Overview Communications Protocol Specification for OEM Control Panels V7.1

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Contents

Chapter 1

Change Notes

- V6.1
  - Added delete all tours to delete tour message (0x0F)
  - Added set zoom speed message (0x74).
  - Added image stabilization control message (0x75).
  - These changes require at least V1.5.4 firmware to work.
- V6.0
  - Refactored document to unified structure.
  - Added get software version command (0x02).
  - This change requires at least V1.5.3 firmware to work.
- V5.2
  - Added timed go to absolute position command (0x11).
  - This change requires at least V1.4.20 Firmware to work
- V5.1
  - Added addition byte D62 to Store Tour Command (0x0E) to allow correct operation.
  - Corrected the data byte for the pan and tilt direction command (0x73, 0x03)
  - Extended User timeout time (0x73,0x06) to 16 bits to allow for full functionality
  - Added Auto with Slow Shutter Speed option to command 0x1F.
  - Added Freeze Frame Command (0x25)
  - Added WDR control command (0x26)
  - Added Near Focus Mode Command (0x27)
  - These changes require at least V1.4.16 Firmware to work.
- V5.0

- Messages 0x15 to 0x24, 0x2B, 0x2C, 0x51, 0x60, 0x64, 0x70 to 0x73 added.
- These messages require at least V1.4.14 Firmware to work.

Chapter 2

Introduction

This document is intended to assist Original Equipment Manufacturers in the programming of control panels which are compatible with the Overview camera system.

It describes that subset of the Overview communications protocol which is applicable to the dialogue between Control Panel and Head (camera assembly).

A complete Overview camera system may include, in addition to a control panel and remote cameras, video switches, keyboards, and alarm panels. Only information relevant to the communication between control panel and cameras is addressed here.

Chapter 3

Communication Protocol

All communication is instigated by the master (eg control panel) and sent to the host (eg unit). The host will send an acknowledge / response as set out in the original message.

Communications use the RS485 standard and are half duplex and asynchronous. A fixed data rate is used: 9600 bits per second with 8 data bits (no parity) and 1 stop bit.

3.1 Data Link Layer

The protocol used is of the byte stuffing variety. This allows unambiguous characters to be used for the start and end of a data frame.

Reserved characters **STX** and **ETX** are used to denote the start and end of frames respectively.

If these occur in the body of a frame then they are replaced with a pair of characters as follows:
STX is replaced by **ESC STUFFED STX**
ETX is replaced by **ESC STUFFED ETX**
ESC is replaced by **ESC ESC**

Character values are (hexadecimal notation):

STX	0x02
EXT	0x03
STUFFED STX	0x82
STUFFED ETX	0x83
ESC	0x1B

The format of all frames is as follows:

- Command from Master (Control Panel):
  - **STX Header Address Command Data LRC ETX**
- Response from the Head (camera):
  - **STX Header Command Data LRC ETX**

3.1.1 Header (1 byte)

The format of the header is:

Bits 7-5	Bit 4	Bit 3	Bits 2-0
Destination type	Long address	No response	Sequence number

Destination type field

The Overview protocol supports a number of different devices on the RS485 link from the master. The **destination type** field identifies which device type a message is addressed to, and enables the master to address a single device, all devices of a specified type, or all devices of all types.

Destination Device	**Value**	
TYPE MASTER	1	Response messages from devices to Master
TYPE HEAD	2	Message from Master to a single Head or to all Heads (as determined by the sequence number see below)
GLOBAL	5	Message from Master to all devices

For the purposes of controlling the Head, only the TYPE MASTER and TYPE HEAD **destination types** are relevant.

Long Address bit

If the **long address bit** is set, the **address** is 2 bytes with the MS byte being sent first. The default is a single byte **address**.

No Response bit

If the **No response bit** is set then the camera will act on the message (if otherwise valid) but will not respond. This feature may be used for high speed commands that could not be resent anyway because of timing constraints, or where the Master cannot process received data.

Sequence number field

The sequence number is used to prevent a Master command from being acted on more than once, in the event that the Master does not successfully receive an acknowledgement from the Head, and therefore resends the command.

If two consecutive messages are received by the Head with the same sequence number, the second message is acknowledged but no other action is taken.

