RC20/RC32/RC58

SensorVision™ Programmable

Video Management System

17 July 2002

TABLE OF CONTENTS

Section **Page**

1 Sears Fresno CCTV configuration

1.1 Observed camera IDs from Fresno Sears 22MAR01

The first hex number in the comments section is the response to the controller when the dome receives a "query" (or "poll") message.

[1] `$Header: d:/txb-s422/RCS/sf.tex,v 1.4 2001-05-23 15:02:53-07 Hamilton Exp Hamilton $`
[2] `$Header: d:/txb-s422/RCS/sfconfig.inc,v 1.7 2001-11-30 15:12:06-08 Hamilton Exp Hamilton $`

Hex	Camera	Port	Status	Comments
0x01	1	5	Pan/Tilt	0xF5
0x02	2	2	Pan/Tilt	0xF5, Slow
0x03	3	2	Pan/Tilt	0xF5, Slow
0x04	4	2	Pan/Tilt	0xF5
0x05	5	5	Pan/Tilt	0xF5
0x06	6	5	Pan/Tilt	0xE5 0xF5
0x07	7	2	Pan/Tilt	0xF5
0x08	8	2	Pan/Tilt	0xF5
0x09	9	—	Blue Screen	
0x0A	10	—	Blue Screen	
0x0B	11	2	Pan/Tilt	0xF5, Some bad responses
0x0C	12	3	Pan/Tilt	0xF5
0x0D	13	3	Pan/Tilt	0xF5
0x0E	14	3	Pan/Tilt	0xF5
0x0F	15	3	Pan/Tilt	0xF5
0x10	16	3	Pan/Tilt	0xF5
0x11	17	3	Pan/Tilt	0xF5
0x12	18	3	Pan/Tilt	0xF5
0x13	19	3	Pan/Tilt, Color	0xF5
0x14	20	—	Blue Screen	
0x15	21	—	Blue Screen	
0x16	22	4	Pan/Tilt	0xF5
0x17	23	—	Blue Screen	
0x18	24	—	Pan/Tilt, Color	
0x19	25	1	Pan/Tilt	0xF5
0x1A	26	3	Pan/Tilt, Color	0xF5
0x1B	27	5	Pan/Tilt	0xF5
0x1C	28	2	Pan/Tilt	0xF5
0x1D	29	2	Pan/Tilt, Color	0xF5
0x1E	30	2	Pan/Tilt	0xF5
0x1F	31	2	Pan/Tilt	0xF5
0x20	32	2	Pan/Tilt	0xF5, Slow
0x21	33	1	Pan/Tilt	0xF5
0x22	34	1	Pan/Tilt	0xF5

Continued on the next page.

Continued from the previous page.

Hex	Camera	Port	Status	Comments
0x23	35	2	Pan/Tilt	0xF5
0x24	36	2	Pan/Tilt	0xF5, Slow
0x25	37	—	No Camera	
0x26	38	—	No Camera	
0x27	39	—	No Camera	
0x28	40	—	Robot Multiplexer	
0x29	41	—	No Camera	
0x2A	42	1	Pan/Tilt	0xF5
0x2B	43	1	Pan/Tilt	0xF5
0x2C	44	—	No Camera	
0x2D	45	—	No Camera	
0x2E	46	—	No Motion	
0x2F	47	—	Blue Screen	
0x30	48	2	Pan/Tilt	0xF8
0x31	49	—	Blue Screen	
0x32	50	—	No Motion, Color	
0x33	51	—	Blue Screen	
0x34	52	—	Blue Screen	
0x35	53	—	Blue Screen	
0x36	54	—	Blue Screen	
0x37	55	—	Blue Screen	
0x38	56	5	Pan/Tilt	0xF5
0x39	57	—	Blue Screen	
0x3A	58	—	Blue Screen	

