

RS232 to PLCBUS Control Transport Protocol

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Version Update Record:

Version	Date	Author	Content
1. 0	20050202	STEVEN LEE	Draft
1. 1	20060715	POWER YANG	Add some explain
1. 2	20070406	POWER YANG	Add some explain
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2. 1	20090211	POWER YANG	Update to 1141+ and 4825+
2. 2	20090416	POWER YANG	Update Change note with 1141 and 1141+
2. 3	20090601	POWER YANG	Font format change

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1. Brief Introduction:

1. 1 This Protocol is used the data transfer between computer and terminal devices.

1. 2 Signal Explain:

Name	Explain	Algorism	Hex	Remark
STX	Frame Start Bit	02	02H	
ETX	Frame End Bit	03	03H	

1. 3 Computer COM Setup:

Computer COM baud rate setup as:: 9600bps.

Each Frame Date: 1 Start Bit, 1Length Bit, 5 or 6 Data Bits, and 1 End Bit.

Computer COM Definition as following:

Pin No.	Pin Name	Purpose	Remark
1	RS232 CD	Data Carrier Detected	NO USE
2	RS232 RXD	Receive Data	Use to receive Data.
3	RS232 TXD	Transmit Data	Use to transmit Data.
4	RS232 DTR	Data Terminal Ready	NO USE
5	GND	Ground	Ground
6	RS232 DSR	Data Set Ready	NO USE
7	RS232 RTS	Request To Send	NO USE
8	RS232 CTS	Clear To Send	NO USE
9	RS232 RI	Ring Indicate	NO USE

1. 4 Computer --- Terminal RS232 Interface Circuit:

Adopt Chip max232, Figure overleap.

2. PC Transmit Command Format:

2. 1 Command basic communicate Frame Format: (See below Figure)

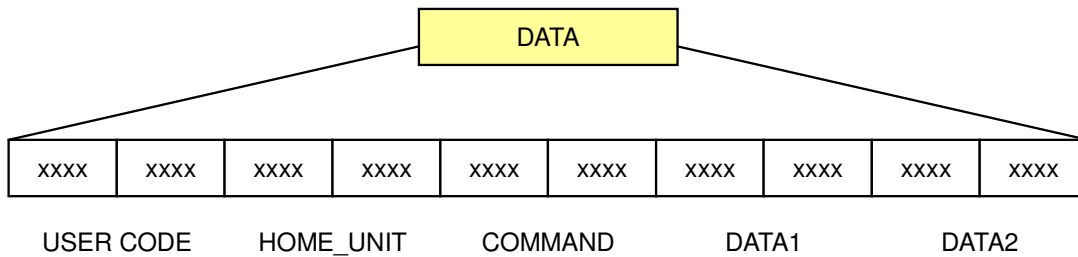


Here: STX is Frame Start Bit **02H**, LENGTH is DATA length, DATA is Data Bit, and ETX is Frame End Bit **03H**.

2. 2 DATA Format:

Described as above, the Length of DATA is changeable.

When the Data transmitted is PLCBUS Command (is provided with USERCODE, HOME_UNIT, COMMAND, DATA1, DATA2), the Length of DATA is **5**.



2. 3 Command Definition:

DATA Type	DATA	Explanation																		
USER CODE	8 Bit Register	<p>The main function is to setup the address (User Code) of Transmitter, and distinguish among different family houses.</p> <p>The main reason: PLCBUS System, no needing to fix any filters.</p>																		
HOME_UNIT	8 Bit Register	<p>The main function is to distinguish different Houses and Units. The high 4 Bits are Home address; and then, the low 4 Bits are Unit address.</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>Bit7</td><td>Bit6</td><td>Bit5</td><td>Bit4</td><td>Bit3</td><td>Bit2</td><td>Bit1</td><td>Bit0</td> </tr> <tr> <td colspan="4" style="text-align: center;">HOME</td> <td colspan="4" style="text-align: center;">UNIT</td> </tr> </table> <table border="1" style="margin-left: auto; margin-right: auto; width: 80%;"> <tr> <td style="width: 50%; vertical-align: top;"> <p>HOME CODE</p> <p>A: 0000</p> <p>B: 0001</p> <p>C: 0010</p> <p>D: 0011</p> <p>E: 0100</p> <p>F: 0101</p> <p>G: 0110</p> <p>H: 0111</p> <p>I: 1000</p> <p>J: 1001</p> <p>K: 1010</p> </td> <td style="width: 50%; vertical-align: top;"> <p>UNIT CODE</p> <p>1: 0000</p> <p>2: 0001</p> <p>3: 0010</p> <p>4: 0011</p> <p>5: 0100</p> <p>6: 0101</p> <p>7: 0110</p> <p>8: 0111</p> <p>9: 1000</p> <p>10: 1001</p> <p>11: 1010</p> </td> </tr> </table>	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0	HOME				UNIT				<p>HOME CODE</p> <p>A: 0000</p> <p>B: 0001</p> <p>C: 0010</p> <p>D: 0011</p> <p>E: 0100</p> <p>F: 0101</p> <p>G: 0110</p> <p>H: 0111</p> <p>I: 1000</p> <p>J: 1001</p> <p>K: 1010</p>	<p>UNIT CODE</p> <p>1: 0000</p> <p>2: 0001</p> <p>3: 0010</p> <p>4: 0011</p> <p>5: 0100</p> <p>6: 0101</p> <p>7: 0110</p> <p>8: 0111</p> <p>9: 1000</p> <p>10: 1001</p> <p>11: 1010</p>
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COMMAND	8 Bit Register	The main function is to load and receive control command. (See Figure 1)																		
DATA1, DATA2	8 Bit Register	Additional Data Bit.																		

COMMAND Register

COMMAND Register is 8 Bit Read-Write one, the main function is to load and receive control command.

Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
LINK	REPRQ	ACK_PULSE	COMMAND				

Bit7 : 1 Extend Address Command, is used to “extend address” or “Special Scene” in the future;

0 Non-extend, it is “0”

Bit6 : 1 For “3-phase power line” only, is used to send COMMAND to “3-phase Coupler”, and then transmitted by “3-phase Coupler”. At this time, any receivers can no respond COMMAND.

0 Generally is 0, at this time, receivers can respond COMMAND.

Bit5 : 1 Demand to transmit “ACK_PULSE” feedback signal;

0 Non-Demand to transmit “ACK_PULSE” feedback signal.

Bit4-Bit0: Each kind of Controller COMMAND:

COMMAND Function List:

00	ALL UNIT OFF	In Same HOME, “All Units Off”.
01	ALL LTS ON	In Same HOME, “All Lights On”.
02	ON #	In Same HOME + UNIT, “One UNIT On”.
03	OFF #	In Same HOME + UNIT, “One UNIT Off”.
04	DIM *#	In Same HOME + UNIT, “One UNIT Dim”.
05	BRIGHT *#	In Same HOME + UNIT, “One UNIT Brighten”.
06	ALL LIGHT OFF	In Same HOME, “All Lights Off”.
07	ALL USER LTS ON	Under Same USER, “All USER Lights On”.
08	ALL USER UNIT OFF	Under Same USER, “All USER Units Off”.
09	ALL USER LIGHT OFF	Under Same USER, “All USER Lights Off”.

