MERIT LI-LIN FASTDOME PROTOCOL

FOR MAIN CABINET AND RECEIVER

1. Description: The receiver and cabinet communicates by standard RS-485 interface.

   UART Format: None parity bit, 8 data bits, 1 stop bit, baud rate: 9600 bps

   Main cabinet in active mode, whereas receiver in passive mode.

2. From the system after – reset. Main cabinet will send out 3 byte to receiver then receiver response 3 bytes right away.

   Note 1. ***For error*** – correction consideration such as code missing. As receiver get the first code then it must calculate how much time to get other two. definitely in 2.5 ms. On the other hand , receiver response 3 codes in 4 ms.

   Note 2. ***NO-KEY command*** – To stop (Pan Right /Pan Left / Tilt Up / Tilt Down / Focus Far / Focus Near / Zoom In / Zoom Out / Iris Large / Iris Small) movement enter 0FFh for 3rd byte.

   Example: Byte1=ID address, Byte2=00h, Byte3=0FFh

   Note 3. ***To start AUTO PAN status***, 3rd byte in the TYPE A command must be entered as 0Ah. Please refer to page 2.

   Note 4. There are 2 ways to stop AUTO PAN status.

   a. 3rd byte in the TYPE A command must be entered as 0Ah. Please refer to page 2.

   b. 3rd byte in the TYPE D command must be entered as 0D2h. Please refer to page 3.

CODE DEFINITION

COMMAND – 1 (System to Receiver)

Byte 1	Receiver Address	001h – 040h
Byte 2	Control Byte 1	***Bit – 0*** = PAN Right ***Bit – 1*** = PAN Left ***Bit – 2*** = TILT Up ***Bit – 3*** = TILT Down ***Bit – 4*** = ZOOM Tele ***Bit – 5*** = ZOOM Wide ***Bit – 6*** = FOCUS Far ***Bit – 7*** = FOCUS Near
Byte 3	Control Byte 2	Explain as below (***Bit 7……Bit 0***)

TYPE A : 0000XXXX AUX RELAY CONTROL (High nibble bit 7,6,5,4 be 0)

Bit – 3 0 → **Relay ON** , 1 → **Toggle**

Bit –2	*Bit –1*	*Bit – 0*	*Relay Identification*	*FastDome type*	*Receiver type*
0	0	0	**IRIS Large**	**Relay ON**	**Relay ON**
0	0	1	**IRIS Small**	**Relay ON**	**Relay ON**
0	1	0	**AUTO PAN**	**Toggle**	**Toggle**
0	1	1	**LIGHT or CAM ESC**	**Relay ON**	**Relay ON**
1	0	0	**SPRAY or IR filter Swap**	**Relay ON**	**Relay ON**
1	0	1	**WIPER or LENS SPEED**	**Relay ON**	**Relay ON**
1	1	0	**AUX 1 or CAM SETUP**	**Relay ON**	**Relay ON / Toggle**
1	1	1	**AUX 2 or 180º Flip**	**Relay ON**	**Relay ON / Toggle**

Note 1 : When a relay on (non toggle status) code received, the corresponding relay is triggered on immediately. As soon as the receiver does not continue to receive the same code, relay will be turned off after 500ms delay. To turn off immediately, NO-KEY command sent.

Note 2: To activate or stop AUTO PAN function : When first 0Ah command sent, receiver will active AUTO PAN function. Receiver will send auto pan ON status response back to system immediately. When 2nd 0Ah command sent, receiver will stop AUTO PAN function. And receiver will send auto pan OFF status response back to system immediately.

Note 3: For 07h command in speed dome configuration is for FLIP function. 07h command in receiver configuration is for AUX2 input.

Note 4: For PIH-7625 series speed dome, 06h command is to activate on screen display setup menu. 03h command is to exit on screen display setup menu.

Note 5: For PIH-7625 series speed dome, enter 05h command once to activate the manual focus, zoom and iris speed in the OSD SET-UP MENU. Enter 05h command again to exit and return to factory default speeds.

