



# **K-Bus Tool**

## **IR Configuration Function**

### **User manual-Ver 2**

<http://www.video-star.com.cn>

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# 1 General

K-BUS Tool is a PC configuration software to configure some devices from video-star, this paper describes the overall framework of the software and the use of IR configuration function. The IR configuration function of this software are only available in conjunction with the IR Learner and IR Emitter, it can facilitate simple set-up of these devices. It is the upgraded version of the first edition of this function. Compared with the first version of the function, user interface more humane, have the very big enhancement on the data processing capacity. Users can avoid the complex and complicated operation in the first version. In addition, the software also provides configuration debugging capabilities, you can avoid ETS software configuration device debugging steps, greatly improve the work efficiency.

The user who use it at first time, should read the software driver installation manual, it detailed introduces the essential condition of the software runs and the related driver installation method.

## 2 Software Introduction

### 2.1 Functional overview

#### 2.1.1 IR Config Function

IR configuration function can be used to learn and test the key encoding of the IR Remoter through the IR learner, and save encoding to the configuration file. Every channel of IR Emitter can be configured in 64 different control commands and 16 group addresses configuration. After completing the configuration, through the EIB Bus and communicate with IR Emitter, then download the IR control command and each channel group configuration data to the IR Emitter, after downloaded successfully, through the other devices of the system with EIB/KNX bus can the IR Remote Control devices, such as the family of DVD, TV, air conditioning, Fan, etc.

**The main functions are as follows:**

- Supports the IR transmitter of BTIS-04/00.1 and BTIS-01/00.1 versions ;
- The device manager of IR can be configured with 20 IR Emitter devices at most ;
- The device manager of IR Learning code can be configured with 40 controlled appliances ;
- Each of the controlled appliance can learn 40 key encoding at most ;
- Each devices have 4 channels, and can configure 256 commands ; (maybe the BTIS-01/00.1 can support more devices, but max. number of commands still are 256)
- Each channel can be configured with 16 group addresses at most ;
- To learn more than 95% of remote controller in the market ;
- The IR control commands can be assigned to 1bit or 1byte type of object, 1bit object can recall the IR control commands of the devices, but 1byte object only can recall the corresponding IR control commands of channel through the scene mode;
- Sending time and sending delay can be set for per IR commands ;
- Each command can include 5 slave functions, this way is suitable for controlling several functions via one command at a time ;

#### 2.1.2 Debug function

Debug function can be used to send the message of group address and monitor the group address message on the bus.

**The main functions are as follows:**

- Only support to send a type of 1bit or 1byte message;
- Support group address message series [write] cycle transmission;
- Support group address message series [read] cycle transmission;
- Support the manual transmission of group address message;
- Can store 10 different message series;
- Each series can add 150 test data (including the delay and group address message).

## 2.2 Operating environment

**Operating system :** the operating system version of Windows XP(32bit)and Windows 7(32/64bit) ;

**Operating environment :** must install "KNX eteC Falcon Runtime V2.1" run time library on the PC(Note: the operating environment in the software installation is introduced in the specification).

## 2.3 Language

**The software supports two language:** Chinese and English,when under the English operating system want to normal use Chinese interface, you need to install Chinese language pack .

## 3 Software Interface

Double-click the shortcut on the desktop [K-BUS Tool.exe] or select [Start]/[All Programs]/[K-BUS Tool]/[K-BUS Tool.exe] to start the software,the initial interface shown as in fig. 3.1.

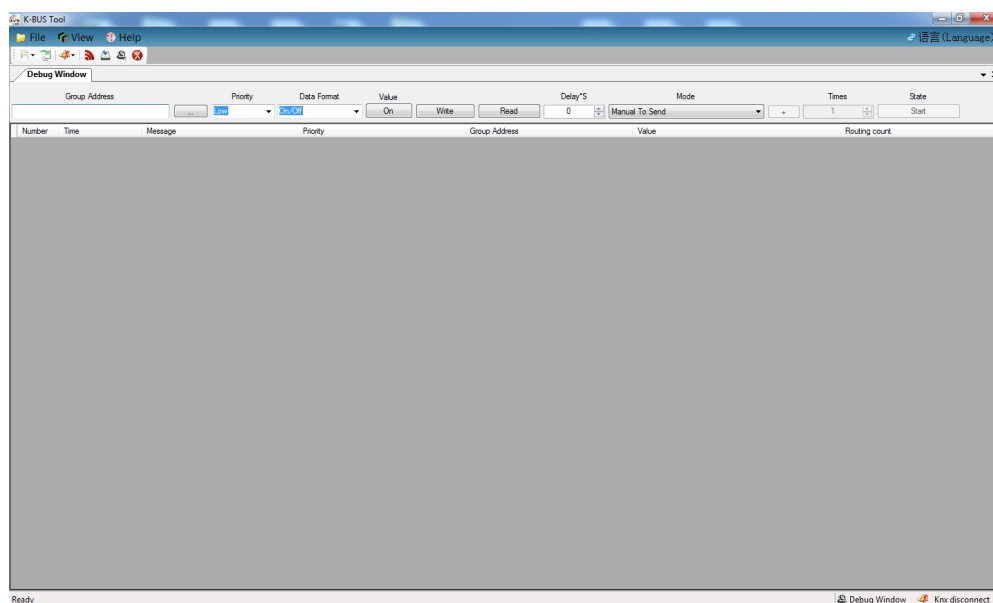


fig.3.1 The initial interface

### 3.1 Main menu

The main menu include three menu group: [file] [view] [help], these menu group content and method of use will introduce as follow section.

#### 3.1.1 [File]

The drop-down menu shown as fig.3.2.

- ① [New]: Create a new configuration file;
- ② [Open]: Open the configuration file;
- ③ [Security settings]:Set password of current configuration file;
- ④ [Communication]:Software and KNX bus communication settings;
- ⑤ [Recent files]:Browse or open the 10 recent success opened files;
- ⑥ [Quit]:Exit the software.

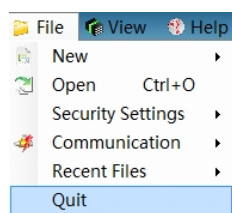


fig.3.2 [File] drop-down menu

### 3.1.2 [View]

The drop-down menu shown as fig.3.3.

- ① [IR Configuration]:Show IR Configuration window;
- ② [Download]:Show Download window;
- ③ [Error list]:Show Error list window;
- ④ [Debug]:Show Debug window;
- ⑤ [Toolbar]:Show Toolbar.

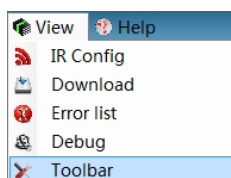


fig.3.3 [View] drop-down menu

### 3.1.3 [Help]

The drop-down menu shown as fig.3.4.

- ① [About]:Show the software version number information;
- ② [User manual]:Open the user manual.

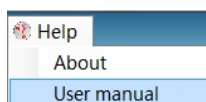


fig.3.4 [Help] drop-down menu

### 3.1.4 [语言(Language)]

The drop-down menu shown as fig.3.5.

- ① [Simplified Chinese]:Select simplified Chinese as the software display language next times;
- ② [English]:Select simplified English as the software display language next times.

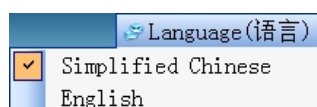


fig.3.5 [语言(Language)] drop-down menu

## 3.2 Debug Window

The debug window shown as fig.3.6, it is similar to ETS4's "Group Monitoring" window, but the functions of debug window would be far less than the functions of ETS's "Group Monitoring", therefore, to obtain more detailed information we need to use the ETS4 "Group Monitoring" window for the test. Debugging is mainly to write or read the device's group data by sending a group telegram, then the user according to the feedback information and the response of controlled appliances to judge the downloaded in the device configuration is in force or not.

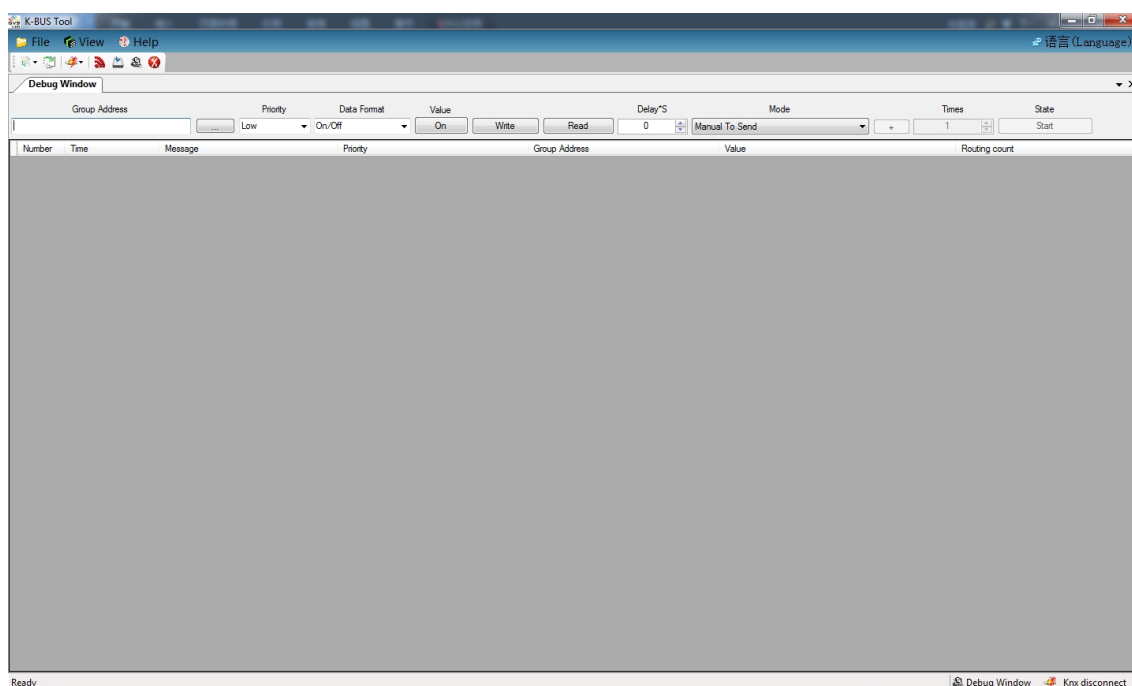


fig.3.6 Debug Window

The debug window includes information input box (fig.3.6 the gray background area) and information feedback box (fig.3.6 the dark background area). These informations are described in the following subsections.

