**		
Target Subnet ID:	Specify subnet ID of target device	1byte,scope 1-254
Target Device ID:	Specify device ID of target device	1byte,scope 1-254
Is Big UDP Package format: No		
Additional Content		
LEN of additional content: 22 bytes,		
Index of Additional Content	**Remark**	**Value**
0 ~21	Version info	22 bytes

1.8 Modify subnetID and DeviceID by Mac address

Supported Device: All modules

Operation Code: **0x F005**		
Target Subnet ID:	Specify subnet ID of target device	1byte, scope 1-254
Target Device ID:	Specify device ID of target device	1byte, scope 1-254
Is Big UDP Package format : **No**		
Additional Content		
LEN of additional content: 10 bytes		
Index of Additional Content	**Remark**	**Value**
0	MAC 1st byte	1byte
1	MAC 2nd byte	1byte
2	MAC 3rd byte	1byte

3	MAC 4th byte	1byte
4	MAC 5th byte	1byte
5	MAC 6th byte	1byte
6	MAC 7th byte	1byte
7	MAC 8th byte	1byte
8	SubnetID	1byte
9	SubDeciveID	1byte

Response

Operation Code: **0xF002**		
Target Subnet ID:	Specify subnet ID of target device	1byte,scope 1-254
Target Device ID:	Specify device ID of target device	1byte,scope 1-254
Additional Content		
LEN of additional content: 1 byte		
Index of Additional Content	**Remark**	**Value**
0	Flag of success or failure	1byte Success=0xF8 Failure=0xF5

1.9 To see whether the specify device is on line

Supported Device: All modules

Operation Code: **0xF065**		
Target Subnet ID:	Specify subnet ID of target device	1byte, scope 1-254
Target Device ID:	Specify device ID of target device	1byte, scope 1-254
Is Big UDP Package format : **No**		
Additional Content		
LEN of additional content: 0 byte		

Response

Operation Code: **0xF066**		
Target Subnet ID:	Specify subnet ID of target device	1byte,scope 1-254
Target Device ID:	Specify device ID of target device	1byte,scope 1-254
Is Big UDP Package format: No		
Additional Content		
LEN of additional content: 0 bytes,		

2 Protocol for Hardware Programming

2.1 Outline

为了方便初级安装者，给产品增加硬件编程

2.1.1 Address conflicts red warning

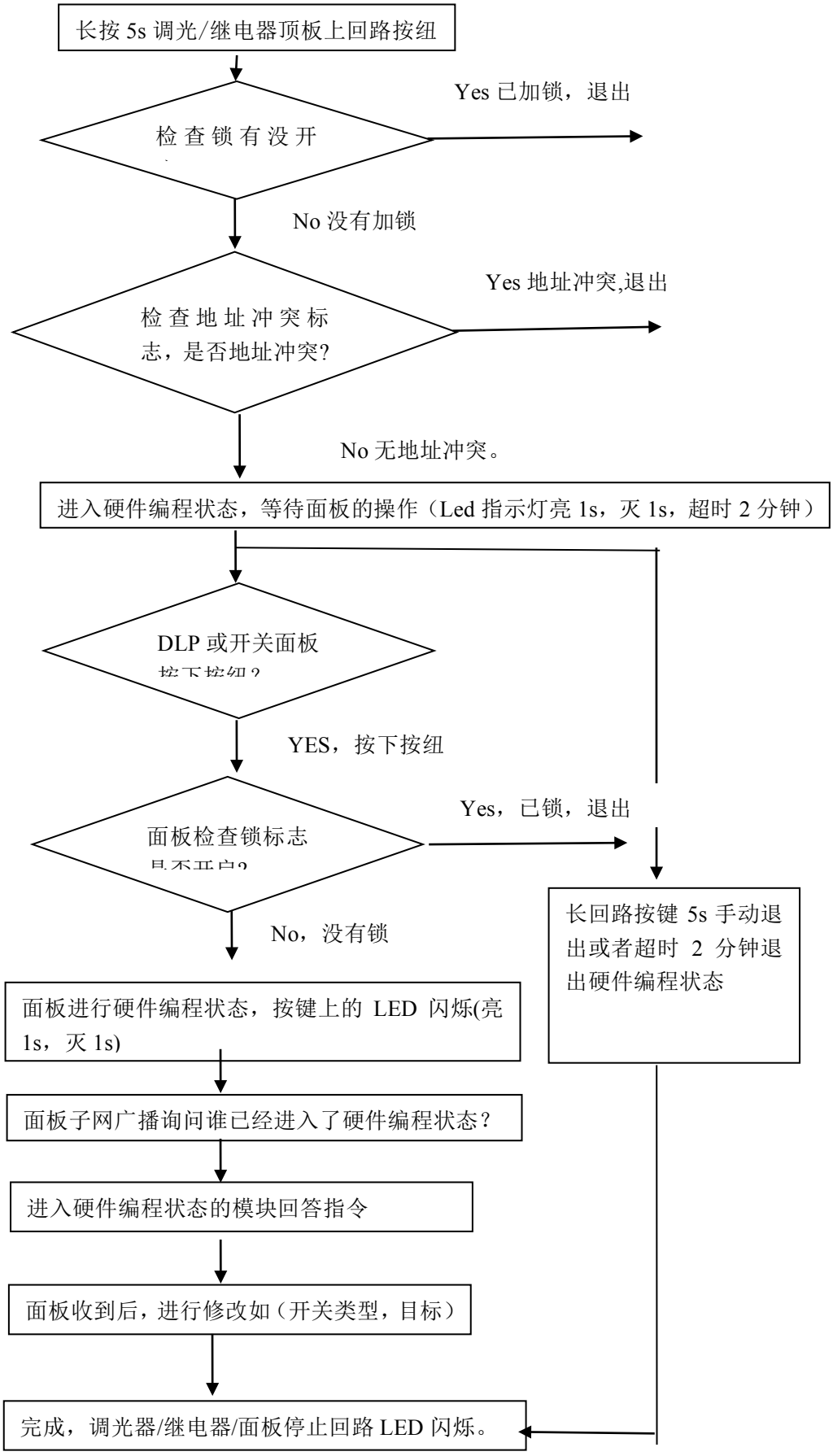
如果软件锁标志是开启的（Lock Active），那么模块上电需要检测本身的地址是否有冲突,如果发现有地址冲突时，所有有冲突的模块的地址广播按纽下的 LED 灯需要红色闪烁（Led 指示灯亮 0.3s，灭 0.5s），进行红色警告。

