COHU
VARIABLE SPEED PAN/TILT - DSP CAMERA
COMMUNICATION INTERFACE PROTOCOL
Rev 2.0.
23-Oct-00

1.1 GENERAL

This documents defines the Asynchronous communication protocol between the MPC Master Control Panel/Host Computer and a Positioner/Dome camera. Figure 1. illustrates the handshake protocol. The communication is a full duplex. Typical or default communication parameters will be 9600 baud, 8 data bits, 1 stop bit and no parity.

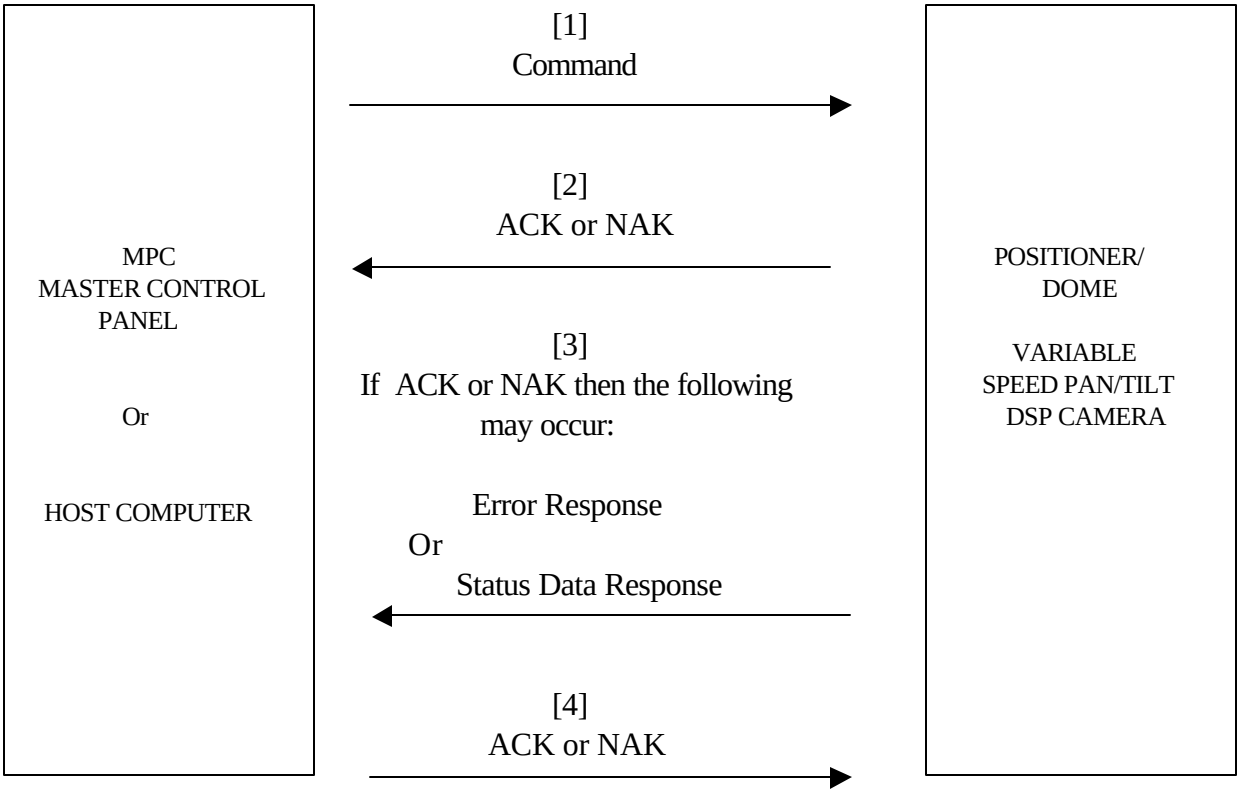

FIGURE 1. TYPICAL COMMUNICATION HANDSHAKE PROTOCOL

Notes: ***The time between two consecutive commands to the camera is 250 millisec. For example, Zoom In and follow right after that is Zoom Stop.***

1.2 MESSAGE FORMAT

Anytime a command message is sent to the Camera the camera will respond with an ACK or NAK. The commands are sent using the command message format show in Table 1. The response message from the camera is shown in Table 3.