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0A	BLINK *#	In Same HOME+ UNIT, "One Light Blink".
0B	FADE STOP #	In Same HOME+ UNIT, "One light Stop Dimming".
0C	PRESETDIM *#	In Same HOME+UNIT, "Preset Brightness Level".
0D	STATUS ON *	Status feedback as "ON".
0E	STATUS OFF	Status feedback as "OFF".
0F	STATUS REQ	Status Checking
10	(R)MASTER ADDR SETUP*#	Setup the main address of Receiver.
11	(T)MASTER ADDR SETUP*#	Setup the main address of Transmitter.
12	SCENES ADDR SETUP*	Setup Scene address
13	SCENES ADDR ERASE	Clean Scene address under the same HOME+UNIT
14	ALL SCENES ADDR ERASE*#	Clean all the Scene addresses in each receiver.
15	FOR FUTURE*	
16	FOR FUTURE*	
17	FOR FUTURE*	
18	GET SIGNAL STRENGTH #	Check the Signal Strength.
19	GET NOISE STRENGTH #	Check the Noise Strength.
1A	REPORT SIGNAL STRENGTH*	Report the Signal Strength.
1B	REPORT NOISE STRENGTH*	Report the Noise Strength.
1C	GET ALL ID PULSE (THE SAME USER AND THE SAME HOME)	Check the ID PULSE in the same USER + HOME.
1D	GET ONLY ON ID PULSE (THE SAME USER AND THE SAME HOME)	Check the Only ON ID PULSE in the same USER+ HOME.
1E	REPORT ALL ID PULSE (For 3-phase power line only)	
1F	REPORT ONLY ON PULSE (For 3-phase power line only)	

Signal needing feedback.

* Command with Data Bit.

Usage for Data Bit:

In the following, it is Command and Usage explanations with Data Bit:

04	DIM	DATA1	—
----	-----	-------	---

DATA1 is DIM Fade rate.

05	BRIGHT	DATA1	—
----	--------	-------	---

DATA1 is BRIGHT Fade rate.

0A	BLINK	DATA1	—
----	-------	-------	---

DATA1 is BLINK interval Data.

0C	PRESETDIM	DATA1	DATA2
----	-----------	-------	-------

DATA1 is Light Brightness Level Data.

DATA2 is Light Dimmer Fade rate.

0D	STATUS ON	DATA1	DATA2
----	-----------	-------	-------

DATA1 is Light Brightness Level Data.

DATA2 is Light Dimmer Fade rate.

10	(R)MASTER ADDR5 SETUP	DATA1	DATA2
----	-----------------------	-------	-------

DATA1 is New USER Code

DATA2 is New HOME+UNIT Code

11	(T)MASTER ADDR5 SETUP	DATA1	DATA2
----	-----------------------	-------	-------

DATA1 is New USER Code

DATA2 is New HOME+UNIT Code

12	SCRENES ADDR5 SETUP	DATA1	DATA2
----	---------------------	-------	-------

USER CODE, HOUSE+UNIT is the new Scene address

DATA1 is 02(ON) or 03(OFF), which is setup the lamps or appliances ON/OFF in new scene address;

DATA2 is Empty

When you setup the scene address, only lamps/appliances are ON status, which can respond this command; while if OFF, they can not respond.

1A	REPORT SIGNAL STRENGTH	DATA1	DATA2
----	------------------------	-------	-------

DATA1 is SIGNAL Strength

1B	REPORT NOISE STRENGTH	DATA1	DATA2
----	-----------------------	-------	-------

DATA1 is NOISE Strength

3. PC Receive Command Format:

3. 1 Command basic communicate Frame Format: (See below Figure):

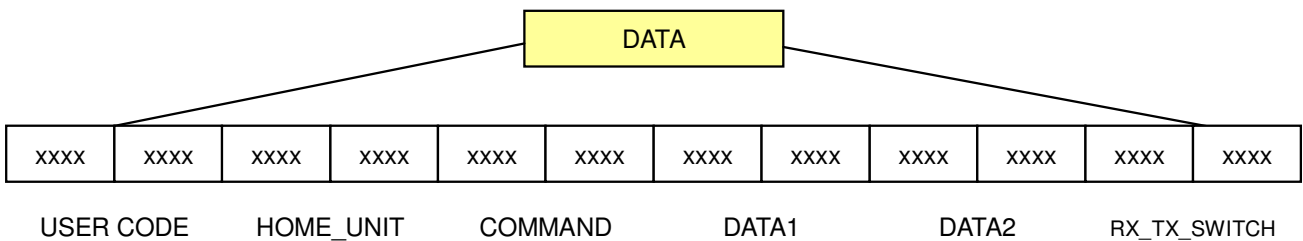


Here: STX is Frame Start Bit **02H**, LENGTH is DATA length, DATA is Data Bit, and ETX is Frame End Bit is **checksum**.

3. 2 DATA Format:

Described as above, the Length of DATA is changeable.

When the Data received is PLCBUS (RISC) Command (is provided with USERCODE, HOME_UNIT, COMMAND, DATA1, DATA2), the Length of DATA is 6. Additional one Data is "RX_TX_SWITCH".



3. 3 RX_TX_SWITCH Register

Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
—	R_ID_SW	R_ACK_SW	R_ITSELF	R_RISC	R_SW	XXXX	XXXX

Bit6: 1 Finishing receiving ID Feedback Signal.

0 Not ID Feedback Signal.

The ID Feedback Data received will be saved in DATA1、DATA2.

Bit5: 1 ACK Feedback Signal received.

0 No ACK Feedback Signal received.

ACK Feedback received.

Bit4: 1 PLCBUS Signal is transmitted by itself.

0 PLCBUS Signal is transmitted from outside (By other controllers)

The Symbol Bit means that the signal transmitted is received by itself successfully.

Bit3: 1 The PLCBUS Signal received accord with RISC Command.

0 The PLCBUS Signal does not accord with RISC Command..

The transfer between PLCBUS and RISC Register is finished, "1" is the PLCBUS Signal can be transferred to RISC Protocol.

Bit2: 1 Receive the correct PLCBUS Signal.

0 Non-Receive PLCBUS Signal.

If it is "1", means it has finished receiving the PLCBUS DATA from Power Line.

4. Interface Communication between PC and PLCBUS:

When PC transmits standard command introduced in **Item 2** to PLCBUS Interface, PLCBUS Interface will send PLCBUS Signal to power line automatically. The transmitting time is 400 Millisecond. During sending PLCBUS Signal, PLCBUS Interface will not receive any command from PC. The signal sent from PC to PLCBUS Interface should be transmitted continuously twice at least, the time interval between the two times is 12.5 mS.

