HDL® KNX / EI3

HDL KNX / EI3
M/IRAC.1

Infrared emitting controller

MODEL: M/IRAC.1

HDL KNX / EIB-BUS

(Intelligent Installation Systems)

Product Manual

Contents

1- General

HDL KNX / EIB series products of IR AC Controller is developed by HDL. Using KNX/EIB BUS communicate with other KNX devices. Database need to be downloaded to the IR AC Controller by using ETS2 V1.3/ETS 3.0, The document descript how to use the products . Our products use standard according to EMC, electrical safety, environmental conditions.
The IR AC Controller are used to control objects, such as:

> * **TV**
> * **DVD**
> * **Air-condition**
> * **Other Equipments(can be controlled by IR)**

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1.1-Product Function

IR AC Controller is a multifunction IR transmitter. It have five function:

  * Single mode
  * Repeat mode
  * Sequence mode
  * Air-condition control
  * Current detection.

And the IR AC Controller have 4 emitting channels(A,B,C,D). IR code is divided into two parts(universal IR code and AC IR code) in the system.The system has 150 universal IR code at most and 500 AC IR code at most. The universal IR code control TV, DVD, other equipments, which can be controlled by IR.The AC IR code specially control air-condition.

* Single mode means that system emits one universal IR code and the emitting channel is one channel and multichannel.

* Repeat mode means system emits one universal IR code several times repeatedly and the emitting channel is one channel and multichannel.

* Sequence mode can emit several universal IR code sequently at one time,but the emitting channel is one channel.

* Air-condition control meams system control Air-condition specially,and the emitting channel is one channel.

* Current detection means system detect the current of equipments running.

2- Hardware

The technical properties of HDL KNX/EIB
IR AC Controller as the following sections.

2.1 Technical data

Transmitting carrier wave frequency： 38KHz
Emission distance：7m
Power supply

    *Operating voltage(supply by the bus)   21 ~ 30 V DC,

    * Current consumption EIB / KNX(operate)   < 15 mA

    * Current consumption EIB / KNX(standby)   < 5 mA

    * Power consumption EIB / KNX(operate)   < 450 mW

    * Power consumption EIB / KNX(standby)   < 150 mW

Connections

    * EIB / KNX   Bus Connection Terminal

                             0.8 mm Ø, single core

    * Cable shoe   12 mm

    * Tightening torque   Max. 0.8 Nm

Operating and display

    * EIB / KNX push button   For assignment of the physical address
For Detection of current

    * Red LED (VE1)   For indicating normal mode (LED Off) or addressing mode (LED On); it is automatically extinguished once the physical address has been transferred. For indicating transmiting current data (LED flicker).

Temperature range

    * Operation   − 5 °C ~ + 45 °C

    * Storage   − 25 °C ~ + 55 °C

    * Transport   − 25 °C ~ + 70 °C

Environment conditions

    * Working Relative Humidity   10%~98%

    * Storage Relative Humidity   10%~98%

Appearance design

    * Dimensions (H x W x D)   45 x 45 x 16 mm

Material and Colour   Plastic, Black

Standard and Safety   Certificated

         * LVD Standard   EN60669-2-1, EN60669-1

         *EMC Standard   EN50090-2-2

CE mark

         * In accordance with the EMC guideline and low voltage guideline

Pollutant   Comply with RoHS

Application table

Type	M/IRAC.1
Max. number of communication objects	193
Max. number of group addresses	254
Max. number of associations	254

Note: The programming requires the EIB Software Tools ETS2 V1.3 or ETS3.0. If use ETS2 V1.3, then import "*.vd2". If use ETS3.0, then Import "*.vd3

2.2 Dimension drawings
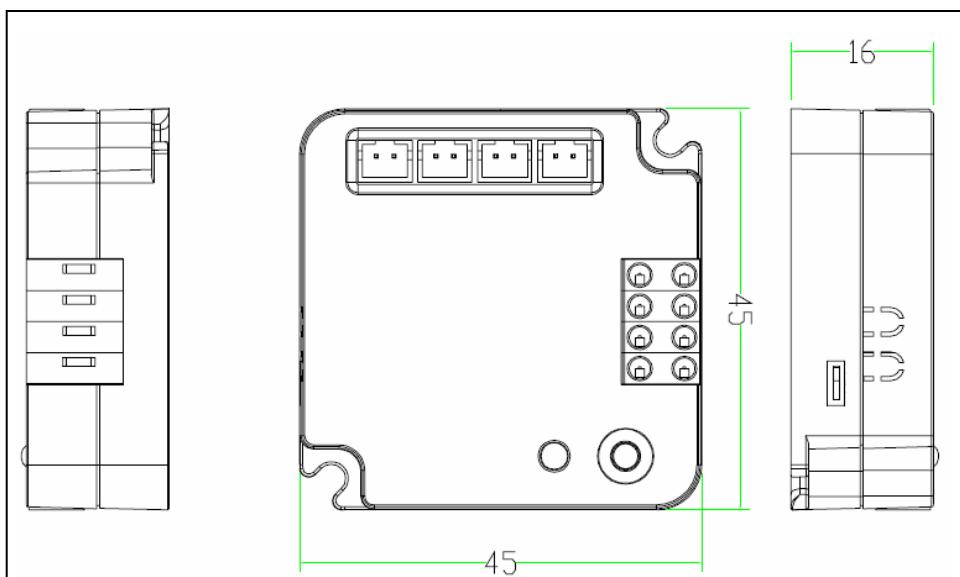
M/IRAC.1

2.3 Wiring diagram
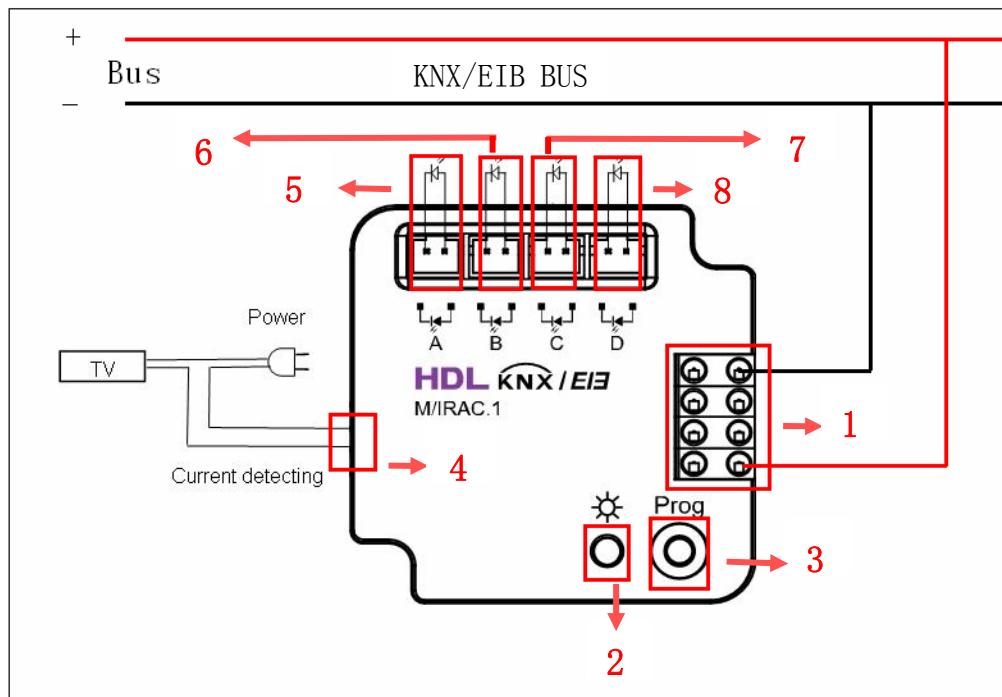
1 KNX/EIB Bus connector
2 Programming LED (VE1)
3 Programming button
4 Current detection connector
5 Channel A(Infrared LED A)
6 Channel B(Infrared LED B)
7 Channel C(Infrared LED C)
8 Channel D(Infrared LED D)

2.4 Maintenance and Cautions

*Please read this user manual carefully before any operation.
*Pay attention to damp proof, quakeproof and dustproof.
*Avoid rain, other liquids or caustic gas.
*Please contact professional maintenance staff or HDL service
 center to repair or fix.
*If damaged by damp or liquid, turn it off immediately.
*Regularly check the circuitry and other related circuit or cables and
 replace the disqualified circuitry on time.
*For security, each circuit to connect an MCB or fuse
*Installation location should be well-ventilated, pay attention to
 moisture, shock, dust proof, mouse.

3- Use preparation

Before using HDL KNX/EIB IR AC Controller must learn IR code using the HDL infrared learner and download IR code into MCU's external memory using the HDL KNX Assistance software.

3.1 HDL KNX/EIB IR AC Controller auxiliary tool

(1) Remote
(2) HDL infrared learner
   HDL infrared learner as follow Fig1
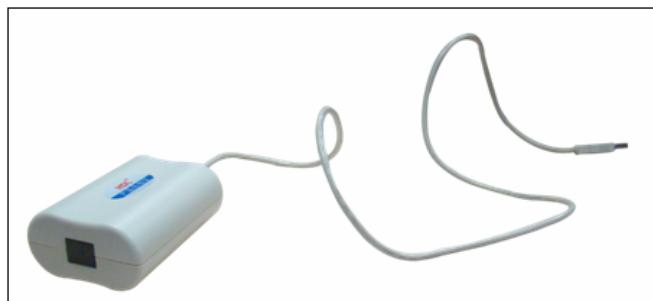
Fig1: HDL infrared learner
The detailed use method of HDL infrared learner is in the user's manual of HDL infrared learner.

(3) HDL KNX Assistance software
   HDL KNX Assistance software icon as follow Fig2

Fig2: HDL KNX Assistance software icon
HDL KNX Assistance software isn't used with ETS3 at the same time. If IR AC Controller never is used , it first must download database and set the physical address, then learn IR code and download IR code. The detailed use method of HDL KNX Assistance software is in the user's manual of HDL KNX Assistance software.