### 3.2.1 Information input

There are two kinds of group telegram sending mode [manually send, circular sent (write / read)] in the information input box:

① Manual to send:

**Group address:** The group address of mailing telegram ;

**Priority:** The priority of sending Group telegram on the bus;

**Button "...":** Browse all input record of the group address ;

**Data point type:** The data type of group telegram ;

**Value:** The value of group telegram ;

**Button "Write":** To send the telegram which write group information;

**Button "Read":** To send the telegram which read group information;

**Delay:** Delay time of telegram sending after click the button "write/read".

## ②Circular sent (write / read)

### (1) Loop to write

**Times:** The sending times of group address telegram series;

**Button "+":** Pop up a dialog box of adding group address series(Shown as fig.3.7).

Number	Group Add...	Priority	Data Format	Value	Delay
1	0/0/1	Low	On/Off	0	1
2	0/0/1	Low	On/Off	0	1
3	0/0/1	Low	On/Off	0	1
4	0/0/1	Low	On/Off	0	1
5	0/0/1	Low	On/Off	0	1
6	0/0/1	Low	On/Off	0	1
7	0/0/1	Low	On/Off	0	1
8	0/0/1	Low	On/Off	0	1
9	0/0/1	Low	On/Off	0	1
10	0/0/1	Low	On/Off	0	1
11	0/0/1	Low	On/Off	0	1
12	0/0/1	Low	On/Off	0	1
13	0/0/1	Low	On/Off	0	1
14	0/0/1	Low	On/Off	0	1

**fig.3.7 Group list dialog box-write**

Through the dialog can add and save 10 cycling test series,each series can add 150 group telegram.When the cycling send start, the debug window will according to the telegram which was stored by the current test sequence, and according to the serial number in turn send the telegram.

### (2) Loop to read

**Times:** The sending times of group address telegram series;

**Button "+":** Pop up a dialog box of adding group address series(Shown as fig.3.8,details please see page [Loop to write](#)).

Telegram List: GroupTelegramList1

Main: 0 Middle: 0 Child: 1 [\*/\*] Priority: Low

Add

Number	Group Address	Priority
1	0/0/1	Low
2	0/0/2	Low
3	0/0/3	Low
4	0/0/4	Low
5	0/0/5	Low
6	0/0/6	Low
7	0/0/7	Low
8	0/0/8	Low

Navigation buttons: Up, Close (X), Down, OK

fig.3.8 Group list dialog box-Read

### 3.2.2 Information display

**Number:**The sequence number of Feedback message ;

**Time:**The time of detecting message ;

**Message:** The information of feedback message ;

**Priority:** The Priority of telegram ;

**Group address:** The group address of telegram ;

**Value:**the value of telegram ;

**Rount count:**The routing count of telegram .

## 3.3 IR configuration

IR configuration window is used to configure the function of IR Emitter, the contents of the window as shown in fig.3.9. Through IR Learning Code Manager, we can learn and record each IR encoding of the appliance remote controller's function ,and can config the key function encoding into the commands library by the commands configuration box, according to a certain format configured to the command which IR Emitter can call, then through the group configuration box you can config the group address of channel function, the command to call and so on.

Finally downloaded the configuration to the IR Emitter via the KNX Bus.

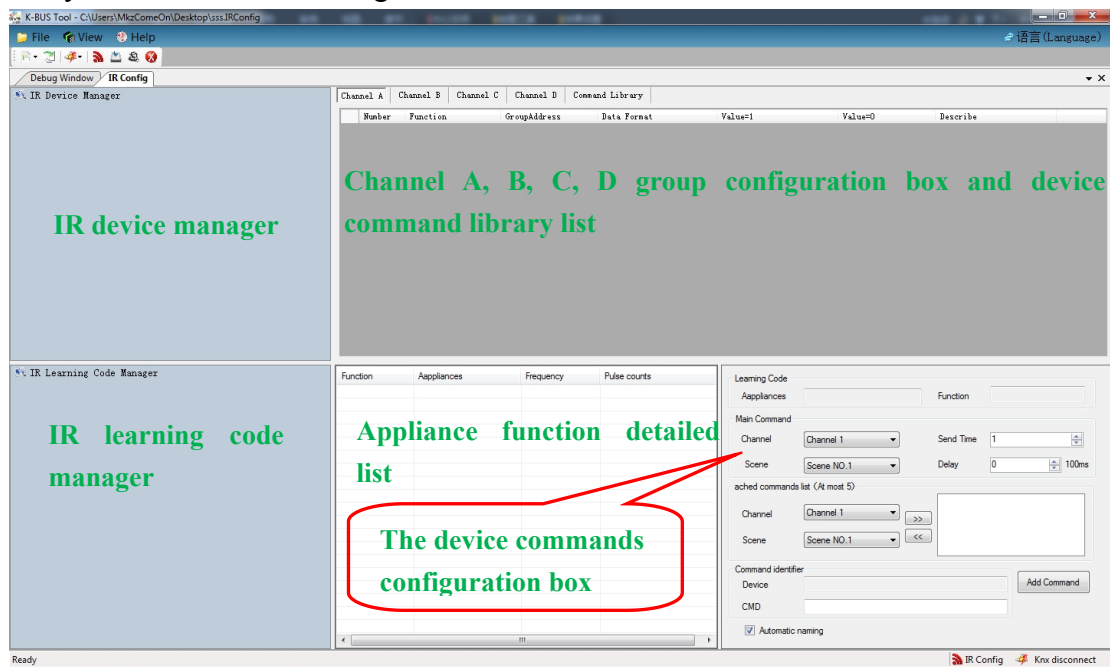


fig. 3.9 IR Configuration

### 3.3.1 Device manager

The device manager is a mechanism to manage the configured information of IR Emitter, it is mainly used for device of new, delete, modify the properties, channel selection, download of the configured information.

### 3.3.2 IR learning Code manager

IR learning Code Manager is a mechanism to manage the information of the controlled appliances which have IR remote controlled function, it is mainly used for the controlled electrical new, delete, rename, import or export IR learning code, and the remote controlled function of appliance's new and learning, test.

### 3.3.3 Appliance function detailed list

The appliance function detailed list is used to display the item sub information which are selected by the learning code manager. we can check the appliance name of selected items, electrical function, the frequency and pulse counting of the electrical function remote controller, also can pass the test to verify the effectiveness of learning code.

### 3.3.4 The device command configuration box

Device command box is divided into four parts: learning code, the main command, the list of Attached commands and command marks.

① Learning Code (Choice in the appliance function detailed list)

**Appliance:** The electrical which the main command calls the electrical function;

**Appliance function:** the main command calls the electrical function;

② Main command

**Channel:** Part of a command;

**Scene:** Part of a command;

**Send time:** The number of send command, for example, the wind speed function of a fan is set to 2 times for transmitting, then when the transmitter receives a corresponding telegram, the transmitter will send the wind speed signal to the fan and continuous send 2 times, then the wind speed of the fan will jump 2 steps.

**Send delay:** To set the send delay for the command. For example, you turn on a fan, and attach a pivot and time function. If they are executed at the same time, this may influence the life of the fan motor, so you can delay a period of time for transmitting of the pivot and time function. Then when the transmitter receives a 14 corresponding telegram, the transmitter will first send the open function signal to the fan, after a while send the pivot function signal to the fan, and then after a time send the time function signal to the fan, in order to protect the motor of the fan.

③ the list of from commands

**Channel:** Part of a command;

**The scene:** Part of a command;

**Button">>":** Add a from command;

**Button"<<":** Delete the from command of selected.

④ Command marks.

**Device:** The device of the current configuration command;

**Command:** The mark of current command;

**Button"Add command"or"Modify command":** Add new command or modify the old command;

**"Automatic naming":** Selected whether or not automate name for the device command.

### 3.3.5 Device command library

Select the tab [Command Library] in the red box of group configuration shown in Figure 3.10 the detailed list of device command Library. The detailed list of device command library shows all the commands' parameters which are configured for the device by the user. Its main parameters had detail introduced in the previous subsection, so this section do not introduce anymore.

Channel A	Channel B	Channel C	Channel D	Command Library			
Number	Function	GroupAddress	Data Format	Value=1	Value=0	Describe	

fig.3.10 The detailed list of device command Library

### 3.3.6 Group configuration

In the group configuration, users can configure every channel's the group address allocation, command calling details, scene configuration and other data of the devices.

**Number**: Each function's serial number (automatic sorting)

**Function**: Assigned the only non empty marking to the function;

**Data format**: Functional data formats including 1Bit and 1Byte, when choose 1Bit, the parameters of [Value=1] and [Value=0] effective, When choose 1Byte, calling all command of the channel by using scene recall.

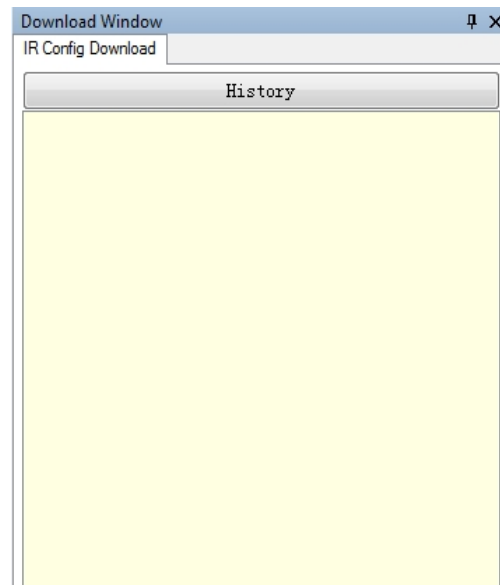
**Value=1**: Setting the data format is 1Bit case, device receives the command which was called by the specified message value 1;

**Value=0**: Setting the data format is 1Bit case, device receives the command which was called by the specified message value 0;

**Description**: The described information of the function;

**The Save button**: The function of save the current editor

### 3.4 The download window



**fig. 3.11 the download window**

Choose the main menu bar [view] menu group drop-down menu [Download], pop up as shown in Figure 3.11 the download window when it is executing the download tasks. It can receive and perform the download task of other window, and each can only perform a download task. Users can cancel the current task's execution and view the information and schedule of the current task and task record By downloading Windows .