1.2 Cameras that the controller knows about

Camera	Type	Motion	Variable speed	Status
1	INDOOR	CONTinuous	PROGrammable	OFFLINE
2	INDOOR	CONTinuous	PROGrammable	OFFLINE
3	INDOOR	CONTinuous	PROGrammable	OFFLINE
4	INDOOR	CONTinuous	PROGrammable	OFFLINE
5	INDOOR	CONTinuous	PROGrammable	OFFLINE
6	INDOOR	CONTinuous	PROGrammable	OFFLINE
7	INDOOR	CONTinuous	PROGrammable	OFFLINE
8	INDOOR	CONTinuous	PROGrammable	OFFLINE
9				
10				
11	INDOOR	CONTinuous	PROGrammable	OFFLINE
12	INDOOR	CONTinuous	PROGrammable	OFFLINE
13	INDOOR	CONTinuous	PROGrammable	OFFLINE
14	INDOOR	CONTinuous	PROGrammable	OFFLINE
15	INDOOR	CONTinuous	PROGrammable	OFFLINE
16	INDOOR	CONTinuous	PROGrammable	OFFLINE
17	INDOOR	CONTinuous	PROGrammable	OFFLINE
18	INDOOR	CONTinuous	PROGrammable	OFFLINE
19	INDOOR	CONTinuous	PROGrammable	OFFLINE
20				
21				
22	INDOOR	FIXED		ONLINE
23				
24	INDOOR	FIXED		ONLINE
25	INDOOR	CONTinuous	PROGrammable	OFFLINE
26	INDOOR	CONTinuous	PROGrammable	OFFLINE
27	INDOOR	CONTinuous	PROGrammable	OFFLINE
28	INDOOR	CONTinuous	PROGrammable	OFFLINE
29	INDOOR	CONTinuous	PROGrammable	OFFLINE
30	INDOOR	CONTinuous	PROGrammable	OFFLINE
31	INDOOR	CONTinuous	PROGrammable	OFFLINE
32	INDOOR	CONTinuous	PROGrammable	OFFLINE
33	INDOOR	CONTinuous	PROGrammable	OFFLINE
34	INDOOR	CONTinuous	PROGrammable	OFFLINE

Continued on the next page.

Continued from the previous page.

Camera	Type	Motion	Variable speed	Status
35	INDOOR	CONTinuous	PROGrammable	OFFLINE
36	INDOOR	CONTinuous	PROGrammable	OFFLINE
37				
38				
39				
40	INDOOR	FIXED		ONLINE
41				
42	INDOOR	CONTinuous	PROGrammable	OFFLINE
43	INDOOR	CONTinuous	PROGrammable	OFFLINE
44				
45				
46	INDOOR	FIXED		ONLINE
47				
48	OUTDOOR	CONTinouus	PROGrammable	OFFLINE
49				
50	INDOOR	CONTinuous	PROGrammable	OFFLINE
51				
52				
53				
54				
55				
56	INDOOR	CONTinuous	PROGrammable	OFFLINE
57				
58				

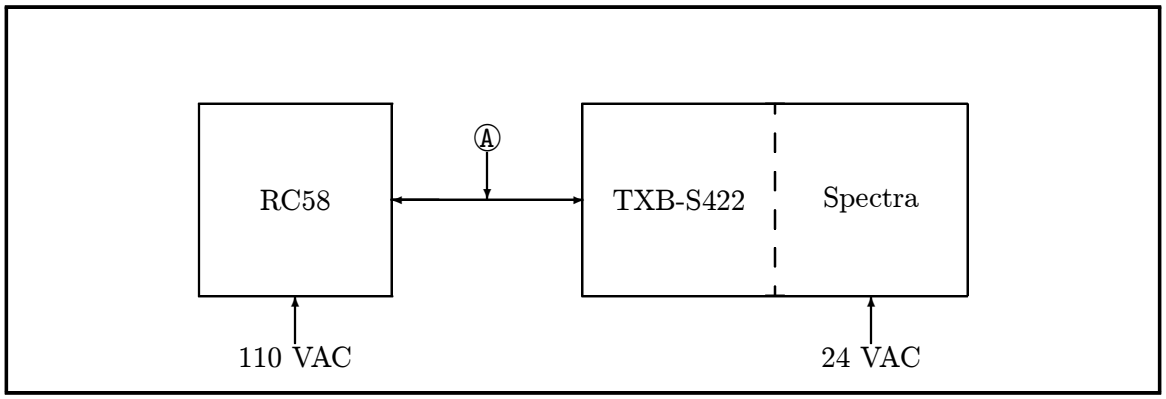
2 Interfacing a Spectra

2.1 To an RC58 controller

A Spectra with a TXB-S422 installed in it may be connected to an RC58 (the controller of a SensorVision™ Programmable Video Management System). This is done by connecting a cable from the IN/OUT J-BOX connectors. To do this make the following connections at point Ⓐ in Figure 1, page 6:

Spectra		Direction	RC58
P_4	CONTROL		IN/OUT
4	RX —	From Controller	Tip
3	RX +	From Controller	Ring
	—	Shield	Sleeve
2	TX —	To Controller	Tip
1	TX +	To Controller	Ring

The RC58 will not recognize the presence of the Spectra until the Spectra (with a TXB-S422 installed) has been powered up (or power cycled). Even then it is important to note that the Spectra is only "partially" installed. This means that the dome will receive and process commands from the controller, but that the controller does not have a completely "normal conversation" with the Spectra.