If the command message contains only a momentary function, no further response beyond the ACK OR NAK will occur .

-The control characters to be used are:-

F8	Start Character (in HEX)
ACK	Acknowledge proper receipt of transmission
NAK	Bad transmission - re transmit
CS	Checksum (End of Message)
ID	Camera address in HEX
##	One byte in Hex
'#'	Number in ASCII

All transmissions will be in formats:-

F8/ID/'c'/DATA BYTES/CHECKSUM

Note: 'Wa' means ASCII characters for W and a

TABLE 1. COMMAND MESSAGE FORMAT

BYTE	DATA	DESCRIPTION
0	F8h	Start of message
1	Camera Address	in HEX (01h to DFh) Note: FFh address is used to read camera address or to assign camera address
2	'c'	Message type (for camera control) ***Note:*** - Assign camera address msg. does not contain the 'c' - Set Camera/Preset ID msg. does not contain the 'c' - Preset programming and goto does not contain 'c' - Var. Speed pan/tilt msg. does not contain the 'c'
	'r' 'l' 'u' 'd'	(for variable speed pan/tilt)
3 to n+3	Command Data	See Table 2 (for camera control) See Table 3 (for variable speed pan/tilt)
n+4	CHECKSUM	End of message 80H-8FH Least significant nibble is XOR of all previous bytes (LS NIBBLES only) except F8h

NOTE: n is the number of command data bytes in the message

TABLE 2. COMMAND/RESPONSE DATA

COMMAND	DESCRIPTION	RESPONSE	DESCRIPTION
DSP CAMERA COMMANDS			
'AS'	Read Camera Address 'A###'		Return the current CamAddr in ASCII ### = '001' – '255'
'As###'	Assign Camera Address ### = '001' – '255'		
NOTE: The above command is also valid if Camera Address FFh is used.			
'B1'	Back Light ON		
'B0'	Back Light OFF # = '1' (ON) = '0' (OFF)		
'BS'	Request for current Status of Back Light	'B#'	Return the current Status of Back Light # = '1' (ON) = '0' (OFF)
'D#'	Digital Zoom Range # = '0' (OFF) = '1' (2X) = '2' (4X) = '3' (8X)		

TABLE 2. COMMAND/RESPONSE DATA (Cont.)

COMMAND	DESCRIPTION	RESPONSE	DESCRIPTION
DSP CAMERA COMMANDS			
'DS'	Request for current Status of Digital Zoom Range	'Z#'	Return the current Status of Digital Zoom Mode # = '0' (OFF) = '1' (2X) = '2' (4X) = '3' (8X)
'S#'	Shutter # = 30h (1/4) = 31h (1/8) = 32h (1/15) = 33h (1/30) = 34h (Auto) = 35h (1/60) = 36h (1/100) = 37h (1/250) = 38h (1/500) = 39h (1/1000) = 3Ah (1/2000) = 3Bh (1/4000) = 3Ch (1/10000)		
'SS'	Request for current Status of Shutter	'S#'	Return the current Status of Shutter # = 30h (1/4) = 31h (1/8) = 32h (1/15) = 33h (1/30) = 34h (Auto) = 35h (1/60) = 36h (1/100) = 37h (1/250) = 38h (1/500) = 39h (1/1000) = 3Ah (1/2000) = 3Bh (1/4000) = 3Ch (1/10000)

TABLE 2. COMMAND/RESPONSE DATA (Cont.)