### 3.5 Error list

Select the main menu bar [view] menu group drop-down menu [Error list], Pops up as shown in Figure 3.12 The error list window. The function of error window is that receive and display the error configured information from other configuration window, and according to the error information to jump to the wrong collocation.

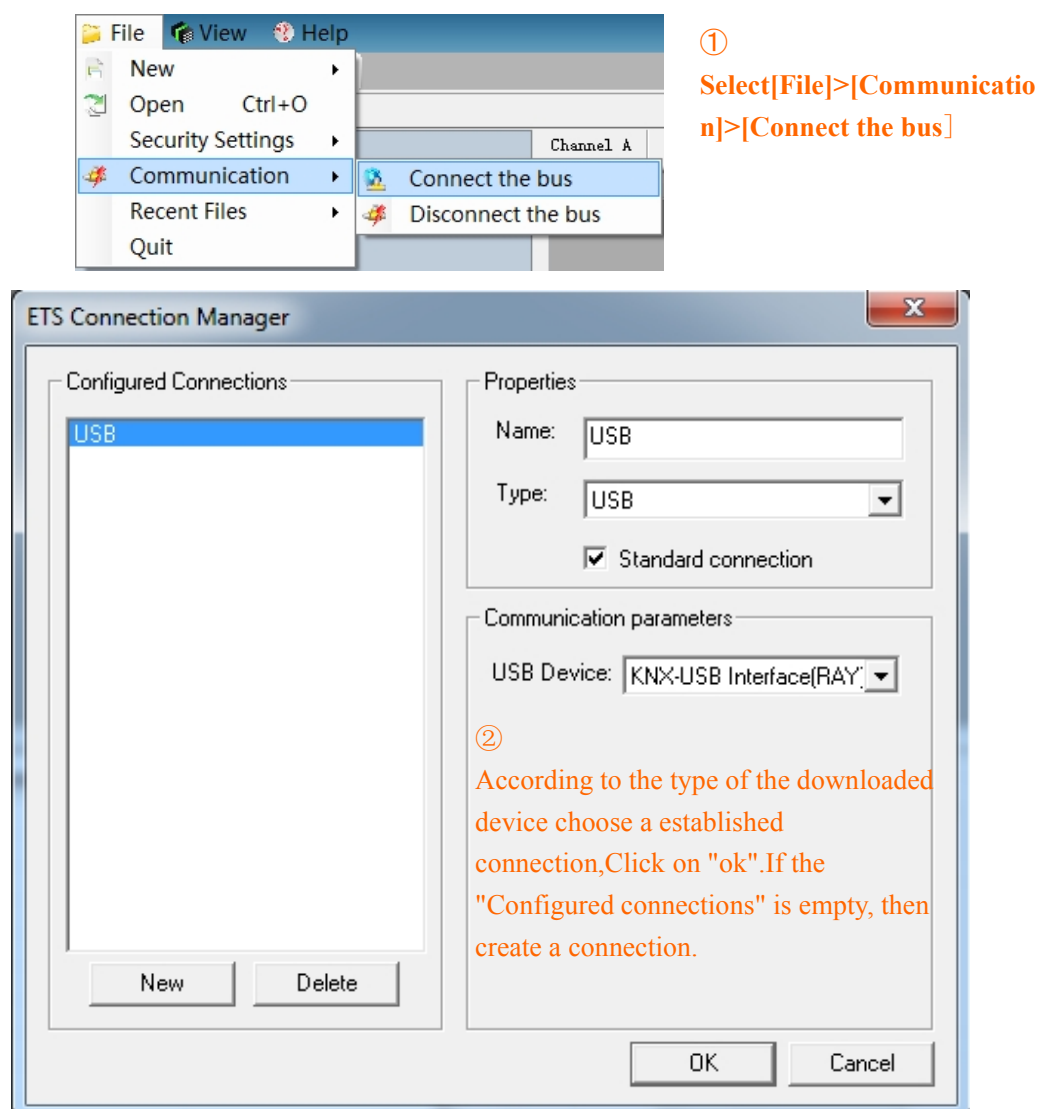
Error List		
Number	Device	Explanation

**fig 3.12 Error list**

## 4 Demo

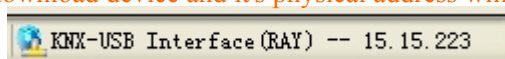
This chapter describes all the actual operation of the software function and the matters of needing attention.

### 4.1 Communication settings



Note: If you select a USB connection in "Configure Connections" box, not detected download device in the right "Communication parameters" box, please check the connection of download device and PC machine .If the connection is good and the downloader is USB, we will need to install the driver.

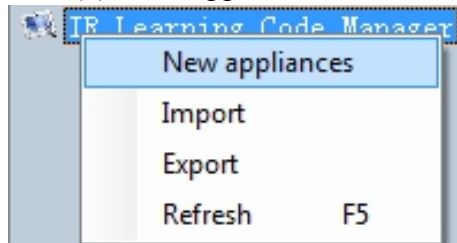
③After the bus successfully connecting ,the download device and it's physical address will be displayed on the right side of the status bar



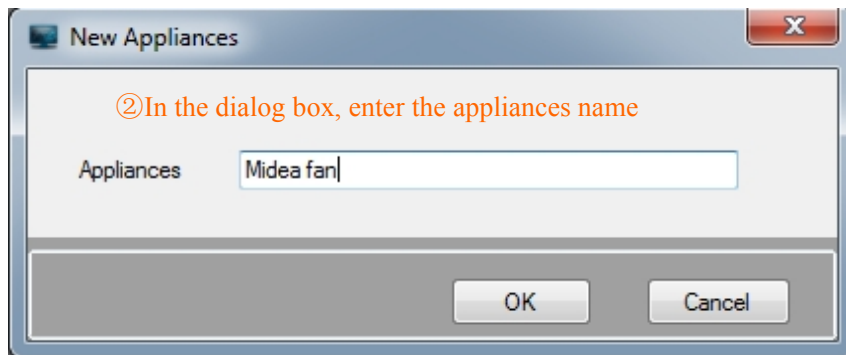
## 4.2 IR configuration function

### 4.2.1 New Controlled appliance

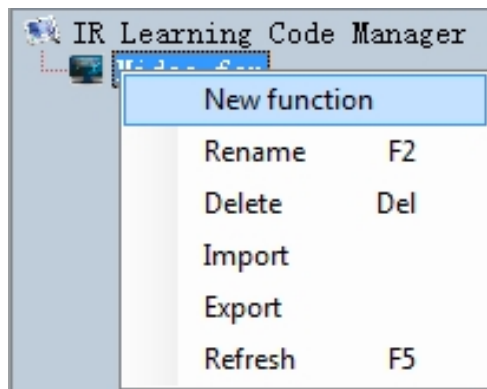
(1) New appliance



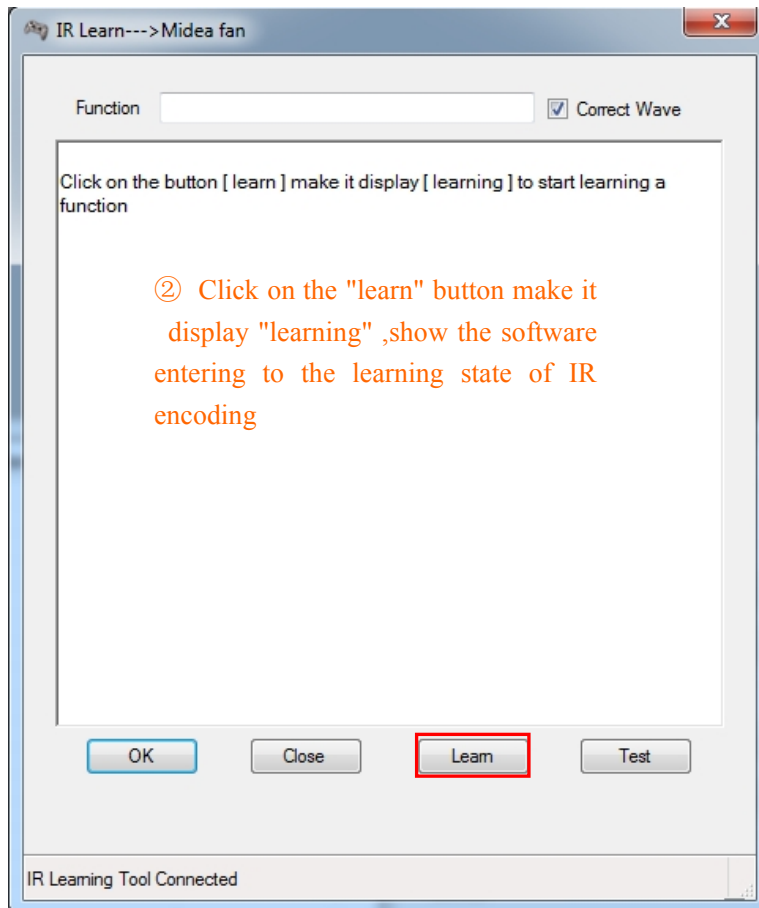
① Right click the "IR learning code manager", Select [New appliance]



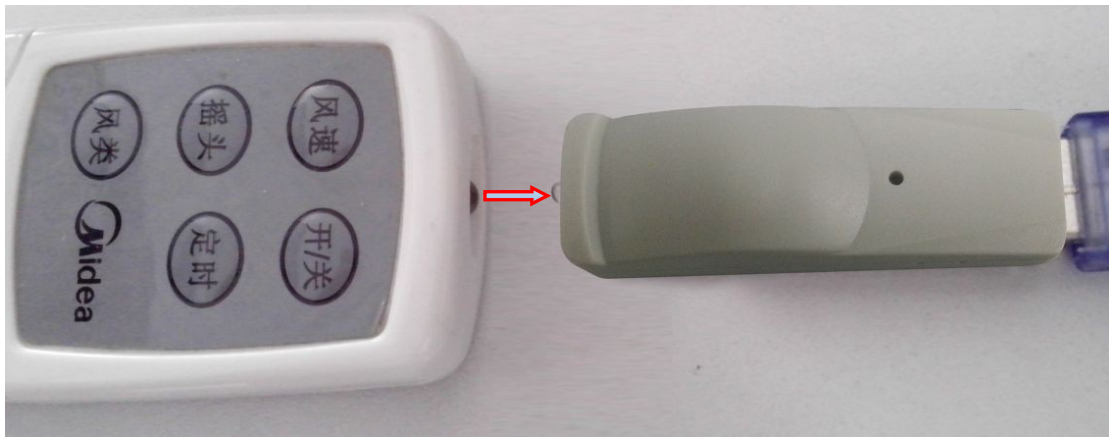
(2) Add functionality to the new appliances



