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SPD1
Status Panel Driver
Operating Manual

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Contents

1 Introduction

The Christie SPD1 Status Panel Driver enables third party cinema equipment to drive Christie CS30 Cinema Status Panels.

Each SPD1 uses a set of opto-coupled inputs to obtain status information from the projection equipment in a cinema. The SPD1 then transmits this information to CS30 Status Panels which display it.

SPD1s are compatible with Christie CA21 automation units when driving Status Panels. Thus SPD1s, CA21s and CS30s can all be connected together on the same network.

SPD1s can also be used in a network with the Christie Central Computer Control software CA-Link. The SPD1s will transmit status to any CS30s on the network. CA-Link will also recognise the cinemas represented by SPD1s.

The connection between SPD1s and CS30s is a simple three wire daisy chained connection. Up to 32 units (a mixture of SPD1s, CA21s and CS30s) can all be interconnected on the one cable.

2 Installation and Set Up Procedure

2.1 Mains Supply Voltage

The SPD1 is provided with a dual voltage transformer allowing operation from either 115VAC or 230VAC.

The mains voltage is selected by a switch on the SPD1 circuit board.

To avoid damage to the CS30, ensure that the correct mains voltage is set before switching it on.

The SPD1 also has a mains fuse labelled F2. A 250mA fuse must be installed for correct operation.

2.2 The RS-485 Electrical Interface

SPD1 Status Panel Drivers, CA21 Automation Units and CS30 Status Panels are all interconnected using an RS-485 interface.

RS-485 is a differential serial interface which drives a balanced 120ohm transmission line. It has a range of over several hundred feet.

Up to 32 tranceivers can be daisy chained on an RS-485 line. In other words, up to 32 units (a mixture of SPD1s, CA21s and CS30s) can be interconnected on the one cable.

The cable for RS-485 must be a shielded twisted pair with an 120ohm characteristic impedance. The shield is signal ground, (not mains earth).

The cable should be a single run with no T-connections (stubs). Each end of the cable must be terminated with an 120ohm resistor across the signal lines.

There must be one set of bias resistors somewhere along the cable. These resistors must have power applied for the network for function properly.

2.2.1 Providing Terminating Resistors

SPD1s, CA21s and CS30s are all provided with 120ohm resistors for terminating the RS-485 line. The resistor is enabled (connected across the RS-485 line) using a jumper on the relevant circuit board.

There must be exactly one 120ohm terminating resistor at each physical end of the RS-485 line.

On the SPD1 circuit board the terminating resistor is enabled by linking J5

On the CS30 circuit board, the terminating resistor is enabled by linking J5.

With CA21s the jumper which selects the terminating resistor depends on the circuit board type and revision. Consult the CA21 or CS30 manual for details.

2.2.2 Bias Resistors

One set of bias resistors must be connected across the RS-485 cable.

There must only be one set of bias resistors on the RS-485 line and the unit containing these resistors must be powered on for correct operation of the network of SPD1s, CA21s and CS30s

The CS30 is provided with a set of bias resistors which are enabled by links on J6 and J7.

CA21s are also provided with bias resistors. See the CS30 manual or CA21 manuals for details.

There are no bias resistors on the SPD1.

2.2.3 RS-485 Connections

The RS-485 cable is an 120ohm twisted pair with a shield.

RS-485 uses differential signals. The two signal lines (on the twisted pair) are receive/transmit + (RT+) and receive/transmit - (RT-). The shield is signal ground, not mains earth.

Connections are made to the SPD1 via the three screw terminals J3.

Ensure that RT+ is connected to RT+, RT- is connected to RT-, and shield is connected to shield on all units (SPD1s CA21s, and CS30s).

Do not connect the shield to mains earth.

2.3 Setting the RS-485 Baud Rate

Two different RS-485 baud rates can be selected with the MODE jumper B0 on the SPD1 circuit board.

The baud rate is selected for the environment in which the SPD1 is operating.

When SPD1s are only used with CS30 Status Panels a baud rate of 9600 is used. To select this situation leave jumper B0 out.

A rate of 38.4Kbauds is required when SPD1s are being used with CS30s, CA21s and CA-Link (Central Computer Control software). In this case install jumper B0.