Note 6: For PIH-7625 series speed dome, Increment hotkey to control IR filter function change. Enter 04h command 1st time then IR filter will be On. Enter the same code 2nd time IR filter will be Off. Enter the 3rd time IR filter will be Auto.

TYPE B : 10XXXXXX SPEED CHANGE FOR PAN AND TILT

Joystick operation PAN/TILT speed (8 step speed)

Bit 7 = 1 ***Bit 6*** = 0

Bit 5	***Bit 4***	***Bit 3***	***TILT Speed***	***PIH-717X***	***PIH-7000/7600***
0	0	0	**0**	0.2°/sec	0.2°/sec
0	0	1	**1**	2°/sec	2°/sec
0	1	0	**2**	8°/sec	8°/sec
0	1	1	**3**	20°/sec	20°/sec
1	0	0	**4**	50°/sec	50°/sec
1	0	1	**5**	110°/sec	90°/sec
1	1	0	**6**	200°/sec	130°/sec
1	1	1	**7**	360°/sec	180°/sec
Bit 2	***Bit 1***	***Bit 0***	***PAN Speed***	***PIH-717X***	***PIH-7000/7600***
0	0	0	**0**	0.2°/sec	0.2°/sec
0	0	1	**1**	2°/sec	2°/sec
0	1	0	**2**	8°/sec	8°/sec
0	1	1	**3**	20°/sec	20°/sec
1	0	0	**4**	50°/sec	50°/sec
1	0	1	**5**	110°/sec	90°/sec
1	1	0	**6**	200°/sec	130°/sec
1	1	1	**7**	360°/sec	180°/sec

TYPE C : 1110XXXX AUTO PAN GROUP SET

Bit 3 Run group 4 ***Bit 2*** Run group 3 ***Bit 1*** Run group 2 ***Bit 0*** Run group 1

TYPE D : SPECIFIC CODE

11010100	Trigger Auto IRIS	(disable by manual IRIS control)
11010101	Trigger Auto FOCUS	(disable by manual FOCUS control)
11010010	Stop Auto PAN	(disable Auto Pan status)
11010000	Privacy Zone Mask ON	available in 25X model (display privacy zone mask)
11010001	Privacy Zone Mask OFF	available in 25X model (turn off privacy zone mask)
11010011	Privacy Zone Mask Setting Save	available in 25X model (save setting value)
11010110	Privacy Zone Mask Setup Entry	available in 25X model (setup enter)
11010111	Privacy Zone Mask Setup Exit	available in 25X model (setup exit)

COMMAND – 1 (Receiver to System)

Byte 1	RECEIVER ADDR (001h – 040h)
Byte 2	000H
Byte 3	11000XXX Bit 0 AUTO PAN STATUS Bit 1 AUTO FOCUS STATUS Bit 2 AUTO IRIS STATUS 1 → ON 0 → OFF

COMMAND – 2 (System to Receiver) Recall preset Point 0 – 07Fh

BYTE 1 = RECEIVER ADDR + 040h (041h – 080h)

BYTE 2 = PRESET NO. ***Note: 00h through 07Fh (For 1 through 128 Preset Point)***

BYTE 3 = DON'T CARE

COMMAND – 2 (Receiver to System)

BYTE 1 = RECEIVER ADDR + 040h (041h – 080h)

BYTE 2 = DWELL TIME (sec) ***Note: 00h through 0FFh (0 through 255 sec)***

BYTE 3 = SPEED (degree / sec) ***Note: 01h through 0FFh (1 through 255 sec)***

COMMAND – 3 (System to Receiver) Save Preset Point 0 – 07FH

BYTE 1 = RECEIVER ADDR + 080h (081h – 0C0h)

BYTE 2 = DWELL TIME (sec) ***Note: 00h through 0FFh (0 through 255 sec)***

BYTE 3 = SPEED (degree / sec) ***Note: 01h through 0FFh (1 through 255 sec)***

COMMAND – 3 (Receiver to System)

BYTE 1 = RECEIVER ADDR + 080h (081h – 0C0h)

BYTE 2 = DWELL TIME (sec) ***Note: 00h through 0FFh (0 through 255 sec)***

BYTE 3 = SPEED (degree / sec) ***Note: 01h through 0FFh (1 through 255 sec)***

COMMAND – 4 (System to Receiver) Alarm polling

BYTE 1 = 0CAh

BYTE 2 = ACKNOWLEDGE (LAST ALARM RECEIVER ADDR.)