3.2 Auxiliary tools use schematic diagram
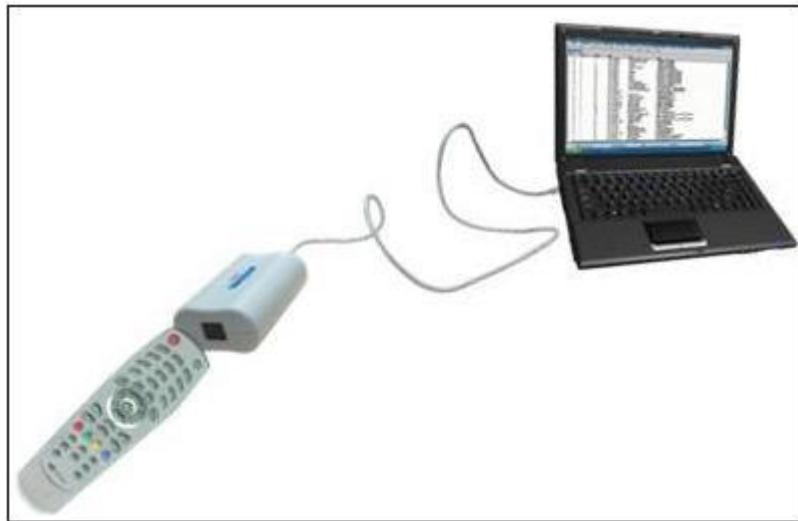
Fig3: use schematic diagram
When learn IR code , keep remote and HDL infrared learner in the same horizontal line. Their distance is 2~4cm.

4- Software

HDL KNX/EIB IR AC Controller database use ETS3.0 to do the design. The Interface and the functions Apply parameters please overview the following description of the paragraph.
The IR AC Controller has five function, they are single mode, repeat mode , sequence mode,air-condition control, current detection. The following paragraph will describe each function in detail.

4.1 Object/Association/Group address define

 In following table, the objects are assigned to some function of the channel output pages, if active some functions and the object will be valid. One or more group addresses can be assigned to a object. The association will connect group addresses to the object.

Name	type	Max. number of communication objects	Max. number of associations	Max .number of group addresses
IR AC Control	M/IRAC.1	193	254	254

Table1: Overview the max. number of the objects, max. number of associations and max. number of the group addresses

Note: If you use ETS2V1.3, Please import "VD2", But you use the ETS3.0, Please import "VD3" to "VD5".

4.2 Function parameter "Notes"
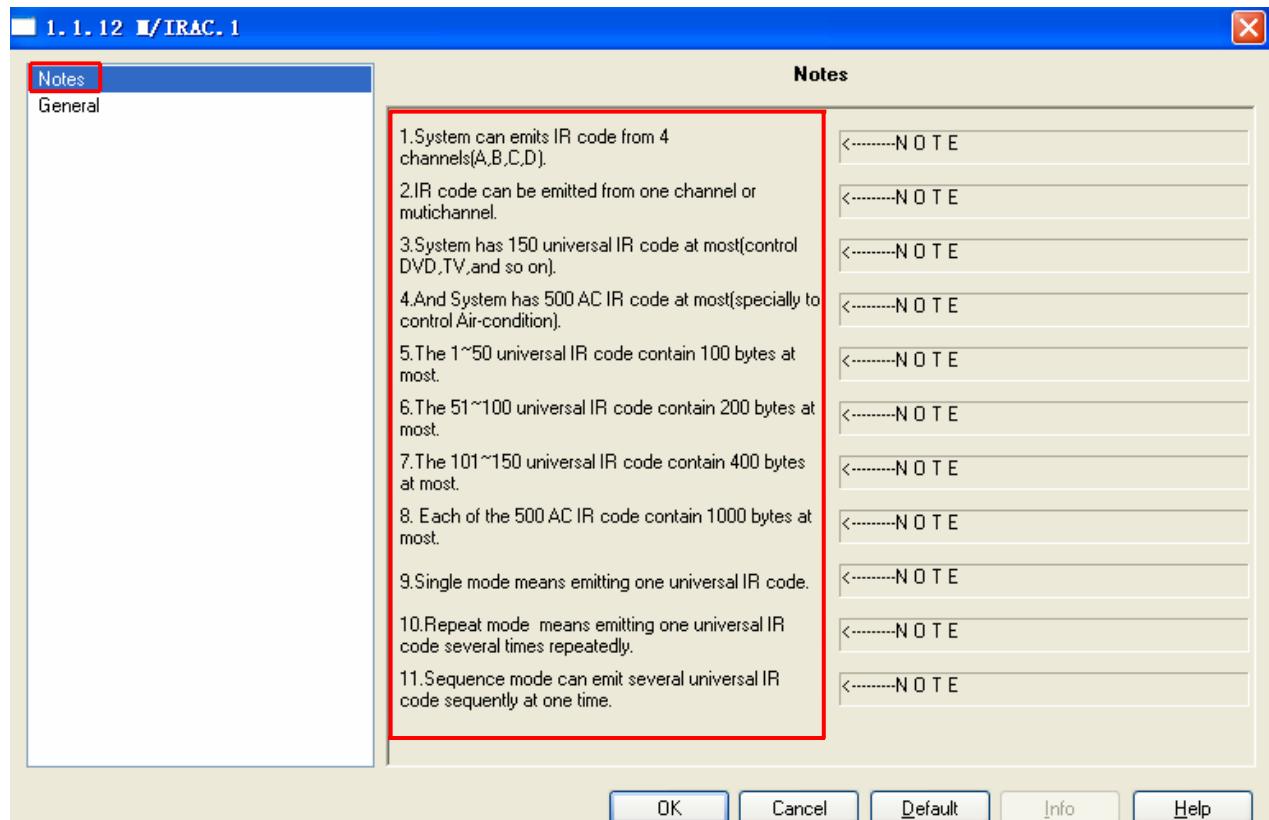
Fig4: "Notes" parameter windows
"Notes" parameter windows briefly describe some function.

4.3 Function parameter "General"
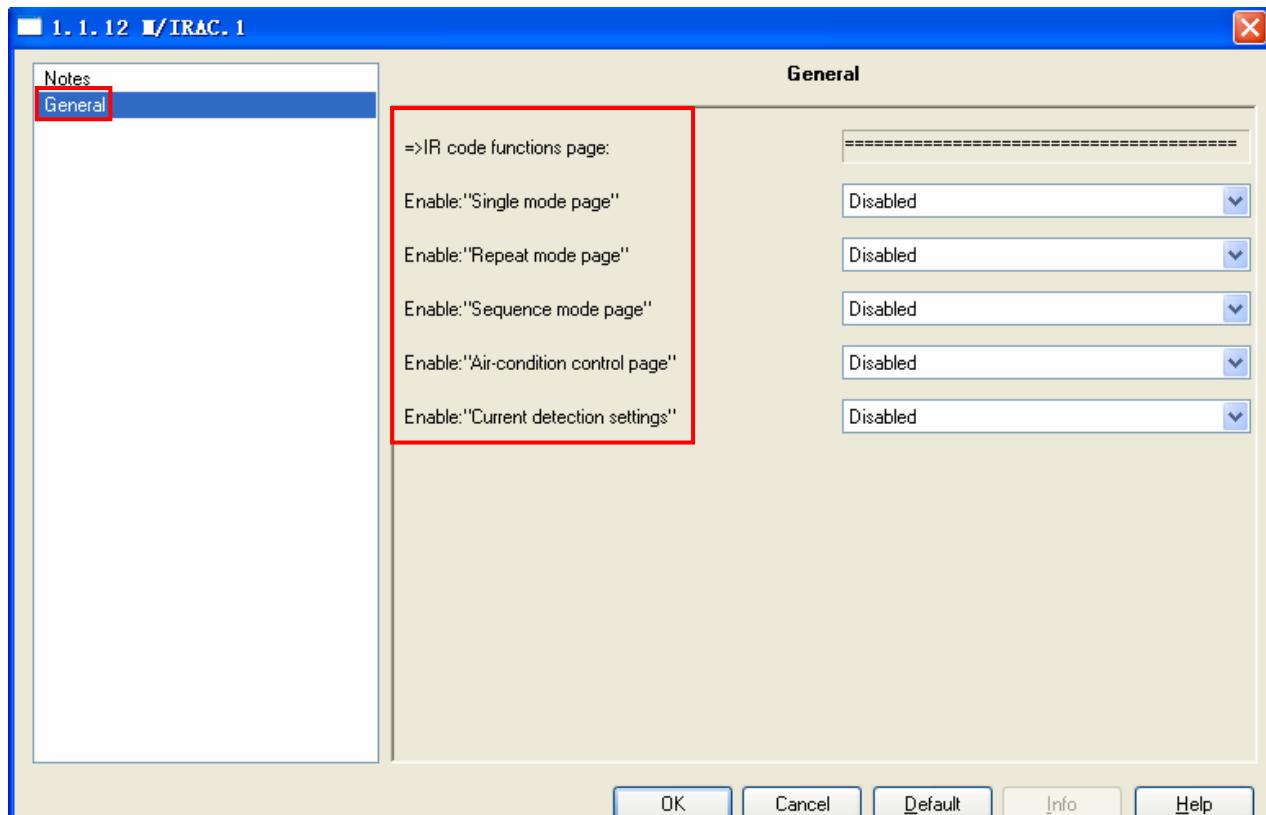
Fig5: "General" parameter windows
"General" parameter windows is function enabled page. All the function can be enabled or disabled. The five function are independent of each other.