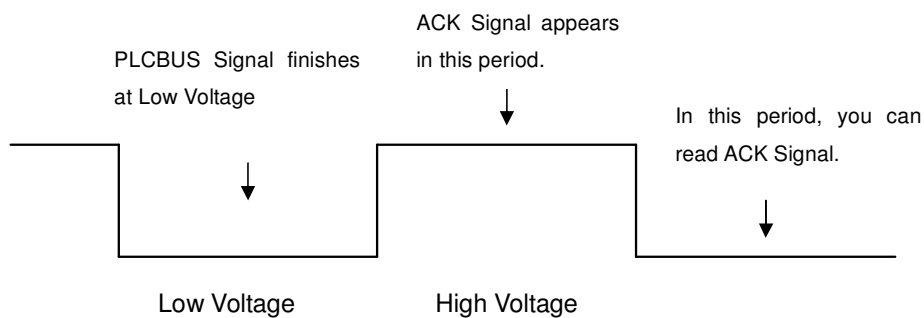
After the PLCBUS Interface has received **ACK**、**ID** or standard PLCBUS carrier wave signal, it will transfer the signal to PC by 232 according to the command format introduced in **Item 3**. And send **once only**.

4. Special Noun Explanation:

ACK Pulse

The ACK Pulse is a single PLCBUS Pulse generated by a PLCBUS receiving device that is used to inform the transmitting device that the PLCBUS Communication Packet was accepted (had a correct checksum and ID information). The ACK Pulse is immediately following the end of a PLCBUS Message.

In PLCBUS Signal, ACK Feedback Ordinal Figure:



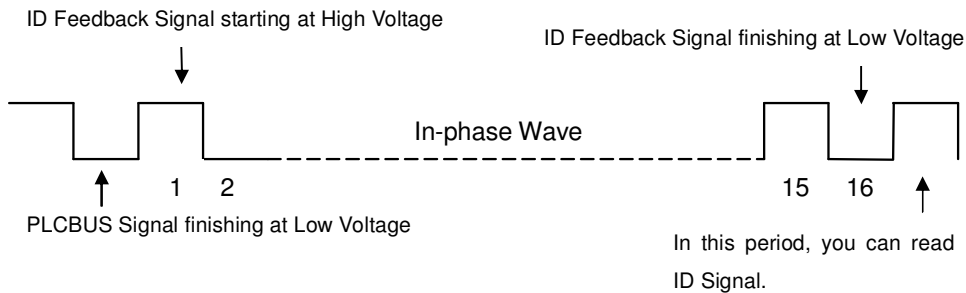
At the first cycle High Voltage after PLCBUS Signal is received, ACK Signal begins feedback. You can estimate whether there is ACK Feedback Signal by reading R_ACK_PULSE bit from RX_TX_SWITCH Register.

The ID Pulse

The ID Pulse is a single PLCBUS Pulse that is generated in the PLCBUS Frame (immediately following the end of a PLCBUS Message) that corresponds to the receiving device's Unit ID. For instance, if the receiving device's Unit ID are 12 then it will generate its ID Pulse 12 frames (half-cycles) after the end of the received PLCBUS Message. The main purpose of the ID Pulse is to indicate to the transmitting device which receiving devices properly received a broadcasted message. A PLCBUS device only generates the ID Pulse when it receives and accepts a PLCBUS Communication Packet that has the ID-bit set to 1.

NOTE: Devices that broadcast PLCBUS Messages with the ID-bit set to 1 should allow for 16 frames after the packet for all possible ID Pulses to be generated on the power line.

In PLCBUS Signal, ID Feedback Ordinal Figure:



At the first cycle High Voltage after PLCBUS Signal is received, ID Signal begins feedback. After 16 and a half-cycle, it will finish in Low Voltage Cycle. You can estimate whether ID Signal has been received finishing by reading R_ID_PULSE bit from RX_TX_SWITCH Register. If received finishing, reading ID Signal by Register R-DATA1、R-DATA2:

R-DATA1 :

Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
UNIT16	UNIT15	UNIT14	UNIT13	UNIT12	UNIT11	UNIT10	UNIT09

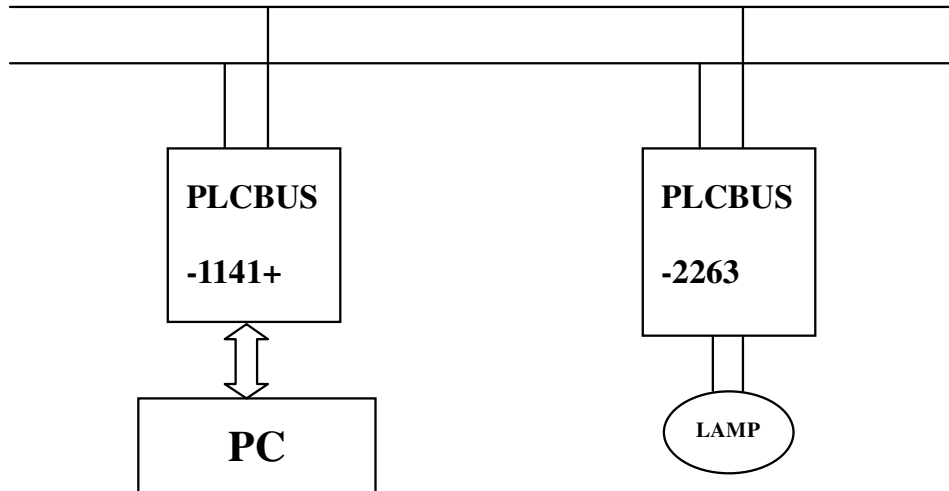
R-DATA2 :

Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
UNIT08	UNIT07	UNIT06	UNIT05	UNIT04	UNIT03	UNIT02	UNIT01

Denotation: In the same "USER+HOME", one UNIT status; 0 is for having no ID Feedback, and 1 is for having ID Feedback.