BYTE 3 = ACKNOWLEDGE (LAST ALARM NO.)

COMMAND – 4 (Receiver to System)

If there is any alarm detected and never been acknowledged otherwise no response

BYTE 1 = 0CAh

BYTE 2 = ALARM RECEIVER ADDR. (001h TO 040h)

BYTE 3 = ALARM NO. (1 TO 6)

Note 1: Alarm polling process: System should send 0CAh, 00h, 00h command to receiver periodically to check if there is alarm triggered.

Note 2a: If there is no alarm triggered, no response from receiver.

Note 2b: If there is an alarm triggered, receiver will response to system with byte1=0CAh, byte2=last alarm receiver address, byte3=last alarm point.

Note 3a: If there was no alarm, system again should send command to receiver as in note1.

Note 3b: If there was alarm triggered, system must send the same command as in note2b, back to receiver to clear receiver alarm status.

Once all alarms are cleared, system should repeat note1 to check alarm status.

COMMAND – 5 (System to Receiver)

Clear all preset datum for specific receiver

BYTE 1 = RECEIVER ADDR. (001h TO 040h)

BYTE 2 = 0FFh

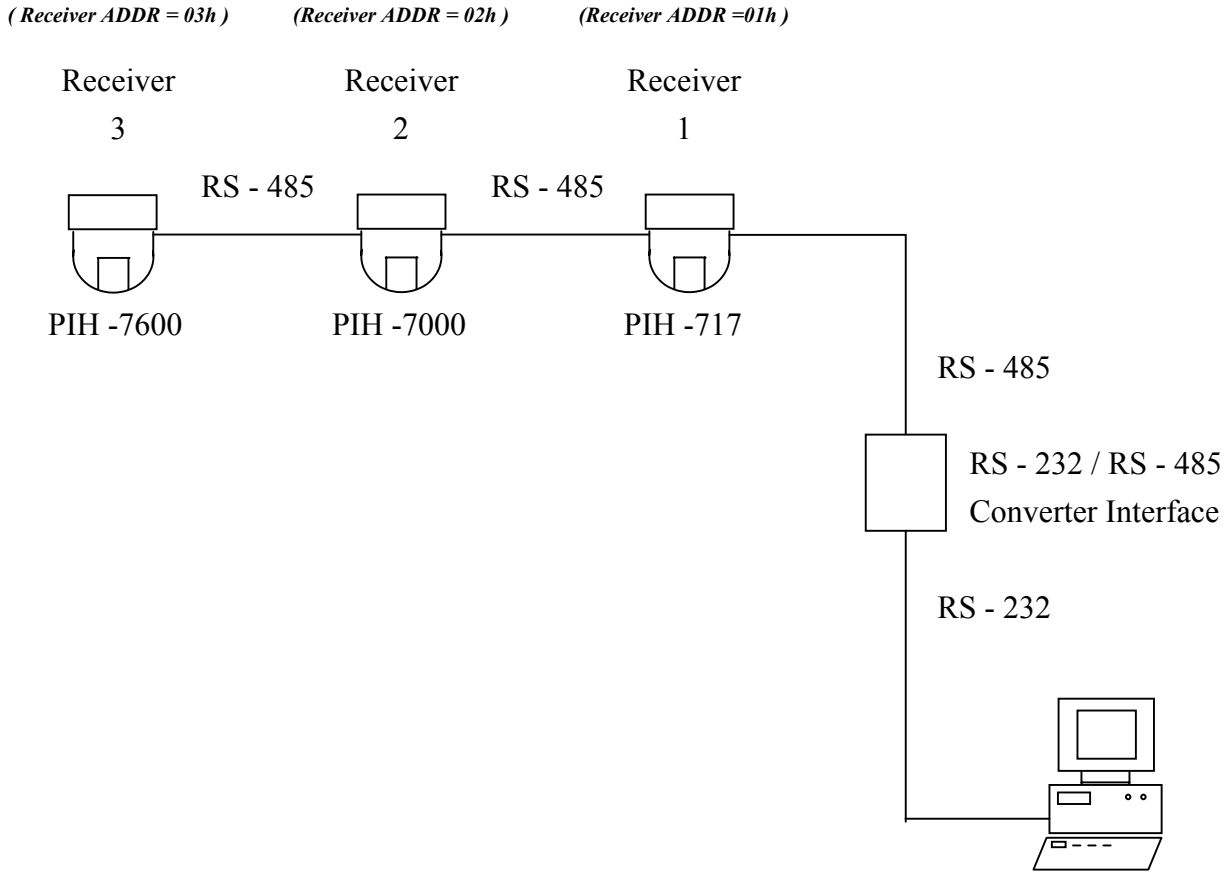
BYTE 3 = 0F5h

COMMAND – 5 (System to Receiver)

BYTE 1 = RECEIVER ADDR. (001h TO 040h)

BYTE 2 = 0FFh

BYTE 3 = 0F5h


(Receiver ADDR = 03h)
(Receiver ADDR = 02h)
(Receiver ADDR =01h)
Receiver 3
Receiver 2
Receiver 1
RS - 485
RS - 485
PIH -7600
PIH -7000
PIH -717
RS - 485
RS - 232 / RS - 485
Converter Interface
RS - 232

I PAN ROTATION CONTROL FOR Receiver ADDR 01 PIH-717

1. Receiver ADDR 01 PIH-717 panning to the right at 2°/Sec.

1st command			Receiver response 3 bytes right away	2nd command			Receiver response 3 bytes right away
Byte1	Byte2	Byte3		Byte1	Byte2	Byte3	
01h	01h	81h		01h	00h	0FFh	
840us	840us	840us		840us	840us	840us	
Panning to the right at 2°				Stop panning status			