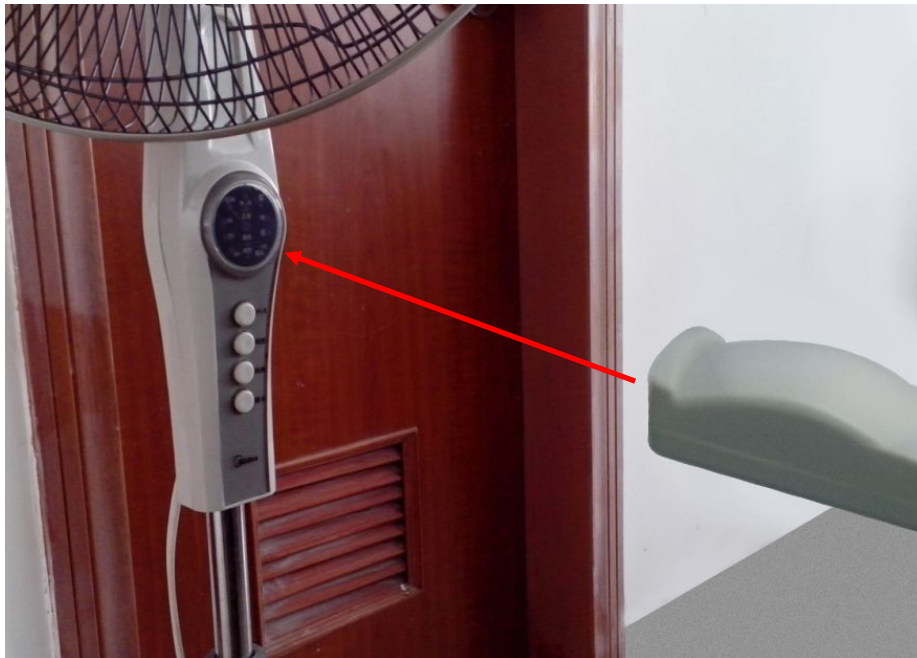
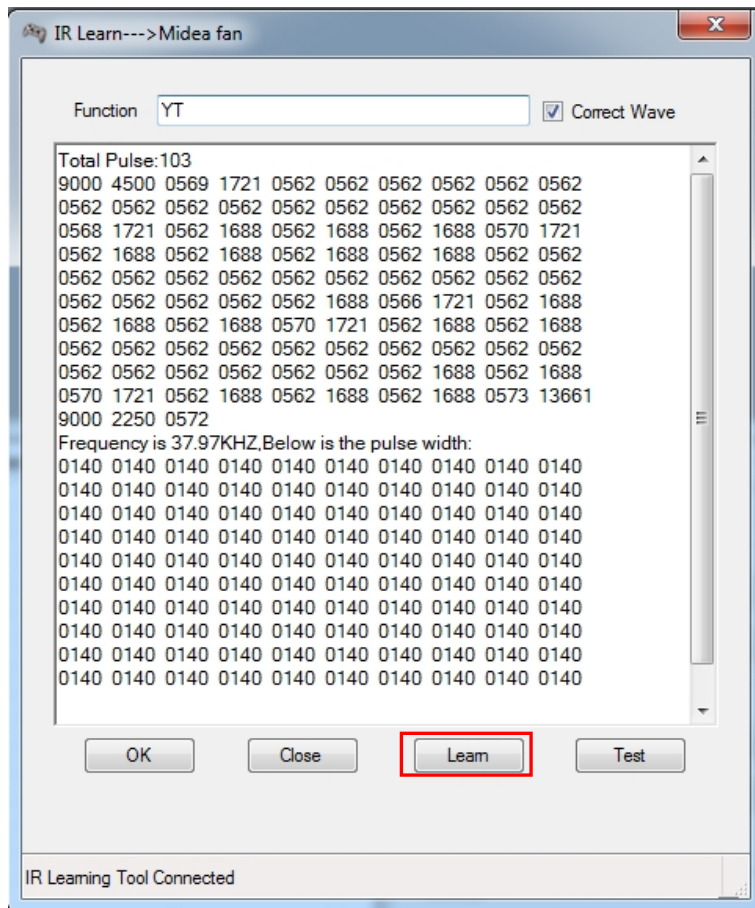
① Right click the new appliances, select [New function]



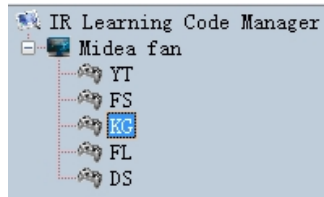
- ③ Learning the electric fan remote controller "swing" function,the Emitter head of remote controller placed on receives head of learner about 0.5cm~2cm when learning



- ④ When the IR learner receives the signal emitted by the remote control button to display the "learning" turn to "learn" to identify this study is completed. Then test the validity of this study.



⑤ IR learner is placed on the opposite of controlled electrical infrared receiver less than 4 meters , then click on the button "Test" to test this learning code .if the test is valid,click button "OK" to save this encoding, If invalid, repeat steps ②~④。



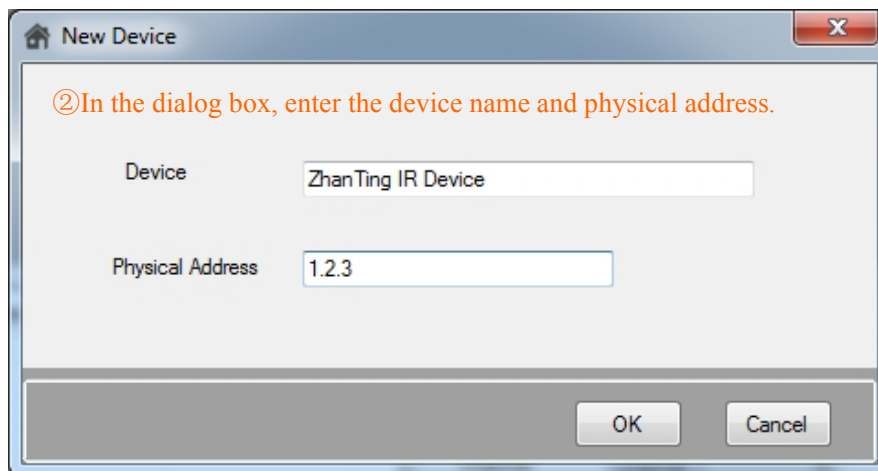
⑥ Repeat ②~⑤ step to complete the learning of remote controller function, like function "CQ", "FS", "KG", "FL", "DS".

## 4.2.2 New IR transmitter

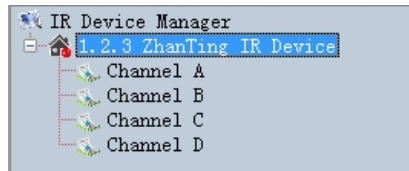
### (1) New device



① Right click the "IR Device Manager", Select [New device].



② In the dialog box, enter the device name and physical address.



③ New device successfully.

### (2) Add functionality to the new device

Function	Appliances	Frequency	Pulse counts
YT	Midea fan	38.00KHZ	103
FS	Midea fan	38.00KHZ	103
KG	Midea fan	37.62KHZ	103
FL	Midea fan	38.00KHZ	103
DS	Midea fan	37.62KHZ	103

① Select a device in "IR Device Manager", then select a appliance in the "IR Learning Code Manager", and choose a function of this appliance in the detailed list box.

Learning Code

Appliances: Midea fan Function: KG

Main Command

Channel: Channel 1 Send Time: 1

Scene: Scene NO.1 Delay: 0 100ms

Attached commands list (At most 5)

Channel: Channel 1

Scene: Scene NO.1

Command identifier

Device: ZhanTing IR Device

CMD: A1

Add command

☐ Automatic naming

② According to the need to input various parameters, click button "Add command" to add the command to current device

③ Repeat ①~② step to config the device command, Get the commands show as following Fig

Channel A Channel B Channel C Channel D Command Library								
Number	CMD	Main Command Parameters				Attached CMD	Send Times	Delay(100ms)
		CMD Number	Appliances	Function				
1	A1	C1 / S1	Midea fan	KG			1	0
2	A2	C1 / S2	Midea fan	FS			1	0
3	A3	C1 / S3	Midea fan	YT			1	0
4	A4	C1 / S4	Midea fan	DS			1	0
5	A5	C1 / S5	Midea fan	FL			1	0
6	A6	C1 / S6	Midea fan	KG	C1 / S3		1	3
7	B1	C2 / S1	Midea fan	FS			1	0
8	B2	C2 / S2	Midea fan	KG			1	0
9	B3	C2 / S3	Midea fan	YT			1	3
10	B4	C2 / S4	Midea fan	DS			1	3
11	B5	C2 / S5	Midea fan	FL			1	0
12	B6	C2 / S6	Midea fan	KG	C2 / S3		1	3

### (3) Group Configuration

We must config some command for the current device the last time ,then we will call these command to config a device function, Configuration show as follows Fig:

#### ① Configuration of channel A:

Channel A Channel B Channel C Channel D Command Library								
Number	Function	GroupAddress	Data Format	Value=1	Value=0	Describe		
1	ScenA	1/0/0	1Byte	Any Command	Any Command			Saved
2	KG/FS	1/0/1	1Bit	A1	A2			Saved
3	YT/DS	1/0/2	1Bit	A3	A4			Saved
4	FL/KG	1/0/3	1Bit	B5	B2			Saved
5	YT	1/0/4	1Bit	A3	A3			Saved
6								Save