COMMAND	DESCRIPTION	RESPONSE	DESCRIPTION
DSP CAMERA COMMANDS			
'IA'	Iris Auto		
'IM'	Iris Manual		
'IS'	Request for current Status of Iris Mode	'I#' # = '0' (Auto) = '1' (Manual)	Return the current Status of Iris Mode
'IO'	Iirs Open		
'IC'	Iris Close		
'Is'	Iris Stop		
'W#'	White Balance # = '0' (Auto) = '1' (Set) = '2' (Lock) = '3' (Indoor) = '4' (Outdoor) = '5' (Flourescent)		
'WS'	Request for current Status of White Balance	'W#' # = '0' (Auto) = '1' (Set) = '2' (Lock) = '3' (Indoor) = '4' (Outdoor) = '5' (Florescent)	Return the current Status of White Balance
'z#'	Zoom Wide # = '0' (Low Speed) = '1' (Medium Speed) = '2' (Fast Speed)		

TABLE 2. COMMAND/RESPONSE DATA (Cont.)

COMMAND	DESCRIPTION	RESPONSE	DESCRIPTION
DSP CAMERA COMMANDS			
'Z#'	Zoom Tele # = '0' (Low Speed) = '1' (Medium Speed) = '2' (Fast Speed)		
'Zs'	Zoom Stop		
'FA'	Focus Auto		
'FM'	Focus Manual		
'FS'	Request for current Status of Focus Mode	'F#'	Return the current Status of Focus Mode # = '0' (Auto) = '1' (Manual)
'F#'	Focus Far # = '0' (Low Speed) = '1' (Medium Speed) = '2' (Fast Speed)		
'N#'	Focus Near # = '0' (Low Speed) = '1' (Medium Speed) = '2' (Fast Speed)		
'Fs'	Focus Stop		
'P' ##	Program Preset Position ## = 10hex to 3Ehex (first 47 positions) = 60hex to 6Fhex (last 16 positions)		
'H' ##	Goto a Preset Position ## = 10hex to 3Ehex (first 47 positions) = 60hex to 6Fhex (last 16 positions)		

TABLE 2. COMMAND/RESPONSE DATA (Cont.)

COMMAND	DESCRIPTION	RESPONSE	DESCRIPTION
DSP CAMERA COMMANDS			
'RS'	Firmware Revision Query		Return Firware Revision (Maximum 24 Characters)
		'Model# Firmware Ver. 1.0'	
		For example:	
		'3855 Firmware Ver. 2.2.'	
ID COMMANDS			
'dIE'	Enable ID display		
'dID'	Disable ID display		
'dIT'	Display ID on top of screen		
'dIB'	Display ID on bottom of screen		
'dL#DATA'	Set content of ID messages # = '1' : line 1 (ID line 1) # = '2' : line 2 (ID line 2) # = '3' : line 3 (Alarm ID line 1) # = '4' : line 4 (Alarm ID line 2) # = '5' : line 5 (Alarm ID line 3) DATA = 24 ASCII characters		
'dP'##DATA	Store Preset ID display in the receiver Preset ID will be displayed when a preset is executed, and disappears when a P/T/Z/F command is executed. ## = 10hex to 3Fhex (first 48 positions) = 60hex to 6Fhex (last 16 positions) DATA = 24 ASCII characters		
'cd' ## 'S'	Get Preset ID display stored in receiver to the GUI ## = 10hex to 3Fhex (first 48 positions) = 60hex to 6Fhex (last 16 positions)		
		'dP'##DATA	

TABLE 2. COMMAND/RESPONSE DATA (Cont.)

COMMAND	DESCRIPTION	RESPONSE	DESCRIPTION
ID COMMANDS			
‘dAE’	Enable Alarm display		
‘dAD’	Disable Alarm # display		
‘dAB’	Enable Alarm Blinking		
‘dAb’	Disable Alarm Blinking		

TABLE 3. VARIABLE PAN/TILT COMMAND DATA

COMMAND	DESCRIPTION	RESPONSE	DESCRIPTION
DSP PAN/TILT COMMANDS			
‘r’ ##	Pan Right ##: 16 variable speed controls (from 30 hex to 3F hex)		
‘l’ ##	Pan Left ##: 16 variable speed controls (from 30 hex to 3F hex)		
‘PS’	Pan Stop		
‘u’ ##	Tilt Up ##: 16 variable speed controls (from 30 hex to 3F hex)		
‘d’ ##	Tilt Down ##: 16 variable speed controls (from 30 hex to 3F hex)		
‘TS’	Tilt Stop		