4.4 Function parameter "single mode"
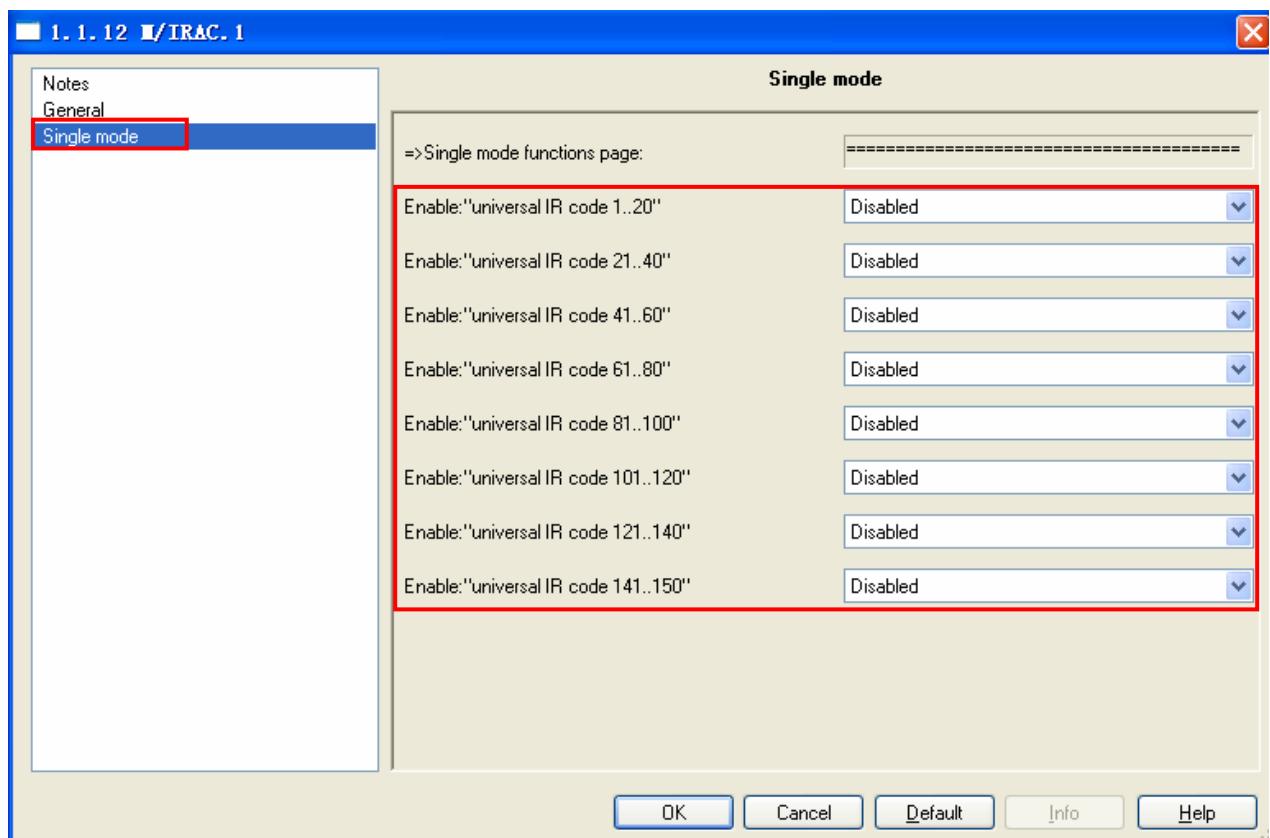
Fig6: "Single mode" parameter windows

Single mode means that system emits one universal IR code and the emitting channel is one channel and multichannel. There are 150 universal IR code are in the single mode. They are divide into 8 groups.

The first group is universal IR code 1 ~ universal IR code 20.
The second group is universal IR code 21 ~ universal IR code 40.
The third group is universal IR code 41 ~ universal IR code 60.
The fourth group is universal IR code 61 ~ universal IR code 80.
The fifth group is universal IR code 81 ~ universal IR code 100.
The sixth group is universal IR code 101 ~ universal IR code 120.
The seventh group is universal IR code 121 ~ universal IR code 140.
The eighth group is universal IR code 141 ~ universal IR code 150.
Every group can be enabled and disabled. Each universal IR code parameter is the same. So, understand only one universal IR code parameter is enough.The follow paragraph will describe the universal IR code 1 parameter.

4.4.1 The universal IR code 1 parameter
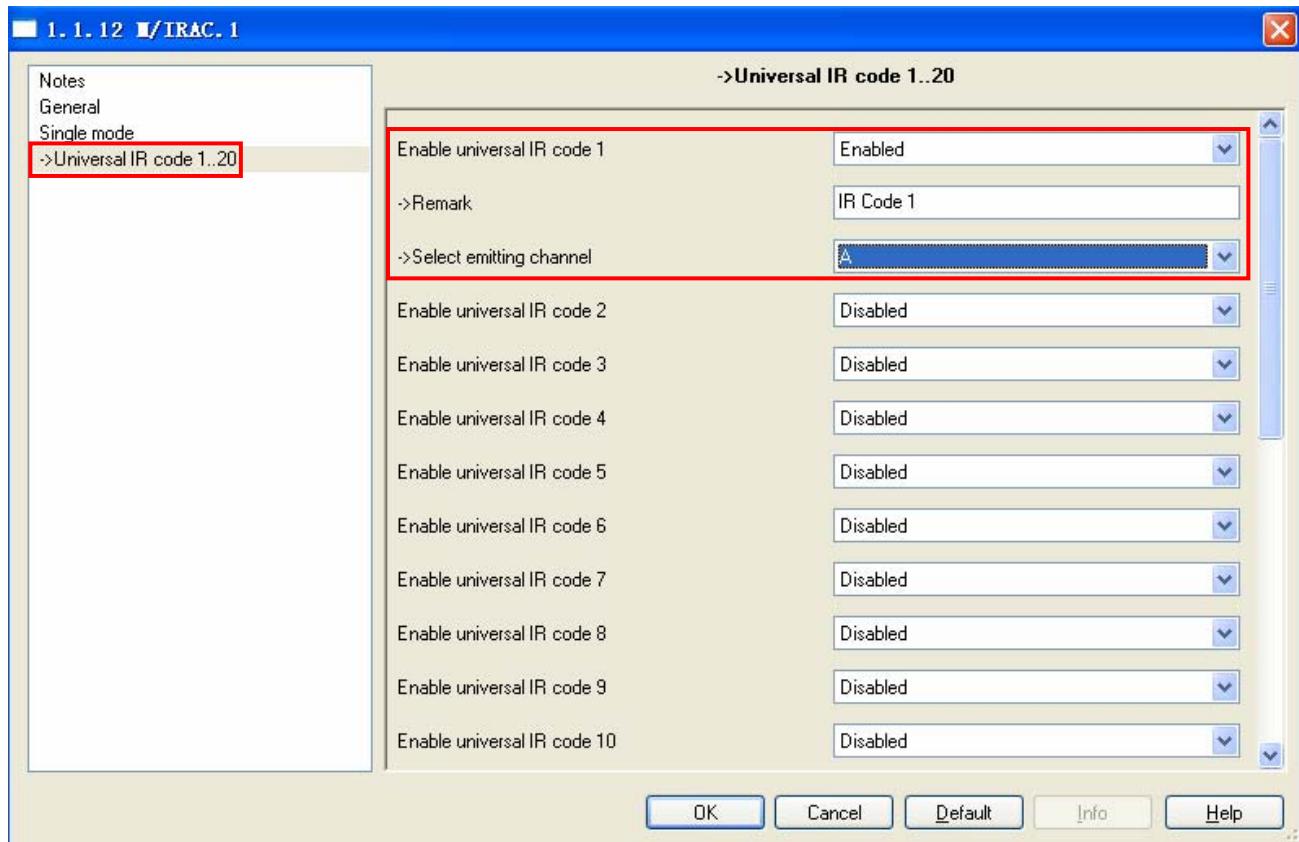
Fig7: The universal IR code 1 parameter windows

The universal IR code 1 is the same with the universal IR code 1 in the HDL KNX Assistance software. The universal IR code can be emitted from one channel or multichannel in the single mode.

---Remark (40bytes)

It only remark this IR code function,for example TV power , DVD power , DVD play,and so on. So, remark IR code when learn it in the HDL KNX Assistance software. It's box can be filled in 40 bytes at most.

---Select emitting channel

Option: A,B, C, D,AB,AC,AD,BC,BD,CD,ABC,ABD,ACD,BCD, ABCD

A: Emitting channel is channel A. IR code is emitted from channel A.

B: Emitting channel is channel B. IR code is emitted from channel B.

C: Emitting channel is channel C. IR code is emitted from channel C.

D: Emitting channel is channel D. IR code is emitted from channel D.

AB: Emitting channel is channel A and channel B. IR code is emitted from channel A and channel B respectively .

AC: Emitting channel is channel A and channel C. IR code is emitted from channel A and channel C respectively .

AD: Emitting channel is channel A and channel D. IR code is emitted from channel A and channel D respectively .

BC: Emitting channel is channel B and channel C. IR code is emitted from channel B and channel C respectively .

BD: Emitting channel is channel B and channel D. IR code is emitted from channel B and channel D respectively .

CD: Emitting channel is channel C and channel D. IR code is emitted from channel C and channel D respectively .

ABC: Emitting channel is channel A and channel B and channel C. IR code is emitted from channel A , channel B and channel C respectively .

ABD: Emitting channel is channel A and channel B and channel D. IR code is emitted from channel A , channel B and channel D respectively .

ACD: Emitting channel is channel A and channel C and channel D. IR code is emitted from channel A , channel C and channel D respectively .

BCD: Emitting channel is channel B and channel C and channel D. IR code is emitted from channel B , channel C and channel D respectively .

ABCD: Emitting channel is channel A and channel B and channel C and channel D. IR code is emitted from channel A , channel B , channel C and channel D respectively .

The default emitting channel is A channel.