$RCSfile: txbs422.inc,v $

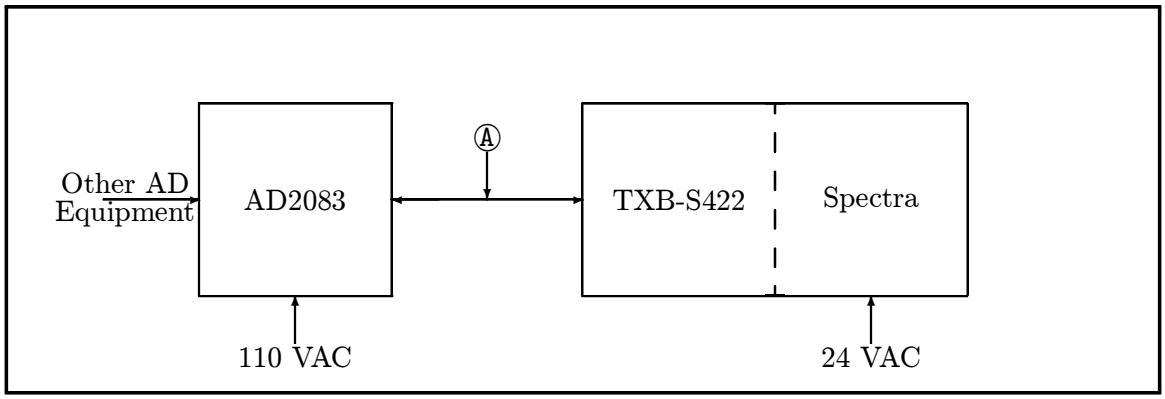
Figure 1. Connection diagram for a Spectra and an RC58 <spectrarc58>

[3] $Header: d:/txb-s422/RCS/txbs422.inc,v 1.7 2001-11-30 14:25:08-08 Hamilton Exp Hamilton $

2.2 To an AD2083/02 translator

A Spectra with a TXB-S422 installed in it may be connected to an AD2083/02 (a code translator for an American Dynamics matrix system). This is done by connecting a cable from the T +/-, R +/- connectors. To do this make the following connections at point Ⓐ in Figure 2, page 7:

Spectra		Direction	AD2083/02
P_4	CONTROL		IN/OUT
4	RX —	From Translator	T +
3	RX +	From Translator	T —
	—	Shield	S
2	TX —	To Translator	R +
1	TX +	To Translator	R —



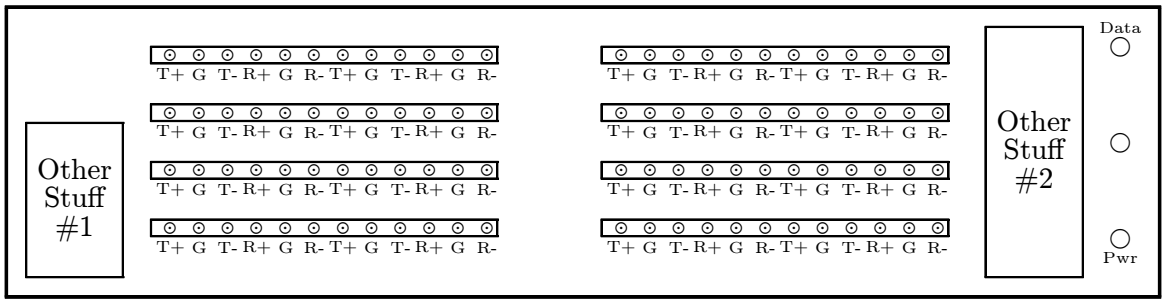
$RCSfile: txbs422.inc,v $

Figure 2. Connection diagram for a Spectra and an AD2083/02 <spectraad2083>

2.3 Using an AD2083/02

The AD2083/02 Data Translator is used to convert American Dynamics "Data Line" information into RS422 messages to control domes, etc. The rear panel is shown in Figure 3, page 8.

Spectra		Direction		AD2083/02
P_4	CONTROL		DB-9	IN/OUT
4	RX +	From Translator	5	T +
3	RX —	From Translator	9	T —
	—	Shield		S
2	TX —	To Translator	1	R +
1	TX +	To Translator	6	R —



$RCSfile: txbs422.inc,v $

Figure 3. AD2083/02 Rear Panel <ad2083/02rear>

Other stuff			
#1		#2	
1	Power LED	2	RJ-45 comm in/out jacks
1	Alarm LED	1	12 pin IO connector
1	Code LED	2	BNC code connectors
	—	1	Power cord

3 RC58 type of Sensormatic controller

There appear to be three closely related controllers that make up different models of Sensormatic's SensorVision™ line of video management systems.