Note: If 2nd NO-KEY command is not send. Then receiver will continue to pan for another 500ms before panning action is stopped.

2. Receiver ADDR 01 PIH-717 move 10 degree to the right at 2 degree/sec

1st			Response	Continue repeat 1st command	No-key			Response
01h	01h	81h			01h	00h	0FFh	
Panning					Stop panning			

Note: If 1st command is repeated. Receiver will continue to pan to the right at 2 degree/sec for 5 sec to reach a total of 10 degrees. Once NO-KEY command is send, pan movement will stop. If NO-KEY command is not sent pan movement will continue for another 500ms. In this case it will move 1 degree more to the right.

II TILT ACTION CONTROL FOR Receiver ADDR 01 PIH- 717

1. Receiver ADDR 01 PIH-717 tilt upwards at 20°/Sec.

1st command				2nd command			
Byte1	Byte2	Byte3	Receiver response 3 bytes right away	Byte1	Byte2	Byte3	Receiver response 3 bytes right away
01h	04h	98h		01h	00h	0FFh	
840us	840us	840us		840us	840us	840us	
Tilt upward				Stop tilt upward status			

Note: If 2nd NO-KEY command is not send. Then receiver will continue to tilt for another 500ms before tilt action is stopped.

2. Receiver ADDR 01 PIH -717 move 100 degree tilt upward at 20 degree/sec.

1st			Response	Continue repeat 1st command	No-Key			Response
01h	04h	98h			01h	00h	0FFh	
Tilt upward					Stop tilt upward			

Note: If 1st command is repeated. Receiver will continue tilt upward at 20 degree/sec for 5 sec to reach a total of 100 degrees. Once NO-KEY command is send, upward movement will stop. If NO-KEY command is not sent, upward movement will continue for another 500ms. In this case, it will move 10 degree more to the right.

However, since PIH-717 is allowed to tilt a max of 90° upward , PIH-717 will stop to tilt upward when limit reached.