如果软件锁标志是关闭的（Lock inactive）,那么模块上电是不需要检测地址是否冲突的,也不会进行红色警告,这样就不会浪费太多的时间而影响系统的正常使用。

2.1.2 Address modification of human involvement

初级安装者可以在模块上进行地址的修改，而不修改使用电脑软件。
存在地址冲突的情况下的地址修改；
在已经存在地址冲突的情况下，这里 LED 已经在闪烁，如果长按地址广播按纽 5s,即进行地址修改，模块自动分配一个可以使用的地址给当前模块，修改地址完毕后，LED 灯转为绿色，停止闪烁。

2.1.3 Hardware Programming Flowchart



2.2 The lock flag hardware programming read / write

2.2.1 Read Lock

Supported Device: Dimmer/Relay/HVAC/9in1/DLP/Switch

Operation Code: **0x0280**		
Target Subnet ID:	Specify subnet ID of target device	scope 0-254
Target Device ID:	Specify device ID of target device	scope 0-254
Additional Content		
LEN of additional content:: 0 byte		

Response

Operation Code: **0x0281**		
Target Subnet ID:	Specify subnet ID of target device	scope 0-254
Target Device ID:	Specify device ID of target device	scope 0-254
Additional Content		
LEN of additional content::1 byte		
Index of Additional Content	**Remark**	**Value**
0	Status of Lock	1byte Active =1 Inactive=0

2.2.2 Modify Lock

Supported Device: Dimmer/Relay/HVAC/9in1/DLP/Switch

Operation Code: 0x0282		
Target Subnet ID:	Specify subnet ID of target device or Broadcast address 255	scope 0-255
Target Device ID:	Specify device ID of target device or Broadcast address 255	scope 0-255
Additional Content		
LEN of additional content:: 1 byte		

Index of Additional Content	**Remark**	**Value**
0	Status of Lock	1byte Active =1 Inactive=0

Response

Operation Code: **0x0283**		
Target Subnet ID:	Specify subnet ID of target device	scope 0-254
Target Device ID:	Specify device ID of target device	scope 0-254
Additional Content		
LEN of additional content::1 byte		
Index of Additional Content	**Remark**	**Value**
0	Flag of success/failure	1byte Success =0xF8 Failure=0xF5

2.3 Ask if any address conflict or not?

Supported Device: Dimmer/Relay/HVAC/9in1/DLP/Switch

Operation Code: **0x0284**		
Target Subnet ID:	subnet ID of itself	scope 0-254
Target Device ID:	Broadcast device address	255
Additional Content		
LEN of additional content:: 10 bytes		
Index of Additional Content	**Remark**	**Value**
0	Subnet ID of itself device	1byte
1	Device ID of itself device	1byte
2	1st byte of MAC of itself device	1byte
3	2nd byte of MAC of itself device	1byte
4	3rd byte of MAC of itself device	1byte
5	4th byte of MAC of itself device	1byte
6	5th byte of MAC of itself device	1byte
7	6th byte of MAC of itself device	1byte
8	7th byte of MAC of itself device	1byte
9	8th byte of MAC of itself device	1byte