4.5 Function parameter "Repeat mode"
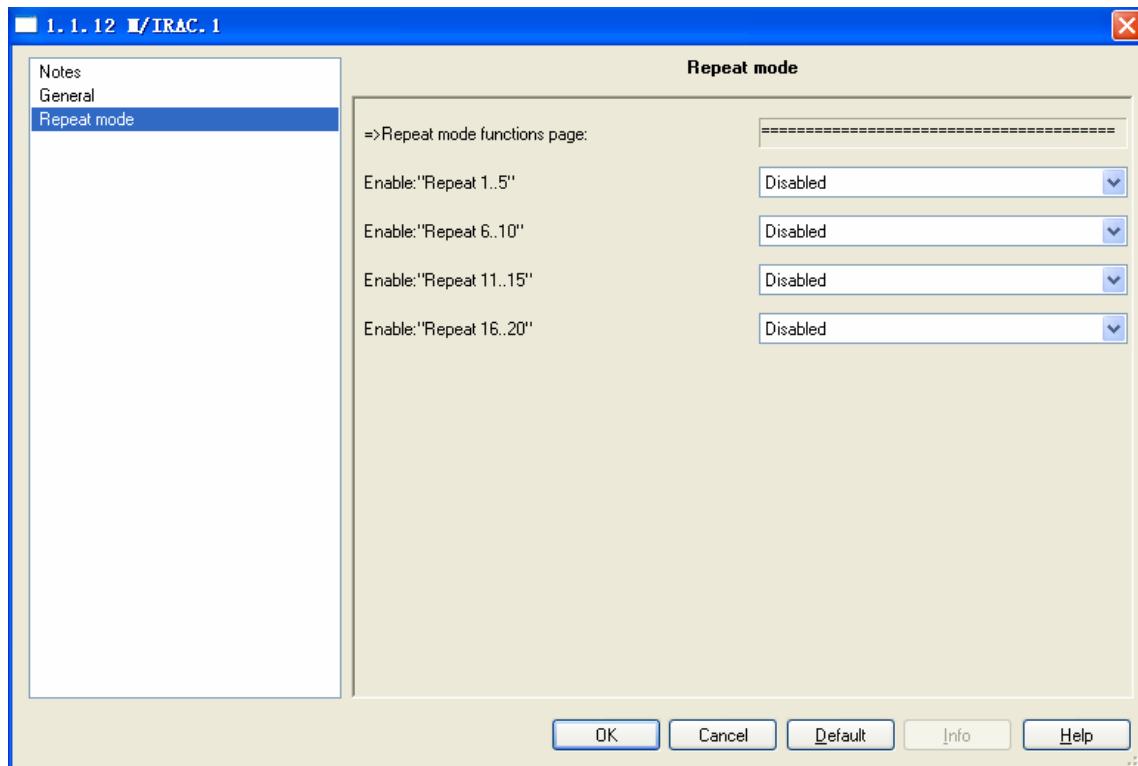
Fig8: "Repeat mode" parameter windows

Repeat mode means system emits one universal IR code several times repeatedly and the emitting channel is one channel and multichannel. There are 20 repeat funciton in the Repeat mode. They are divided into 4 groups. Every groups can be enabled and disable. Each repeat function is the same.So,understand only one repeat function parameter is enough. The follow paragraph will describe the Repeat 1 parameter.

4.5.1 The Repeat 1 parameter
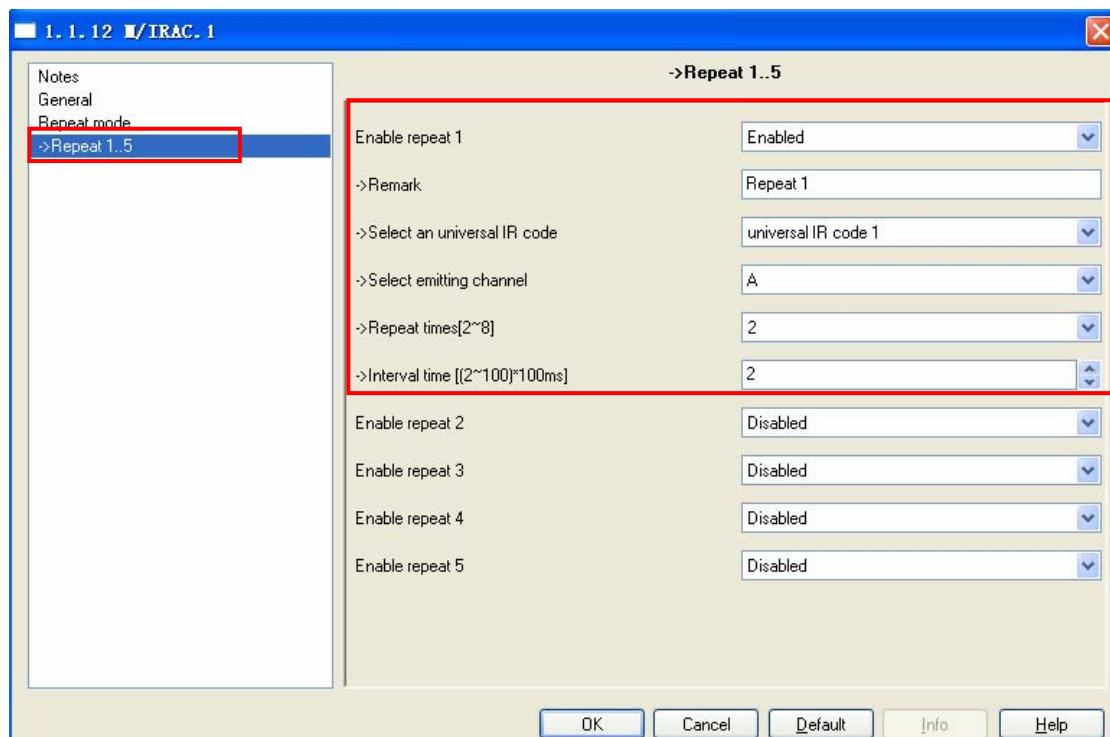
Fig9: Repeat 1 parameter windows

Repeat mode control object is sound, TV channel, index, and so on.

---Remark(40bytes)

It only remark this Repeat function,for example TV channel, DVD sound, DVD index, and so on. So, remark the IR code when learn it. It's box can be filled in 40 bytes at most.

---Select an universal IR code

Option: universal IR code 1...universal IR code150

universal IR code 1...universal IR code150: Select an universal IR code as repeat emitting object in the Repeat 1. Its default option is universal IR code 1.

---Select emitting channel

Option: A,B, C, D,AB,AC,AD,BC,BD,CD,ABC,ABD,ACD,BCD, ABCD

A: Emitting channel is channel A. IR code is emitted from channel A.

B: Emitting channel is channel B. IR code is emitted from channel B.

C: Emitting channel is channel C. IR code is emitted from channel C.

D: Emitting channel is channel D. IR code is emitted from channel D.

AB: Emitting channel is channel A and channel B. IR code is emitted from channel A and channel B respectively .

AC: Emitting channel is channel A and channel C. IR code is emitted from channel A and channel C respectively.

AD: Emitting channel is channel A and channel D. IR code is emitted from channel A and channel D respectively.

BC: Emitting channel is channel B and channel C. IR code is emitted from channel B and channel C respectively.

BD: Emitting channel is channel B and channel D. IR code is emitted from channel B and channel D respectively.

CD: Emitting channel is channel C and channel D. IR code is emitted from channel C and channel D respectively.

ABC: Emitting channel is channel A and channel B and channel C. IR code is emitted from channel A, channel B and channel C respectively.

ABD: Emitting channel is channel A and channel B and channel D. IR code is emitted from channel A, channel B and channel D respectively.

ACD: Emitting channel is channel A and channel C and channel D. IR code is emitted from channel A, channel C and channel D respectively.

BCD: Emitting channel is channel B and channel C and channel D. IR code is emitted from channel B, channel C and channel D respectively .

ABCD: Emitting channel is channel A and channel B and channel C and channel D. IR code is emitted from channel A, channel B, channel C and channel D respectively.

The default emitting channel is A channel.

---Repeat times[2~8]

Option:2..8

2..8: The default repeat times is 2.Repeat times range is 2 ~ 8. For example, The emitting channel is ABCD,select universal IR code 10, repeat times is 8, Interval time is 200ms.It emits universal IR code 10 from channel A , channel B , channel C and channel D respectively . And 200ms late,it emits universal IR code 10 from channel A , channel B , channel C and channel D respectively again. As this it emits the code 8 times repeatedly in all.

---Interval time[(2~100)*100ms]

Option:2..100

2..100: Interval time range is 200ms ~ 10s. The factor of interval time is 2~100,the multiple is 100.So,its box is filled in 2 ~ 100.

4.6 Function parameter "Sequence mode"
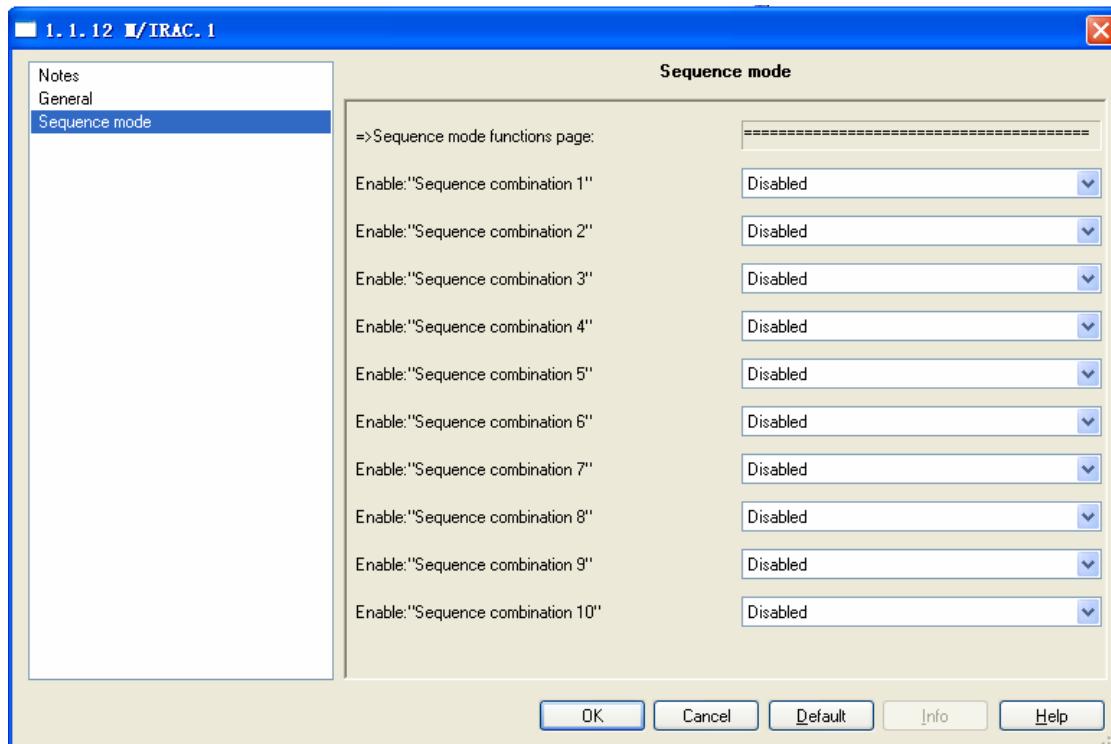
Fig10: "Sequence mode" parameter windows

Sequence mode can emit several universal IR code sequently at one time,but the emitting channel is one channel. There are 10 sequence funciton in the sequence mode.Every sequence function have 10 steps. Each sequence function is the same.So,understand only one sequence function parameter is enough.The follow paragraph will describe the Sequence 1 parameter.