5. Transmit in One Phase Examples

5. 1 PLCBUS Interface 1141+ with a PLCBUS-2263 (one load Dimmer)



Examples:

Turn on the light use **A1 ON** command by 1141

1. PC to 1141+ : 02 05 55 00 22 00 00 03

2. 1141+ to PC : 02 06 55 00 22 64 00 1C 01

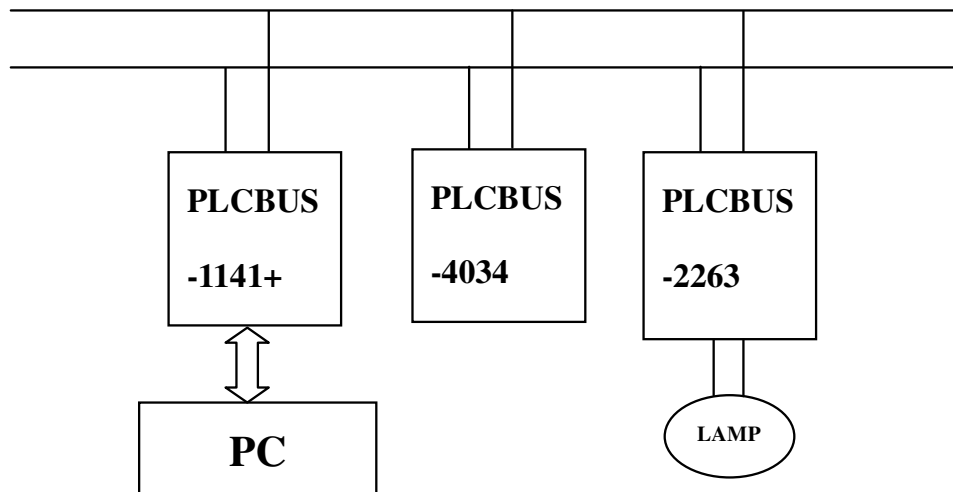
This means PLCBUS-1141+ received signal from power line by itself. sending

3. 1141+ to PC : 02 06 55 00 22 64 00 20 FD

This means receiver PLCBUS-2263 received command from power line, then send ACK back to 1141+.

So in this case, If PLCBUS-2263 no there or not received the command then no feedback to 1141+. Means not point 3 HEX back to PC

5. 2 PLCBUS-4034 with PLCBUS-2263 (one load Dimmer) monitor by PLCBUS-1141+



Examples:

Turn on the light use **A1 ON** command by PLCBUS-4034

1. 4034 send A1 ON command to power line by hand.
2. 1141+ to PC : 02 06 55 00 22 64 00 0C 11

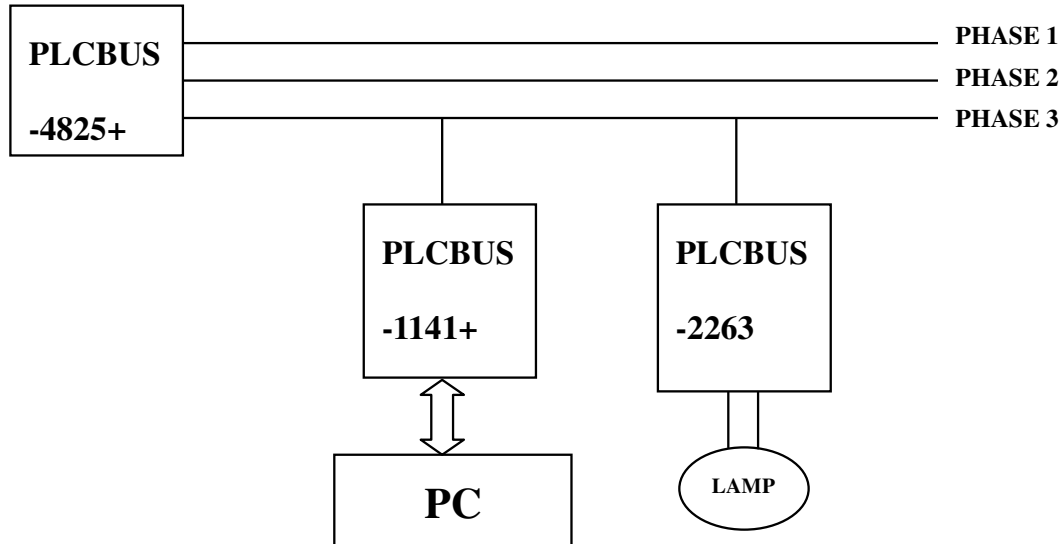
In this case, PLCBUS-2263 received the command, because if not, 4034 will send A1 ON command again like this:

1. 4034 send A1 ON command to power line by hand.
2. 1141+ to PC : 02 06 55 00 22 64 00 0C 11
3. 4034 send A1 ON command again to power line by automation.
4. 1141+ to PC : 02 06 55 00 22 64 00 0C 11

But by point 4, we can't confirm PLCBUS-2263 activated the A1 ON command. So, If you want to confirm PLCBUS-2263 was ON, You may send Status REQ command to check.

6. Transmit in Three Phase Examples

6.1 PLCBUS Interface 1141+ with a PLCBUS-2263 in the same phase



Examples:

Turn on the light use **A1 ON** command by 1141+

1. PC to 1141+: 02 05 55 00 62 00 00 03

2. 1141+ to PC: 02 06 55 00 62 64 00 1C C1

This means PLCBUS-1141 received signal form power line by itself. sending

3. 1141+ to PC: 02 06 55 00 62 64 00 20 BD

This means PLCBUS-4825+ received command from power line, then send ACK to 1141.

4. 1141+ to PC: 02 06 55 00 22 64 00 0C 11

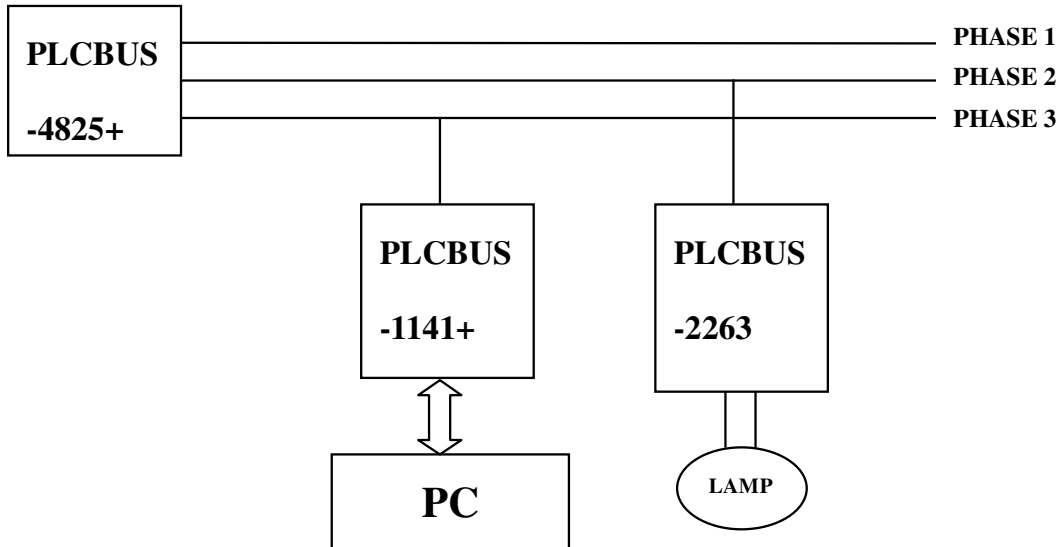
PLCBUS-4825+ transmit command to three phase at the same time..