The RC58 controller[5] may have the largest number of cameras attached to it (58). The RC20 and RC32 controllers probably have about the same capabilities. The differences relate to the maximum number of domes that are supported.

The protocol is probably similar with the major difference being with polling that wrap occurs at either dome number 20 or 32.

1. All commands are sent three times.
2. Polling recycles from `0x3A` (58_{10}) to `0x01` (1_{10}) with no skipped addresses.
3. Blue cable (upper) has the controller's outputs.
4. Blue wiring is Red, Black.
5. Red wiring is Green, White.
6. Most connectors are flipped. (Port 4 red is not flipped.)
7. There are no variable speed commands.

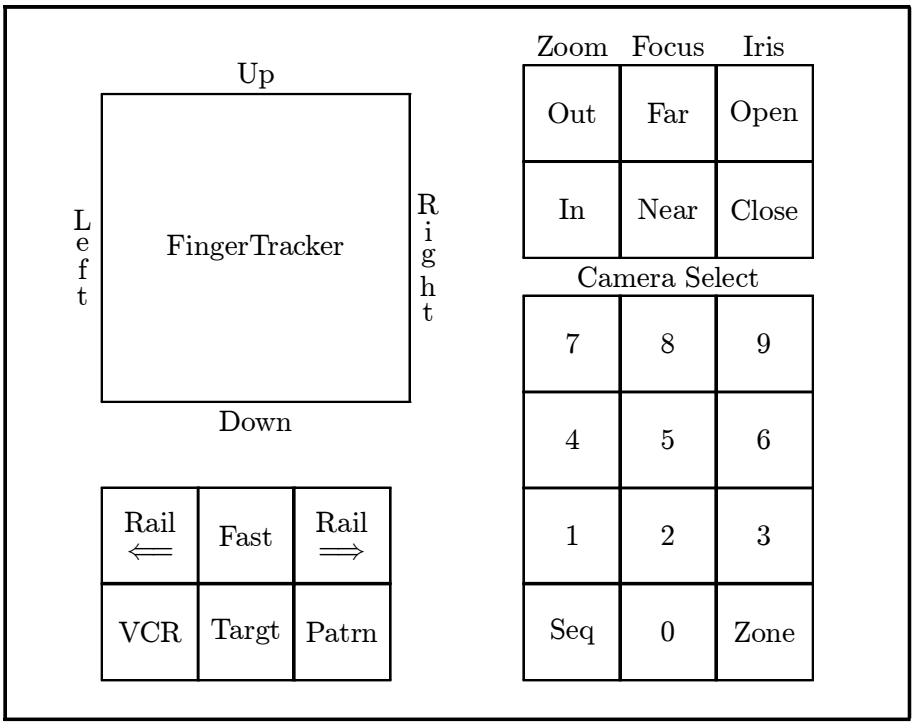
Note

In the above table I have mentioned "Blue" and "Red" to indicate various cables. I have marked the equipment at Sears Fresno with these colors to aid me in investigating the protocol. The actual equipment does not have these colors on it. The colors were chosen because I happened to have two rolls of colored electrician's tape in those colors and BREAKOUT color codes its display with red and blue. Having every thing consistent makes it more likely that I will avoid serious mistakes.

3.1 FingerTracker

Control of an RC58 class controller is normally done using a FingerTracker type control keyboard and an alphanumeric keyboard. A layout of these types of control keyboards are shown in Figure 4, page 10 and Figure 5, page 10.

[4] `$Header: d:/txb-s422/RCS/rc58.inc,v 1.5 2002-02-28 12:57:31-08 Hamilton Exp Hamilton $`
[5] Installed at Sears Fresno.
[6] `$Header: d:/txb-s422/RCS/ft.inc,v 1.4 2002-02-13 07:53:55-08 Hamilton Exp Hamilton $`
[7] `$Header: d:/txb-s422/RCS/an.inc,v 1.3 2002-02-13 07:53:50-08 Hamilton Exp Hamilton $`



$RCSfile: ft.inc,v $

Figure 4. VM1 type Control Keypad

Over ride	1	2	3	4	5	6	7	8	9	0	Reset
Selc	Q	W	E	R	T	Y	U	I	O	P	Del
List	A	S	D	F	G	H	J	K	L	Enter	Insrt
Quit	Start	Z	X	C	V	B	N	M	·	⇑	⇓
Menu	Set	Low Prty	F1	F2	Space	Space	F3	Lock Pan	Track	⟸	⟹