III IRIS CONTROL

1. IRIS-Large command for Receiver ADDR 02 PIH-7000

1st command			Receiver response 3 bytes right away	2nd command			Receiver response 3 bytes right away
Byte1	Byte2	Byte3		Byte1	Byte2	Byte3	
02h	00h	00h		02h	00h	0FFh	
840us	840us	840us		840us	840us	840us	
IRIS Large				Stop IRIS Large status			

2. If IRIS-Large command is repeated. IRIS will continue to open till above 2nd NO-KEY command is send. If NO-KEY command is not send, IRIS will continue to open for another 500ms

3. IRIS-Small command for Receiver ADDR 02 PIH-7000

1st command			Receiver response 3 bytes right away	2nd command			Receiver response 3 bytes right away
Byte1	Byte2	Byte3		Byte1	Byte2	Byte3	
02h	00h	01h		02h	00h	0FFh	
840us	840us	840us		840us	840us	840us	
IRIS Small				Stop IRIS Small status			

4. If IRIS-Small command is repeated. IRIS will continue to close till above 2nd NO-KEY command is send. If NO-KEY command is not send, IRIS will continue to close for another 500ms

5. Auto iris command for Receiver ADDR 03 PIH-7600

1st command			Receiver response 3 bytes right away	2nd command			Receiver response 3 bytes right away
Byte1	Byte2	Byte3		Byte1	Byte2	Byte3	
03h	00h	0D4h		03h	00h	0FFh	
840us	840us	840us		840us	840us	840us	
Auto IRIS				Stop status			

IV FOCUS CONTROL

1. FOCUS Far Command for Receiver ADDR 01 PIH-717

1st command				2nd command			
Byte1	Byte2	Byte3	Receiver response 3 bytes right away	Byte1	Byte2	Byte3	Receiver response 3 bytes right away
01h	40h	0FFh		01h	00h	0FFh	
840us	840us	840us		840us	840us	840us	
Focus Far				Stop Focus Far status			

2. When FOCUS Far Command is repeated. Lens FOCUS will become farther till above 2nd NO-KEY command is send. If NO-KEY command is not send, FOCUS will continue for another 500ms

3. FOCUS Near command for Receiver ADDR 01 PIH-717

1st command				2nd command			
Byte1	Byte2	Byte3	Receiver response 3 bytes right away	Byte1	Byte2	Byte3	Receiver response 3 bytes right away
01h	80h	0FFh		01h	00h	0FFh	
840us	840us	840us		840us	840us	840us	
Focus Near				Stop Focus Near status			

4. When FOCUS Near command is repeated, Lens FOCUS will become nearer till above 2nd NO-KEY command is send. If NO-KEY command is not send, FOCUS will continue for another 500ms

5. Auto Focus command for Receiver ADDR 01 PIH-717

1st command				2nd command			
Byte1	Byte2	Byte3	Receiver response 3 bytes right away	Byte1	Byte2	Byte3	Receiver response 3 bytes right away
01h	00h	0D5h		01h	00h	0FFh	
840us	840us	840us		840us	840us	840us	
Auto Focus				Stop status			

V ZOOM IN AND ZOOM OUT CONTROL

1. ZOOM In command for Receiver ADDR 01 PIH-717

1st command			Receiver response 3 bytes right away	2nd command			Receiver response 3 bytes right away
Byte1	Byte2	Byte3		Byte1	Byte2	Byte3	
01h	10h	0FFh		01h	00h	0FFh	
840us	840us	840us		840us	840us	840us	
ZOOM In				Stop ZOOM In status			

2. When ZOOM In command is repeated, Lens will continue to zoom in till above 2nd NO-KEY command is send. If NO-KEY command is not send, zoom in will continue for another 500ms