#### ② Configuration of channel B:

Channel A Channel B Channel C Channel D Command Library								
Number	Function	GroupAddress	Data Format	Value=1	Value=0	Description		
1	ScenB	2/0/0	1Byte	Any Command	Any Command			Saved
2	FS/KG	2/0/1	1Bit	B1	B2			Saved
3	YT	2/0/2	1Bit	B3	B3			Saved
4	KG Attached	2/0/3	1Bit	B6	B6			Saved
5	Com	1/0/1	1Bit	B4	A2			Saved
6								Save

### ③ Configuration of channel C:

Channel A	Channel B	Channel C	Channel D	Command Library				
	Number	Function	GroupAddress	Data Format	Value=1	Value=0	Description	
▶	1	ScnC	3/0/0	1Byte	Any Command	Any Command		Saved
	2	DS/FS	1/0/1	1Bit	A4	B1		Saved
	3							Save

### ④ Configuration of channel C:

Channel A		Channel B		Channel C		Channel D		Command Library			
	Number	Function	GroupAddress	Data Format	Value=1	Value=0	Description				
▶	1			<div></div>	<div></div>	<div></div>		<div>Save</div>			

The Group configuration analysis as follows table:

Telegram			The response process of IR Emitter			
Group Address	Data Format	Value	Chanel A	Chanel B	Chanel C	Chanel D
1/0/0	Byte	0	C1/S1			
1/0/0	Byte	1	C1/S2			
1/0/0	Byte	2	C1/S3			
1/0/0	Byte	...	C1/S...			
1/0/0	Byte	x	C1/S(1+x)			
1/0/1	1Bit	1	A1	B4	A4	
1/0/1	1Bit	0	A2	A2	B1	
1/0/2	1Bit	1	A3			
1/0/2	1Bit	0	A4			
1/0/3	1Bit	1	B5			
1/0/3	1Bit	0	B2			
1/0/4	1Bit	1	A3			
1/0/4	1Bit	0	A3			
2/0/0	Byte	0		C2/S1		
2/0/0	Byte	1		C2/S2		
2/0/0	Byte	2		C2/S3		
2/0/0	Byte	...		C2/S...		
2/0/0	Byte	x		C2/S(1+x)		
2/0/1	1Bit	1		B1		
2/0/1	1Bit	0		B2		
2/0/2	1Bit	1		B3		
2/0/2	1Bit	0		B3		
2/0/3	1Bit	1		B6		
2/0/3	1Bit	0		B6		
3/0/0	Byte	0			C3/S1	

3/0/0	Byte	1			C3/S2	
3/0/0	Byte	2			C3/S3	
3/0/0	Byte	...			C3/S...	
3/0/0	Byte	x			C3/S(1+x)	

### 4.2.3 Error correction

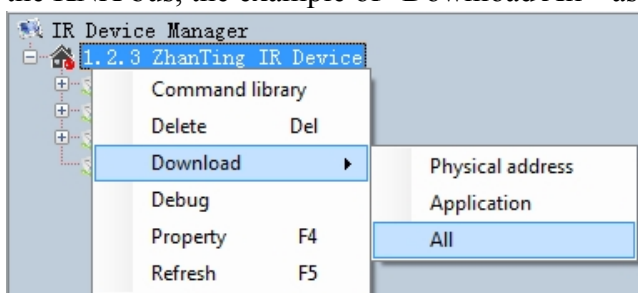
In the configuration process, we often have to create, delete, modify some commands, and these operations may affect the group configuration function. For example, the command "A6" have been some function calls in channel A, if you delete it that will show the error as Fig 4.1 Double click the error term, jump to the point of error ,then modification.If not timely amended, will lead to the same mistake at the download data validation and cannot download.

Error List		
Number	Device	Explanation
1	ZhanTing IR Device	In [Channel A],the command[Value=1] of function [YT/DS] is deleted
2	ZhanTing IR Device	In [Channel A],the command[Value=1] of function [YT] is deleted
3	ZhanTing IR Device	In [Channel A],the command[Value=0] of function [YT] is deleted
4	ZhanTing IR Device	In device command{ A6 },the attached command number [ C1 / S3 ] is deleted

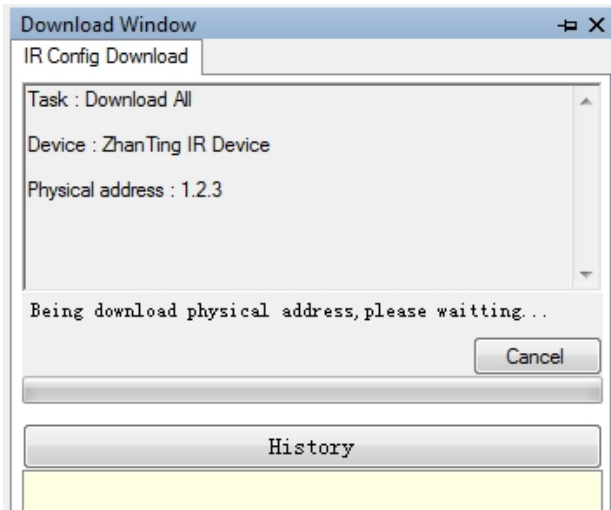
fig 4.1 Error List

### 4.2.4 Download

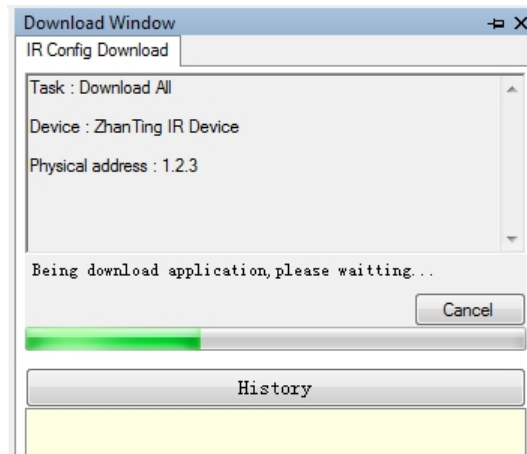
In the previous subsection, we have provided a simple infrared transmitter devices, this section describes how to download configuration to the IR Emitter via the KNX bus, the example of "Download All " as follow.



① you must to press the programming button before downloading physical address or downloading all

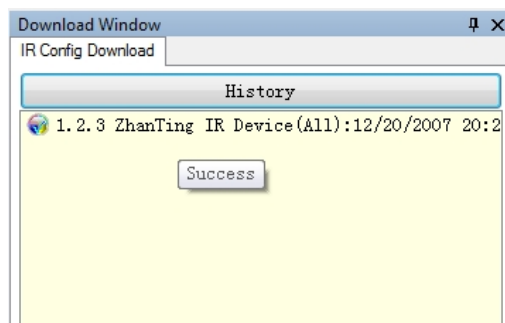


② Start the download



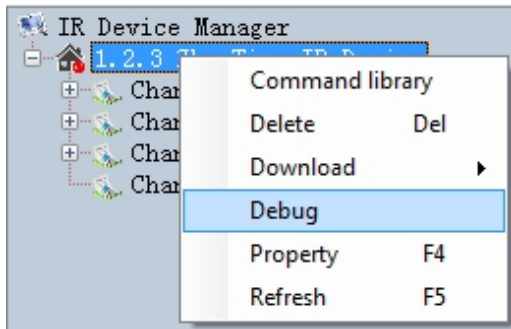
③Download application

④ The download is complete, tick ico indicate downloaded successfully, a fork to indicate failure, palm indicate cancel

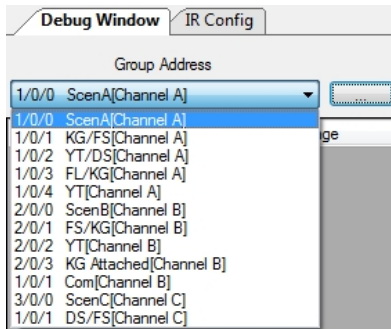


## 4.2.5 Debug

(1)Manually to send

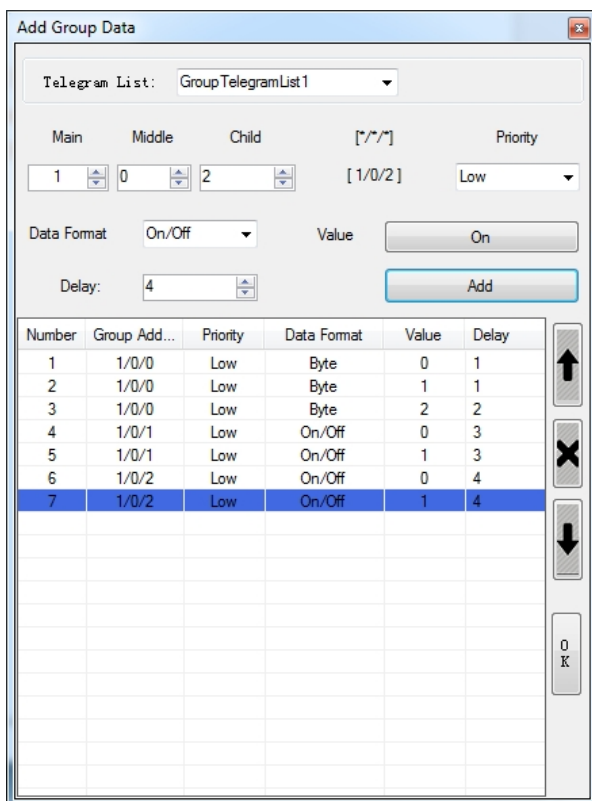


① Right click a device,select [Debug],then jump to the debug window



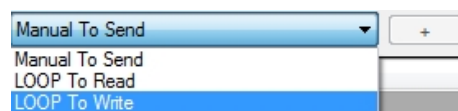
② Click button "...",Select a group address in the dropdown list.

③ According to the configuration and fill in the information box,click button "Write",you will see some feedback information in the display box,indicate the group telegram has been sent to the bus,If the appliance has no reaction, first check the emission head and the receiving head of fan alignment or not, then check the function whether is to act in a particular situation, Finally, check the function of the learning code work or not.



(2) Loop to write

① Select [Loop to write], then click button "+".



② Filling data according to the test requirement,then click "OK" to save the test list.