4.61   The Sequence 1 parameter
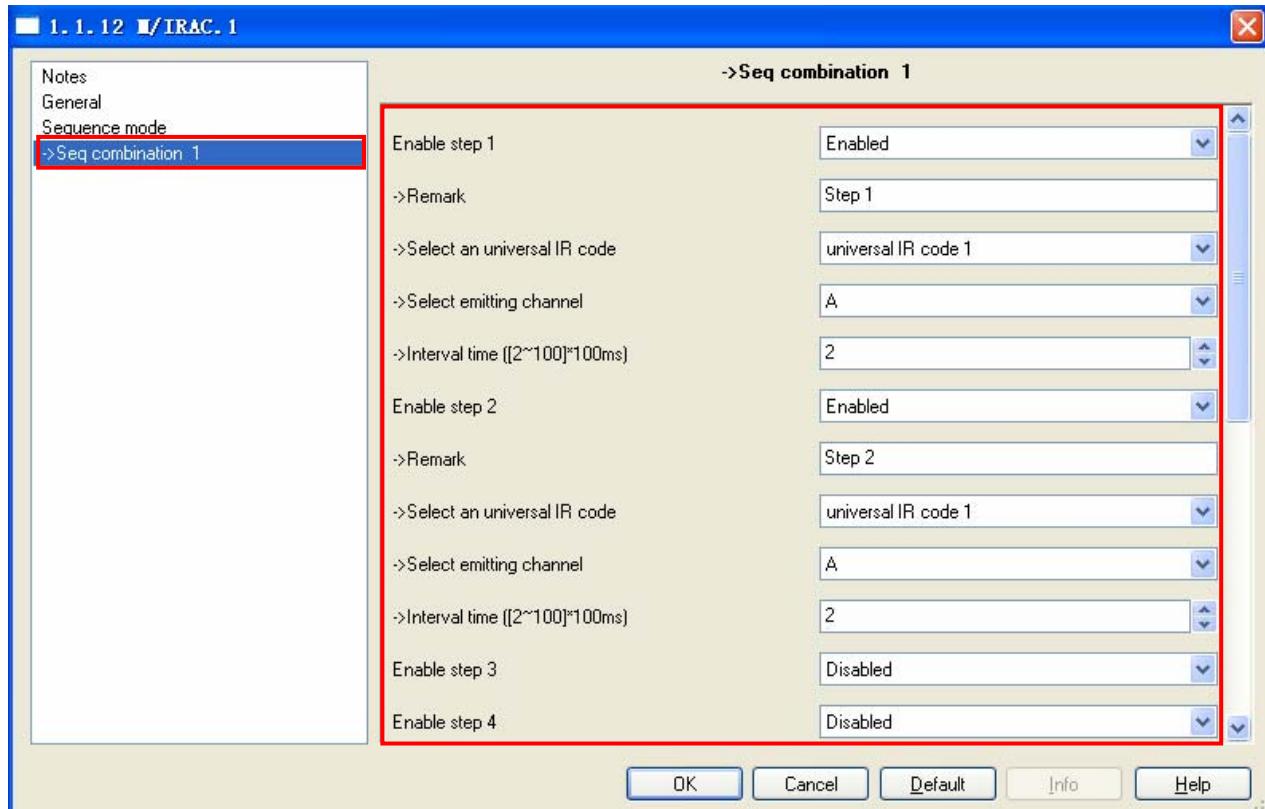
Fig11: Sequence 1 parameter windows

The default option of step 1 and the step 2 is enabled,and other are disabled.Enabled step must be Step 1 to Step N (N is 2~10) and they must be continuous. For example,enable Step1 ~Step 6 or enable Step1 ~ Step 10 are right. Enable Step 2 ~ Step 5 or enable Step 7 ~ Step 10 are insignificance. Enable Step 1 ~Step 5 and Step 8, enable Step 8 is insignificance. Every step have to emit one universal IR code.Each step parameter is the same. Understand only one step function parameter is enough.

---Enable step 1
  Option: Enabled
        Disabled
Enabled : Enable this step can emit the IR code of the step.Like the other step,if Step N is enabled ,Step N+1 ~ Step 10 is disabled.And the number of enabled step is N.
Disabled: Disable this step, and if disable this step 1,this sequence is disabled .

---Remark(40bytes)

_____

It only remark this step function,for example TV power , DVD sound ,DVD power,and so on. So, remark the IR code when learn it. It's box can be filled in 40 bytes at most.

---Select an universal IR code

Option: universal IR code 1...universal IR code 150

universal IR code 1...universal IR code150: Select an universal IR code as step emitting object in the step 1.Its option is universal IR code 1 by default.

---Select emitting channel

Option: A
         B
         C
         D

A: Emitting channel is channel A. IR code is emitted from channel A.
B: Emitting channel is channel B. IR code is emitted from channel B.
C: Emitting channel is channel C. IR code is emitted from channel C.
D: Emitting channel is channel D. IR code is emitted from channel D.
The emitting channel is A channel by default.

---Interval time[(2~100)*100ms]

Option:2..100

2..100: Interval time is the interval time between emitting two step IR code. The interval time of Step 10 is insignificance,because Step 10 is the last step. Interval time range is 200ms ~ 10s. The factor of interval time is 2~100,the multiple is 100.So,its box is filled in 2 ~ 100.

4.7 Function parameter "Air-condition control"
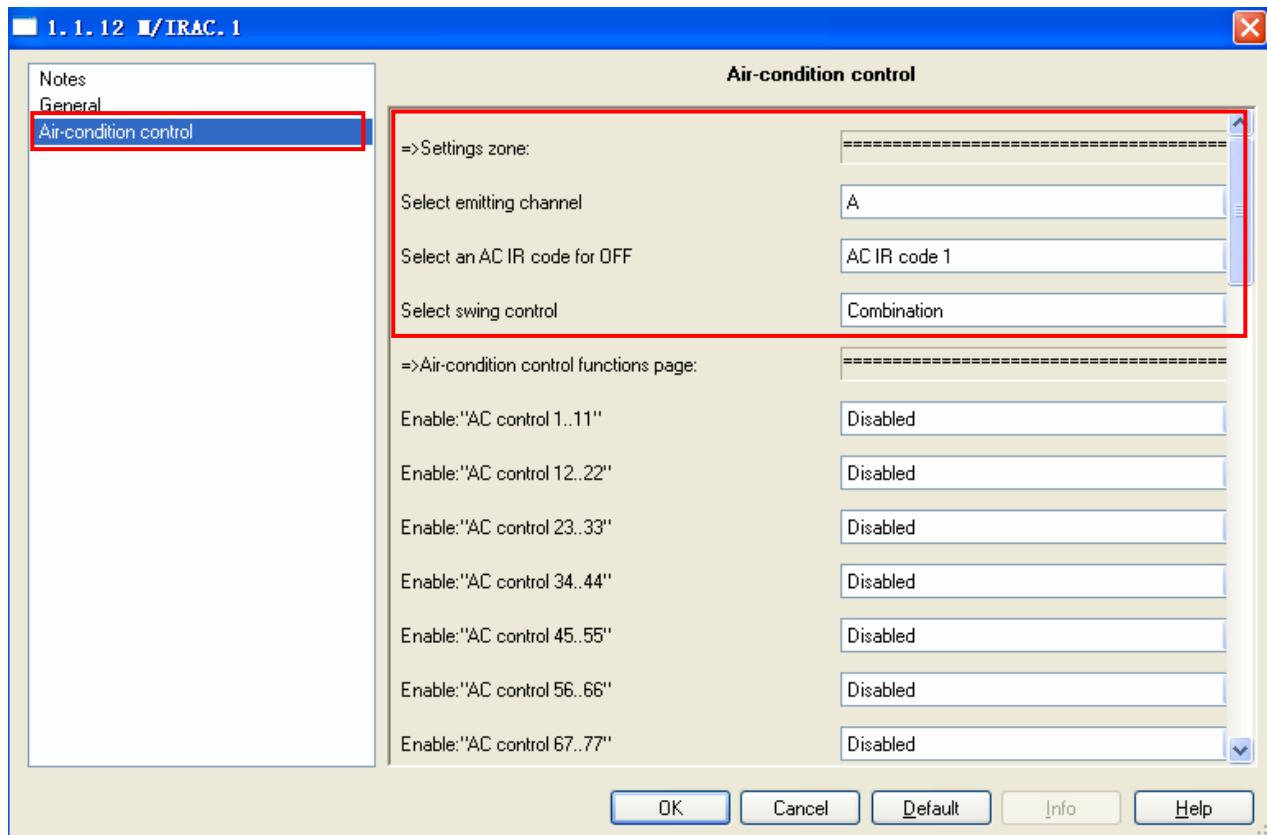
Fig12: "Air-condition control" parameter windows

Air-condition control means system controls air-condition specially, and the emitting channel is one channel. System emits AC IR code in the Air-condition control . Air-condition have main control function and assistant control function.The main control function is temperature, mode, fan speed, swing, ON or OFF function. The assistant control function is timer control,smart wind,healthy wind,and so on. They can be used in the single mode.In the Air-condition control,there are only the main control function. Control temperature is 20~30℃. Mode is auto,cooling,heating, dehumidification,fan. The fan speed is auto speed , low speed ,middle speed ,hight speed . Swing is swing and no swing. AC IR code usually is a combination of temperature, mode, fan speed, swing. But some AC IR code contain only one control function. So this control function is independent. Swing control function have combination function and independent function two case.So air-condition have two kinds.One kind is its swing control function is combined,the other is its swing control function is independent.But most of air-conditio is its swing control function is combined .The number of air-condition control which its swing control function is combined is 11*5*4*2=440. Because there are 11 different

temperature, 5 mode, 4 fan speed, 2 swing. And the number of air-condition control which its swing control function is independent is 11*5*4=220. These 440 control function and 220 control function are combined.