The Master shall use sequence numbers 1 to 7. Sequence number 0 is reserved for globally addressing a message to a specified **destination type**.[1]

3.1.2 Address (0,1,2 bytes)

The **address** of the receiving device is one or two bytes as determined by the **long address bit** in the header. A slave ignores all messages that are not addressed to that slave. Globally addressed messages (either messages with a GLOBAL **destination type** field or TYPE HEAD messages with a sequence number of 0) have no **address** field. No response is made to globally addressed messages.

3.1.3 Command (1 byte)

This is the command type (see chapter 4).

3.1.4 Data (0 to 128 bytes)

This number and meaning of the data bytes depends on the command type as detailed in 4.4 below.

3.1.5 LRC (1 byte)

The **LRC** is the EXCLUSIVE OR of all bytes from the header to the byte immediately preceding the **LRC** itself (not including the **STX** or **ETX** characters). It is calculated over the data buffer prior to transmission, and not over the byte-stuffed data actually transmitted.

3.2 Master/Slave Operation

All communication is initiated by the Master (control panel). Communication is never initiated by the slave (Head).

If the frame is valid and the **destination type** and **address** are valid for the slave then the slave will respond, unless the **No response** bit is set in the Header or it is a global message. If the frame is illegal in its syntax or **LRC** the slave will neither respond to nor act on the frame.

[1]The Master will need to maintain a separate sequence number for each slave device. Overview Heads can be configured to ignore sequence numbers in the processing of received messages. The Master may then send messages to a specific Head, with a fixed sequence number in the range 1-7.

There is no system of acknowledgement and retry for response messages from the slave to the Master.

If the slave detects an **STX** character within a frame, that frame is discarded, and the slave resynchronises on the next received frame (which may be the frame initiated by the unexpected **STX** character, or may be the frame after that implementation dependent).

Responses follow the frame format set out above except that bit 7 of the command byte is always set and the **address** field is absent.

3.2.1 Timing

Transmission cadence should be maintained if possible; certainly any inter-character gaps should be restricted to less than 1ms.

The Master should wait for up to half a second for a response from the Head, before deciding that the communication attempt has failed. Most responses will be much faster than this, but some messages may require the Head to access non-volatile memory, which can be time-consuming.

The Master should impose a line turn around delay from the end of a received **ETX** before beginning transmission of **STX**. This delay should be at least 1ms.

If the host does not receive a response to a command, a single retry is recommended.

Note: there is no biasing of the RS485 data lines in Overview Heads. The data lines are externally terminated.

Chapter 4

Command and Data Structure

The following commands are addressed by the Master to the Head. Destination types are therefore TYPE HEAD in commands and TYPE MASTER in responses. As data length is parsed on the head side message checking it is imperative that the correct number of data bytes are sent respective of the command.

Command	0x01 *(response 0x81)*
Name	Go to postion
Function	Send the unit to a preset position
Notes	Position 99 (0x62) is set as the wash position

	Transmit Message		**Response Message**
CMD	0x01	CMD	0x81
D1	Position Number: P1:0x00 → P250:0xF9	D1	0x00: No Error 0x01: Out of range 0x02: Not initialized

Command	0x04 *(response 0x84)*
Name	Pan and tilt velocity control
Function	Controls the speed of the pan and the tilt motors. This command will also control the cursor in the menu structure. It is envisaged that this command will be sent as a direct response to the movement of a joystick on a control panel.
Notes	2s compliment values are used to control speed and direction Pan Right: 0xFF (min speed) to 0x81 (max speed) Pan Left: 0x01 (min speed) to 0x7F (max speed) Tilt Down: 0xFF (min speed) to 0x81 (max speed) Tilt Up: 0x01 (min speed) to 0x7F (max speed)

	Transmit Message		**Response Message**
CMD	0x04	CMD	0x84
D1	Pan velocity		No data sent in response
D2	Tilt velocity		

Command	0x05 *(response 0x85)*
Name	Zoom and focus control
Function	Controls the zoom and focus of the unit. It is envisaged that this command will be sent in response to zoom and focus functions being called from a control panel.
Notes	2s compliment values are used to control speed and direction Focus Near: 0xFF (min speed) to 0x81 (max speed) Focus Far: 0x01 (min speed) to 0x7F (max speed) Focus Stop: 0x00 Zoom Tele: 0xFF (min speed) to 0x81 (max speed) Zoom Wide: 0x01 (min speed) to 0x7F (max speed) Zoom Stop: 0x00

	Transmit Message		**Response Message**
CMD	0x05	CMD	0x85
D1	Focus velocity		No data sent in response
D2	Zoom velocity		