5. 1141+ to PC: 02 06 55 00 0D 64 03 0C 23

PLCBUS-4825+ report PLCBUS-2263 states to PLCBUS-1141+.

So in this case, If PLCBUS-4825+ can't received ACK from PLCBUS-2263 at the first sending, then the PLCBUS-4825+ will automation sending again, If not received ACK again, then PLCBUS-4825+ will feedback to 1141+ that the 2263 states OFF.

6.2 PLCBUS Interface 1141+ with a PLCBUS-2263 in the different phase



Examples:

Turn on the light use **A1 ON** command by 1141+

1. PC to 1141+ : 02 05 55 00 62 00 00 03

2. 1141+ to PC: 02 06 55 00 62 64 00 1C C1

This means PLCBUS-1141 received signal form power line by itself. Sending

3. 1141+ to PC: 02 06 55 00 62 64 00 20 BD

This means PLCBUS-4825 received command from power line, then send ACK back to 1141.

4. 1141+ to PC: 02 06 55 00 22 64 00 0C 11

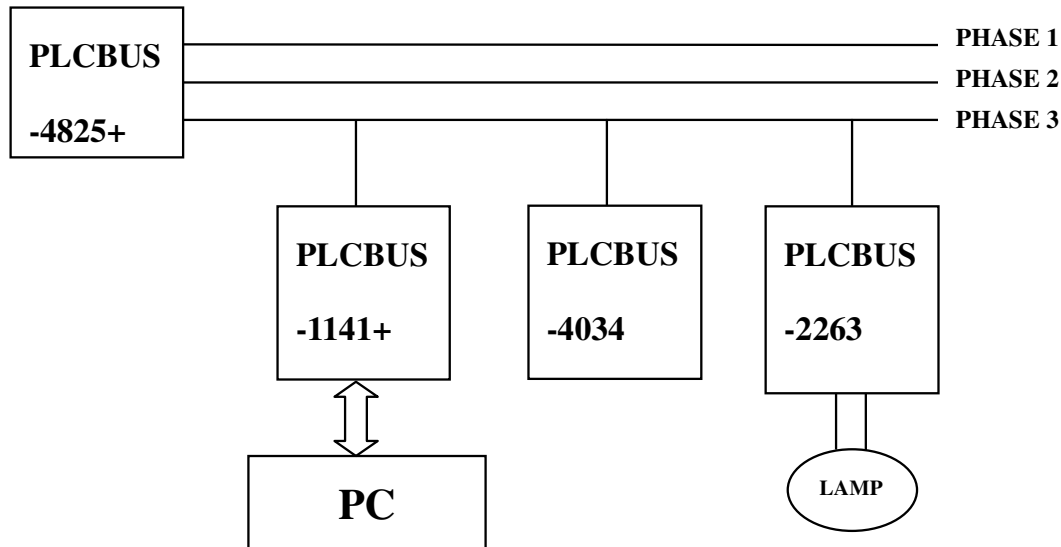
PLCBUS-4825+ transmit command to three phase at the same time.

5. 1141+ to PC: 02 06 55 00 0D 64 03 0C 23

PLCBUS-4825+ report PLCBUS-2263 states to PLCBUS-1141+.

So in this case, because 1141+ and PLCBUS-2263 in the different phase, So when PLCBUS-2263 received A1 ON command form PLCBUS-4825+, it only report to PLCBUS-4825+ with ACK message in the phase 2.

6.3 PLCBUS-4034 with PLCBUS-2263 monitor by PLCBUS-1141 in the same phase



Examples:

Turn on the light use **A1 ON** command by PLCBUS-4034

1. 4034 send A1 ON command to power line by hand.
2. 1141+ to PC : 02 06 55 00 62 64 00 0C D1

This means PLCBUS-1141+ received signal form power line by itself. Sending

3. 1141+ to PC : 02 06 55 00 22 64 00 0C 11

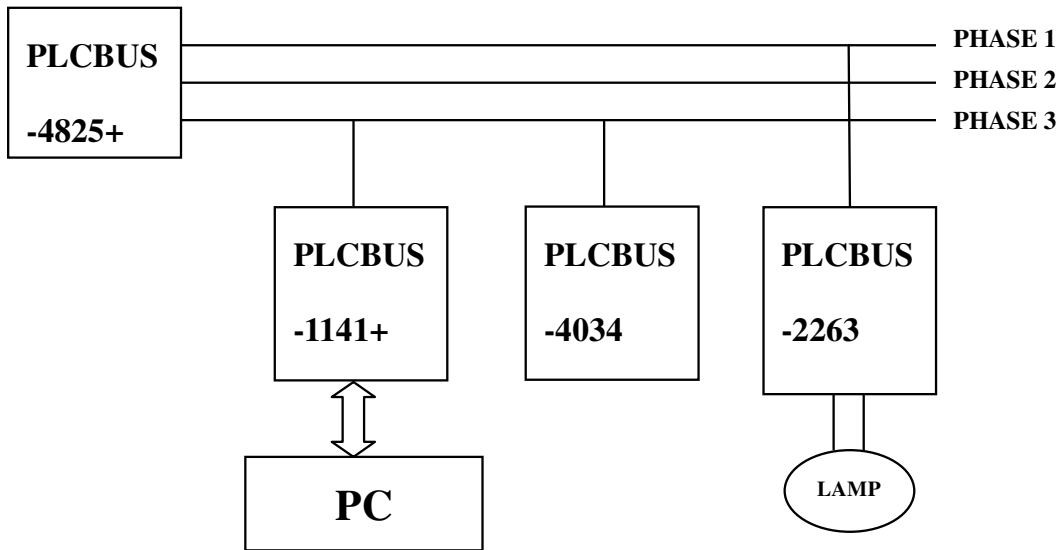
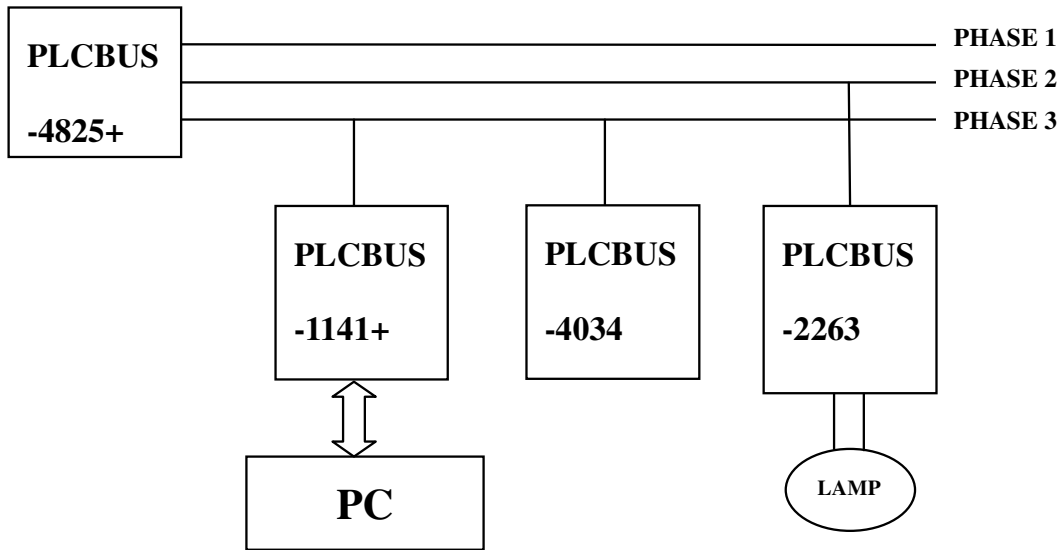
PLCBUS-4825+ transmit command to three phase at the same time..