4.71 Function parameter "Settings zone"

"Settings zone" is in the red box in the Fig12. AC IR code 1~ AC IR code 10 are recommended to use in "Settings zone". AC IR code 11~ AC IR code 500 are recommended to use in "Air-condition control functions page".

---**Select emitting channel**
    Option: A
          B
          C
          D
A: Emitting channel is channel A. IR code is emitted from channel A.
B: Emitting channel is channel B. IR code is emitted from channel B.
C: Emitting channel is channel C. IR code is emitted from channel C.
D: Emitting channel is channel D. IR code is emitted from channel D.
The emitting channel is A channel by default.

---**Select an AC IR code for OFF**
    Option: AC IR code 1
          …
          AC IR code 500
AC IR code 1…AC IR code 500: Select an AC IR code as emitting object to turn off the air-conditon.
The function of the Selected AC IR code can turn off the Air-condition. Its option is AC IR code 1 by default.

---**Select swing control**
    Option: Combination
          Independent
Combination: The swing control function of air-condition is combination.The number of control function is 440.As Fig12.
Independent: The swing control function of air-condition is independent.The number of control function is 220. As Fig13.
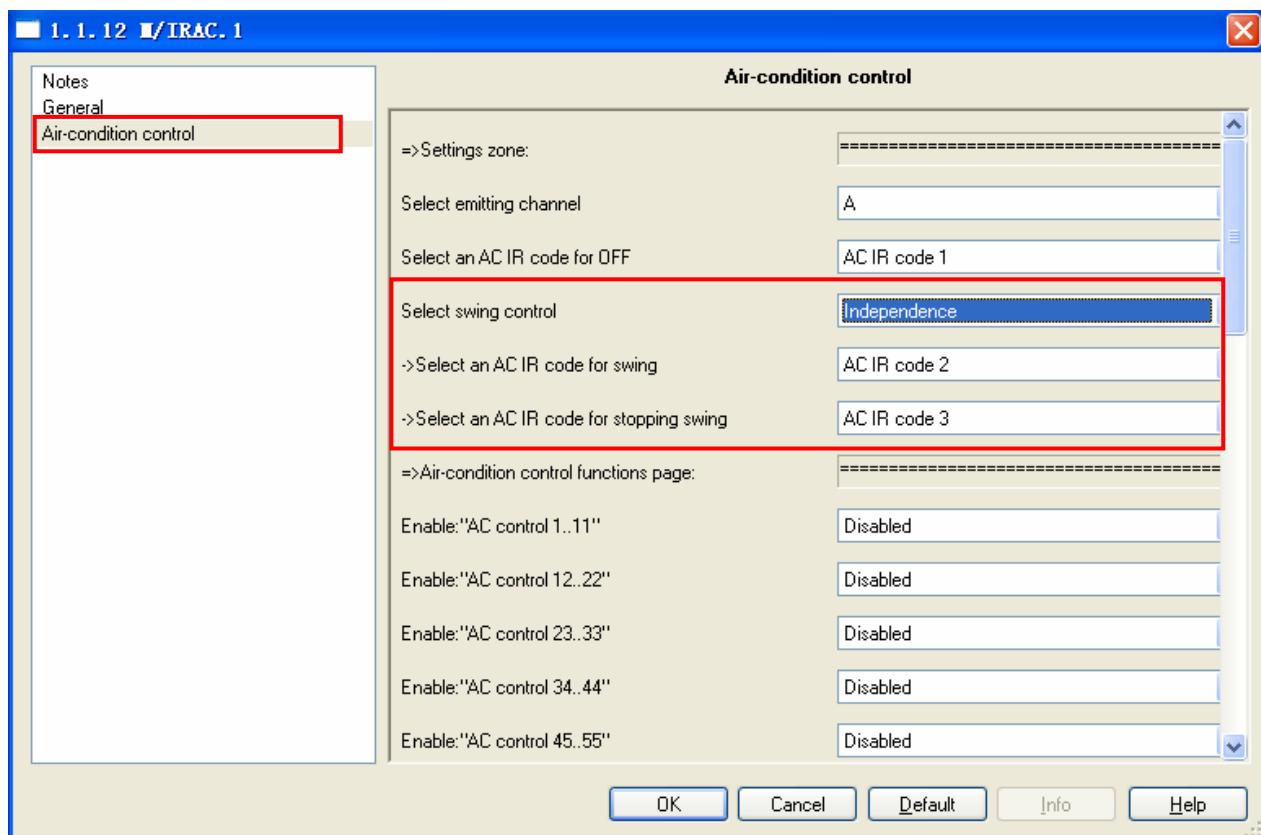
Fig13: "Select swing" parameter windows

---Select an AC IR code for swing

    Option: AC IR code 1

        …

        AC IR code 500

    AC IR code 1…AC IR code 500: Select an AC IR code as emitting object to let the air-conditon swing. The function of the Selected AC IR code can let the Air-condition swing. Its default option is AC IR code 2.

---Select an AC IR code for stopping swing

    Option: AC IR code 1

        …

        AC IR code 500

    AC IR code 1…AC IR code 500: Select an AC IR code as emitting object to stop the air-conditon swing. The function of the Selected AC IR code can stop the Air-condition swing. Its option is AC IR code 3 by default.

4.72 Function parameter "Air-condition control function page"
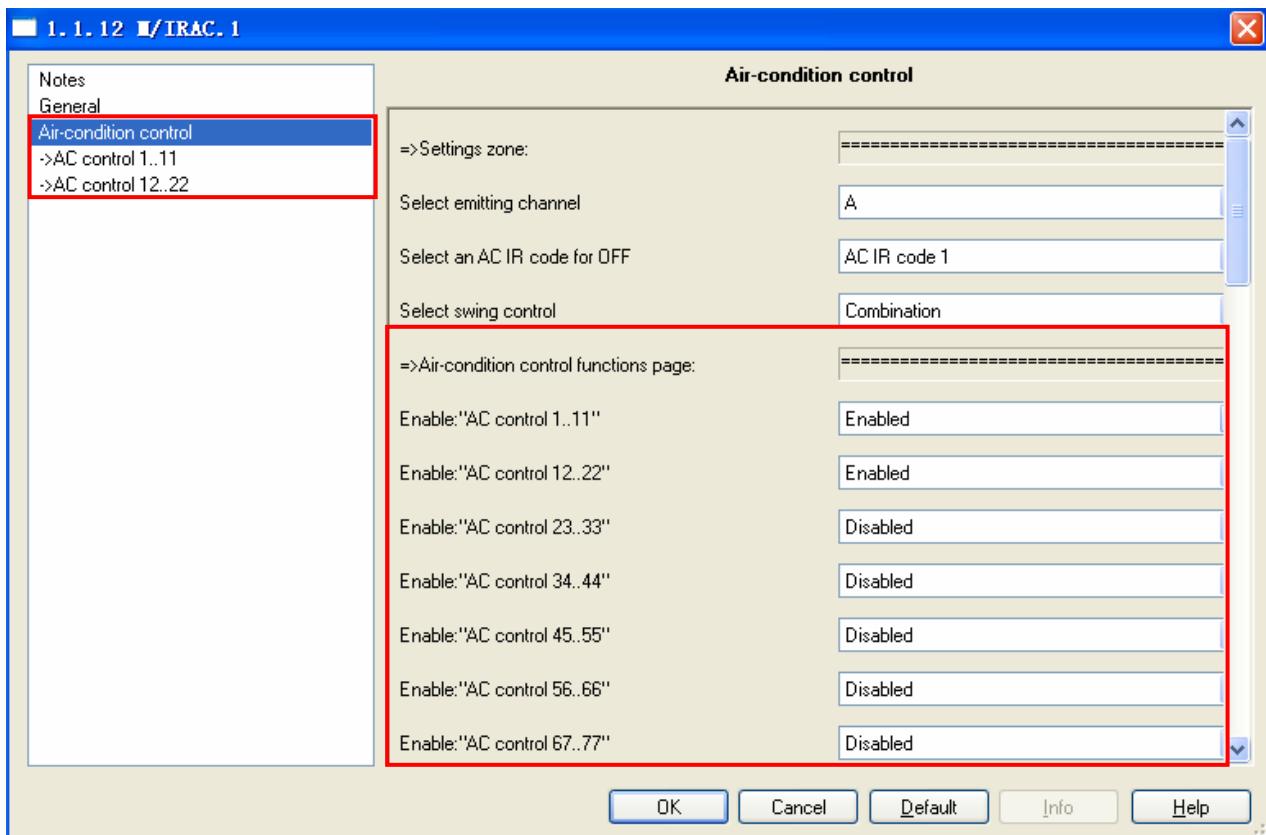
Fig14: "Air-condition control function page" parameter windows
If swing control is selected "Combination",there are 440 control function.Every control have 6 parameters.They are "Remark","Select an AC IR code","Temperature","Mode","Fan","wind".As Fig15.The 440 control function is separated according to five modes.Every mode have 88 control function. 1~88 control function contain auto mode. 89~176 control function contain cooling mode. 177~264 control function contain heating mode. 265~352 control function contain dehumidification mode. 353~440 control function contain fan mode. Every control function have the same 6 parameters. The follow paragraph will describe the AC control 1.
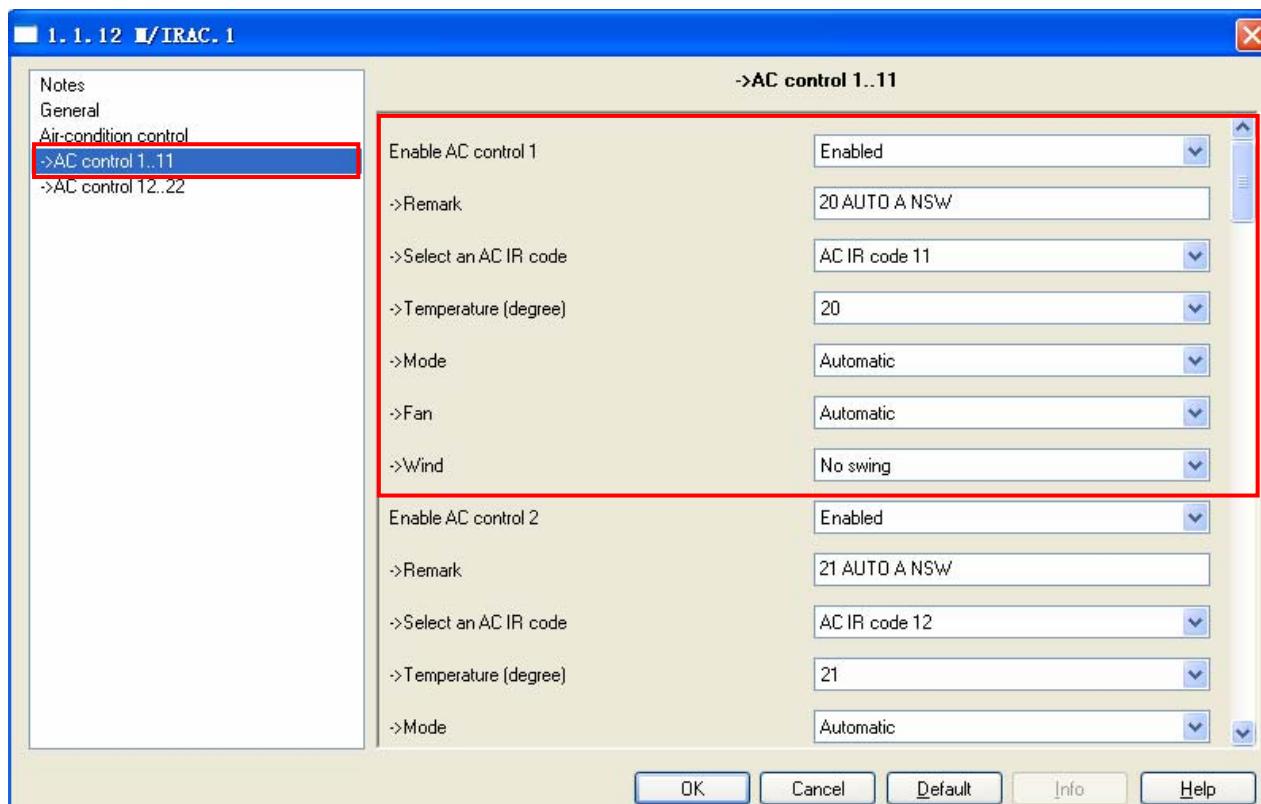
Fig15: "AC control 1" parameter windows