3. ZOOM Out command for Receiver ADDR 02 PIH-7000

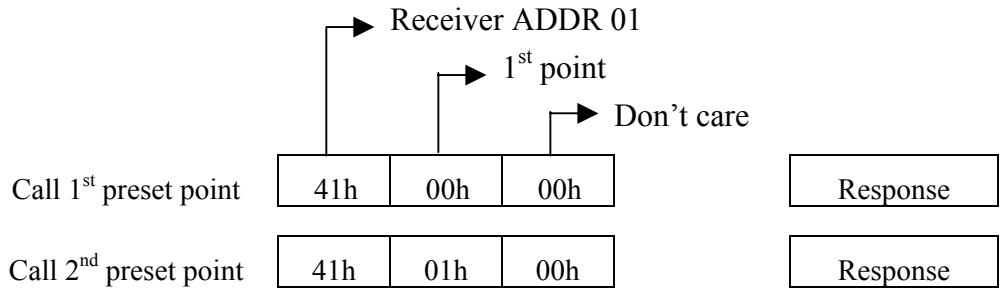
1st command			Receiver response 3 bytes right away	2nd command			Receiver response 3 bytes right away
Byte1	Byte2	Byte3		Byte1	Byte2	Byte3	
02h	20h	0FFh		02h	00h	0FFh	
840us	840us	840us		840us	840us	840us	
ZOOM Out				Stop ZOOM Out status			

4. When ZOOM Out command is repeated, Lens will continue to zoom out till above 2nd NO-KEY command is send. If NO-KEY command is not send, zoom out will continue for another 500ms

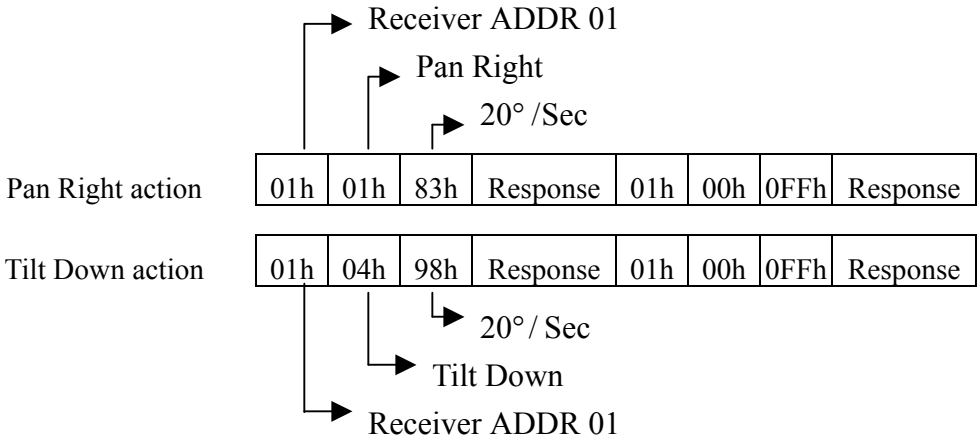
VI PRESET SET – UP

Max 128 Preset Position For Each FASTDOME

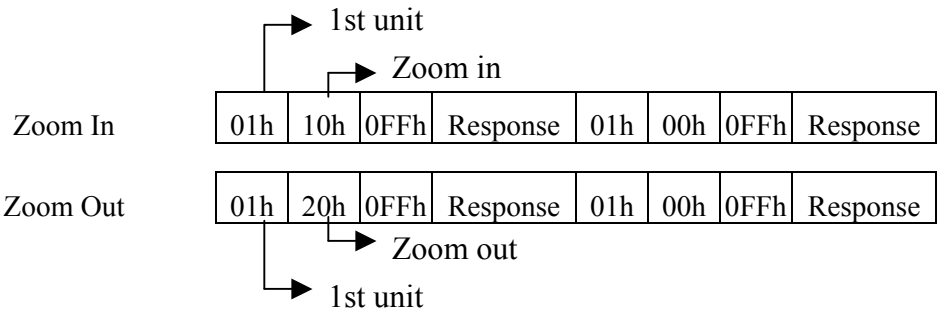
1. Recall Preset position for ***Receiver ADDR 01*** PIH-717



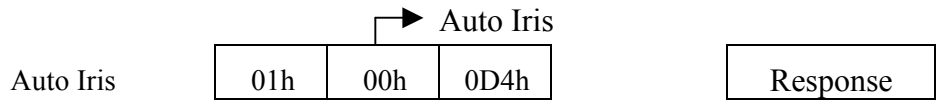
2. ***Receiver ADDR 01*** PIH-717 Pan and Tilt to preset point