Command	0x08 *(response 0x88)*
Name	Resume action
Function	Causes the unit to resume its previous action after interruption
Notes	This command will allow for a preset position or a tour to be reinstated

	Transmit Message		**Response Message**
CMD	0x08	CMD	0x88

Command	0x09 *(response 0x89)*
Name	Store postion
Function	Stores the current PTZF co-ordinates as a specific position number
Notes	Position 99 (0x62) is as the wash position

	Transmit Message		**Response Message**
CMD	0x09	CMD	0x89
D1	Position Number: P1:0x00 → P250:0xF9	D1	0x00: No Error 0x01: Out of range

Command	0x0A *(response 0x8A)*
Name	Return postion data
Function	Returns the PTZF information for a preset position along with its text tag
Notes	**Pan Range:** $0_d, 0_h(0\,^\circ) \rightarrow 4096000_d, 3E8000_h(360\,^\circ)$ **Tilt Range:** $1137778_d, 115C72_h(90\,^\circ) \rightarrow 2184533_d, 21555_h(182\,^\circ)$ **Zoom (Sony):** $0_d, 0_h$ (wide) $\rightarrow 16384_d, 4000_h$ (tele) $\rightarrow 28672_d, 7000_h$ (digital) **Focus (Sony):** $4096_d, 1000_h$ (far) $\rightarrow 49152_d, C000_h$(wide end)

	Transmit Message		**Response Message**
CMD	0x0A	CMD	0x8A
D1	Position Number: P1:0x00 - P250:0xF9	D1	0x00: No Error 0x01: Out of range 0x02: Not initialized
		D2	0x00
		D3	LSB of pan position
		D4	Pan position byte 2
		D5	Pan position byte 3
		D6	MSB of pan position
		D7	LSB of tilt position
		D8	Tilt position byte 2
		D9	Tilt position byte 3
		D10	MSB of tilt position
		D11	LSB of zoom position
		D12	Zoom position byte 2
		D13	Zoom position byte 3
		D14	MSB of zoom position
		D15	LSB of focus position
		D16	Focus position byte 2
		D17	Focus position byte 3
		D18	MSB of focus position
		D1...Dn	ASCII representation of position tag text

Command	0x0B *(response 0x8B)*
Name	Return tour data
Function	Returns the 20 position numbers, dwell times and travel times for a tour
Notes	A tour is a succession of preset positions. During a tour the unit will remain at each position for the specified dwell time and will move between positions such that the time taken will be the specified travel time. Tour and position numbers are zero-indexed whilst dwell and travel times are one-indexed and measured in seconds.

	Transmit Message		**Response Message**
CMD	0x0B	CMD	0x8B
D1	Tour Number: T1:0x00 → T100:0x63	D1	0x00: No Error 0x01: Out of range. 0x02: Tour notiinitialized
		D2	Item 1: Position Number
		D3	Item 1: Dwell time
		D4	Item 1: Travel Time
		$\sum_{n=2}^{n=19} D_{3n-1}$	Item n: Position Number
		$\sum_{n=2}^{n=19} D_{3n}$	Item n: Dwell time
		$\sum_{n=2}^{n=19} D_{3n+1}$	Item n: Travel Time
		D59	Item 20: Position Number
		D60	Item 20: Dwell time
		D61	Item 20: Travel Time

Command	0x0E *(response 0x8E)*
Name	Store tour data
Function	Store 20 position numbers, dwell times and travel times for a tour
Notes	A tour is a succession of preset positions. During a tour the unit will remain at each position for the specified dwell time and will move between positions such that the time taken will be the specified travel time. Tour and position numbers are zero-indexed whilst dwell and travel times are one-indexed and measured in seconds. 0xFF should be used for all positions, dwell and travel times in unused tour items.

	Transmit Message		**Response Message**
CMD	0x0E	CMD	0x8E
D1	Tour Number: T1:0x00 → T100:0x63	D1	0x00: No Error 0x01: Out of range.
D2	Item 1: Position Number		
D3	Item 1: Dwell time		
D4	Item 1: Travel Time		
$\sum_{n=2}^{n=19} D_{3n-1}$	Item n: Position Number		
$\sum_{n=2}^{n=19} D_{3n}$	Item n: Dwell time		
$\sum_{n=2}^{n=19} D_{3n+1}$	Item n: Travel Time		
D59	Item 20: Position Number		
D60	Item 20: Dwell time		
D61	Item 20: Travel Time		
D62	0xFF		

Command	0x0F *(response 0x8F)*
Name	Delete tour
Function	Delete one or all tours
Notes	

	Transmit Message		**Response Message**
CMD	0x0F	CMD	0x8F
D1	Tour Number: T1:0x00 → T100:0x63 All:0xFF	D1	0x00: No Error 0x01: Out of range.