Response

Operation Code: **0x0285**		
Target Subnet ID:	Specify subnet ID of target device	scope 0-254
Target Device ID:	Specify device ID of target device	scope 0-254
Additional Content		
LEN of additional content::9 bytes		
Index of Additional Content	**Remark**	**Value**
0	If exist same address or not	1byte Exist =1 Do no exist=0
1	1st byte of MAC of target device	1byte
2	2nd byte of MAC of target device	1byte
3	3rd byte of MAC of target device	1byte
4	4th byte of MAC of target device	1byte
5	5th byte of MAC of target device	1byte
6	6th byte of MAC of target device	1byte
7	7th byte of MAC of target device	1byte
8	8th byte of MAC of target device	1byte

2.4 Create New Random Address

备注：为了极少地址冲突的机率，需要在 1-254 中产生随机数，每个随机数并需要暂存。在查询前，需要检测历史记录中是否存在，如果存在历史记录，须重新产生一个随机数；如果不存在在历史记录，即查询当前地址是否可用。如果不可用，继续继续产生随机地址。
如果在 2s 钟内没有收到回答，即表明此地址可用。

2.5 DLP/Switch Programming

备注：问有哪些模块进入硬件编程状态？

Supported Device: DLP/Switch

Operation Code: **0x0286**		
Target Subnet ID:	subnet ID of itself	scope 0-254
Target Device ID:	Broadcast device address	255
Additional Content		
LEN of additional content:: 0 byte		

Response

Operation Code: **0x0287**		
Target Subnet ID:	Specify subnet ID of target device	scope 0-254
Target Device ID:	Specify device ID of target device	scope 0-254
Additional Content		
LEN of additional content::7 bytes		
Index of Additional Content	**Remark**	**Value**
0	Subnet ID of controlled device (like Dimmer/Relay/HVAC/9in1)	1byte
1	Device ID of controlled device	1byte
2	Device Category	1byte **(see the definition below)**
3	1st Parameter	1byte
4	2nd Parameter	1byte
5	3rd Parameter	1byte
6	4th Parameter	1byte

Definition of Parameter according to device category

SN	Device Category	1st Parameter	2nd Parameter	3rd Parameter	4th Parameter
1	Dimmer	Channel No (brightness =100)	<N/A>	<N/A>	<N/A>
2	Relay	Channel No	<N/A>	<N/A>	<N/A>
3	HVAC	Subnet ID	Device ID	<N/A>	<N/A>
4	Sensors	<N/A>	<N/A>	<N/A>	<N/A>
5	Z-Audio	<N/A>	<N/A>	<N/A>	<N/A>

2.6 After the success of human involvement to modify the address, subnet broadcast to all devices

Supported Device: DLP/Switch/Dimmer/Relay/9in1/HVAC

Operation Code: **0x0288**		
Target Subnet ID:	subnet ID of itself	scope 0-254

Target Device ID:	Broadcast device address	255
Additional Content		
LEN of additional content:: 2 byte		
Index of Additional Content	**Remark**	**Value**
0	Old Subnet ID (修改前的地址)	1byte
1	Old Device ID (修改前的地址)	1byte

备注：
当有地址冲突的设备收到以上指令后，检测旧地址是否与本身地址相同，如果不相同，不用处理；如果相同，则在 500ms 内产生一个延时的随机数，之后发送指令 “**2. Ask if any address conflict or not? 问当前子网中有没有与自己的地址冲突？**”

8 HVAC

1 Control and statue

1.1 Read AC Current Status

Operation Code: **0xE0EC**		
Target Subnet ID:	Specify subnet ID of target device	1byte, scope 1-254
Target Device ID:	Specify device ID of target device	1byte, scope 1-254
Additional Content		
LEN of additional content:: 0 byte		

Response

Operation Code: **0x E0ED**		
Target Subnet ID:	Specify subnet ID of target device	1byte, scope 1-254
Target Device ID:	Specify device ID of target device	1byte, scope 1-254
Additional Content		
LEN of additional content:: 8 bytes		
Index of Additional Content	**Remark**	**Value**

