SERIAL PROTOCOL REFERENCE
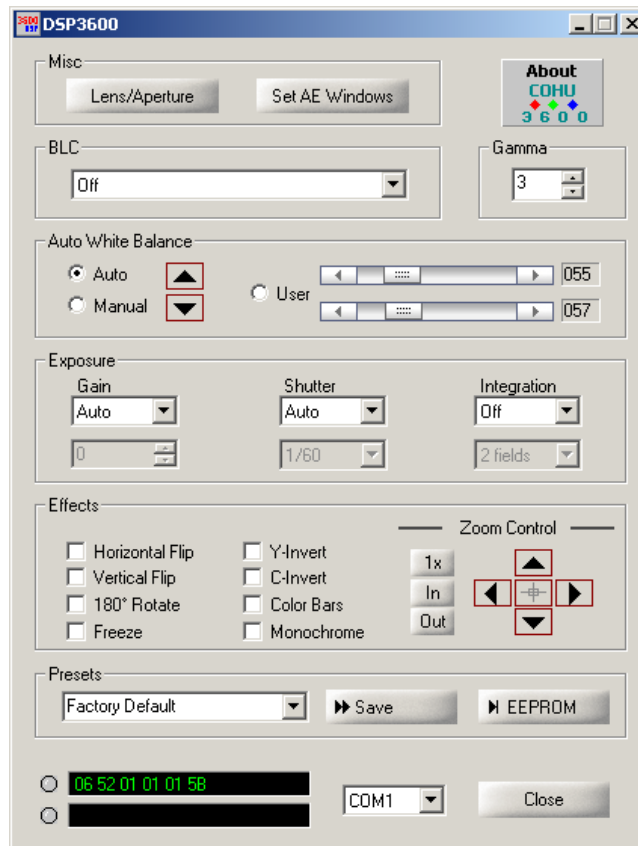
for 3600 DSP CAMERA

Typical GUI for Model 3600 Protocol Controlled Camera

RS-232 Communications

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RELATED MANUAL

3610 Camera Technical Reference (installation and operation) Manual: Manual No. 6X-1042b

1.0 GENERAL DESCRIPTION

This document provides a description of the Protocol for communication with a Cohu Model 3600 DSP Color Camera using RS-232 (serial) communications. Figure 1 shows a typical Graphical User Interface (GUI) using this protocol to control the camera. Table 1 lists some of the common abbreviations used in this manual.

In essence the protocol provides two basic functions:

> **1. Send a write command to set the value of some parameter, or**

> **2. Send a read command to retrieve the status of some parameter**

These two commands will be expanded upon in subsequent sections of this manual.
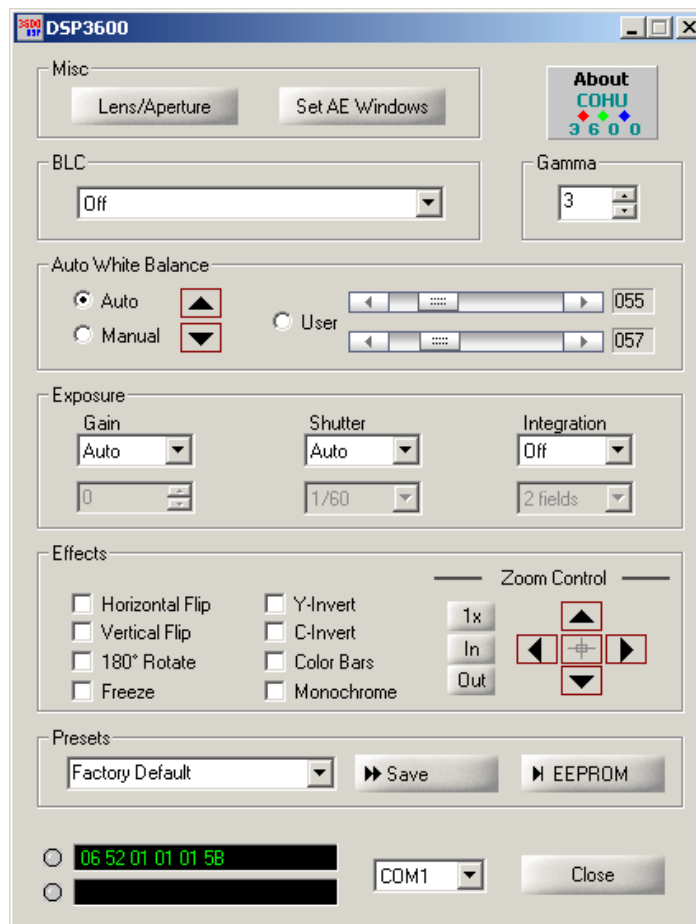
Figure 1. GUI Interface

Table 1. Abbreviations Used

ABBREVIATION	NAME	DESCRIPTION
SW	START WORD	Total number of bytes in one packet
COM	COMMAND	Command code
DTn	DATA0 to DATAn	Data string
CAT	CATEGORY No.	Write / read category number
STB	START BYTE	Write / read start byte number
ENB	END BYTE	Write / read end byte number
CS	CHECK SUM	Check sum from SW to just before CS
ST	STATUS	The message length of the previous received packet when processing ends normally — or when one of the error codes in table 3 occurs

2.0   HARDWARE INTERFACE

 The compact size of the Model 3600 requires that the interface for power, video and RS-232 communications be provided through a single, rear panel connector. Consequently, control of the camera from an external computer requires a special cable (Cohu CTC-32, CTC-34 or CTC-36 or equivalents). A drawing appears at the rear of this manual showing the rear panel mating connector.

3.0   COMMUNICATIONS BASICS

This section provides basic information about communicating with the camera.

3.1 Communications Link

The computer and the camera maintain a serial data path between each other with the following characteristics.

• Asynchronous communications

• half duplex

• 8 data bits

• 2 stop bits

• no parity

• baud rate fixed at 19,200

A UART in the computer and a UART in the camera maintain this data path. The protocol uses the data path established by these two UART's to communicate back and forth between the camera and the controlling computer.

3.2   Timing

Figure 2 shows the response time between sending a command and receiving a response back from the camera
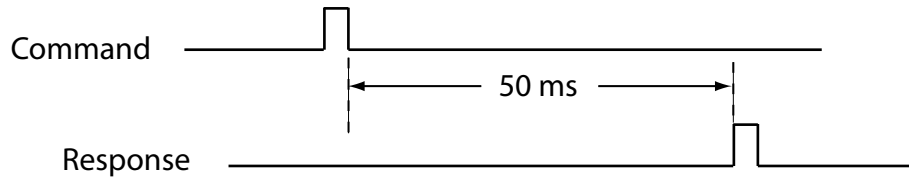
Figure 2. Timing Diagram

3.3   Protocol Terminology and Data Structure Categories

Determining values for the SW (start word) byte, COM (command type — read or write) byte and CS (checksum) byte is fairly straightforward. The CAT (catetory), PARAM (parameter) and DATA (data) bytes are the actual data used to control functions.