TABLE 3. VARIABLE PAN/TILT COMMAND DATA

COMMAND	DESCRIPTION	RESPONSE	DESCRIPTION
STANDARD MOMENTARY COMMANDS			
Note: All standard command won't contains 'c' as DSP commands.			
'PR'	Pan Right		
'PL'	Pan Left		
'PS'	Pan Stop		
'TU'	Tilt Up		
'TD'	Tilt Down		
'TS'	Tilt Stop		
'rn'	Pan Right – Nudge	**Notes:**	Nudge commands are optional
'ln'	Pan Left – Nudge		
'un'	Tilt Up – Nudge		
'dn'	Tilt Down - Nudge		
Note: All above command will generate variable speed pan/tilt based on the Camera Zoom position.			
'ZI'	Zoom In		
'ZO'	Zoom Out		
'ZS'	Zoom Stop		
'FN'	Focus Near		
'FF'	Focus Far		
'FS'	Focus Stop		
'IO'	Iris Open		
'IC'	Iris Close		
'IS'	Iris Stop		
'rs'	Software Reset		
LATCH COMMANDS			
'LM'	Manual Iris toggle		
'LL'	Lens Speed toggle		
'L?'	Latch Status Request	.See Table 4 for response status	
'L1'	Aux 1 Function (Auto/Manual Focus)		
'B1'	Integration Up		
'B2'	Integration Down	.Continue to do this to go back to 1/60th Shutter	

TABLE 3. VARIABLE PAN/TILT COMMAND DATA

COMMAND	DESCRIPTION	RESPONSE	DESCRIPTION
HOME COMMANDS			
'H0' to 'H9'	Goto Presets 1 to 10		
'P0' to 'P9'	Program Presets 1 to 10		
'H?'	Home Position Request.	.See Table 4 for response status	

TABLE 4. STANDARD LATCH/HOME RESPONSE MESSAGE FORMAT

BYTE	DATA	DESCRIPTION
FORMAT LATCH STATUS RESPONSE		
0	F8h	Start of message
1	Camera Address	in HEX (01h to DFh)
2	'L'	Latch status
3	30hex – 37hex	LS nibble is four bits of status
		Bit Value 0/1
		B0 = Auto Iris/Manual Iris
		B1 = Camera Power Off/On
		B2 = Lens Speed Slow/Fast
		B3 = Not Used
4	'A'	Aux status
5	30hex – 37hex	LS nibble is four bits of status
		Bit Value 0/1
		B0 = Auto Integration/Manual Integration
		B1 = Not Used
		B2 = Not used
		B3 = Not Used
n+5	CHECKSUM	End of message
		80H-8FH Least significant nibble is XOR of all previous bytes (LS NIBBLES only) except F8h

NOTE: n is the number of command data bytes in the message

FORMAT HOME STATUS RESPONSE		
0	F8h	Start of message
1	Camera Address	in HEX (01h to DFh)
2	'H'	Latch status
3	30hex – 39hex	Home Position
n+3	CHECKSUM	End of message
		80H-8FH Least significant nibble is XOR of all previous bytes (LS NIBBLES only) except F8h

NOTE: n is the number of command data bytes in the message

TABLE 5. DSP RESPONSE MESSAGE FORMAT

BYTE	DATA	DESCRIPTION
0	F8h	Start of message
1	Camera Address	in HEX (01h to DFh) Note: FFh address is used to read camera address or to assign camera address
2	'c'	Message type (camera)
3 to n+3	Response Data	Refer to Response Data of those commands above
n+4	CHECKSUM	End of message 80H-8FH Least significant nibble is XOR of all previous bytes (LS NIBBLES only) except F8h

NOTE: n is the number of command data bytes in the message