4. 1141+ to PC : 02 06 55 00 0D 64 03 0C 23

PLCBUS-4825+ report PLCBUS-2263 states to PLCBUS-4034.

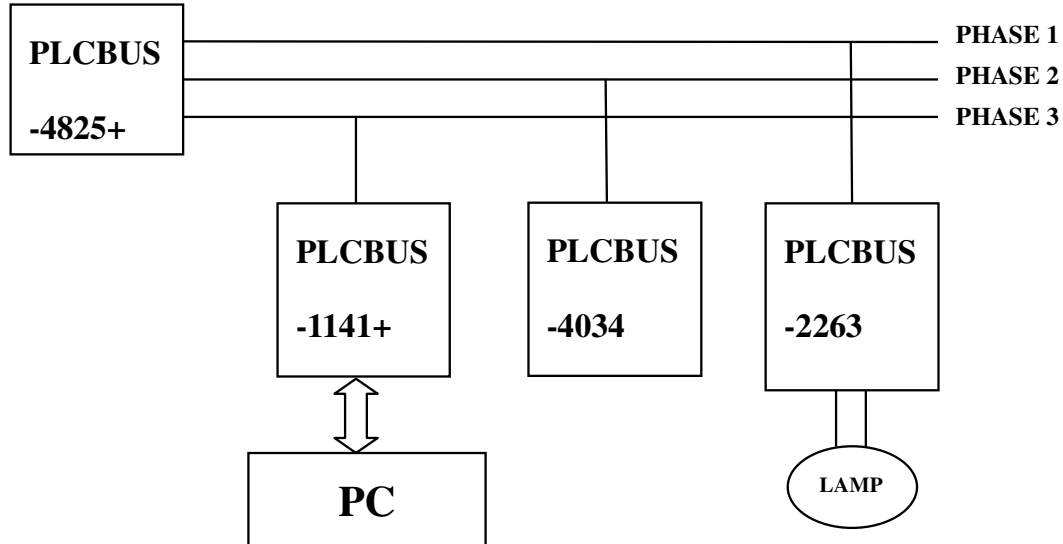
So in this case, if there is power line noise effect communication, PLCBUS-4034 not received ACK message from 4825+ at the first time, 4034 will send A1 ON again to power line by automation. Also, If 4825+ send A1 on to 2263 and 2263 can't feedback with ACK, 4825+ will send A1 ON again. Under HEX is bad condition if noise effect communication.

02 06 55 00 62 64 00 0C D1	4034 send A1 ON by hand
02 06 55 00 62 64 00 0C D1	4034 send A1 ON by automation
02 06 55 00 22 64 00 0C 11	4825 send A1 ON by automation
02 06 55 00 22 64 00 0C 11	4825 send A1 ON by automation
02 06 55 00 0D 64 03 0C 23	4825 feedback 2263 status to 4034



This two circuit are as same as 6.3 point.

6. 4 PLCBUS-4034 with PLCBUS-2263 monitor by PLCBUS-1141 in the different phase



Examples:

Turn on the light use **A1 ON** command by PLCBUS-4034

1. 4034 send A1 ON command to power line by hand.

2. 1141+ to PC : 02 06 55 00 22 64 00 0C 11

3. 1141+ to PC : 02 06 55 00 0D 64 03 0C 23 4825+ feedback status to each phase

PLCBUS-4825+ transmit command to three phase at the same time..

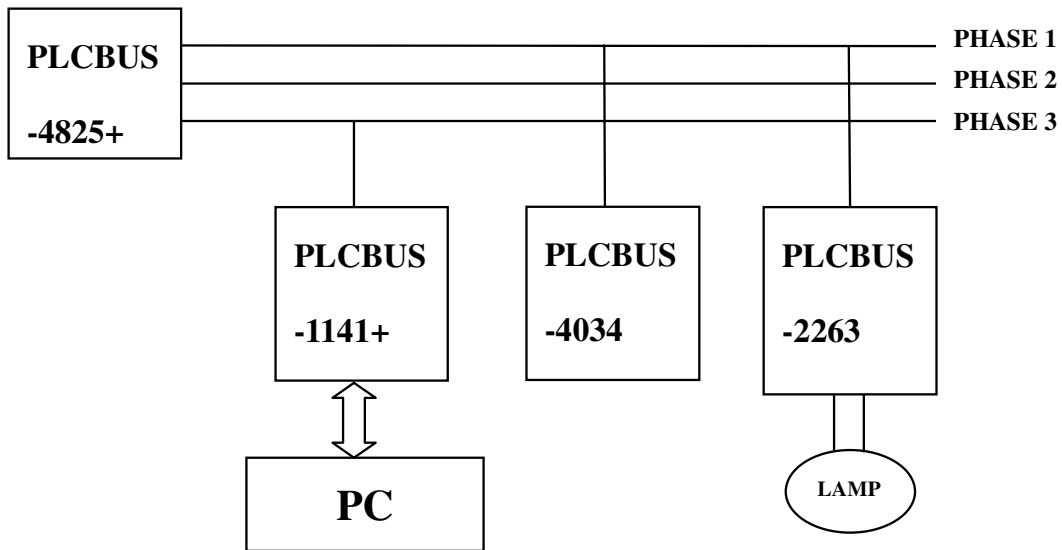
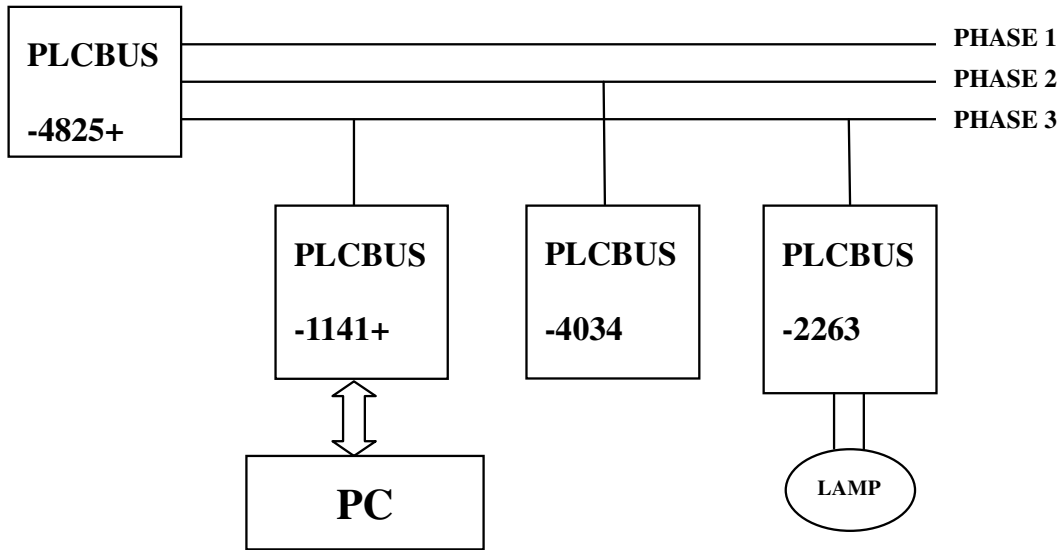
So in this case, if there is power line noise effect communication, PLCBUS-4034 not received ACK message from 4825+ at the first time, 4034 will send A1 ON again to power line by automation. Also, If 4825+ send A1 on to 2263 and 2263 can't feedback with ACK, 4825+ will send A1 ON again. Under HEX is bad condition if noise effect communication.