Command	0x11 *(response 0x91)*
Name	Go to timed absolute position
Function	Send the unit to a position in a given time
Notes	**Pan Range:** $0_d, 0_h(0\,^\circ) \rightarrow 4096000_d, 3E8000_h(360\,^\circ)$ **Tilt Range:** $1137778_d, 115C72_h(90\,^\circ) \rightarrow 2184533_d, 21555_h(182\,^\circ)$ **Zoom (Sony):** $0_d, 0_h$ (wide) $\rightarrow 16384_d, 4000_h$ (tele) $\rightarrow 28672_d, 7000_h$ (digital) **Focus (Sony):** $4096_d, 1000_h$ (far) $\rightarrow 49152_d, C000_h$(wide end) **Time:** $0_d, 0_h \rightarrow 255_d, FF_h$ time in seconds for move

	Transmit Message		**Response Message**
CMD	0x11	CMD	0x91
D1	LSB of pan position	D1	0x00
D2	Pan position byte 2		
D3	Pan position byte 3		
D4	MSB of pan position		
D5	LSB of tilt position		
D6	Tilt position byte 2		
D7	Tilt position byte 3		
D8	MSB of tilt position		
D9	LSB of zoom position		
D10	Zoom position byte 2		
D11	Zoom position byte 3		
D12	MSB of zoom position		
D13	LSB of focus position		
D14	Focus position byte 2		
D15	Focus position byte 3		
D16	MSB of focus position		
D17	Time		

Command	0x14 *(response 0x94)*
Name	Start tour
Function	Start a stored tour
Notes	A tour is a succession of preset positions. During a tour the unit will remain at each position for the specified dwell time and will move between positions such that the time taken will be the specified travel time.

	Transmit Message		**Response Message**
CMD	0x14	CMD	0x94
D1	Tour Number: T1:0x00 → T100:0x63	D1	0x00: No Error 0x01: Out of range 0x02: Not initialized

Command	0x15 *(response 0x95)*
Name	Set video gain level
Function	Sets the cable compensation video gain level
Notes	This sets the level of the onboard video gain circuitry.

	Transmit Message		**Response Message**
CMD	0x15	CMD	0x95
D1	Level 0(min) → 7(max)		No data sent in response

Command	0x16 *(response 0x96)*
Name	Set digital zoom mode
Function	Set whether digital zoom is enabled or not
Notes	

	Transmit Message		**Response Message**
CMD	0x16	CMD	0x96
D1	Off: 0x00 On: 0x01		No data sent in response

Command	0x1A *(response 0x9A)*
Name	Set camera colour mode
Function	
Notes	

	Transmit Message		**Response Message**
CMD	0x1A	CMD	0x9A
D1	Colour only mode: 0x00 Mono only mode: 0x01 Colour/mono mode: 0x02	D1	No data sent in response

Command	0x1C *(response 0x9C)*
Name	Set white balance mode
Function	
Notes	Sony Camera FCB-EX Models

	Transmit Message		**Response Message**
CMD	0x1C	CMD	0x9C
D1	AWB: 0x00 Indoor: 0x01 Outdoor: 0x02 ATW: 0x03 Manual: 0x04	D1	No data sent in response

Command	0x1D *(response 0x9D)*
Name	Set white balance red level
Function	
Notes	Change will only occur once the white balance mode is set to manual

	Transmit Message		**Response Message**
CMD	0x1D	CMD	0x9D
D1	Red Level: 0x00 → 0xFF		No data sent in response

Command	0x1E *(response 0x9E)*
Name	Set white balance blue level
Function	
Notes	Change will only occur once the white balance mode is set to manual

	Transmit Message		**Response Message**
CMD	0x1E	CMD	0x9E
D1	Blue Level: 0x00 → 0xFF		No data sent in response

Command	0x25 *(response 0xA5)*
Name	Set freeze frame mode
Function	
Notes	

	Transmit Message		**Response Message**
CMD	0x25	CMD	0xA5
D1	Off: 0x00 On: 0x01		No data sent in response