The jumpers on the CS30s must be set to match the baud rate used by the SPD1. Early versions of the CS30 are fixed at 9600 bauds. They cannot be used with CA-Link.

After altering the B0 jumper, the SPD1 must be switched off and on again.

The above details are summarised in the following Table.

SPD1 Baud Rates

Baud Rate	Environment	B0
9600 Baud	When SPD1s are only used with CS30s	Out
38.4 Kbaud	When SPD1s are to be used with CS30s, CA21s and CA-Link.	In

2.4 Setting the SPD1 Cinema Number

Each SPD1 must be set to the number of the cinema it receives status from. This number is used by the CS30 to display status for the cinema.

The cinema number is in the range 1-32. It is set by the five jumpers A0 to A4 on the SPD1 circuit board, as shown in the following Table.

To disable the SPD1 (so it does not transmit any status) use jumper B1 as described in Section 2.5. When the SPD1 is disabled in this way the cinema number is ignored.

SPD1 Cinema Number

Cinema No.	A4	A3	A2	A1	A0
1	Out	Out	Out	Out	Out

Cinema No.	A4	A3	A2	A1	A0
2	Out	Out	Out	Out	In
3	Out	Out	Out	In	Out
4	Out	Out	Out	In	In
5	Out	Out	In	Out	Out
6	Out	Out	In	Out	In
7	Out	Out	In	In	Out
8	Out	Out	In	In	In
9	Out	In	Out	Out	Out
10	Out	In	Out	Out	In
11	Out	In	Out	In	Out
12	Out	In	Out	In	In
13	Out	In	In	Out	Out
14	Out	In	In	Out	In
15	Out	In	In	In	Out
16	Out	In	In	In	In
17	In	Out	Out	Out	Out
18	In	Out	Out	Out	In
19	In	Out	Out	In	Out
20	In	Out	Out	In	In
21	In	Out	In	Out	Out
22	In	Out	In	Out	In
23	In	Out	In	In	Out
24	In	Out	In	In	In
25	In	In	Out	Out	Out
26	In	In	Out	Out	In
27	In	In	Out	In	Out
28	In	In	Out	In	In
29	In	In	In	Out	Out
30	In	In	In	Out	In
31	In	In	In	In	Out
32	In	In	In	In	In

Those people familiar with the binary number system will recognise that the cinema number is one more than the binary number set by the jumpers.

2.5 Disabling the SPD1

If jumper B1 is installed the SPD1 will stop transmitting status information. For normal operation B1 must be left out.

When the SPD1 is disabled the cinema number set on the jumpers is ignored.

2.6 The SPD1 Inputs

The SPD1 has six optically isolated inputs for picking up status information from the cinema equipment. These inputs each require from 2.5V to 24V, AC or DC to operate.

Their input resistance is 10Kohms.

Because the inputs will operate from AC, the polarity of DC applied to them does not matter.

Each input has a LED which illuminates when the input is activated (with volts applied).

The inputs are brought out to a row of screw terminals as shown below.

Arrangement of Inputs on Screw Terminals

V+	V+	IN1	IN2	0V	IN3	IN4	0V	IN5	IN6

For convenience, approximately 12VDC is supplied on two of the screw terminals. This voltage can be used to drive the inputs. +12VDC is provided on the two terminals marked V+, and 0V is provided on the two terminals marked 0V,

+12V must only be used for driving SPD1 inputs from electrically isolated contacts such as relays. Connections using it should also be kept short.

+12V or 0V must not be connected to mains earth.

2.7 How Inputs Indicate Status

There are several ways an SPD1 can derive status information from its inputs.

The different schemes are selected by jumpers B2 and B3 on the SPD1 circuit board as defined in the Table below.

Jumper Settings for Deriving Status From Inputs

B3	B2	Description
Out	Out	USA scheme
Out	In	General scheme
In	Out	Not implemented at present
In	In	Encoded standard status

2.7.1 USA Scheme

With this scheme (B3,B2 = out,out) only one input can be active at any one time. In the Table below, the blanks in the input columns mean that the inputs are not active.