0	Status of AC on/off	1byte AC On=1 AC Off=0
1	Cool temperature set point	1byte
2	***Fan Index and Mode Index***	Lower 4 bits is Fan index of Fan Table higher 4 bits is AC mode index of Mode Table. Please see explanation blow
3	Local Flag	1byte (Useless now)
4	Current temperature	1byte
5	Heat temperature set point	1byte
6	Preserved	1byte
7	Auto temperature Set point	1byte

Explanation of Fan Index and Mode Index:

byteTmp:= arrayReceiveBuffer [9+2];
bytFANIndex:= byteTmp and $0F; //Low 4 bits
bytACModeIndex:=(byteTmp and $F0) shr 4 ; //High 4 bits

According to the above fan table marrayFAN & mode table marrayACMode you got (**0x E125).**

For example

bytFANIndex=2
bytACModeIndex=1

So
marrayFAN [0..2]={0,1,2}
Fan = marrayFAN[bytFANIndex]= marrayFAN[2]=2
so current fan is MEDIUM speed

marrayACMode[0..2]={0,2,3}
Mode= marrayACMode[bytACModeIndex]= marrayACMode[1]=2
So Current AC mode is FAN.

1.2 Read Temperature Value

Supported Device: HVAC, Zone Beast, 9in1/6in1 Sensor, 4T

Operation Code: **0XE3E7**		
Target Subnet ID:	Specify subnet ID of target device	scope 1-254
Target Device ID:	Specify device ID of target device	scope 1-254
Additional Content		
LEN of additional content:1byte		
Index of Additional Content	**Remark**	**Value**
0	Temperature unit	1byte Celsius=1 Fahrenheit =0

Response

Operation Code: **0XE3E8**		
Target Subnet ID:	Specify subnet ID of target device	scope 1-254
Target Device ID:	Specify device ID of target device	scope 1-254
Additional Content		
LEN of additional content: Max 17 bytes		
Index of Additional Content	**Remark**	**Value**
0	Temperature unit	1byte Celsius=1 Fahrenheit =0
1	Temperature value 1	1byte
2	Temperature value 2 (optional)	1byte
3	Temperature value 3 (optional)	1byte
4	Temperature value 4 (optional)	1byte
5	Temperature value 5 (optional)	1byte
6	Temperature value 6 (optional)	1byte
7	Temperature value 7 (optional)	1byte
8	Temperature value 8 (optional)	1byte
9	Flag or plus/minus of temperature 1 (optional)	1byte Plus=0,Minus=1
10	Flag or plus/minus of temperature 2 (optional)	1byte Plus=0,Minus=1

11	Flag or plus/minus of temperature 3 (optional)	1byte Plus=0,Minus=1
12	Flag or plus and minus of temperature 4 (optional)	1byte Plus=0,Minus=1
13	Flag or plus and minus of temperature 5 (optional)	1byte Plus=0,Minus=1
14	Flag or plus/minus of temperature 6 (optional)	1byte Plus=0,Minus=1
15	Flag or plus/minus of temperature 7 (optional)	1byte Plus=0,Minus=1
16	Flag or plus/minus of temperature 8 (optional)	1byte Plus=0,Minus=1

1.3 Panel Control

Operation Code: **0x**E3D8		
Target Subnet ID:	Specify subnet ID of DDP	1byte, scope 1-254
Target Device ID:	Specify device ID of DDP	1byte, scope 1-254
Additional Content		
LEN of additional content:: 2 bytes		
Index of Additional Content	**Remark**	**Value**
0	Type	1byte
1	Value, it depends on type above	1byte
Definition		
Function	**Type**	**Value**
Invalid	0x00	0x00
IR receiver function	0x01	Enable=0x01 Disable=0x00
Button Lock	0x02	No lock=0x00 Lock=0x01
AC ON	0x03	0x01
AC Off	0x03	0x00
Cool temperature Set Point	0x04	1byte, Cool set point **0-30 c** **32F-86F**
Fan Speed	0x05	Auto=0 High=1 Medial=2

		Low=3
AC Mode	0x06	Cool=0 Heat=1 FAN=2 Auto=3
Heat temperature Set Point	0x07	1byte,Heat Set Point **0-30 c** **32F-86F**
Auto temperature Set Point	0x08	1byte,Auto Set Point **0-30 c** **32F-86F**
Invoking DDP Button	0x12	1 byte DDP button number Scope 1-32 1 = left of the first button of Pag1 from top to bottom 2 = right of the first button of Pag1 from top to bottom 3 = left of the second button from top to bottom of Pag1 4 = 2R P1 , 5 = 3L P1, 6 = 3R P1, 7 = 4L P1, 8 = 4R P1; 9 = 1L P2, 10 = 1R P2, 11 = 2L P2, 12 = 2R P2, 13 = 3L P2, 14 = 3R P2 …… 32 = right of the fourth button of Pag4
Go to Page	0x16	Page No 1-7