Command	0x27 *(response 0xA7)*
Name	Set near focus mode
Function	
Notes	

	Transmit Message		**Response Message**
CMD	0x27	CMD	0xA7
D1	Off: 0x00 On: 0x01		No data sent in response

Command	0x28 *(response 0xA8)*
Name	Get homing complete status
Function	
Notes	

	Transmit Message		**Response Message**
CMD	0x28	CMD	0xA8
		D1	0x00: True 0x01: False 0x02: Timed out (Error)

Command	0x29 *(response 0xA9)*
Name	Run homing routine
Function	Re-home the pan and tilt axis of the unit
Notes	

	Transmit Message		**Response Message**
CMD	0x29	CMD	0xA9
D1	0x00	D1	0x00

Command	0x2A *(response 0xAA)*
Name	Store Position Text
Function	Stores a custom 20 character string which is displayed when at a specified preset position.
Notes	If the required text is less than 20 characters it is recommended to use 0x20 (ASCII space) to fill the remaining character buffer in the command.

	Transmit Message		**Response Message**
CMD	0x2A	CMD	0xAA
D1	Position Number: P1:0x00 → P250:0xF9		No data sent in response
D2-D21	ASCII representation of position tag text		

Command	0x2B *(response 0xAB)*
Name	Delete postion
Function	Delete one or all preset positions
Notes	

	Transmit Message		**Response Message**
CMD	0x2B	CMD	0xAB
D1	Position Number: P1:0x00 → P250:0xF9 ALL:0xFF	D1	0x00: No Error 0x01: Out of range

Command	0x2C *(response 0xAC)*
Name	Manual position focus mode
Function	Sets whether the stored focus position or autofocus is used when focusing at a preset position
Notes	

	Transmit Message		**Response Message**
CMD	0x2C	CMD	0xAC
D1	On: 0x00 Off: 0x01		No data sent in response

Command	0x31 *(response 0xB1)*
Name	Return current location
Function	Returns the current PTZF data for the unit
Notes	**Pan Range:** $0_d, 0_h(0\,^\circ) \rightarrow 4096000_d, 3E8000_h(360\,^\circ)$ **Tilt Range:** $1137778_d, 115C72_h(90\,^\circ) \rightarrow 2184533_d, 21555_h(182\,^\circ)$ **Zoom (Sony):** $0_d, 0_h$ (wide) $\rightarrow 16384_d, 4000_h$ (tele) $\rightarrow 28672_d, 7000_h$ (digital) **Focus (Sony):** $4096_d, 1000_h$ (far) $\rightarrow 49152_d, C000_h$(wide end)

	Transmit Message		**Response Message**
CMD	0x31	CMD	0xB1
		D1	LSB of pan position
		D2	Pan position byte 2
		D3	Pan position byte 3
		D4	MSB of pan position
		D5	LSB of tilt position
		D6	Tilt position byte 2
		D7	Tilt position byte 3
		D8	MSB of tilt position
		D9	LSB of zoom position
		D10	Zoom position byte 2
		D11	Zoom position byte 3
		D12	MSB of zoom position
		D13	LSB of focus position
		D14	Focus position byte 2
		D15	Focus position byte 3
		D16	MSB of focus position

Command	0x33 *(response 0xB3)*
Name	Relay control
Function	Allows control of peripheral and additional features of the unit
Notes	The relay byte is defined as follows: 0x05 Start Wash 0x06 Stop Wash 0x07 Turn on digital zoom 0x08 Turn off digital zoom 0x0B Toggle digital zoom

	Transmit Message		**Response Message**
CMD	0x33	CMD	0xB3
D1	Relay byte	D1	0x00: No Error 0x01: Out of range

Command	0x38 *(response 0xB8)*
Name	Activate alarm
Function	Send alarm active message to the unit
Notes	An alarm response can go to any preset position or start any standard or mimic (pattern) tour

	Transmit Message		**Response Message**
CMD	0x38	CMD	0xB8
D1	Alarm Number: A1:0x00 → A250:0xF9		No data sent in response

Command	0x39 *(response 0xB9)*
Name	Setup alarm response
Function	Stores what action should be executed if a certain alarm is triggered
Notes	An alarm response can go to any preset position or start any standard or mimic (pattern) tour