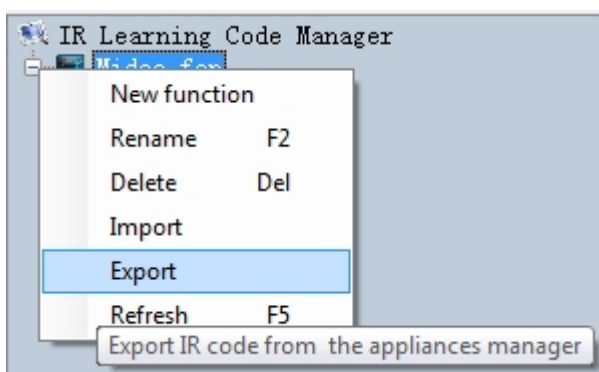
### ③The group telegram

Number	Time	Message	Priority	Group Address	Value	Routing count
1	12/12/2007 20:26:18	Start	-	-	-	-
2	12/12/2007 20:26:19	To bus	Low	1/0/0	0	6
3	12/12/2007 20:26:20	To bus	Low	1/0/0	1	6
4	12/12/2007 20:26:22	To bus	Low	1/0/0	2	6
5	12/12/2007 20:26:25	To bus	Low	1/0/1	0	6
6	12/12/2007 20:26:28	To bus	Low	1/0/1	1	6
7	12/12/2007 20:26:32	To bus	Low	1/0/2	0	6
8	12/12/2007 20:26:36	To bus	Low	1/0/2	1	6
9	12/12/2007 20:26:37	End	-	-	-	-

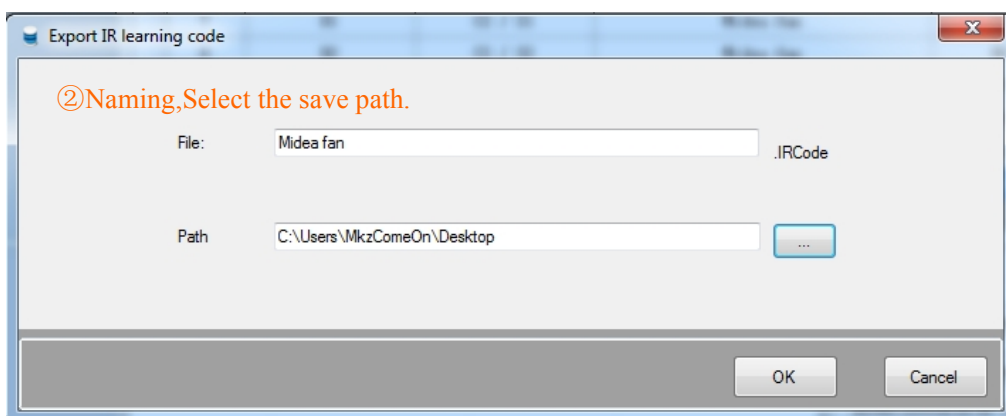
## 4.2.6 Import\Export IR learning encoding data

After create electrical appliances, in order not to repeat the work, we can Export encoding data to the file ".IRCode".or import encoding data of file ".IRCode" and ".IRConfig".

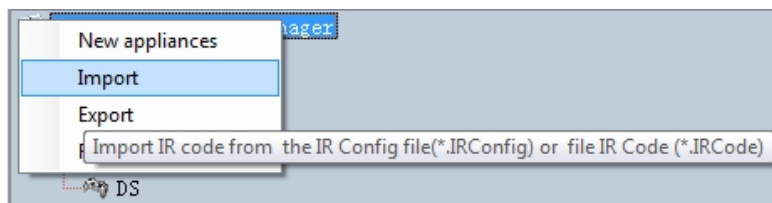
(1)Export file ".IRCode"



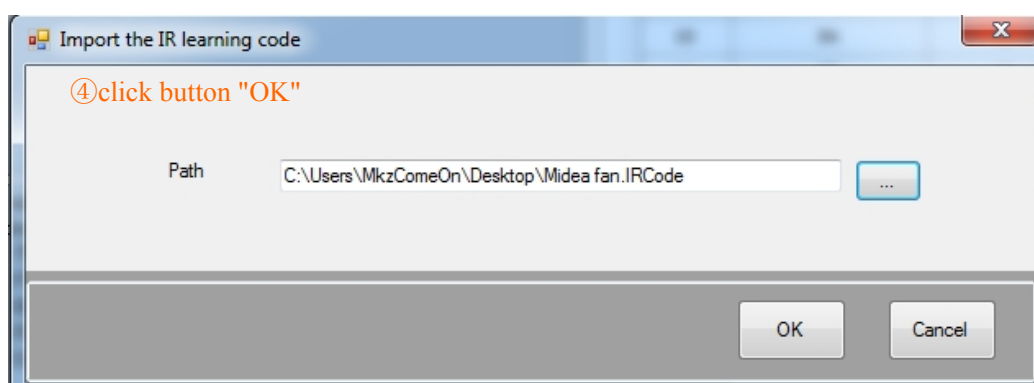
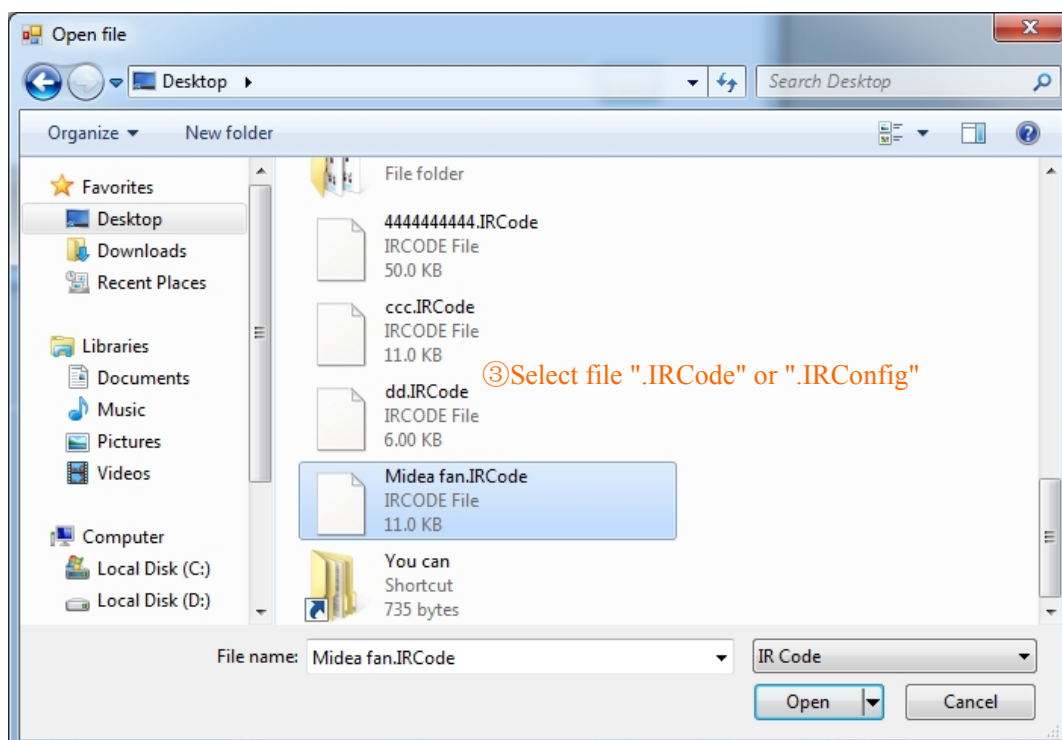
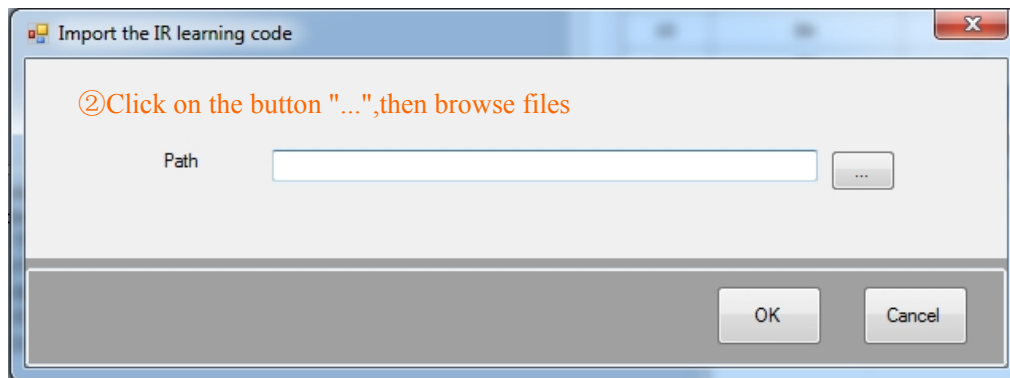
① Right click a appliance,select [Export],then export the encoding of appliance.(you can also Right click the IR Learning Code Manager to export all appliances)



(1)Export file ".IRCode" or ".IRConfig"

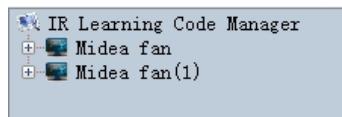


① Right click the IR Learning Code Manager select [Import]to export all encoding data of the file ".IRCode" or ".IRConfig".