The structure of this data is organized by Category. Some of the categories include

   • CAT 1: SYSCON (system configuration)
   • CAT 2: PICT (picture)
   • CAT 3: AE (auto exposure)
   • CAT 4: AWB (auto white balance)
   • CAT 5: EFFECTS

Within each category is a list of parameters and for each parameter, there may be one or more bytes of data.

A parameter can be any of a varitey of camera characteristics: a gain setting, a color balance setting, a gamma setting, or perhaps a function turned on or off. A parameter can be set to some value with a write command or its value can be read back with a read command.

3.4   Protocol Message Format

Every message will consist of the following bytes:

   • a length,
   • a command type (read or write),
   • a category type,
   • a parameter within that category type,
   • the data (usually one byte but for pan and tilt messages two bytes are required),

• and a checksum byte.

3.5 Calculating Checksum

Checksum is calculated by summing (in hex) the values of all bytes beginning with the message length and continuing through to the value of the data byte (or bytes).

For example, the first five bytes of this message are used to determine the checksum (CS):

06 57 04 01 02 CS

The required checksum (CS) value is 64 (hex addition)

This message with the checksum added at the end would be:

06 57 04 01 02 64   (64 is the checksum value)

3.6   Command Length

The protocol has a 64 byte limit to the length of any message. All the commands and responses covered in this manual will be substantially less than this limit. No message will require special handling.

4.0   THE TWO BASIC COMMAND TYPES (WRITE & READ)

Two basic command types can be sent to the camera:

1. A write command is sent to set the value of some parameter.

   After a write command is sent to the camera, either:

 • a response indicating the number of bytes received by the camera will be returned, or

 • there will be an error message returned.

2. A read command is sent to retrieve the status of some parameter

   After a read request is sent to the camera, either:

 • the requested data will be returned or

• there will be an error message returned

Table 2a. Write Command Message Format

Byte	Data	Description
0	SW	Total length of the message
1	COM	Command type (write "W" = 57)
2	CAT	The category of the command
3	PARAM	The parameter within the category
4 to 4+n	DATA	All data associated with the parameter type
5+n	CS	Checksum byte (sum of all bytes from 0 to 4+n)

4.1   The Write Command Message

Table 2b.   Responses to Write Command Message

Either a message will be returned indicating the number of bytes that had been received (06):		
03	06	09
or a message will be received containing one of these four errors (F0 - F3):		
03	F0	F3
03	F1	F4
03	F2	F5
03	F3	F6

Table 2c. Response Error Codes (Write & Read)

CODE	MEANING
F0h	Communications error (Check sum error or number of valid bytes error)
F1h	Category number error
F2h	Byte number error
F3h	Other errors

4.2 The Read Command Message

Table 3a.   Read Command Message Format

Byte	Data	Description
0	SW	Total length of the message
1	COM	Command type (Receive "R" = 52)
2	CAT	The category of the command
3	PARAM	The starting parameter within the category
4	PARAM	The ending parameter within the category
5	CS	Checksum byte (sum of all bytes from 0 to 4)

Note: The starting parameter and the ending parameter will nearly always be the same value (eg. 05 and 05) because typically only one parameter is being retrieved.

The response to sending this Read Command should be the requested data in one of the formats shown in table 3b — or an error message will be returned (see table 2c).

Table 3b.   Typical Read Messages Returned

1 Data Byte

Read Response for Data Contained in One Data Byte		
BYTE	**DATA**	**FUNCTION**
0	04	Length of this message
1	06	Length of command message received
2	DT	Data
3	CS	Checksum

2 Data Bytes

Read Response for Data Contained in Two Data Bytes		
BYTE	**DATA**	**FUNCTION**
0	05	Length of this message
1	06	Length of command message received
2	DT	Data
3	DT	Data
4	CS	Checksum

5.0   EXAMPLES

Table 4 illustrates the messages required to set the Auto White Balance (AWB) feature into the Auto, Manual or User mode. All data is shown in hex.

Table 4. Typical Auto White Balance Messages (hex)

SW	COM	CAT	PARAM	DATA	CS	DESCRIPTION
06	57	04	01	00	62	Set Auto WB Mode
06	57	04	01	02	64	Set Manual WB Mode
06	57	04	01	07	69	Set User WB Mode

The response to each command message will consist of a 3-byte message, which will indicate whether the command was accepted or there was an error. Two examples are shown on table 5.

Table 5. Typical Command Message Responses (hex)

SW	DATA	CS	DESCRIPTION
03	06	09	Message Received OK
03	F0	F3	Communications Error

Normally, the camera will respond as shown in the first example. In the event that an error occurs, the camera will respond with a message similar to the second example. The various error codes that could be returned in the second byte are listed in Table 2C.

6.0   MESSAGES SPANNING TWO DATA BYTES (PAN & TILT)

The data portion of some messages spans two bytes. In a situation when two bytes must be sent, the Start Word (SW) must be be changed from 06 to 07 indicating the additional seventh byte. See figure 4 for an illustration showing bytes 5 and 6 for horizontal panning.

An example of this is the electronic panning for right/left and up/down using the arrow buttons in the Viewer GUI.

For panning right and left, all 8 bits of byte 5 are used but only bits 0 and 1 of byte 6. Note that the remaining six bits of byte 6 are not used and, in this example, should be set to 0.

Most of the messages sent to control camera functions will require only a single data byte. That is byte 5 of a standard message command. (The exception to this is the pan and tilt functions which require two data bytes. Byte 6 becomes the additional data byte and checksum then becomes byte 7.)

Table 6 is a list of all the single-byte message commands required to control the camera. Figure 3A illustrates the home page of the Viewer GUI and keys each control function to one of these tables.

Table 6. List of Command Tables

TABLE	FUNCTIONS CONTROLLED	PAGE
8	Aperture Default Commands	15
9	Horizontal and Vertical Aperture Commands	15
10	DC Servo Lens Level Setting Commands	16
11	Lens Type Commands	16
12	Highlight Windows Commands	16
13	Window Weight Commands	17
14	Gamma Value Commands	17
15	Exposure Integration Commands	17
16	Exposure Shutter Commands	18
17	Pan, Tilt, and Home Commands	18
18	Zoom Control 1X-In-Out Commands	19
19	Effects Commands	19
20	Exposure Gain Commands	19
21	Auto White Balance Commands	20
22	Back Lighting Compensation Commands	20

Notes:

1. In some of the more lengthy tables that follow, bytes that repeat are not shown so that the tables are easier to read.