	Transmit Message		**Response Message**
CMD	0x39	CMD	0xB9
D1	Alarm Number: A1:0x00 → A250:0xF9		No data sent in response
D2	Response type: 0x01: Tour/mimic tour 0x02: Position 0x03: IR		
D3	Response number: T1:0x00 → T100:0x63 P1:0x00 → P250:0xF9		

Command	0x3A *(response 0xBA)*
Name	Deactivate alarm
Function	Send an alarm deactivated message to the unit
Notes	

	Transmit Message		**Response Message**
CMD	0x3A	CMD	0xBA
D1	Alarm Number: A1:0x00 → A250:0xF9		No data sent in response

Command	0x3B *(response 0xBB)*
Name	Reboot unit
Function	
Notes	On receipt of this command, the unit performs a complete hardware and software reset operation

	Transmit Message		**Response Message**
CMD	0x3B	CMD	0xBB

Command	0x3C *(response 0xBC)*
Name	Reload factory defaults
Function	Restores the unit to its original settings
Notes	All position, tour and alarm data will be reset as well as any other options that have been set on the unit

	Transmit Message		**Response Message**
CMD	0x3C	CMD	0xBC

Command	0x3F *(response 0xBF)*
Name	Menu control
Function	Controls menu toggling and item selections
Notes	The menu can be toggled on and off at any stage during operation. All menu options are selected and/or adjusted by using the menu item select command.Positional control of the menu cursor is implemented via the pan and tilt velocity command (0x04)

	Transmit Message		**Response Message**
CMD	0x3F	CMD	0xBF
D1	0x01: Enter/exit menu 0x04: Select current item		No data sent in response

Command	0x48 *(response 0xC8)*
Name	Clear error list
Function	Deletes all data from the internal error log of the unit
Notes	This is the only way of clearing the error log. Reload factory defaults (0x3C) will not clear the error log.

	Transmit Message		**Response Message**
CMD	0x48	CMD	0xC8

Command	0x4C *(response 0xCC)*
Name	Go to an absolute position
Function	Send the unit to a position
Notes	**Pan Range:** $0_d, 0_h(0\,^\circ) \rightarrow 4096000_d, 3E8000_h(360\,^\circ)$ **Tilt Range:** $1137778_d, 115C72_h(90\,^\circ) \rightarrow 2184533_d, 21555_h(182\,^\circ)$ **Zoom (Sony):** $0_d, 0_h$ (wide) $\rightarrow 16384_d, 4000_h$ (tele) $\rightarrow 28672_d, 7000_h$ (digital) **Focus (Sony):** $4096_d, 1000_h$ (far) $\rightarrow 49152_d, C000_h$(wide end)

	Transmit Message		**Response Message**
CMD	0x4C	CMD	0xCC
D1	LSB of pan position	D1	0x00
D2	Pan position byte 2		
D3	Pan position byte 3		
D4	MSB of pan position		
D5	LSB of tilt position		
D6	Tilt position byte 2		
D7	Tilt position byte 3		
D8	MSB of tilt position		
D9	LSB of zoom position		
D10	Zoom position byte 2		
D11	Zoom position byte 3		
D12	MSB of zoom position		
D13	LSB of focus position		
D14	Focus position byte 2		
D15	Focus position byte 3		
D16	MSB of focus position		

Command	0x4D *(response 0xCD)*
Name	Get Date and Time
Function	Returns the date and time stored in the unit
Notes	The year data byte has a range of $70_d \rightarrow 99_d$ and$0 \rightarrow 20_d$

	Transmit Message		**Response Message**
CMD	0x4D	CMD	0xCD
		D1	Seconds
		D2	Minutes
		D3	Hours
		D4	Day
		D5	Month
		D6	Year
		D7	0x00
		D8	Daylight saving mode 0x00: Off 0x01: On

Command	0x4E *(response 0xCE)*
Name	Set Date and Time
Function	
Notes	The year data byte has a range of $70_d \rightarrow 99_d$ and$0 \rightarrow 20_d$

	Transmit Message		**Response Message**
CMD	0x4E	CMD	0xCE
D1	Seconds		No data sent in response
D2	Minutes		
D3	Hours		
D4	Day		
D5	Month		
D6	Year		
D7	0x00		

Command	0x51 *(response 0xD1)*
Name	Get error statistic
Function	Returns a single error from the error list stored in the unit
Notes	Error number 0-2 general info, Error number 3 onwards: error index