02 06 55 00 22 64 00 0C 11 4825 send A1 ON by automation

02 06 55 00 22 64 00 0C 11 4825 send A1 ON by automation

02 06 55 00 0D 64 03 0C 23 4825+ feedback status to each phase

There is a problem with this circuit; the 1141 can't know 2263 status after 2263 activated. So we will release the new version of PLCBUS-4825 to solve it. Before this you may design 1141 and 4034 in the same phase.



This two circuit are as same as 6.4 point.

7. Command Timing Delay

Before you read command timing delay, you must understand chapter 5 and 6.

7.1 One Phase System

ABOUT COMMAND

In one phase system, the command delay time depend on the command type. PLCBUS RISC command delay time always within 350-450mS. Like A1 ON command is 400mS.

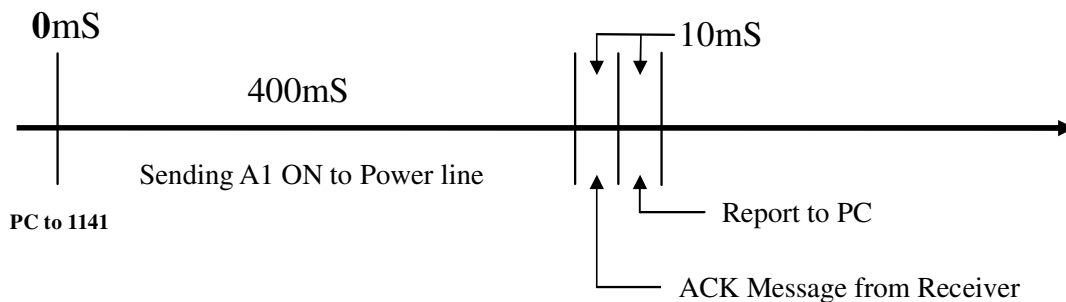
ABOUT FEEDBACK

ACK feedback will spend 10mS

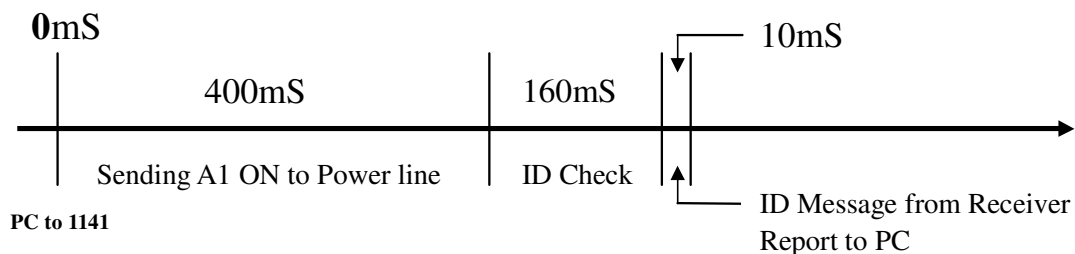
ID feedback will spend 160mS

Examples:

Now we send A1 ON command by PLCBUS-1141, The timing like this:



Now we send A house ID check command by PLCBUS-1141, The timing like this:



7. 2 Three Phase System

ABOUT COMMAND

In one phase system, the command delay time depend on the command type. PLCBUS RISC command delay time always within 350-450mS. Like A1 ON command is 400mS. In three phase system every command delay timing like one phase system,.

Different is:

First send three phase command (see 2.3 COMMAND Register Bit6 is 1) to three phase coupler (PLCBUS-4825+).

Second three phase coupler send one phase command to three phase at the same time.

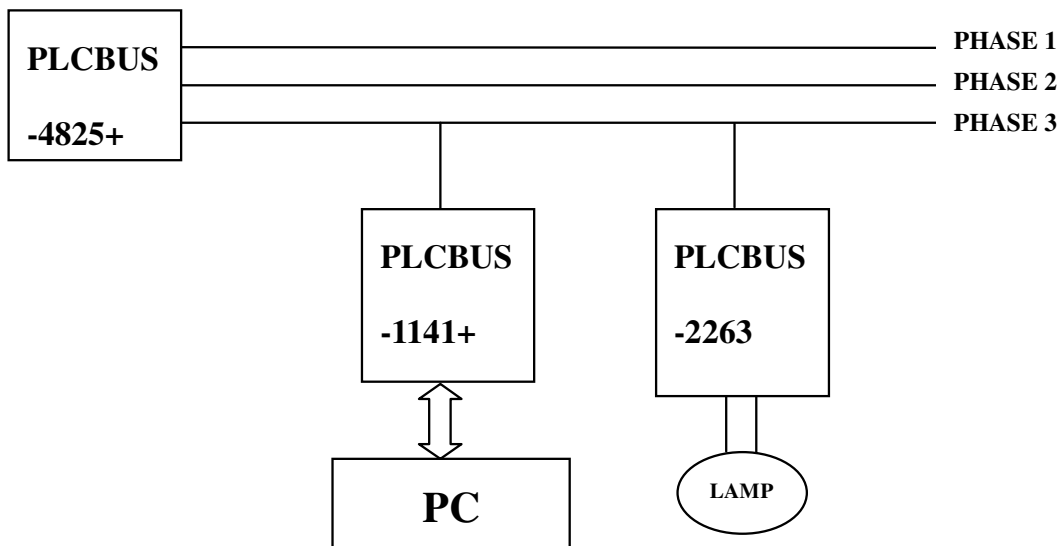
Third three phase coupler send back how about receiver activated (NOT all command feedback).