2. Positioning of the AE sensing window sizes is covered in

figures 6A and 6B.

7.0   MESSAGES REQUIRING ONLY A SINGLE DATA BYTE

Most of the messages sent to control camera functions will require only a single data byte. That is byte 5 of a standard message command. (The exception to this is the pan and tilt functions which require two data bytes. Byte 6 becomes the additional data byte and checksum then becomes byte 7.)

Table 6 is a list of all the single-byte message commands required to control the camera. Figure 3A illustrates the home page of the Viewer GUI and keys each control function to one of these tables.

8.0   SAVE AND EEPROM COMMAND BUTTONS

When the Save button is clicked in the Cohu Viewer GUI all current commands are saved into a table and then sent to the Camera. Approximately 18 messages are sent when this button is clicked.

Clicking the EEPROM button tells the Camera to store what you currently have. This is useful to use before turning the camera off so that when it is turned on again it comes up at the same settings. A single three byte message is sent for this EEPROM command: 03 7A 7D

9.0   AUTO EXPOSURE WINDOW

Changing size of the five areas of the auto exposure window requires some explanation of how these windows operate. See figures 6A and 6B.

The Auto Exposure window is divided into five areas. The size of all five window areas is controlled by moving the two horizontal lines (Y_1 and Y_2) and the two vertical lines (X_1 and X_2). Each of the four lines can be moved through a maximum of 13 positions.

The position of line Y_2 is referenced to Y_1. Likewise, the position of X_2 is referenced to X_1.

In effect, the positions of Y_2 and X_2 are their spacing from Y_1 and X_1, respectively.

When either Y_2 or X_2 is to be moved only one message is required: the new distance from their reference lines.

But when Y_1 or X_1 is to be repositioned, two messages must be sent: one for the line being moved and one for the spacing to the related line so that it does not move.

Several different parameters (byte 4 of the message) are used to construct these messages: they are parameters 24, 25, and 28.

Note that for parameter 25, position data in byte 5 (data) must be OR'ed for the line not being repositioned.

Parameter 24 data for the low nibble should be set to 0's since this nibble is not used for any function.

Table 7
Table 8
Table 9
Table 10

Table 11
Table 12

See figure 3B
for Window Views

Table 21

Table 20

Table 19

Table 18

Message
Sent

Message
Received

DSP3600

Misc
Lens/Aperture   Set AE Windows

About
COHU
3 6 0 0

BLC
Off

Gamma
3

Auto White Balance
○ Auto   ▲   ○ User   055
○ Manual   ▼   057

Exposure
Gain   Shutter   Integration
Auto   Auto   Off
0   1/60   2 fields

Effects
☐ Horizontal Flip   ☐ Y-Invert
☐ Vertical Flip   ☐ C-Invert
☐ 180° Rotate   ☐ Color Bars
☐ Freeze   ☐ Monochrome

Zoom Control
1x   ▲
In   ◄ ⊕ ►
Out   ▼

Presets
Factory Default   ▶ Save   ▶ EEPROM

06 52 01 01 01 5B

COM1   Close

Table 13

Table 14

Table 15

Table 16
Figure 3
Figure 4

Table 17

03 7A 7D

See section 8
in text section
of manual

Figure 3A. Command Message Locations
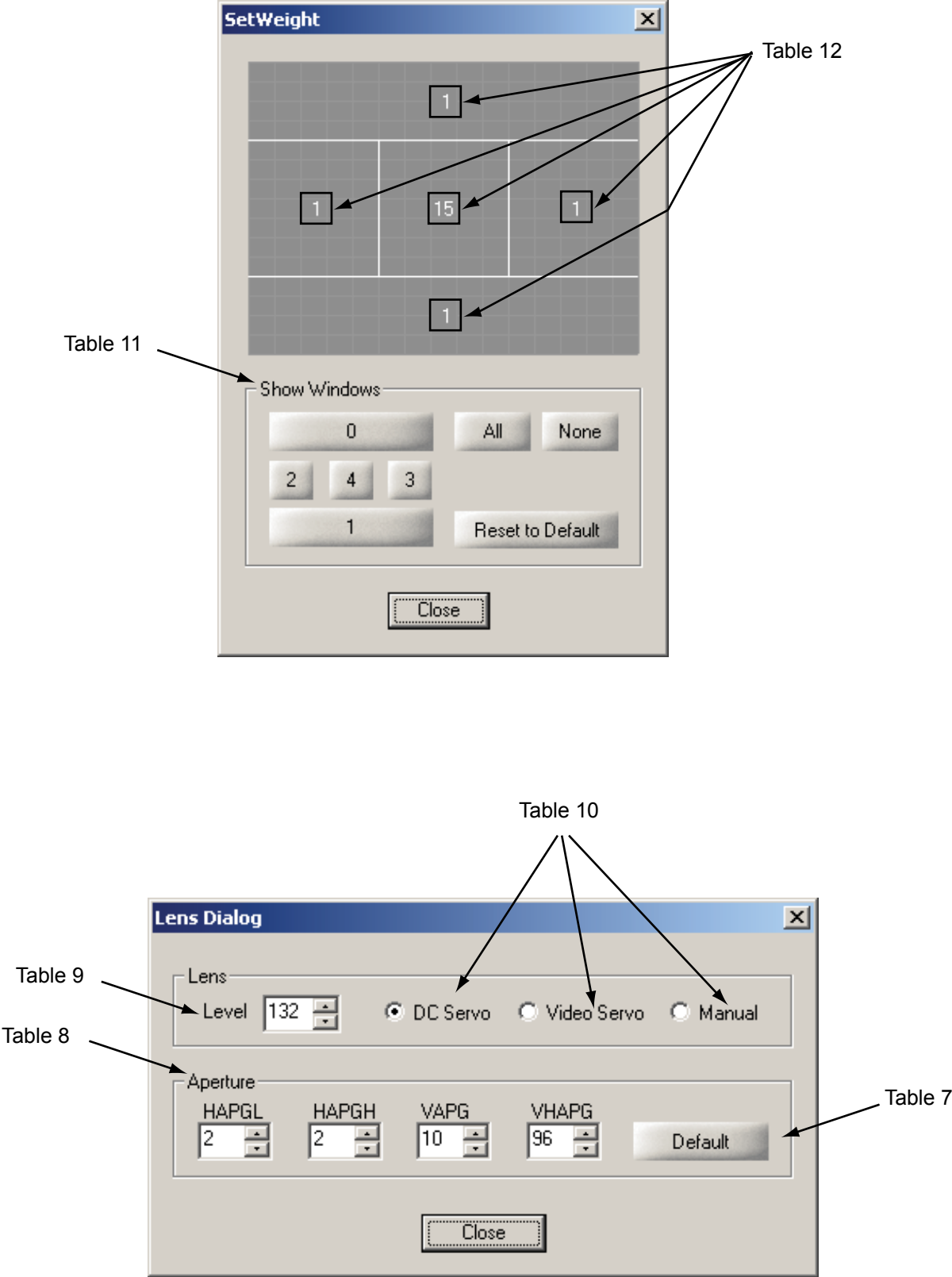
Figure 3B. Command Message Locations