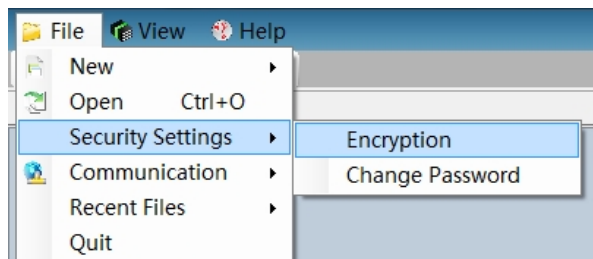


⑥



## 4.3 Security settings

### 4.3.1 Encryption

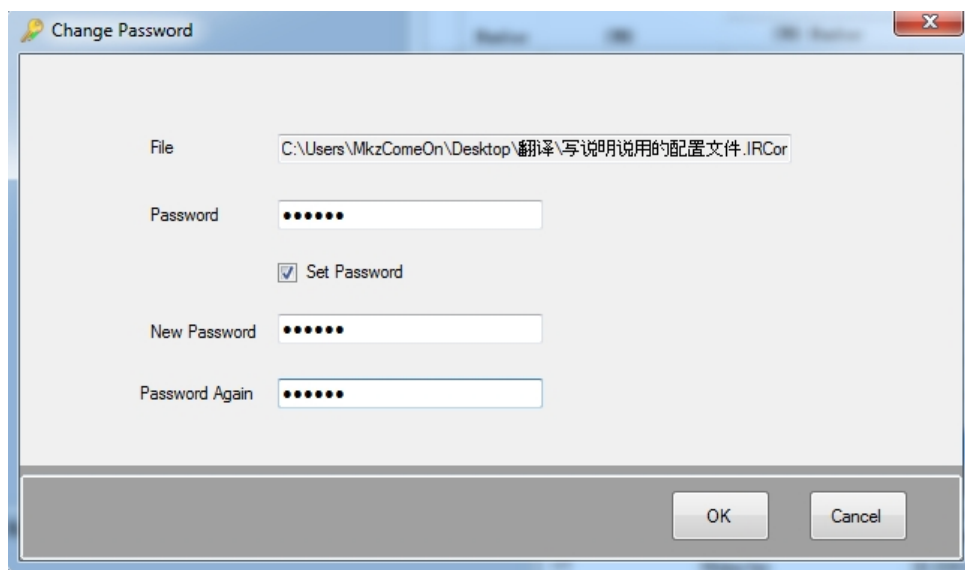


① Select [File][Security settings][Encryption]



② Enter the password

### 4.3.2 Change Password



## 4.4 The language switching

In the software operation , Select [ 语言 (Language)][ Simplified Chinese]or[English] , then Restart the software. Note:Only to restart software, language changing take effect.

## 4.5 Precautions

① The stored path of configuration file should not be too long, the total path characters cannot exceed 255 characters;

②The configuration file name cannot exceed 255 characters;

③Object (such as device, appliances, device command) name cannot exceed 255 characters;

④ If the device command sending times more than 2 times or also as other attached commands ,Suggest to add some delay, otherwise the controlled electric appliance will respond not to come over;

⑤The file cannot be deleted when opened, otherwise the software will pop-up anomaly with cannot find the file;

⑥ ".IRCode" and ".IRConfig" files can only be opened with the software,otherwise it will damage the file;

⑦File encryption to protect the file only in a certain extent, so the important data must to be make a backup;

⑧This software does not provide the password retake service , so be sure to

remember file password;

⑨The red box files are software system files,missing software will not run.



Note: The red box files are software system files.The file "en" is English language pack, missing English interface cannot be used.

# Appendix 1 Device Command execution process

The orders of the principal and subordinate command are determined by the delay of command preferentially when executing command.. If there is no difference in delay ,then the principal command is before the subordinate command while the subordinate command determined by the position sequence of "Attached CMD". And the command doesn't support the recursive call –that is the subordinate command of command can not be executed. Here are some examples below that will introduce the process in detail.

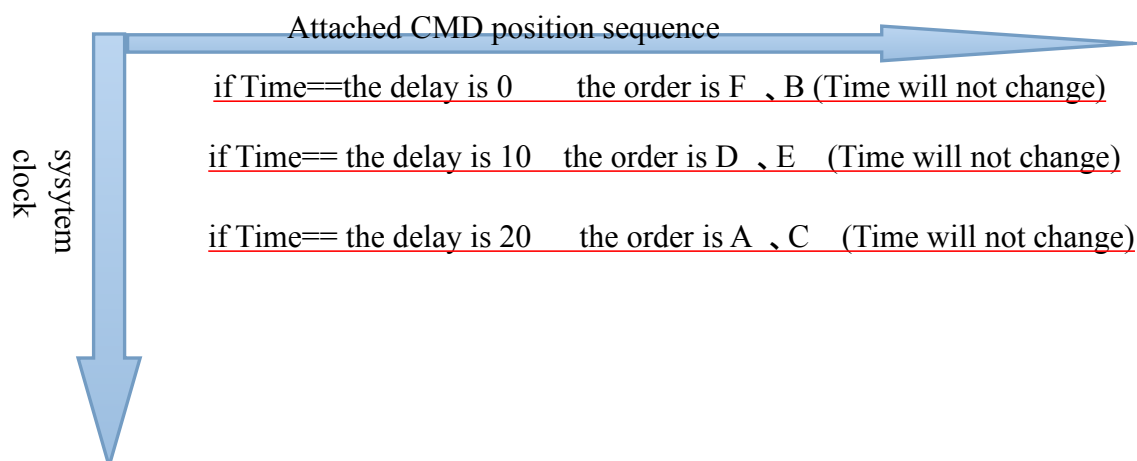
## (1) Part in common for principal and subordinate command

Channel A	Channel B	Channel C	Channel D	Command Library				
	Number	CMD	Main Command Parameters			Attached CMD	Send Times	Delay(100ms)
			CMD Number	Appliances	Function			
	1	D	C1 / S5	Midea fan	KG	C1 / S10 , C1 / S8 , C1 / S6 , C1 / S9 , C1 / S7	1	10
	2	A	C1 / S6	Midea fan	DS		1	20
	3	B	C1 / S7	Midea fan	FS		4	0
	4	C	C1 / S8	Midea fan	YT		1	20
	5	E	C1 / S9	Midea fan	FL		4	10
▶	6	F	C1 / S10	Midea fan	CQ		2	0

In the chart,C1/S5 corresponding to D,C1/S6 corresponding to A,C1/S7 corresponding to B,C1/S8 corresponding to C,C1/S9 corresponding to E,C1/S10 corresponding to F.

When the emitter calls command D, we can get the sequence from the delay time preferentially: (B、F)<(D、E)<(A、C); the orders of those have the same delay time are based on the the position sequence of "Attached CMD". Then we can get the final sequence: F(2)-B(4)-D(1)-E(4)-A(1)-C(1) and the execution time  $N=2+4+1+4+1+1=13$ .

The system schematic diagram as follow(will not mention below): when the command begins, the time -counter variate Time start to change(added by 1 in every 100ms) as well as the total execution time N(decreased by 1 ).



(2) Totally Different delay time for principal and subordinate command

① When the emitter calls command D, the ascending order according to the delay time is  $A < B < D < C$ . Then we can send the commands in sequence :

Channel A	Channel B	Channel C	Channel D	Command Library				
	Number	CMD	Main Command Parameters			Attached CMD	Send Times	Delay(100ms)
			CMD Number	Appliances	Function			
	1	D	C1 / S5	Midea fan	KG	C1 / S6 , C1 / S7 , C1 / S8	1	20
	2	A	C1 / S6	Midea fan	DS		1	0
	3	B	C1 / S7	Midea fan	FS		1	10
	4	C	C1 / S8	Midea fan	YT		1	30
	5	E	C1 / S9	Midea fan	FL		1	0

A(1)-B(1)-D(1)-C(1), in which the numbers in the brackets represent the execution time.

② When the emitter calls command D, the ascending order according to the delay time is  $A < B < D < C$ . Then we can send the commands in sequence :

Channel A	Channel B	Channel C	Channel D	Command Library				
	Number	CMD	Main Command Parameters			Attached CMD	Send Times	Delay(100ms)
			CMD Number	Appliances	Function			
	1	D	C1 / S5	Midea fan	KG	C1 / S6 , C1 / S7 , C1 / S8	3	20
	2	A	C1 / S6	Midea fan	DS		1	0
▶	3	B	C1 / S7	Midea fan	FS		5	10
	4	C	C1 / S8	Midea fan	YT		1	30
	5	E	C1 / S9	Midea fan	FL		1	0

A(1)-B(5)-D(3)-C(1), in which the numbers in the brackets represent the execution time.

(3) No difference in delay time for principal and subordinate command

① When the emitter calls command D, the commands can not be ranked according to the delay time. Then the principal command D will be executed preferentially. Besides, the sequence of the subordinate commands are determined by the position sequence of "Attached CMD"—that is A, B, C, E, F. Finally, we can

Channel A		Channel B		Channel C		Channel D		Command Library		
Main Command Parameters										
Number	CMD	CMD Number	Appliances	Function	Attached CMD			Send Times	Delay(100ms)	
▶	1	D	C1 / S5	Midea fan	KG	C1 / S6 , C1 / S7 , C1 / S8 , C1 / S9 , C1 / S10			1	0
	2	A	C1 / S6	Midea fan	DS				1	0
	3	B	C1 / S7	Midea fan	FS				1	0
	4	C	C1 / S8	Midea fan	YT				1	0
	5	E	C1 / S9	Midea fan	FL				1	0
	6	F	C1 / S10	Midea fan	CQ				1	0

send the the commands in sequence: D(1)-A(1)-B(1)-C(1)-E(1)-F(1), in which the numbers in the brackets represent the execution time.

② When the emitter calls command D, the commands can not be ranked according to the delay time. Then the principal command D will be executed preferentially. Besides, the sequence of the subordinate commands are determined by the position sequence of "Attached CMD"—that is F, C, A, E, B. Finally, we can send the commands in sequence: D(1)-F(2)-C(1)-A(1)-E(4)-B(4), in which the numbers in the brackets represent the execution time.

# GVS K-BUS® KNX/EIB KNX/IR Configuration Function

Channel A	Channel B	Channel C	Channel D	Command Library				
	Number	CMD	Main Command Parameters			Attached CMD	Send Times	Delay(100ms)
			CMD Number	Appliances	Function			
	1	D	C1 / S5	Midea fan	EG	C1 / S10 , C1 / S8 , C1 / S6 , C1 / S9 , C1 / S7	1	0
	2	A	C1 / S6	Midea fan	ES		1	0
	3	B	C1 / S7	Midea fan	FS		4	0
	4	C	C1 / S8	Midea fan	YT		1	0
▶	5	E	C1 / S9	Midea fan	FL		4	0
	6	F	C1 / S10	Midea fan	CQ		2	0

## Appendix 2

# The response process of IR Transmitter receiving the group telegram

The IR transmitter according to the data type and the group telegram value call related commands after receiving a correct group telegram(see 4.2.2 section),Here are some examples below that will introduce the process in detail. (Note: In order to understand of the appendix two, please read the appendix first).