ABOUT FEEDBACK

Every time, you want to send three phase command to coupler, you must need ACK message feedback. That means you must make command register Bit5 to 1. Also need Command Register Bit6 to 1.

Examples:

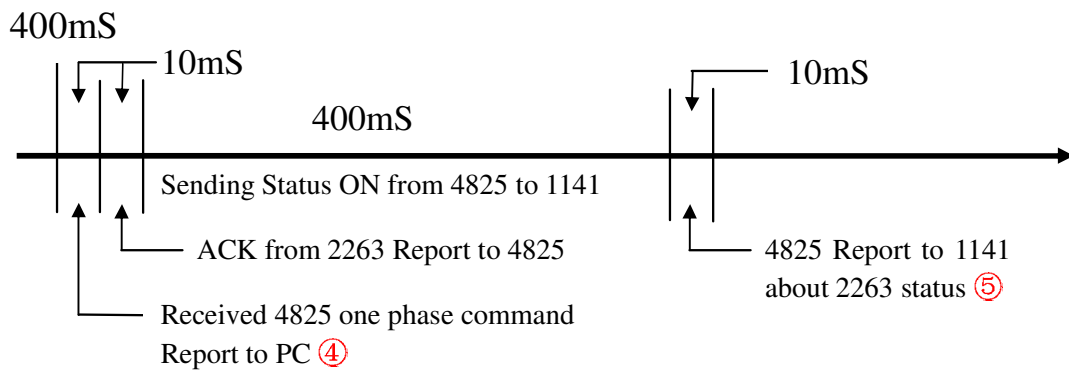
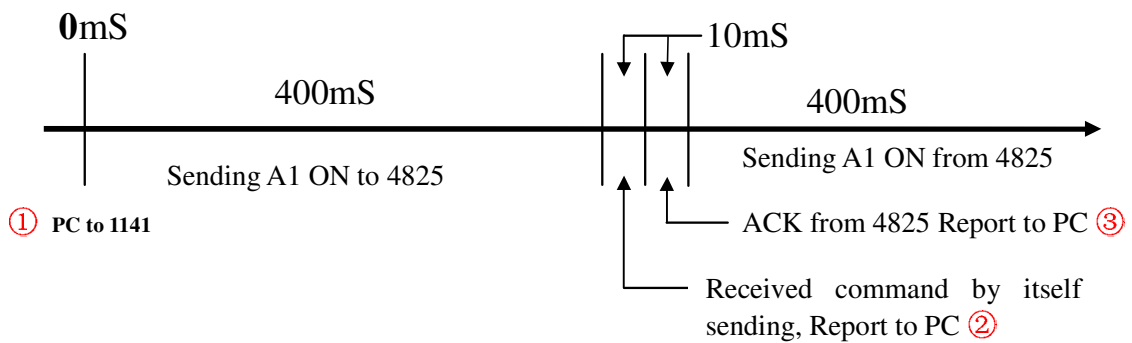
Now we use chapter 6.1 PLCBUS Interface 1141 with a PLCBUS-2263 in the same phase to show you how about delay timing.



PC will show you about this:

- ①. PC to 1141 : 02 05 55 00 62 00 00 03
- ②. 1141 to PC : 02 06 55 00 62 64 00 1C C1
- ③. 1141 to PC : 02 06 55 00 62 64 00 20 BD
- ④. 1141 to PC : 02 06 55 00 22 64 00 0C 11
- ⑤. 1141 to PC : 02 06 55 00 0D 64 03 0C 23

This is just a example. When you develop software, you may delay more time or waiting



feedback from 1141. Also you need to pay attention with noise come. When noise come sometimes 4825 will send command twice if command need ACK feedback.

This list will show you what command need ACK feedback with 4825 and 4825+.

Please notice command with “ # “

00	ALL UNIT OFF	In Same HOME, “All Units Off”.
01	ALL LTS ON	In Same HOME, “All Lights On”.
02	ON #	In Same HOME +UNIT, “One UNIT On”.
03	OFF #	In Same HOME + UNIT, “One UNIT Off”.
04	DIM *#	In Same HOME + UNIT, “One UNIT Dim”.
05	BRIGHT *#	In Same HOME + UNIT, “One UNIT Brighten”
06	ALL LIGHT OFF	In Same HOME, “All Lights Off”.
07	ALL USER LTS ON	Under Same USER, “All USER Lights On”.
08	ALL USER UNIT OFF	Under Same USER, “All USER Units Off”.
09	ALL USER LIGHT OFF	Under Same USER, “All USER Lights Off”.
0A	BLINK *#	In Same HOME+ UNIT, “One Light Blink”.
0B	FADE STOP #	In Same HOME+ UNIT, “One light Stop Dimming”.
0C	PRESETDIM *#	In Same HOME+UNIT, “Preset Brightness Level”.
0D	STATUS ON *	Status feedback as “ON”.
0E	STATUS OFF	Status feedback as “OFF”
0F	STATUS REQ	Status Checking
10	(R)MASTER ADDR SETUP*#	Setup the main address of Receiver.
11	(T)MASTER ADDR SETUP*#	Setup the main address of Transmitter.
12	SCENES ADDR SETUP*	Setup Scene address
13	SCENES ADDR ERASE	Clean Scene address under the same HOME+UNIT
14	ALL SCENES ADDR ERASE*#	Clean all the Scene addresses in each receiver.
15	FOR FUTURE*	
16	FOR FUTURE*	
17	FOR FUTURE*	
18	GET SIGNAL STRENGTH #	Check the Signal Strength.
19	GET NOISE STRENGTH #	Check the Noise Strength.
1A	REPORT SIGNAL STRENGTH*	Report the Signal Strength.
1B	REPORT NOISE STRENGTH*	Report the Noise Strength.
1C	GET ALL ID PULSE (THE SAME USER AND THE SAME HOME)	Check the ID PULSE in the same USER + HOME.
1D	GET ONLY ON ID PULSE (THE SAME USER AND THE SAME HOME)	Check the Only ON ID PULSE in the same USER+ HOME.
1E	REPORT ALL ID PULSE (For 3-phase power line only)	
1F	REPORT ONLY ON PULSE (For 3-phase power line only)	

Signal needing ACK feedback.

* Command with Data Bit.

8. Change note with 1141 and 1141+

1. The version 1.0-1.3 is for 1141, The version 2.1-2.2 is for 1141+

2. Checksum change.

When 1141 report to PC, the last date is 03, When 1141+ report to PC, the last date is checksum. About detailed, please note V2.2-3.1

3. Timing change in three phase with 4825 and 4825+.

The ACK report to PC form receiver to 4825 or 4825+ is canceled. Because 4825 or 4825+ will report to 1141+ the status about receiver at the last date, So not necessary for ACK report to PC.

-- End --

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