PAN

BYTE **1   2   3   4   5   6   7**

DATA   07 57 05 05 (D4 01)3D

Byte 6   Byte 5

7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
0	0	0	0	0	0	0	1	1	1	0	1	0	1	0	0

01   D4

Not Used
Always Zeroes

Horizontal Pan
(Typical pan left message shown)
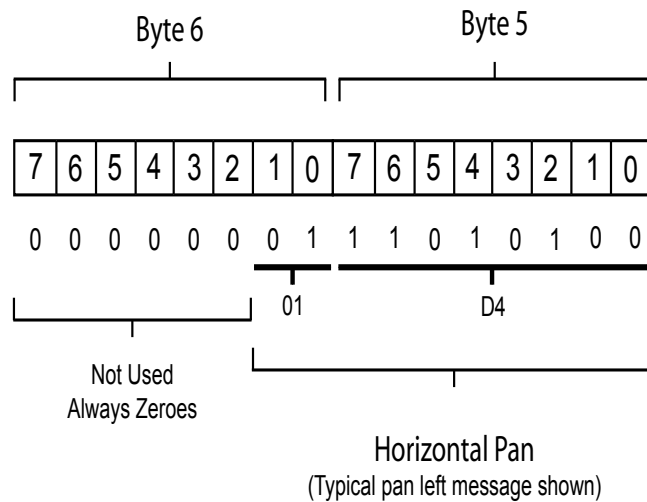
TILT

BYTE **1   2   3   4   5   6   7**

DATA   07 57 05 07 (E8 04)3D

Byte 6   Byte 5

7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
0	0	0	0	0	1	0	0	1	1	1	0	1	0	0	0

04   E8

Not Used
Always Zeroes

Not Used
Always Zeroes

Vertical Tilt
(Typical tilt message shown)
9-BIT DATA
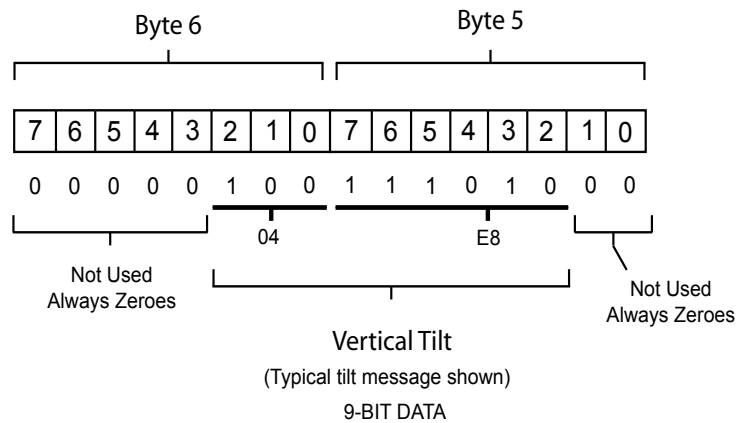
MAXIMUM TILT UP		MAXIMUM TILT DOWN	
00	01	80	06
BYTE 5	BYTE 6	BYTE 5	BYTE 6

Figure 4. Typical Pan/Tilt Messages Byte Formats

07 57 05 05 F8 03 65
07 57 05 05 F0 03 5D
07 57 05 05 E8 03 55

⇩

07 57 05 05 00 01 6B

▲

↔

07 57 05 05 00 02 6A
(horizontal center)

07 57 05 05 FC 01 65
07 57 05 05 F8 01 61
07 57 05 05 F4 02 5D

◀

07 57 05 05 04 02 6E
07 57 05 05 08 02 72
07 57 05 05 0C 02 76

▶

⇩

07 57 05 05 20 01 89

⊕

↕

07 57 05 07 00 04 6E
(vertical center)