### Example 1

#### Channel A

Channel A	Channel B	Channel C	Channel D	Command Library					
Number	Function	GroupAddress	Data Format	Value=1	Value=0	Description			
1	GFSDGFDS	1/0/112	1Byte	Any Command	Any Command			Saved	
2	GG	1/0/100	1Bit	D	D			Saved	
3	SSS	1/0/100	1Bit	A	B			Saved	
4	DSD	1/0/100	1Bit	C	C			Saved	
5	SS	1/0/100	1Bit	F	C			Saved	
6								Save	

#### Channel B

Channel A	Channel B	Channel C	Channel D	Command Library					
Number	Function	GroupAddress	Data Format	Value=1	Value=0	Description			
1	dddd	1/0/11	1Bit	B	E			Saved	
2	afdfs	1/0/12	1Bit	C	A			Saved	
3								Save	

#### Channel C

Channel A	Channel B	Channel C	Channel D	Command Library					
Number	Function	GroupAddress	Data Format	Value=1	Value=0	Description			
1	fasf	1/0/13	1Bit	C	E			Saved	
2								Save	

#### Channel D

Channel A	Channel B	Channel C	Channel D	Command Library					
Number	Function	GroupAddress	Data Format	Value=1	Value=0	Description			
1	fasdf	1/0/14	1Bit	E	E			Saved	
2								Save	

#### Device Command Library

Channel A	Channel B	Channel C	Channel D	Command Library			
Main Command Parameters					Attached CMD	Send Times	Delay(100ms)
Number	CMD	CMD Number	Appliances	Function			
1	D	C1 / S5	Midea fan	KG	C1 / S10 , C1 / S8 , C1 / S6 , C1 / S9 , C1 / S7	1	10
2	A	C1 / S6	Midea fan	DS		1	20
3	B	C1 / S7	Midea fan	FS		4	0
4	C	C1 / S8	Midea fan	YT		1	20
5	E	C1 / S9	Midea fan	FL		4	10
6	F	C1 / S10	Midea fan	CQ		2	0

The response process of IR Transmitter receiving the group telegram[1/0/100 1bit value=1]:

When receiving the group telegram, all the currnt commands of Channel A:

D(GG)\A(SSS)\C(DSD)\F(SS)(Parenthesis corresponding to the group configuration function),do the following:

**First**,According to the position sequence(Ascending):

Delay time 0: F(SS)

Delay time 10: D(GG)

Delay time 20: C(DSD)\A(SSS)

**Second**,According to the position in channel configuration sequence (From top to bottom):

①D(GG)

②A(SSS)

③C(DSD)

④F(SS)

**Third**,Based on the results of the last step,sort their Attached CMD according to the delay time:

①Attached CMD of D(GG):

(B[D(GG)]\F[D(GG)])<E[D(GG)]<(A[D(GG)]\C[D(GG)])

Delay time 0: B[D(GG)]\F[D(GG)]

Delay time 10: E[D(GG)]

Delay time 20: A[D(GG)]\C[D(GG)],**Square brackets is the main CMD.**

②A(SSS): have no Attached CMD;

③C(DSD): have no Attached CMD;

④F(SS): have no Attached CMD;

**Fourth**,Based on the results of the last step,According to the position in Attached CMD sequence (From left to right):

①Attached CMD of D(GG):

F[D(GG)]<B[D(GG)]<E[D(GG)]<C[D(GG)]<A[D(GG)]

Delay time 0: F[D(GG)]<B[D(GG)]

Delay time 10: E[D(GG)]

Delay time 20: C[D(GG)]<A[D(GG)]

②A(SSS): have no Attached CMD;

③C(DSD): have no Attached CMD;

④F(SS): have no Attached CMD;

**Fifth**,Insert the results of the last step into the results of the first step(From left to

right and From top to bottom),Finally, we can get the results as follows:

When the IR Transmitter receiving the group telegram[1/0/100 1bit value=1],the channelA send the commands in sequence:

Alfter 0\*100ms:

F(SS)\F[D(GG)]\B[D(GG)]

Alfter 10\*100ms:

D(GG)\E[D(GG)]

Alfter 20\*100ms:

C(DSD)\A(SSS)\C[D(GG)]\A[D(GG)]

For ease of observation(The sending times of each command see in the device library):

Alfter 0\*100ms:

F\F\B

Alfter 10\*100ms:

D\E

Alfter 20\*100ms:

C\A\C\A

## Example 2


### Channel A

Channel A	Channel B	Channel C	Channel D	Command Library				
	Number	Function	GroupAddress	Data Format	Value=1	Value=0	Describe	
	1	GFSDGFDS	1/0/112	1Byte	<div>Any Command</div>	<div>Any Command</div>		<div>Saved</div>
	2	GG	1/0/100	1Bit	<div>D</div>	<div>D</div>		<div>Saved</div>
	3	SSS	1/0/100	1Bit	<div>A</div>	<div>B</div>		<div>Saved</div>
	4	DSD	1/0/100	1Bit	<div>C</div>	<div>C</div>		<div>Saved</div>
	5	SS	1/0/100	1Bit	<div>F</div>	<div>C</div>		<div>Saved</div>
	6							<div>Save</div>

### Channel B

Channel A	Channel B	Channel C	Channel D	Command Library				
	Number	Function	GroupAddress	Data Format	Value=1	Value=0	Description	
	1	dddd	1/0/11	1Bit	B	E		Saved
	2	afdfs	1/0/12	1Bit	C	A		Saved
	3							Save

### Channel C

Channel A		Channel B		Channel C		Channel D		Command Library	
	Number	Function	GroupAddress	Data Format	Value=1	Value=0	Description		
	1	fasf	1/0/13	1Bit	C	E		Saved	
	2							Save	

### Channel D

Channel A	Channel B	Channel C	Channel D	Command Library				
	Number	Function	GroupAddress	Data Format	Value=1	Value=0	Description	
	1	fasdf	1/0/14	IBit	E	E		Saved
	2							Save

### Device Command Library

Channel A	Channel B	Channel C	Channel D	Command Library					
Number	CMD	Main Command Parameters				Attached CMD	Send Times	Delay(100ms)	
		CMD Number	Appliances	Function					
1	D	C1 / S5	Midea fan	KG		C1 / S10 , C1 / S8 , C1 / S6 , C1 / S9 , C1 / S7	1	10	
2	A	C1 / S6	Midea fan	DS		C1 / S9 , C1 / S8 , C1 / S5 , C1 / S10	1	20	
3	B	C1 / S7	Midea fan	FS		C1 / S5 , C1 / S9 , C1 / S6	4	0	
4	C	C1 / S8	Midea fan	YT		C1 / S7 , C1 / S10 , C1 / S5 , C1 / S9 , C1 / S6	1	20	
5	E	C1 / S9	Midea fan	FL		C1 / S5 , C1 / S7	4	10	
6	F	C1 / S10	Midea fan	CQ			2	0	

The response process of IR Transmitter receiving the group telegram[1/0/100 1bit value=1]:

When receiving the group telegram, all the currnt commands of Channel A:

D(GG)\A(SSS)\C(DSD)\F(SS)(Parenthesis corresponding to the group configuration function),do the following:

**First**,According to the position sequence(Ascending):

Delay time 0: F(SS)

Delay time 10: D(GG)

Delay time 20: C(DSD)\A(SSS)

**Second**,According to the position in channel configuration sequence (From top to bottom):

①D(GG)

②A(SSS)

③C(DSD)

④F(SS)

**Third**,Based on the results of the last step,sort their Attached CMD according to the delay time:

①Attached CMD of D(GG):

(B[D(GG)]\F[D(GG)])<E[D(GG)]<(A[D(GG)]\C[D(GG)])

Delay time 0: B[D(GG)]\F[D(GG)]

Delay time 10: E[D(GG)]

Delay time 20: A[D(GG)]\C[D(GG)],Square brackets is the main CMD.

②Attached CMD of A(SSS):

F[A(SSS)]<(D[A(SSS)]\E[A(SSS)])<C[A(SSS)]

Delay time 0: F[A(SSS)]

Delay time 10: D[A(SSS)]\E[A(SSS)]

Delay time 20: C[A(SSS)]

③Attached CMD of C(DSD):

(B[C(DSD)]\F[C(DSD)])<(D[C(DSD)]\E[C(DSD)])<A[C(DSD)]

Delay time 0: B[C(DSD)]\F[C(DSD)]

Delay time 10: D[C(DSD)]\E[C(DSD)]

Delay time 20: A[C(DSD)]

④F(SS):have no Attached CMD;

**Fourth**,Based on the results of the last step,According to the position in Attached CMD sequence (From left to right):

①Attached CMD of D(GG):

F[D(GG)]<B[D(GG)]<E[D(GG)]<C[D(GG)]<A[D(GG)]

Delay time 0: F[D(GG)]<B[D(GG)]

Delay time 10: E[D(GG)]

Delay time 20: C[D(GG)]<A[D(GG)]

②Attached CMD of A(SSS):

F[A(SSS)]<E[A(SSS)]<D[A(SSS)]<C[A(SSS)]

Delay time 0: F[A(SSS)]

Delay time 10: E[A(SSS)]<D[A(SSS)]

Delay time 20: C[A(SSS)]

③Attached CMD of C(DSD):

B[C(DSD)]<F[C(DSD)]<D[C(DSD)]<E[C(DSD)]<A[C(DSD)]

Delay time 0: B[C(DSD)]<F[C(DSD)]

Delay time 10: D[C(DSD)]<E[C(DSD)]

Delay time 20: A[C(DSD)]

④F(SS):have no Attached CMD;

**Fifth**,Insert the results of the last step into the results of the first step(From left to right and From top to bottom),Finally, we can get the results as follows:

When the IR Transmitter receiving the group telegram[1/0/100 1bit value=1],the channelA send the commands in sequence:

alfter 0\*100ms:

F(SS)F[D(GG)]\B[D(GG)]\F[A(SSS)]\B[C(DSD)]\F[C(DSD)]

alfter 10\*100ms:

D(GG)\E[D(GG)]\E[A(SSS)]\D[A(SSS)]\D[C(DSD)]\E[C(DSD)]

alfter 20\*100ms:

C(DSD)\A(SSS)\C[D(GG)]\A[D(GG)]\C[A(SSS)]\A[C(DSD)]

For ease of observation(The sending times of each command see in the device library):

alfter 0\*100ms:

F、F、B、F、B、F

alfter 0\*100ms:

D、E、E、D、D、E

alfter 0\*100ms:

C、A、C、A、C、A