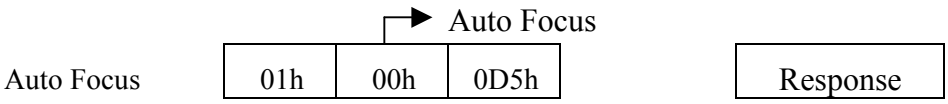
3. ***Receiver ADDR 01*** PIH-717 Zoom In and Zoom Out to preset point



4. ***Receiver ADDR 01*** PIH-717 Auto Iris for preset point



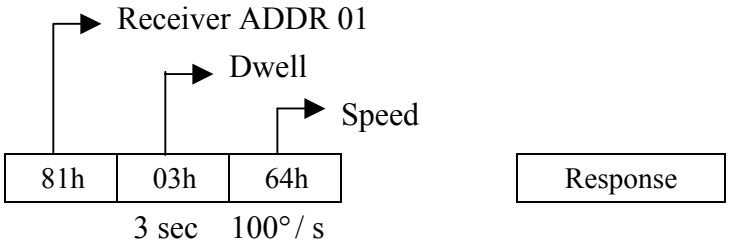
5. ***Receiver ADDR 01*** PIH-717 Auto Focus for preset point



6. Preset speed (1° ~ 255° / s) : The speed moving from a preset point to next preset point.

Duration time for each preset point ranging from 0 ~ 255 sec. In auto pan mode , if the duration time for a preset is set to zero , this preset point will be bypassed.

Example : Set up speed at 100°/ sec and duration time at 3 sec. For No.1 preset.



7. 128 presets available.

See chart A to set up preset No.1 ~ No.16

See chart B to set up preset No.17 ~ No.128

CHART A

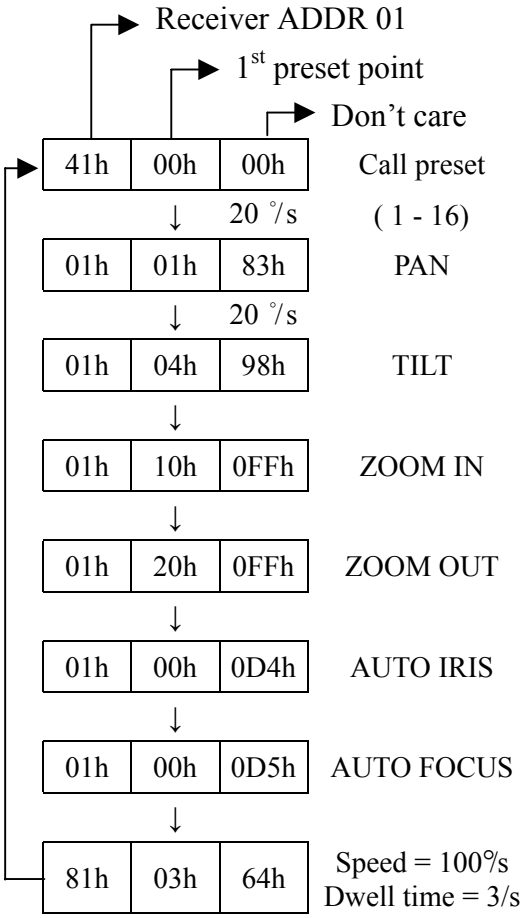
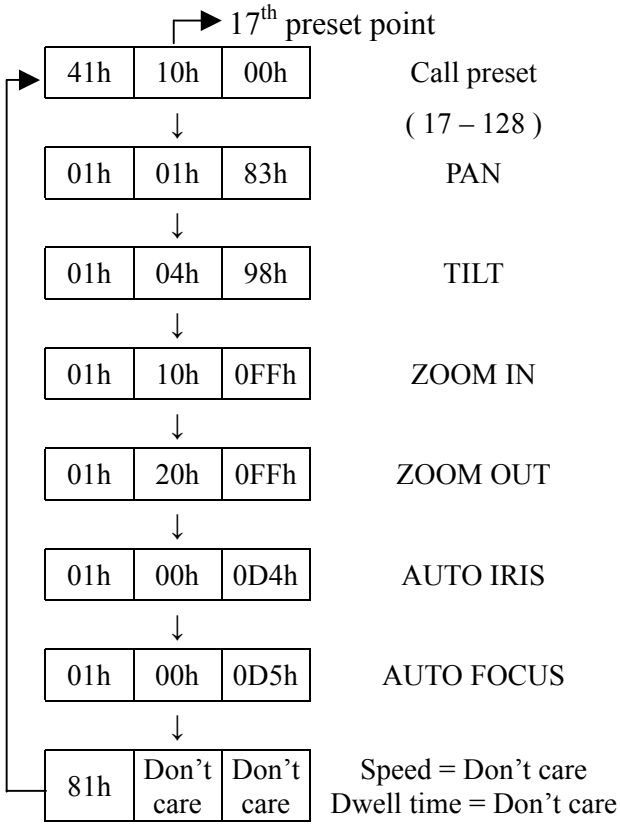
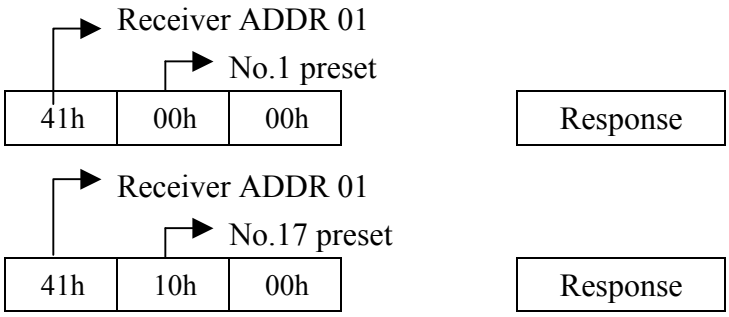