---Enable AC control 1

    Option: Enabled

              Disabled

   Enabled: This control function is enabled.

   Disabled: This control function is disabled.

---Remark

    It remark this control function.It's box can be filled in 40 bytes at most. Its default text is "20 AUTO A NSW". It describe information of IR code—temperature ,mode, the speed of fan, status of wind. "20~30" means temperature 20℃~30℃. "AUTO" , "COOL", "HEAT", "DEH", "FAN"means the mode is automatic,cooling,heating,dehumidification, fan respectively. "A" , "L" , "M" , "H" means the speed of fan is automatic, low,middle and hight respectively. "NSW", "SW" means status of wind is not swing and swing respectively.The ramark is corresponding to the default selection of follow four parameters (Temperature,Mode,Fan, Wind).

---Select an AC IR code

    Option: AC IR code 1

              …

              AC IR code 500

    AC IR code 1…AC IR code 500: The AC IR code selected is emitted

to control air-condition. Its default option is AC IR code 11.

---Temperature(degree)

Option: 20..30

20..30: It is temperature.The range of temperature is 20~30℃. Its default value is corresponding to the first word of default text in the Remark parameter.

--- Mode

Option: Automatic
  Cooling
  Heating
  Dehumidification
  Fan

Automatic: The mode of AC IR code is automatic.
Cooling: The mode of AC IR code is cooling.
Heating: The mode of AC IR code is heating.
Dehumidification: The mode of AC IR code is dehumidification.
Fan: The mode of AC IR code is fan.
Its default value is corresponding to the second word of default text in the Remark parameter.

--- Fan

Option: Automatic
  Low
  Middle
  Hight

Automatic: The speed of fan of AC IR code is automatic.
Low: The speed of fan of AC IR code is low.
Middle: The speed of fan of AC IR code is middle.
Hight: The speed of fan of AC IR code is hight.
Its default value is corresponding to the third word of default text in the Remark parameter.

--- Wind

Option: No swing
  Swing

No swing: It means wing status is not swing.
Swing: It means wing status is swing.

All above parameter can be selected by user.But it is necessary to keep the default value.Because setting 440 control function parameter is a hard sledding work.And when learning IR code must do according to the regulation of "Air-condition control function page" parameter. For

example ,The 11 AC IR code remark is "20 ATUO A NSW", the 11 AC IR code contain temperature is 20,the mode is automatic,fan speed is automatic, wind status is not swing. Each 88 of the 440 control function contain mode respectively is automatic, cooling, heating, dehumidification,fan. Each 22 of the 88 control function contain fan speed respectively are automatic,low,middle, hight. Each 11 of the 22 control function contain wind status respectively are not swing, swing. Each 11 of 440 control function contain temperature respectively are 20~30℃.Such as Table2.

	Tempera-ture	Wind	Fan	Mode
AC IR 11 ... **AC IR 21**	**20℃** ... **30℃**	**No swing** ... **No swing**	**Automatic** . .	**Automatic** .
AC IR 22 ... **AC IR 32**	**20℃** ... **30℃**	**Swing** ... **Swing**	. . **Automatic**	.
AC IR 33 ... **AC IR 43**	**20℃** ... **30℃**	**No swing** ... **No swing**	**Low** . .	. **Automatic**
AC IR 44 ... **AC IR 54**	**20℃** ... **30℃**	**Swing** ... **Swing**	. . **Low**	
AC IR 55 ... **AC IR 65**	**20℃** ... **30℃**	**No swing** ... **No swing**	**Middle** . .	
AC IR 66 ... **AC IR 76**	**20℃** ... **30℃**	**Swing** ... **Swing**	. . **Middle**	
AC IR 77 ... **AC IR 87**	**20℃** ... **30℃**	**No swing** ... **No swing**	**Hight** . .	
AC IR 88 ... **AC IR 98**	**20℃** ... **30℃**	**Swing** ... **Swing**	. . **Hight**	
AC IR 99 ... **AC IR 186**				**Cooling**
AC IR 187 ... **AC IR 274**				**Heating**
AC IR 275 ... **AC IR 362**				**Dehumidi-fication**
AC IR 363 ... **AC IR 450**				**Fan**

Table2：the regulation of default learnning AC IR code

If swing control is selected "Independent",there are 220 control function. It is similar to swing control is selected "Combination".It don't contain wind status. Each 44 of the 220 control function contain mode respectively is automatic, cooling,heating,dehumidification, fan. Each

11of the 44 control function contain fan speed respectively is automatic, low,middle, hight. The 11 of 220 control function contain temperature respectively are 20~30℃.Such as Table3.

	Temperature	Fan	Mode
AC IR 11 ... **AC IR 21**	**20**℃ ... **30**℃	**Automatic** . . . **Automatic**	**Automatic** .
AC IR 22 ... **AC IR 32**	**20**℃ ... **30**℃	**Low** . . . **Low**	.
AC IR 33 ... **AC IR 43**	**20**℃ ... **30**℃	**Middle** . . . **Middle**	. **Automatic**
AC IR 44 ... **AC IR 54**	**20**℃ ... **30**℃	**Hight** . . . **Hight**	
AC IR 55 ... **AC IR 98**			**Cooling**
AC IR 99 ... **AC IR 142**			**Heating**
AC IR 143 ... **AC IR 186**			**Dehumidification**
AC IR 187 ... **AC IR 230**			**Fan**

Table3：the regulation of default learnning AC IR code

4.8 Function parameter "Current detection settings"
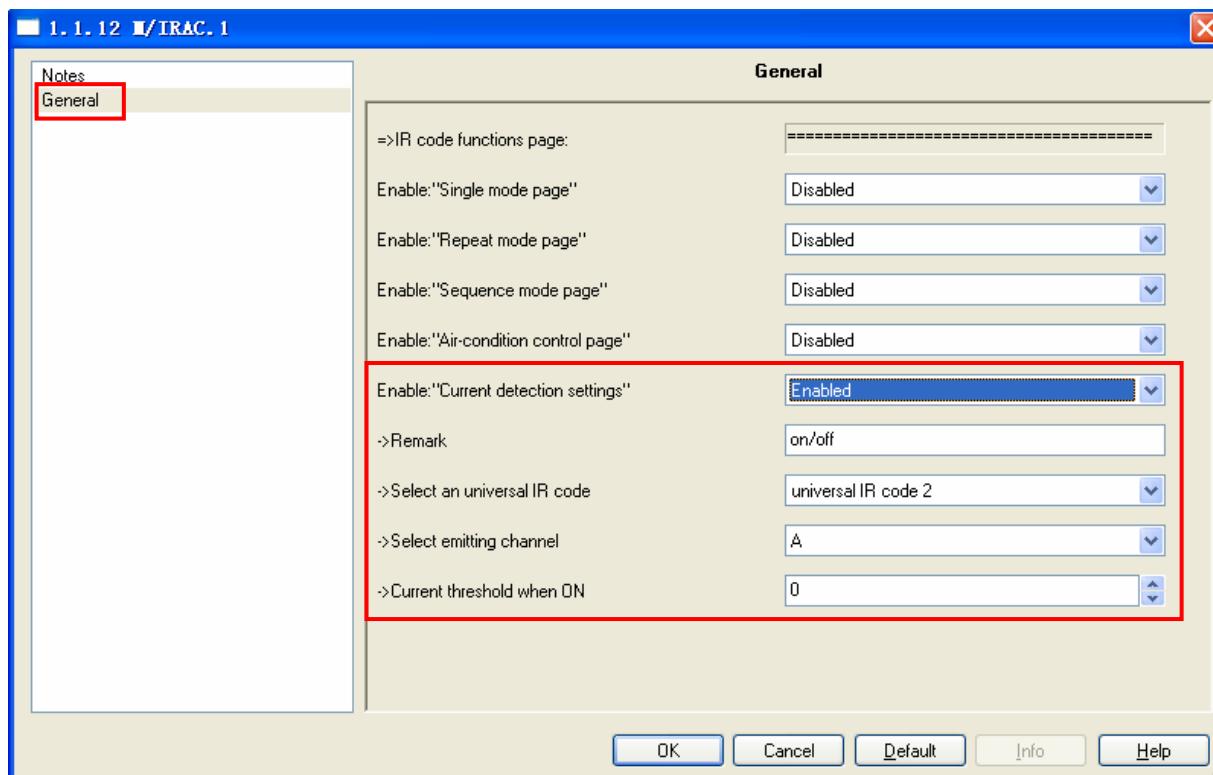
Fig16: "Current detection settings" parameter windows