⇩

07 57 05 05 E0 02 4A

▼

07 57 05 07 08 04 76
07 57 05 07 10 04 7E
07 57 05 07 18 04 86

⇩

07 57 05 07 80 06 F0
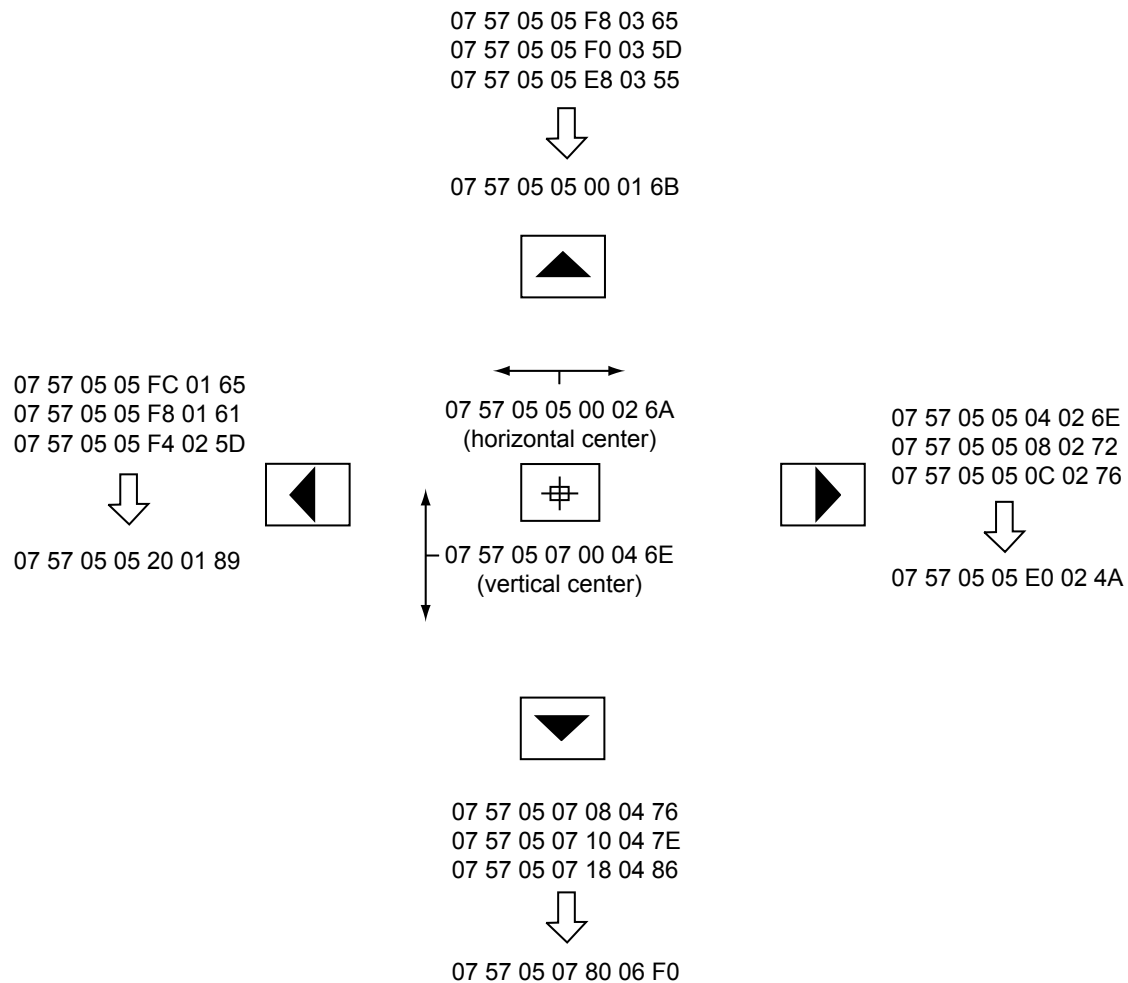
NOTES

Illustration shows messages sent for the first three clicks in each direction followed by
an arrow and then the final message at end of range. Each click is an increment of four.

The two messages in the center are the home positions for horizontal and vertical.
When the center button is clicked two messages are sent to the camera: horizontal & vertical

Figure 5. Pan, Tilt, and Centering Messages

A: VERTICAL HEIGHT OF WINDOW AREAS

The size of all five window areas is controlled by moving the Y_1 Y_2 and X_1 X_2 lines

Circled numbers indicate window sensing areas ⓪ through ④

MESSAGE
Byte 4   Byte 5

25h [Data] → | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |

Position of Y_1 (13 Positions) E ← 2

Current X_1 Settings (See figure 5B)

If Y_1 is to be moved, two messages must be sent. One for Y_1 and one for Y_2

(The position of Y_2 is referenced to Y_1)

MESSAGE
Byte 4   Byte 5

24h [Data] → | 7 | 6 | 5 | 4 | | | | |

Position of Y_2 (13 Positions) E ← 2

Not Used Set to 0's

If only Y_2 is to be moved, a single message can be sent.
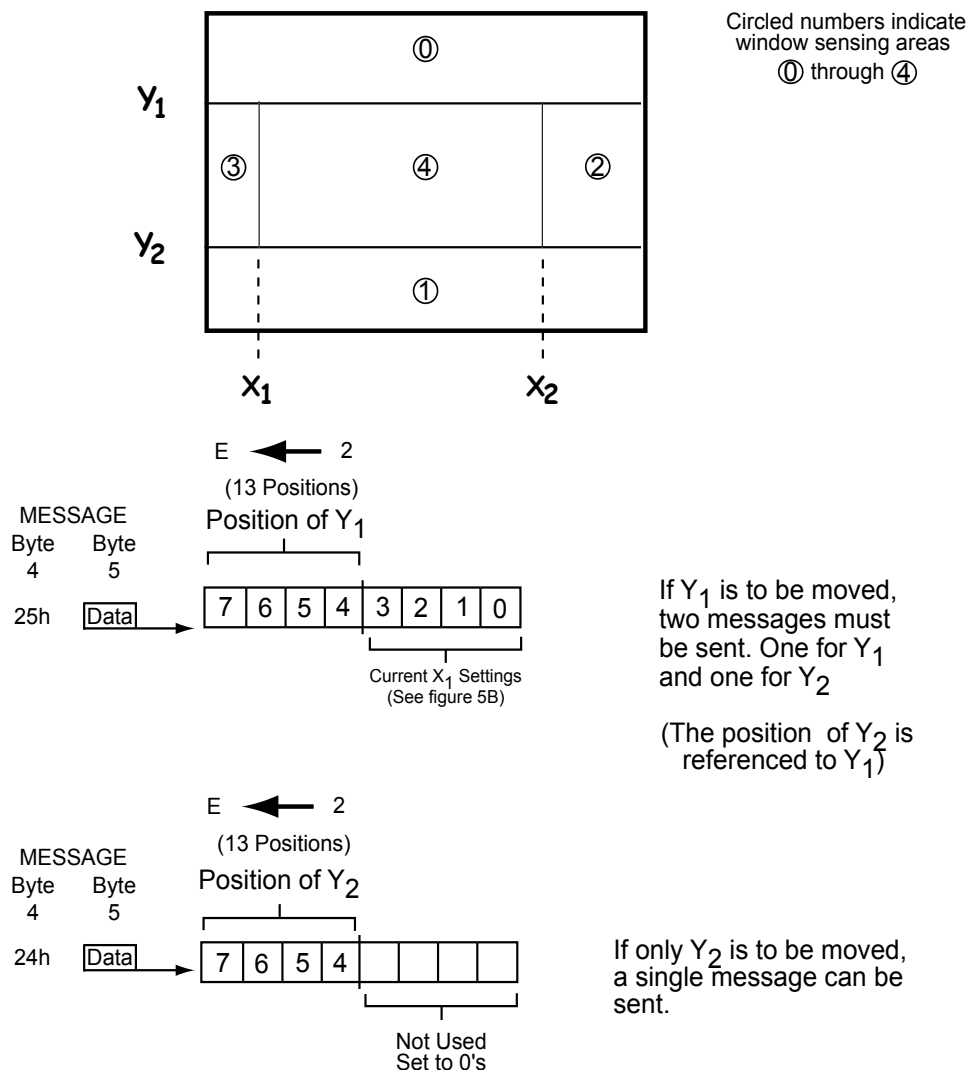
Typical Messages to move Y_1 to a new position (and hold Y_2 at the same position):

Y_2 **06 57 03 24 60 E4**
Y_1 **06 57 03 25 66 EB**

EXAMPLE Y MESSAGE

		TYPICAL MESSAGES					
TO MOVE	**MESSAGE(S) SENT**	**MESSAGE FORMAT**					
		SW	COM	CAT	PARAM	DATA	CS
Y1	**Y1**	06	57	03	25	2 to E	CS
	Y2	06	57	03	24	2 to E	CS
Y2	**Y2**	06	57	03	24	2 to E	CS
Note: When constructing the Y1 message, the current X1 position must be OR'ed in to the byte							