CHART B



VII RECALL PRESET

After presets are set up , you will be able to recall presets.

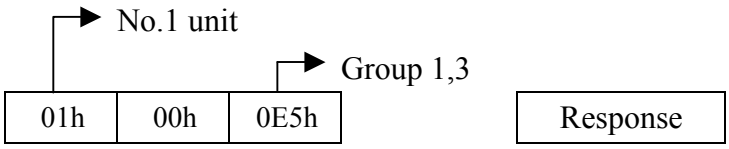


VIII GROUPING FOR PRESETS

First 16 presets can be set into 4 groups. Auto panning amongst groups can be set up.

Example :

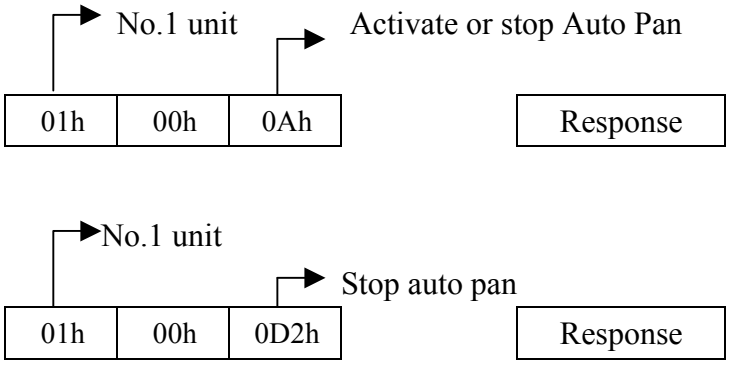
Set up auto pan function for group 1 and group 3 presets for No.1 PIH-717



1st group	Preset	1 , 2 , 3 , 4
2nd group	Preset	5 , 6 , 7 , 8
3rd group	Preset	9 , 10 , 11 , 12
4th group	Preset	13 , 14 , 15 , 16

IX ACTIVATE AUTO PAN

After group selection is done , auto pan can be activated. PIH-717 will rotate according to your selection of group , sequence as continual rotation. To stop auto pan , input the same command.



X CLEAR PRESET VALUE

Example : If you want to clear all preset value and data in No.1 PIH-717


No.1 unit
01H
0FFH
0F5H
Response