Response

Operation Code: **0x**E3D9		
Target Subnet ID:	Broadcast address	0xFF
Target Device ID:		0xFF
Additional Content		
LEN of additional content:: 2bytes		
Index of Additional Content	**Remark**	**Value**
0	Type of AC control	1 byte
1	Value, it depends on type above	1byte

1.4 HVAC Automatic Control

Operation Code: **0x193A**		
Target Subnet ID:	Specify subnet ID of target device	scope 1-254
Target Device ID:	Specify device ID of target device	scope 1-254
Additional Content		
LEN of additional content:: 13 bytes		
Index of Additional Content	**Remark**	**Value**
0	AC No.	1byte，default value is 1
1	Temperature unit	1byte ， Celsius:0 ， Fahrenheit:1
2	Reserved	1byte ，Reserved
3	Cool set temperature value	1byte
4	Heat set temperature value	1byte
5	Auto set temperature value	1byte
6	Reserved	1byte ，Reserved
7	AC Mode & Fan Speed	1byte, Higher 4bits is AC mode (cold=0, heat=1 , FAN=2，Auto=3，dry=4) , Lower 4 bits is fan speed(Auto=0 ， high fan speed=1 ， medium fan speed=2，low fan speed=3)
8	HVAC Power	1byte，1-on , 0-off
9	Reserved	1byte ，Reserved
10	Reserved	1byte ，Reserved
11	Reserved	1byte ，Reserved
12	Reserved	1byte ，Reserved

Response

Operation Code: **0x193B**		
Target Subnet ID:	Specify subnet ID of target device	scope 1-254
Target Device ID:	Broadcast address	0xFF
Additional Content		
LEN of additional content: 13 bytes		
Index of Additional Content	**Remark**	**Value**
0	AC No.	1byte，default value is 1
1	Temperature type	1byte， Celsius:0， Fahrenheit:1，

2	Reserved	1byte ， Reserved
3	Cool set temperature value	1byte
4	Heat set temperature value	1byte
5	Auto set temperature value	1byte
6	Reserved	1byte ， Reserved
7	AC mode & fan Speed	Higher 4bits is AC mode (cold=0, heat=1，FAN=2，Auto=3，dry=4)，Lower 4 bits is fan speed(Auto=0，high fan speed=1， medium fan speed=2，low fan speed=3)
8	HVAC active flag	1byte，1-on 0-off
9	Reserved	1byte ， Reserved
10	Reserved	1byte ， Reserved
11	Reserved	1byte ， Reserved
12	Reserved	1byte ， Reserved

2 Settings

2.1 Temperature mode type Celsius or Fahrenheit

2.1.1 Read Celsius/Fahrenheit Flag

Operation Code: **0x E120**		
Target Subnet ID:	Specify subnet ID of target device	1byte, scope 1-254
Target Device ID:	Specify device ID of target device	1byte, scope 1-254
Additional Content		
LEN of additional content:: 0 byte		

Response

Operation Code: 0x**E121**		
Target Subnet ID:	Specify subnet ID of target device	1byte, scope 1-254
Target Device ID:	Specify device ID of target device	1byte, scope 1-254
Additional Content		
LEN of additional content:: 1byte		
Index of Additional Content	**Remark**	**Value**

0	Celsius/ Fahrenheit flag	1byte Celsius =0; Fahrenheit =1

2.1.2 Modify Celsius/Fahrenheit Flag

Operation Code: **0xE122**		
Target Subnet ID:	Specify subnet ID of target device	1byte, scope 1-254
Target Device ID:	Specify device ID of target device	1byte, scope 1-254
Additional Content		
LEN of additional content:: 1byte		
Index of Additional Content	**Remark**	**Value**
0	Celsius/ Fahrenheit flag	1 byte Celsius =0; Fahrenheit =1;

Response

Operation Code: **0xE123**		
Target Subnet ID:	Specify subnet ID of target device	1byte, scope 1-254
Target Device ID:	Specify device ID of target device	1byte, scope 1-254
Additional Content		
LEN of additional content:: 2bytes		
Index of Additional Content	**Remark**	**Value**

0	Flag of success or failure	1 byte
		success =0xF8;
		failure =0xF5;

1	Celsius/ Fahrenheit flag	1 byte Celsius =0; Fahrenheit =1;

2.2 The count of Fan Speed and Mode

2.2.1 Read AC the count of Fan Speed and Mode

Operation Code: **0xE124**		
Target Subnet ID:	Specify subnet ID of target device	1byte, scope 1-254
Target Device ID:	Specify device ID of target device	1byte, scope 1-254
Additional Content		
LEN of additional content::10 bytes		