Figure 6A. AE Detection Window Vertical Positioning (hex)

B: HORIZONTAL WIDTH OF WINDOW AREAS

The size of all five window areas is controlled by moving the Y_1 Y_2 and X_1 X_2 lines

Circled numbers indicate
window sensing areas
⓪ through ④

Y_1

Y_2

X_1 X_2

E ← 2
(13 Positions)
Position of X_1

MESSAGE
Byte 4   Byte 5

25h   Data →

7	6	5	4	3	2	1	0

Current Y_1 Settings
(See figure 5A)

If X_1 is to be moved,
two messages must
be sent. One for X_1
and one for X_2

(The position of X_2 is
referenced to X_1)

E ← 2
(13 Positions)
Position of X_2

MESSAGE
Byte 4   Byte 5

28h   Data →

7	6	5	4				

Not Used
Set to 0's

If only X_2 is to be moved,
a single message can be
sent.
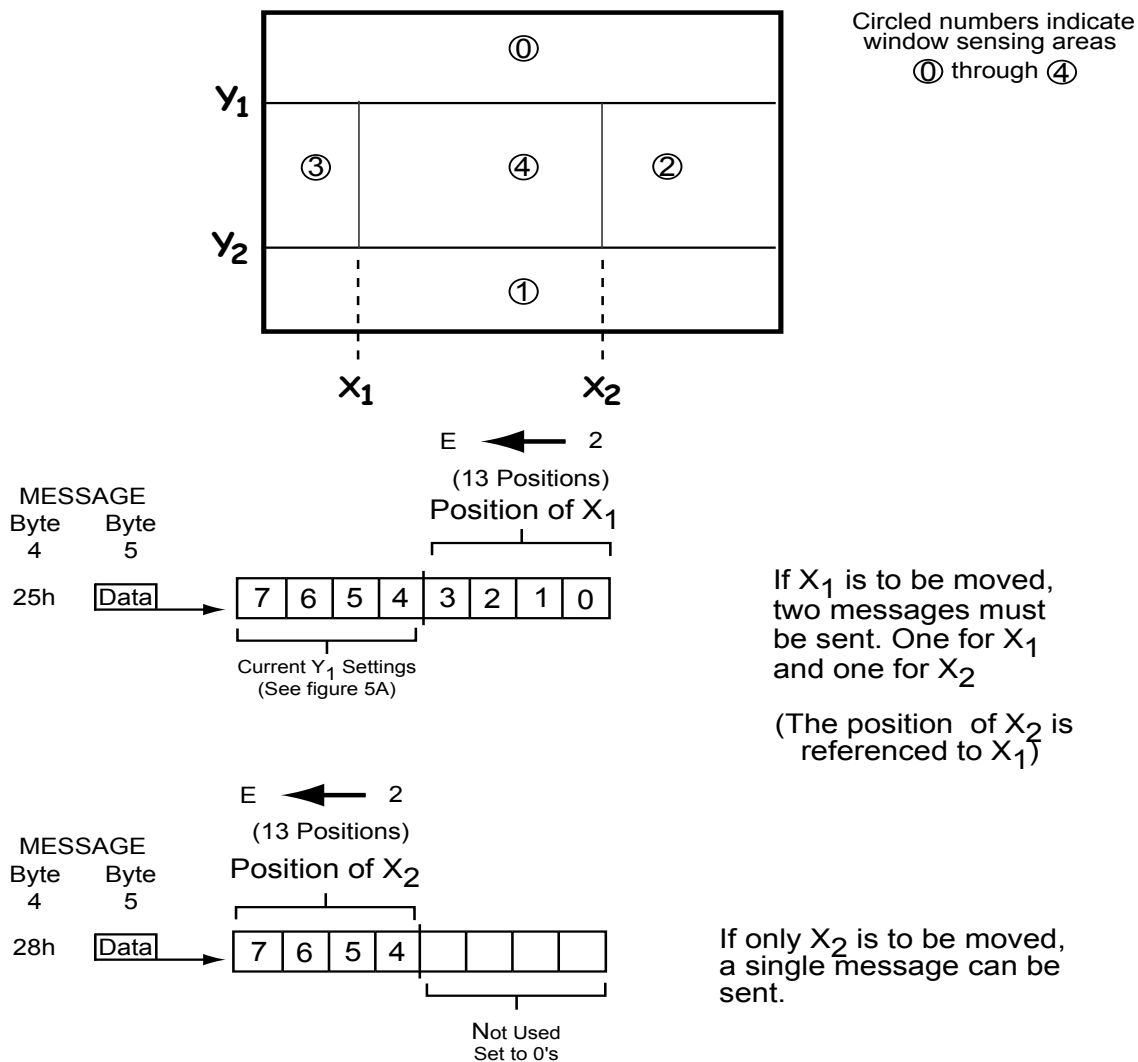
Typical Messages to move X_1 to a new position (and hold X_2 at the same position):

X_2 **06 57 03 28 30 B8**
X_1 **06 57 03 25 66 E8**

TYPICAL MESSAGES							
TO MOVE	**MESSAGE(S) SENT**	**MESSAGE FORMAT**					
		SW	**COM**	**CAT**	**PARAM**	**DATA**	**CS**
X1	**X1**	06	57	03	25	2 to E	CS
	X2	06	57	03	28	2 to E	CS
X2	**X2**	06	57	03	28	2 to E	CS
Note: When constructing the X1 message, the current Y1 position must be OR'ed into the byte							

EXAMPLE X MESSAGES

Figure 6B. AE Detection Window Horizontal Positioning (hex)

Table 7. Aperture Default Commands

APERTURE DEFAULTS		
NAME	VALUE	HEX
HAPGL	2	06 57 02 42 AA 4B
HAPGH	2	06 57 02 42 AB 4C
VAPG	10	06 57 02 42 A0 41
VHAPG	96	06 57 02 45 00 A4

Table 8. Horizontal and Vertical Aperture Commands

Lens Aperture Window	
HAPGL	
0	06 57 02 42 A8 49
1	A9 4A
2	AA 4B
3	06 57 02 42 AB 4C
HAPGH	
0	06 57 02 42 A3 44
1	A7 48
2	AB 4C
3	06 57 02 42 AF 50
VAPG	
0	06 57 02 42 00 A1
1	10 B1
2	20 C1
3	30 D1
4	40 E1
5	50 F1
6	60 01
7	70 11
8	80 21
9	90 31
10	A0 41
11	B0 51
12	C0 61
13	D0 71
14	E0 81
15	06 57 02 42 F0 91

Table 8. (continued)