$RCSfile: an.inc,v $

Figure 5. VM1 type Alphanumeric Keyboard

4 Results of examining the RC58 at Sears, Fresno

Note

1. In the following tables, I have made an attempt to indicate what was generated when each key was hit.
   A. The format of "3-byte" commands is: CAM ID, OP CODE, CKSUM.
   B. The format of the "1 byte" response is: CAM ID.
   C. There are other formats of data with the largest messages coming from the camera and being either 104 or 204 bytes in length. The internal format and importance of these commands is unknown.
2. In describing the commands send by the RC58, I have used a short hand description of the commands generated. Since all commands start with a CAM ID and end with a CKSUM, I have not indicated their presence. Then because many commands are sent three times, I indicate this with the phrase "$(3\times_D)$" for when the key(s) are depressed (down) and "$(3\times_U)$"for when the key(s) are released (up) just after the repeated OP CODE.
3. "Boxed" numbers, (79), refer to pages in the "Training Manual, SensorVision™ Programmable, Video Management Systems, (RC20, RC32, and RC58)". This particular page reference is to the "RC58 Rack Box Connectors" in appendix B.

4.1 Control Keypad generated commands

6, 96

ZOOM OUT	`0x8B` $(3\times_D)$ ZOOM OUT	`0x8C` $(3\times_U)$ ZOOM STOP
ZOOM IN	`0x8A` $(3\times_D)$ ZOOM IN	`0x8C` $(3\times_U)$ ZOOM STOP
FOCUS FAR	`0x88` $(3\times_D)$ FOCUS FAR	`0x89` $(3\times_U)$ FOCUS STOP
FOCUS NEAR	`0x87` $(3\times_D)$ FOCUS NEAR	`0x89` $(3\times_U)$ FOCUS STOP
IRIS OPEN	`0x90` $(3\times_D)$ IRIS OPEN	`0x92` $(3\times_U)$ IRIS STOP
Continued on the next page.		

[8] `$Header: d:/txb-s422/RCS/rc58tabl.inc,v 1.8 2001-12-26 15:51:40-08 Hamilton Exp Hamilton $`

Continued from the previous page.				
IRIS CLOSE	0x91 ($3\times_D$) IRIS CLOSE	0x92 ($3\times_U$) IRIS STOP		
UP	0x84 ($3\times_D$) TILT UP	0x86 ($3\times_U$) TILT STOP		
UP/RIGHT	0x84 ($3\times_D$) TILT UP	0x82 ($3\times_D$) PAN RIGHT	0x83 ($3\times_U$) PAN STOP	0x86 ($3\times_U$) TILT STOP
RIGHT	0x82 ($3\times_D$) PAN RIGHT	0x83 ($3\times_U$) PAN STOP		
RIGHT/DOWN	0x82 ($3\times_D$) PAN RIGHT	0x85 ($3\times_D$) TILT DOWN	0x83 ($3\times_U$) PAN STOP	0x86 ($3\times_U$) TILT STOP
DOWN	0x85 ($3\times_D$) TILT DOWN	0x86 ($3\times_U$) TILT STOP		
DOWN/LEFT	0x81 ($3\times_D$) PAN LEFT	0x85 ($3\times_D$) TILT DOWN	0x83 ($3\times_U$) PAN STOP	0x86 ($3\times_U$) TILT STOP
LEFT	0x81 ($3\times_D$) PAN LEFT	0x83 ($3\times_U$) PAN STOP		
LEFT + FAST	0x81 ($3\times_D$) PAN LEFT	0x9A ($3\times_D$) FASTER	0x83 ($3\times_U$) PAN STOP	
LEFT/UP	0x81 ($3\times_D$) PAN LEFT	0x84 ($3\times_D$) TILT UP	0x83 ($3\times_U$) PAN STOP	0x86 ($3\times_U$) TILT STOP
RAIL LEFT	0x8D ($3\times_D$) FAST	0x8F ($3\times_U$) FAST STOP		
FAST	0x9A ($3\times_D$) FASTER	0x9B ($3\times_U$) FASTER STOP		
RAIL RIGHT	0x8E ($3\times_D$) FASTEST	0x8F ($3\times_U$) FAST STOP		

4.2 Initial screen

```
HH:MM:SS PM DOW DD MMM 2001

SENSORVISION POWER UP SEQUENCE STARTED

(C) SENSORMATIC ELECTRONICS CORP.
       RF002 System 58D
            1997

   COLD START IN PROGRESS

 DOME CONFIGURATION IN PROGRESS
```

5

Index