Response

Operation Code: **0xE125**		
Target Subnet ID:	Specify subnet ID of target device	1byte, scope 1-254
Target Device ID:	Specify device ID of target device	1byte, scope 1-254
Additional Content		
Index of Additional Content	**Remark**	**Value**
0	LEN of FAN table	1byte
1	1st FAN value	1byte CONST_FAN_AUTO_ID=0; CONST_FAN_HIGH_ID=1; CONST_FAN_MEDIUM_ID=2; CONST_FAN_LOW_ID=3;
…	…	…
LEN of FAN table	Last FAN Value	1byte
5	LEN of AC mode table	1byte
6	1st AC mode value	1byte CONST_AC_MODE_COOL_ID=0; CONST_AC_MODE_HEAT_ID=1; CONST_AC_MODE_FAN_ID=2; CONST_AC_MODE_AUTO_ID=3;
…	…	…
…	Last AC Mode value	1byte

Example source code which is made by Delphi:

```
bytLenOfFanTable:= arrayReceiveBuffer [9+0];
        setLength(marrayFAN, bytLenOfFanTable);
        if bytLenOfFanTable >0 then
        begin
```

```
        for byteI :=0 to High(marrayFAN) do
        begin
          marrayFAN[byteI]:= arrayReceiveBuffer [10+ byteI];
        end;
      end;

      bytLenOfModeTable:= arrayReceiveBuffer [9+5];
      setLength(marrayACMode, bytLenOfModeTable);
      if bytLenOfModeTable >0 then
      begin
        for byteI :=0 to High(marrayACMode) do
        begin
            marrayACMode[byteI]:= arrayReceiveBuffer [15+byteI];
        end;
       end;
```

For Example
You have Fan Auto/High/Medium, you disable Low Fan from SBUS Software, so
bytLenOfFanTable =3
marrayFAN [0..2]={0,1,2}

You have AC Mode Cool/FAN/Auto, you disable mode heat from SBUS software,so
LenOfModeTable=3
marrayACMode[0..2]={0,2,3}

Above information you will need it when you read AC status below.

2.2.2 Modify AC the count of Fan Speed and Mode

Operation Code: **0xE126**		
Target Subnet ID:	Specify subnet ID of target device	1byte, scope 1-254
Target Device ID:	Specify device ID of target device	1byte, scope 1-254
Additional Content		
LEN of additional content::10 bytes		
Index of Additional Content	**Remark**	**Value**

0	LEN of FAN table	1byte
1	1st FAN value	1byte CONST_FAN_AUTO_ID=0; CONST_FAN_HIGH_ID=1; CONST_FAN_MEDIUM_ID=2; CONST_FAN_LOW_ID=3;
…	…	…
LEN of FAN table	Last FAN Value	1byte
5	LEN of AC mode table	1byte
6	1st AC mode value	1byte CONST_AC_MODE_COOL_ID=0; CONST_AC_MODE_HEAT_ID=1; CONST_AC_MODE_FAN_ID=2; CONST_AC_MODE_AUTO_ID=3;
…	…	…
…	Last AC Mode value	1byte

Response

Operation Code: **0xE127**		
Target Subnet ID:	Specify subnet ID of target device	1byte, scope 1-254
Target Device ID:	Specify device ID of target device	1byte, scope 1-254
Additional Content		
LEN of additional content::1 byte		
Index of Additional Content	**Remark**	**Value**
0	Flag of success of failure	1byte Success=0xF8 Failure=0xF5

2.3 AC Temperature Range

2.3.1 Read AC Temperature Range

Operation Code: **0x1900**		
Target Subnet ID:	Specify subnet ID of target device	1byte, scope 1-254
Target Device ID:	Specify device ID of target device	1byte, scope 1-254

Additional Content
LEN of additional content:: 0 byte

Response

Operation Code: **0x1901**		
Target Subnet ID:	Specify subnet ID of target device	1byte, scope 1-254
Target Device ID:	Specify device ID of target device	1byte, scope 1-254
Additional Content		
LEN of additional content:: 6bytes		
Index of Additional Content	**Remark**	**Value**
0	The start temperature of cool range	1byte
1	The end temperature of cool range	1byte
2	The start temperature of heat range	1byte
3	The end temperature of heat range	1byte
4	The start temperature of auto range	1byte
5	The end temperature of auto range	1byte