	Transmit Message		**Response Message**
CMD	0x51	CMD	0xD1
D1	Error number	D1	0x00: Valid error number 0x01: Invalid error number
		D2	Error count
		D3	Year and month
		D4	Day
		D5	Hour
		D6	Minute
		D7	Second

Command	0x5A *(response 0xDA)*
Name	Camera test
Function	Test to check that the camera comms are operating correctly
Notes	Used primarily as part of the automated board test routine

	Transmit Message		**Response Message**
CMD	0x5A	CMD	0xDA
		D1	0x00: No error 0x01: Error

Command	0x71 *(response 0xF1)*
Name	Privacy patch functions
Function	
Notes	Privacy patch functions 0x01: create privacy patch 0x02: delete privacy patch 0x03: go to privacy patch

	Transmit Message		**Response Message**
CMD	0x71	CMD	0xF1
D1	Privacy patch function code	D1	0x00: No error 0x01: Out of range
D2	Patch number: 0x00 → 0x17 (Sony) 0x00 → 0x0E (Sanyo) 0x00 → 0x07 (Hitachi) 0xFF: All patches		

Command	0x72 *(response 0xF2)*
Name	Mimic tour functions
Function	
Notes	Mimic tour function codes 0x01: start recording mimic tour 0x02: stop recording mimic tour 0x03: delete mimic tour

	Transmit Message		**Response Message**
CMD	0x72	CMD	0xF2
D1	Mimic tour function code	D1	0x00: No error 0x01: Out of range
D2	Mimic tour number: M1:0x00 → M4:0x04 0xFF: All mimic tours (delete only)		

Command	0x73 *(response 0xF3)*	
Name	Setup user options	
Function		
Notes	Function code	Function data
	0x01: scale speed with zoom	D2: 0x00-on, 0x01-off
	0x02: linear speed	D2: 0x00 to 0x08
	0x03: pan/tilt direction	D2: 0x00-pan , 0x01-tilt D3: 0x00-reversed, 0x01-normal
	0x04: bottom flip	D2: 0x00-on, 0x01-off
	0x05: power fail mode	D2: 0x00 - off D2: 0x01 - position and tour D2: 0x02 - position, tour and joystick
	0x06: user time out	D2: LSB of time in seconds (0 - off) D3: MSB of time in seconds (0 - off) D4: 0x00-preset, 0x01-tour D5: preset/tour number

	Transmit Message		**Response Message**
CMD	0x73	CMD	0xF3
D1	Function code		No data sent in response
D2-D5	Function data		

Command	0x74 *(response 0xF4)*
Name	Set zoom speed
Function	Sets the standard zoom speed of the unit
Notes	

	Transmit Message		**Response Message**
CMD	0x74	CMD	0xF4
D1	0x00: Slow 0x01: Normal 0x01: Fast		No data sent in response

Command	0x75 *(response 0xF5)*
Name	Image stabilization
Function	Sets image stabilization mode
Notes	Only for image stabilization enabled modules

	Transmit Message		**Response Message**
CMD	0x75	CMD	0xF5
D1	0x00: Off 0x01: On		No data sent in response

Command	0x80 *(response 0x80)*
Name	Set camera IR fliter switch time
Function	Sets the minimum time between transitions of the IR Fliter
Notes	For Sony camera equipped units only

	Transmit Message		**Response Message**
CMD	0x80	CMD	0x80
D1	0x00 → 0xFF seconds		No data sent in response

Command	0xFF *(response 0xFF)*
Name	PTZFI velocity control
Function	Controls all the mechanical axis of the unit (pan, tilt, zoom, focus and iris). This function will also control the cursor in the menu.
Notes	2s compliment values are used to control speed and direction Pan Right: 0xFF (min speed) to 0x81 (max speed) Pan Left: 0x01 (min speed) to 0x7F (max speed) Tilt Down: 0xFF (min speed) to 0x81 (max speed) Tilt Up: 0x01 (min speed) to 0x7F (max speed) Focus Near: 0xFF (min speed) to 0x81 (max speed) Focus Far: 0x01 (min speed) to 0x7F (max speed) Zoom Tele: 0xFF (min speed) to 0x81 (max speed) Zoom Wide: 0x01 (min speed) to 0x7F (max speed) Iris Up: 0x02 Iris Down: 0x03

	Transmit Message		**Response Message**
CMD	0xFF	CMD	0xFF
D1	Pan velocity		No data sent in response
D2	Tilt velocity		
D3	Zoom velocity		
D4	Focus velocity		
D5	Iris data		

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