“D” PROTOCOL MANUAL

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QUESTIONS

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WHAT THIS MANUAL COVERS

This manual covers the "D" protocol. This protocol is used between matrix switching systems and receiver/drivers.

THE "D" PROTOCOL

The format for a message is:

Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7
Synch Byte	Address	Command 1	Command 2	Data 1	Data 2	Check Sum

All values below are shown in hexadecimal (base 16).

The synchronization byte is always $FF.

The address is the logical address of the receiver/driver being controlled.

The check sum is the 8 bit (modulo 256) sum of the payload bytes (bytes 2 through 6) in the message.

THE STANDARD COMMAND SET

Command 1 and 2 are as follows:

	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Command 1	Sense	Reserved	Reserved	Auto / Manual Scan	Camera On / Off	Iris Close	Iris Open	Focus Near
Command 2	Focus Far	Zoom Wide	Zoom Tele	Down	Up	Left	Right	Always 0

The sense bit (command 1 bit 7) indicates the meaning of bits 4 and 3. If the sense bit is on, and bits 4 and 3 are on, the command will enable auto-scan and turn the camera on. If the sense bit is off and bits 4 and 3 are on the command will enable manual scan and turn the camera off. Of course, if either bit 4 or bit 3 are off then no action will be taken for those features.

The reserved bits (6 and 5) should be set to 0.

Word 5 contains the pan speed. Pan speed is in the range $00 (stop) to $3F (high speed) and $FF for "turbo" speed. Turbo speed is the maximum speed the device can obtain and is considered separately because it is not generally a smooth step from high speed to turbo. That is, going from one speed to the next usually looks smooth and will provide for smooth motion with the exception of going into and out of turbo speed.
Word 6 contains the tilt speed. Tilt speed is in the range $00 (stop) to $3F (maximum speed).

Word 7 is the check sum. The check sum is the sum of bytes (excluding the synchronization byte) modulo 256.

EXTENDED COMMANDS

In addition to the " PTZ" commands shown above, there are control commands that allow you access to the more advanced features of some equipment.

The response to one of these commands is four bytes long. The first byte is the synchronization character (FF), the second byte is the receiver address, the third byte contains the alarm information and the fourth byte is the check sum.

Command	Word 3	Word 4	Word 5	Word 6
Set Preset	00	03	00	01 to 20
Clear Preset	00	05	00	01 to 20
Go To Preset	00	07	00	01 to 20
Flip (180° about)	00	07	00	21
Go To Zero Pan	00	07	00	22
Set Auxiliary	00	09	00	01 to 08
Clear Auxiliary	00	0B	00	01 to 08
Remote Reset	00	0F	00	00
Set Zone Start	00	11	00	01 to 08
Set Zone End	00	13	00	01 to 08
Write Char. To Screen	00	15	X Position 00 to 28	ASCII Value
Clear Screen	00	17	00	00
Alarm Acknowledge	00	19	00	Alarm No.
Zone Scan On	00	1B	00	00
Zone Scan Off	00	1D	00	00
Set Pattern Start	00	1F	00	00
Set Pattern Stop	00	21	00	00
Run Pattern	00	23	00	00
Set Zoom Speed	00	25	00	00 to 03
Set Focus Speed	00	27	00	00 to 03
Reset Camera to defaults	00	29	00	00
Auto-focus auto/on/off	00	2B	00	00-02
Auto Iris auto/on/off	00	2D	00	00-02
AGC auto/on/off	00	2F	00	00-02
Backlight compensation on/off	00	31	00	01-02
Auto white balance on/off	00	33	00	01-02
Enable device phase delay mode	00	35	00	00
Set shutter speed	00	37	Any	Any
Adjust line lock phase delay	00-01	39	Any	Any
Adjust white balance (R-B)	00-01	3B	Any	Any
Adjust white balance (M-G)	00-01	3D	Any	Any
Adjust gain	00-01	3F	Any	Any
Adjust auto-iris level	00-01	41	Any	Any
Adjust auto-iris peak value	00-01	43	Any	Any
Query[1]	00	45	Any	Any

[1] This command can only be used in a point to point application. A device being queried will respond to any address. Therefore, if more than one device hears this command, you will have multiple devices transmitting at the same time.

CREATING LABELS

Many devices have the ability to display labels on the video. Labels that identify the preset or zone being scanned are common. There is a special technique to establish a label that is associated with either a preset or a zone. First, you send the label to the receiver/driver using the "Write Char. to Screen" command. After the label is up on the screen you set the preset. That will establish the label and associate it with the preset.

EXAMPLE MESSAGES

(all message values are in hexadecimal)

Message to send	Message
Receiver 1, Camera on	FF, 01, 88, 00, 00, 00, 89
Receiver 1, Camera off	FF, 01, 08, 00, 00, 00, 09
Receiver 2, Left 1/2 speed	FF, 02, 00, 04, 00, 20, 26
Receiver 2, Stop	FF, 02, 00, 00, 00, 00, 02
Receiver 10, Camera on, Focus far, Left, turbo speed	FF, 0A, 88, 90, 00, 40, 62

Note: the check sum calculation for the last message looks like this:

```
0A        00001010
88        10001000
Subtotal  10010010  92
90        10010000
Subtotal  00100010  22   (modulo 256 allows the high bit to roll off)
00        00000000
Subtotal  00100010  22
40        01000000
          01100010  62   Final check sum value
```

RESPONSES

Devices that receive the " D" protocol may generate a response.

The general response to a received command has the following format.

Sync	Address	Alarm Information	Check Sum

The alarm information is one byte formatted as follows:

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Alarm 8	Alarm 7	Alarm 6	Alarm 5	Alarm 4	Alarm 3	Alarm 2	Alarm 1

If the bit is on (1) then the alarm is active. If the bit is off (0) then the alarm is inactive.

The check sum is the sum of the received command's check sum, and the alarm information.

The response to the query command is:

Sync	Address	Part Number (15 bytes)	Check Sum

The address is the address of the device responding to the query.

The part number is the ASCII text string containing the program number (PRG…) of the device being queried.

The check sum is the 8 bit (modulo 256) sum of the received query command's check sum, the address of the response, and the 15-byte part number.

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