2.3.2 Modify AC Temperature Range

Operation Code: **0x1902**		
Target Subnet ID:	Specify subnet ID of target device	1byte, scope 1-254
Target Device ID:	Specify device ID of target device	1byte, scope 1-254
Additional Content		
LEN of additional content:: 6 bytes		
Index of Additional Content	**Remark**	**Value**
0	The start temperature of cool range	1byte
1	The end temperature of cool range	1byte
2	The start temperature of heat range	1byte
3	The end temperature of heat range	1byte
4	The start temperature of auto	1byte

	range	
5	The end temperature of auto range	1byte

Response

Operation Code: **0x1903**		
Target Subnet ID:	Specify subnet ID of target device	1byte, scope 1-254
Target Device ID:	Specify device ID of target device	1byte, scope 1-254
Additional Content		
LEN of additional content:: 1byte		
Index of Additional Content	**Remark**	**Value**
0	Flag of success or failure	1byte Success=0xF8 Failure =0xF5

2.4 Delays for Compressor and Fan

2.4.1 Read delays for Compressor and Fan

Operation Code: **0x E3F4**		
Target Subnet ID:	Specify subnet ID of target device	scope 1-254
Target Device ID:	Specify device ID of target device	scope 1-254
Additional Content		
LEN of additional content:: 0 byte		

Response

Operation Code: **0x E3F5**		
Target Subnet ID:	Specify subnet ID of target device	scope 1-254
Target Device ID:	Specify device ID of target device	scope 1-254
Additional Content		
LEN of additional content: 4 bytes		
Index of Additional Content	**Remark**	**Value**
0	Delay for fan on	1byte,1-10s
1	Delay for fan off	1byte,1-10s

2	Delay for compressor on	1byte, 3-127s or 1-10mins if bit[7]=1, then it means second If bit[7]=0, then it means minute
3	Delay for compressor off	1byte, 1-10s

2.4.2 Modify delays for Compressor and Fan

Operation Code: **0x E3F6**		
Target Subnet ID:	Specify subnet ID of target device	scope 1-254
Target Device ID:	Specify device ID of target device	scope 1-254
Additional Content		
LEN of additional content:: 4 bytes		
Index of Additional Content	**Remark**	**Value**
0	Delay for fan on	1byte,1-10s
1	Delay for fan off	1byte,1-10s
2	Delay for compressor on	1byte, 3-127s or 1-10mins if bit[7]=1, then it means second If bit[7]=0, then it means minute
3	Delay for compressor off	1byte, 1-10s

Response

Operation Code: **0x E3F7**		
Target Subnet ID:	Specify subnet ID of target device	scope 1-254
Target Device ID:	Specify device ID of target device	scope 1-254
Additional Content		
LEN of additional content: 1 byte		
Index of Additional Content	**Remark**	**Value**
0	Flag of Success of failure	1byte Success=0xF8 Failure =0xF5

2.5 VAV settings

2.5.1 Read VAV settings

Operation Code: **0x E3F8**		
Target Subnet ID:	Specify subnet ID of target device	scope 1-254
Target Device ID:	Specify device ID of target device	scope 1-254
Additional Content		
LEN of additional content:: 0 byte		

Response

Operation Code: **0x E3F9**		
Target Subnet ID:	Specify subnet ID of target device	scope 1-254
Target Device ID:	Specify device ID of target device	scope 1-254
Additional Content		
LEN of additional content: 3 bytes		
Index of Additional Content	**Remark**	**Value**
0	VAV of High Fan mode	1byte
1	VAV of Middle Fan mode	1byte
2	VAV of Low Fan mode	1byte

2.5.2 Modify VAV settings

Operation Code: **0x E3FA**		
Target Subnet ID:	Specify subnet ID of target device	scope 1-254
Target Device ID:	Specify device ID of target device	scope 1-254
Additional Content		
0	VAV of High Fan mode	1byte
1	VAV of Middle Fan mode	1byte
2	VAV of Low Fan mode	1byte

Response

Operation Code: **0x E3FB**		
Target Subnet ID:	Specify subnet ID of target device	scope 1-254
Target Device ID:	Specify device ID of target device	scope 1-254

Additional Content		
LEN of additional content: 1 byte		
Index of Additional Content	**Remark**	**Value**
0	Flag of Success of failure	1byte Success=0xF8 Failure =0xF5

2.6 Running Sequences for compressor

2.6.1 Read running Sequences for compressor

Operation Code: **0x E3FC**		
Target Subnet ID:	Specify subnet ID of target device	scope 1-254
Target Device ID:	Specify device ID of target device	scope 1-254
Additional Content		
LEN of additional content:: 2 bytes		
Index of Additional Content	**Remark**	**Value**
0	Constant Flag	1byte,0xF8
1	Relay No for AC Mode	1byte, 1-3 M1=1 M2=2 M3=3