Current detection is setted for a intelligent switch. When press ON key, the current detection circuit would detect the current of equipment running status, and conclude equipment is ON or OFF. If equipment is ON, the controller don't emit infrared; if equipment is OFF, controller emit infrared and turn on the equipment. When push OFF key, if the current detection circuit detect equipment is OFF, controller don't emit infrared; and if the current detection circuit detect equipment is ON, controller emit infrared and turn off equipment.

---"Current detection settings"

Option: Enabled

Disabled

Enable: Current detection function is enabled.

Disable: Current detection function is disabled.

---Remark

It remark this control function.It's box can be filled in 40 bytes at most. Its default text is "on/off".

---Select an universal IR code

Option: universal IR code 1

…

universal IR code 150

universal IR code 1…universal IR code 150: The universal IR code is power IR code. Its default option is universal IR code 2. If universal IR code N is selected,"Enable universal IR code N" in the single mode is recommended to disable or don't assign group address to it.

---Select emitting channel

Option: A

B

C

D

A: Emitting channel is channel A. IR code is emitted from channel A.

B: Emitting channel is channel B. IR code is emitted from channel B.

C: Emitting channel is channel C. IR code is emitted from channel C.

D: Emitting channel is channel D. IR code is emitted from channel D.

---Current threshold when ON

Option: 0…4092

0…4092: This value is the digital value of current which can turn on the equipment. How to get this value?The follow paragraph 4.81 will describe it in detail.

4.81 How to get the current threshold

(1) Current detection connect circuit
   connect circuit as Fig17.
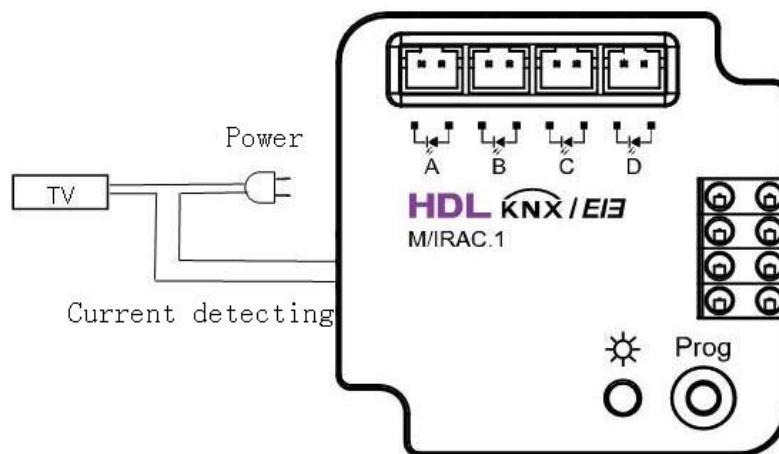
Fig17: current detection connect circuit diagram

(2) Configuration "Current detection settings" object group address
   Open database "IR AC Controller.db" with ETS3. Enable "Current detection settings".Configurate NO.193 object group address.

(3) Compute the current threshold
   Open database "IR AC Controller.db" with ETS3.Open group monitor and start EIB connection.Power on equipment(DVD,TV,..) and IR AC Controller .Turn on equipment,long press programming button about 5 seconds,and the LED is light,and loosen the button, the LED is flicker.Then the LED will be flicker 3 minutes.In the 3 minutes,it must be writed down V1 and V2. IR AC Controller send a digital value of current to EIB bus about per second. ETS3 group monitor can receive the data.Write down the hightest reasonable value V1. For example a group received by ETS3 group monitor is 756,767, 748,990,762, 758, 734,740,760, the hightest reasonable value V1 is 767. Turn off equipment, write down the lowest reasonable value V2.For example a group received by ETS3 group monitor is 109, 120,125,85,117,124,102,130, the lowest reasonable value V2 is 102. The current threshold is (V1+V2)/2. The current threshold is not a accurate value.It could be (V1+V2)/2 ($\pm$5%).And press programming button to turn off LED.

5- Communication objects description

In this section will introduce the communication objects, The objects will show by setting the function enable .

5.1 Objects "Single mode"

Number	Name	Object Function	Description	Group Addresses	Length	C	R	W	T	U
0	Single mode	IR 1 ('1' - emitting)		1/1/1	1 bit	C	-	W	-	U
1	Single mode	IR 2 ('1' - emitting)		1/1/2	1 bit	C	-	W	-	U
2	Single mode	IR 3 ('1' - emitting)			1 bit	C	-	W	-	U
3	Single mode	IR 4 ('1' - emitting)			1 bit	C	-	W	-	U
4	Single mode	IR 5 ('1' - emitting)			1 bit	C	-	W	-	U
5	Single mode	IR 6 ('1' - emitting)			1 bit	C	-	W	-	U

NO.	Object name	Function	Flags	Data type
0	Single mode	IR 1 ('1'-emitting)	C W U	EIS1 DPT 1.001 1bit
This communication object is used for emitting single mode infrared. NO.0~ NO.149 object have the same Flags and Data type.				

Table 4. Single mode object

5.2 Objects "Repeat mode"

Number	Name	Object Function	Description	Group Addresses	Length	C	R	W	T	U
150	Repeat mode	Repeat 1 ('1' - emitting)		1/1/150	1 bit	C	-	W	-	U
151	Repeat mode	Repeat 2 ('1' - emitting)			1 bit	C	-	W	-	U
152	Repeat mode	Repeat 3 ('1' - emitting)			1 bit	C	-	W	-	U
153	Repeat mode	Repeat 4 ('1' - emitting)			1 bit	C	-	W	-	U
154	Repeat mode	Repeat 5 ('1' - emitting)			1 bit	C	-	W	-	U

Objects "Repeat mode" is the similar to the Objects "Single mode".They have the Flags and Data type.NO.150~ NO.169 object are Objects "Repeat mode".

5.3 Objects "Sequence mode"

170	Sequence mode	Sequence 1 ('1' - start)		1/1/170	1 bit	C	-	W	-	U
171	Sequence mode	Sequence 2 ('1' - start)			1 bit	C	-	W	-	U
172	Sequence mode	Sequence 3 ('1' - start)			1 bit	C	-	W	-	U
173	Sequence mode	Sequence 4 ('1' - start)			1 bit	C	-	W	-	U
174	Sequence mode	Sequence 5 ('1' - start)			1 bit	C	-	W	-	U
175	Sequence mode	Sequence 6 ('1' - start)			1 bit	C	-	W	-	U
176	Sequence mode	Sequence 7 ('1' - start)			1 bit	C	-	W	-	U
177	Sequence mode	Sequence 8 ('1' - start)			1 bit	C	-	W	-	U

Objects "Sequence mode" is the similar to the Objects "Single mode".They have the Flags and Data type.NO.150~ NO.169 object are Objects "Sequence mode".

5.3 Objects "Air-condition control"

Number	Name	Object Function	Description	Group Addresses	Length	C	R	W	T	U
180	Air-condition	Switch		1/1/180	1 bit	C	-	W	-	U
181	Air-condition Temperature	Setpoint temperature		1/1/181	2 Byte	C	-	W	-	U
182	Air-condition Fan	ON CMD for automatic		1/1/182	1 bit	C	-	W	-	U
183	Air-condition Fan	ON CMD for low speed		1/1/183	1 bit	C	-	W	-	U
184	Air-condition Fan	ON CMD for medium speed		1/1/184	1 bit	C	-	W	-	U
185	Air-condition Fan	ON CMD for high speed		1/1/185	1 bit	C	-	W	-	U

NO.	Object name	Function	Flags	Data type
180	Air-condition	Switch	C W U	EIS1 DPT 1.001 1bit
This communication object is used for emitting Air-condition switch infrared. NO.182~ NO.191 object and NO.180 object have the same Flags and Data type.				

Table 5. "Air-condition control" object

NO.	Object name	Function	Flags	Data type
182	Air-condition Temperature	Setpoint temperature	C W U	EIS5 DPT 9.001 2 Byte
This communication object is used to control Air-condition temperature.				

Table6. Temperature object

5.4 Objects "Current detection settings"

192	Detection Switch	Switch state		1/1/192	1 bit	C	-	W	-	U
193	Output	Digital value of the current		1/1/193	2 Byte	C	-	W	T	U

NO.	Object name	Function	Flags	Data type
192	Deteciton Switch	Switch state	C W U	EIS1 DPT 1.001 1 bit
This communication object is used to turn on or turn off the equipment.				

Table7. Deteciton Switch object

NO.	Object name	Function	Flags	Data type
193	Output	Digital value of the current	C W T U	EIS5 DPT 9.021 2 Byte
This communication object is used to send Digital value of the current to bus.It is only one output in the this database.				

Table8. Output

6-Application

6.1 Program functions diagram

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