Lens Dialog Window	
VHAPG	
0	06 57 02 45 00 A4
16	10 B4
32	20 C4
48	30 D4
64	40 E4
80	50 F4
96	60 04
112	70 14
128	80 24
144	90 34
160	A0 44
176	B0 54
192	C0 64
208	D0 74
224	E0 84
240	F0 94
255	06 57 02 45 FF A3

**Table 9. DC Servo Lens
Level Setting Commands**

Lens Dialog Window Lens Level	
109	06 57 08 4E 6D 20
110	63 21
111	6F 22
112	70 23
113	71 24
114	72 25
115	73 26
116	74 27
117	75 28
118	76 29
119	77 2A
120	78 2B
121	79 2C
122	7A 2D
123	7B 2E
124	7C 2F
125	7D 30
126	7E 31
127	7F 32
128	80 33
129	81 34
130	82 35
131	83 36
132	84 37
133	85 38
134	86 39
135	87 3A
136	88 3B
137	89 3C
138	8A 3D
139	8B 3E
140	8C 3F
141	8D 40
142	8E 41
143	8F 42
144	90 43
145	91 44
146	92 45
147	93 46
148	94 47
149	06 57 08 4E 95 48

Table 10. Lens Type Commands

LENS DIALOG	
DC Servo	06 57 01 03 72 D3
Video Servo	06 57 03 05 25 8A
Manual	06 57 03 05 26 8B

**Table 11. Highlight Windows
Commands**

SHOW WINDOWS	
0	06 57 05 43 02 A7
1	03 A8
2	04 A9
3	05 AA
4	06 AB
All	01 A6
None	06 57 05 43 00 A5

Table 12. Window Weight Commands

	TOP	MIDDLE LEFT	MIDDLE	MIDDLE RIGHT	BOTTOM
	WINDOW WEIGHT				
1	06 57 03 0F 1A 89	06 57 03 10 11 81	06 57 03 11 11 82	06 57 03 11 11 82	06 57 03 10 11 81
2	2A 99	11 81	21 92	12 83	12 82
3	3A 49	21 91	31 A2	13 84	13 83
4	4A B9	31 A1	41 B2	14 85	14 84
5	5A C9	41 B1	51 C2	15 86	15 85
6	6A D9	51 C1	61 D2	16 87	16 86
7	7A E9	61 D1	71 E2	17 88	17 87
8	8A F9	71 E1	81 F2	18 89	18 88
9	9A 09	81 F1	91 02	19 8A	19 89
10	AA 19	91 01	A1 12	1A 8B	1A 8A
11	BA 29	A1 11	B1 22	1B 8C	1B B
12	CA 39	B1 21	C1 32	1C 8D	1C C
13	DA 49	C1 31	D1 42	1D 8E	1D D
14	EA 59	D1 41	E1 52	1E 8F	1E E
15	06 57 03 0F FA 69	06 57 03 10 F1 61	06 57 03 11 F1 62	06 57 03 11 1F 90	06 57 03 10 1F 8F

Table 13. Gamma Value Commands

	GAMMA
0	06 57 02 0F 01 6F
1	11 7F
2	21 8F
3	31 9F
4	41 AF
5	51 BF
6	61 CF
7	71 DF
8	81 EF
9	06 57 02 0F 91 FF

Table 14. Exposure Integration Commands

EXPOSURE	
Integration	
Off	06 57 03 05 26 8B
On	06 57 03 05 46 AB
fields	
2	06 57 03 18 41 B9
3	42 BA
4	43 BB
5	44 BC
10	49 C1
20	53 CB
40	54 CC
80	55 CD
160	56 CE
320	57 CF
510	06 57 03 18 58 D0

EXPOSURE	
Shutter	
Auto	06 57 03 05 45 AA
Manual	06 57 03 05 47 AC
1/60 (NTSC)	06 57 03 17 00 77
1/50 (PAL)	
1/100 (NTSC)	01 78
1/120 (PAL)	
1/250	02 79
1/500	03 7A
1/1000	04 7B
1/2000	05 7C
1/4000	06 7D
1/10,000	07 7E
1/20,000	08 7F
1/50,000	06 57 03 17 09 80
Note: For a PAL camera the shutter speeds appear in the Viewer GUI menu as 1/50 and 1/120, but the same command is sent.	

Table 15. Exposure Shutter Commands

Table 16. Pan, Tilt, and Home Commands

ZOOM CONTROL HOME AND PAN/TILT ARROWS			
FUNCTION	**MESSAGE**	**DATA SHOWN**	**INCREMENT STEP SIZE FOR EACH CLICK**
Home Button	07 57 05 07 00 04 6E	Vertical home	not applicable
	07 57 05 05 00 02 6A	Horizontal home	
Up Arrow	07 57 05 07 F8 03 65	First click from home	4
	07 57 05 07 00 01 6B	End of range	
Down Arrow	07 57 05 07 08 04 76	First click from home	4
	07 57 05 07 80 06 F0	End of range	
Right Arrow	07 57 05 05 04 02 6E	First click from home	4
	07 57 05 05 E0 02 4A	End of range	
Left Arrow	07 57 05 05 FC 01 65	First click from home	4
	07 57 05 05 20 01 89	End of range	
Clicking the Home button returns zoom to the center. The top most command for Up, Down, Right, & Left in this table is the first command sent when that related button is clicked. off the home position. For example, from the home position, clicking the up arrow sends the F8 03 data. Continued clicking will finally send the command 00 01 at the end of range.			

**Table 17. Zoom Control
1X-In-Out Commands**

ZOOM CONTROL	
1X	06 57 05 03 00 65 (wide angle of camera)
In	In and Out allows for 112 increments or decrements in steps of two from 00h to EOh. See below for an example
Out	
In	06 57 05 03 E0 45 (maximum value)
	DE 43
	DC 41
112 increments/decrements in steps of 2	
	02 69
	02 67
Out	06 57 05 03 00 65 (minimum value)

Note: 1x and and the minimum value of Out correspond to the camera at its maximum wide angle setting. The maximum value corresponds to the camera at its maximum telephoto setting.