Response

Operation Code: **0x E3FD**		
Target Subnet ID:	Specify subnet ID of target device	scope 1-254
Target Device ID:	Specify device ID of target device	scope 1-254
Additional Content		
LEN of additional content:: 7 bytes		
Index of Additional Content	**Remark**	**Value**
0	Flag of Success or Failure	1byte, Success=0xF8

		Failure=0xF5
1	Relay No for AC Mode	1byte, 1-3 M1=1 M2=2 M3=3
2	AC Mode No	1byte,
3	duration for 1st step on	1byte
4	duration for 2nd step off	1byte
5	duration for 3rd step on	1byte
6	duration for 4th step off	1byte

2.6.2 Modify running Sequences for compressor

Operation Code: **0x E3FE**		
Target Subnet ID:	Specify subnet ID of target device	scope 1-254
Target Device ID:	Specify device ID of target device	scope 1-254
Additional Content		
LEN of additional content:: 7 bytes		
Index of Additional Content	**Remark**	**Value**
0	Constant Flag	1byte, 0xF8
1	Relay No for AC Mode	1byte, 1-3 M1=1 M2=2 M3=3
2	AC Mode No	1byte,
3	Delay for 1st step on	1byte
4	Delay for 2nd step off	1byte
5	Delay for 3rd step on	1byte
6	Delay for 4th step off	1byte

Response

Operation Code: **0x E3FF**		
Target Subnet ID:	Specify subnet ID of target device	scope 1-254
Target Device ID:	Specify device ID of target device	scope 1-254
Additional Content		
LEN of additional content: 1 byte		

Index of Additional Content	**Remark**	**Value**
0	Flag of Success of failure	1byte Success=0xF8 Failure =0xF5

2.7 Temperature Sensors for HVAC

2.7.1 Read temperatures sensor for HVAC

Operation Code: **0x 018C**		
Target Subnet ID:	Specify subnet ID of target device	scope 1-254
Target Device ID:	Specify device ID of target device	scope 1-254
Additional Content		
LEN of additional content:: 0 byte		

Response

Operation Code: **0x 018D**		
Target Subnet ID:	Specify subnet ID of target device	scope 1-254
Target Device ID:	Specify device ID of target device	scope 1-254
Additional Content		
LEN of additional content: 12 bytes		
Index of Additional Content	**Remark**	**Value**
0	Reserved	1byte
1	Enabled for Sensor 1	1byte Enabled =1,disabled=0
2	Compensation for sensor 1	1byte,
3	Enabled for Sensor 2	1byte Enabled =1,disabled=0
4	Subnet ID Of Sensor 2	1byte,1-254
5	Device ID Of Sensor 2	1byte,1-254
6	Reserved	1byte
7	Enabled for Sensor 3	1byte Enabled =1,disabled=0
8	Subnet ID Of Sensor 3	1byte,1-254
9	Device ID Of Sensor 3	1byte,1-254

10	Port No of 4T	1byte,1-4 (updated on Nov 14,2012)

11	Way Of Calculation	1byte
		const_max_temperature=1;
		const_avg_temperature=2;
		const_min_temperature=3;

2.7.2 Modify temperatures sensor for HVAC

Operation Code: **0x 018E**		
Target Subnet ID:	Specify subnet ID of target device	scope 1-254
Target Device ID:	Specify device ID of target device	scope 1-254
Additional Content		
LEN of additional content:: 12 bytes		
Index of Additional Content	**Remark**	**Value**
0	Reserved	1byte
1	Enabled for Sensor 1	1byte Enabled =1,disabled=0
2	Compensation for sensor 1	1byte,
3	Enabled for Sensor 2	1byte Enabled =1,disabled=0
4	Subnet ID Of Sensor 2	1byte,1-254
5	Device ID Of Sensor 2	1byte,1-254
6	Reserved	1byte
7	Enabled for Sensor 3	1byte Enabled =1,disabled=0
8	Subnet ID Of Sensor 3	1byte,1-254
9	Device ID Of Sensor 3	1byte,1-254
10	Port No of 4T	1byte,1-4 (updated on Nov 14,2012)

11	Way Of Calculation	1byte
		const_max_temperature=1;
		const_avg_temperature=2;
		const_min_temperature=3;

Response

Operation Code: **0x 018F**		
Target Subnet ID:	Specify subnet ID of target device	scope 1-254

Target Device ID:	Specify device ID of target device	scope 1-254
Additional Content		
LEN of additional content: 12 bytes		
Index of Additional Content	**Remark**	**Value**
0	Flag of Success of failure	1byte Success=0xF8 Failure =0xF5