Table 18. Effects Commands

EFFECTS CHECK BOXES	
Horizontal Flip	06 57 05 01 CA 2D
Vertical Flip	09 81 EC
180° Rotate	08 84 EE
Freeze	09 82 ED
Y-Invert	09 82 EF
C-Invert	09 88 F3
Color Bars	06 57 08 31 CO 56
Monochrome	06 57 02 2F 2C BA

Table 19. Exposure Gain Commands

EXPOSURE	
Gain	
Auto	06 57 03 05 26 8B
Manual	06 57 03 05 06 6B
0	06 57 03 17 00 77
1	10 87
2	20 97
3	30 A7
4	40 B7
5	50 17
6	60 E7
7	06 57 03 17 70 E7

Table 20. Auto White Balance and Manual Adjustments Commands

AUTO WHITE BALANCE COMMANDS	
Auto	06 57 04 01 00 62
Manual	06 57 04 01 02 64
Increment Up Arrow	06 57 04 01 12 74
Increment Down Arrow	06 57 04 01 0A 6C
User	06 57 04 01 07 69
Top Slider (000 to 255)	06 57 04 17 00 78 to 06 57 04 15 FF 76
Bottom Slider (000 to 255)	06 57 04 17 00 78 to 06 57 04 15 FF 76

Table 21. Back Lighting Compensation Commands

BLC SELECT (Bright Light Control Select)	
Off	06 57 03 06 02 68
Auto Weighted Averages	06 57 03 06 06 6C
Brighten Dark Areas	06 57 03 06 0A 70
Darken Bright Areas	06 57 03 06 0E 74

There are three wiring configurations for this connector depending on the version of the camera. Refer to the 3610 Series DSP Color Camera Technical Reference Manual for installation and operation information including the wiring of these three cables. It is available as manual number 6X-1042(A). If the manual has been updated the (A) would become (B), (C), etc. Use the latest available version of the manual.
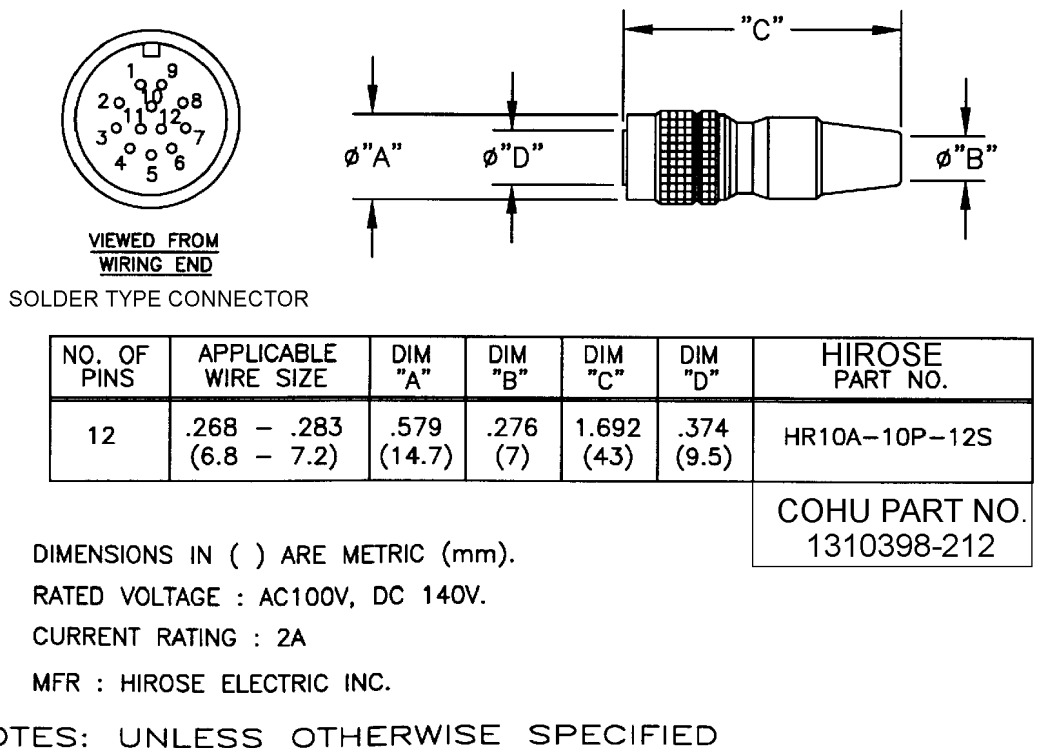
VIEWED FROM
WIRING END

SOLDER TYPE CONNECTOR

NO. OF PINS	APPLICABLE WIRE SIZE	DIM "A"	DIM "B"	DIM "C"	DIM "D"	HIROSE PART NO.
12	.268 – .283 (6.8 – 7.2)	.579 (14.7)	.276 (7)	1.692 (43)	.374 (9.5)	HR10A–10P–12S

COHU PART NO.
1310398-212

4. DIMENSIONS IN ( ) ARE METRIC (mm).

3. RATED VOLTAGE : AC100V, DC 140V.

2. CURRENT RATING : 2A

1. MFR : HIROSE ELECTRIC INC.

OTES: UNLESS OTHERWISE SPECIFIED

Figure 7. Camera Rear Panel Mating Connector

COHU
Cohu, Inc. / Electronics Division
I S O   9 0 0 1   C e r t i f i e d

ADVANCED
VIDEO
TECHNOLOGY
Made in the U.S.A.

COHU ELECTRONICS WARRANTY

Cohu, Inc., Electronics Division warrants equipment manufactured to be free from defects of material and workmanship. Any such defective part or parts will be repaired or replaced when confirmed by Cohu examination to have become defective within two years from the date of shipment to the original purchaser for standard CCD, CMOS and uncooled thermal cameras and one year from date of shipment to the original purchaser for image intensified cameras, and all other Cohu manufactured products.

Pressurized Housings: Pressurized camera products include a lifetime pressurization warranty. Cohu will re-pressurize, at no charge, returned environmental cameras not exhibiting evidence of physical damage due to misuse. All warranty repairs will be performed at the Cohu factory or as otherwise authorized by Cohu in writing. Purchaser shall prepay transportation charges to Cohu.

Extended IR Cameras: Cameras utilizing extended infrared (extended IR) sensors found to exceed acceptable white blemish specifications within one month of delivery shall be repaired or replaced without charge.

This Warranty does not extend to Cohu equipment subjected to misuse, accident, neglect, improper application, or repaired or altered other than by Cohu, or unless authorized by Cohu in writing. Cameras utilizing extended IR sensors are not warranted for use in areas of elevated levels of cosmic radiation.

Television image pickup tubes, image intensifiers, lenses, and products manufactured by companies other than Cohu are warranted by their original manufacturers. This Warranty is in lieu of all other warranties, express, implied, or statutory, including warranties of fitness for a particular purpose and merchantability, and this Warranty sets forth the purchaser's sole remedy in connection with such warranties. Whether as a result of breach of contract or warranty, tort (including negligence) or otherwise, Cohu shall not be liable for any penalties regardless of reason, including but not limited to collateral, consequential, incidental, or exemplary damages, including without limitation, any loss of profit or revenues, loss of use of any equipment or goods, or removal or re-installation of equipment without prior written approval.

A Return Authorization (RA) Number must be obtained from Cohu prior to returning any item for warranty repair or replacement.

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