USA Scheme For Deriving Status From SPD1 Inputs

IN1	IN2	IN3	IN4	IN5	IN6	Status Displayed on CS30
On						Projector running - green LED on
	On					Projector stopped - yellow and red LEDs on (Start/End without film threaded)
		On				Projector ready - yellow LED on (Start/End with film threaded)
			On			Fault - red LED flashes and CS30 beeps
				On		Green LED flashes
					On	Yellow LED flashes

2.7.2 General Scheme

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With this scheme (B3,B2 = out,in) each input selects a single LED on the CS30 and either turns it on or flashes it. In addition, when the red LED is flashing to indicate a fault, the CS30 beeper also sounds.

With this scheme more than one input can be active at a time, but it is not possible for both inputs which control a single LED to be on at the one time. For example it makes no sense to activate both Inputs 1 and 2 at the same time. This combination would attempt to turn on the green LED and flash it.

General Scheme For Deriving Status From SPD1 Inputs

IN1	IN2	IN3	IN4	IN5	IN6	Status Displayed on CS30
On						Green LED on
	On					Green LED flashes
		On				Yellow LED on
			On			Yellow LED flashes
				On		Red LED on
					On	Red LED flashes and beeper sounds

2.7.3 Scheme Which Encodes Standard Status

This scheme (B3,B2 = in,in) allows automation units to generate standard session status (as generated by Christie automation units) using four outputs (relays or transistors). Each combination of SPD1 inputs selects one of the standard CS30 states.

Only inputs 1 to 4 on the SDP1 are used. Inputs 5 and 6 are ignored.

Scheme For Deriving Standard Status From SPD1 Inputs

IN1	IN2	IN3	IN4	CS30 Green LED	CS30 Yellow LED	CS30 Red LED	Meaning of CS30 State
				Off	Off	Off	Cinema not responding
On				Off	On	On	Automation idle, film not threaded
	On			Off	On	Off	Automation Idle, film threaded
On	On			Off	Flashes	On	Session scheduled, film not threaded
		On		Off	Flashes	Off	Session scheduled, film threaded
On		On		Flashes	Flashes	Off	Showing slides
	On	On		Flashes	Off	Off	Showing film previews
On	On	On		On	Off	Off	Showing main feature
			On	On	Flashes	Off	Session ending
On			On	Off	On	Flashes	Fault when idle
	On		On	Off	Flashes	Flashes	Fault when session scheduled
On	On		On	Flashes	Flashes	Flashes	Fault during slides
		On	On	Flashes	Off	Flashes	Fault during previews
On		On	On	On	Off	Flashes	Fault during feature
	On	On	On	On	Flashes	Flashes	Fault when ending

3 Operation

There nothing to operate on the SPD1 once it has been installed and set up.

Before SPD1s, CS30s and CA21s will operate properly together the following settings must have been made.

(1)   The RS-485 baud rate must be set on each SPD1 using the jumper B0. In general if the SPD1 is only used with CS30s the baud rate should be set to 9600 bauds by removing B0. To enable the SPD1 to be used with CA-Link the baud rate must be set to 38.4Kbauds.

(2)   The status scheme must be set on each SPD1 using jumpers B2 and B3. (See Section 2.6.). The status scheme determines how CS30 status is derived from the inputs on the SPD1.

(3)   Each SPD1 must be set to a unique cinema number by setting the jumpers A0 to A4 on its circuit board. (Section 2.4 explains the jumper settings.)

(4)   To allow the SPD1 to transmit status normally jumper B1 must be left out.

(5)   Each CA21 must have its cinema number set to a unique value using the ACn≅ option in the Setup procedure. (See the CA21 Manual.)

(6)   Each CS30 must be set to respond to the required range of cinema numbers. (See the CS30 Manual.)

Whenever any alterations are made to the jumper settings on the CS30 circuit board, the power to the SPD1 must be switched off and on again.

An SPD1 sends status to CS30s subject to the following rules.

(1)   If jumper B1 is installed, the SPD1 will not send any status information.

(2)   Status is transmitted by an SPD1 whenever it detects a change on its inputs or at least every 5 seconds.

4 CS30 Status Indication

For convenience, details are given below of the meaning of the status LEDs on CS30s when driven by CA21s

The three LEDs in each column of a CS30 indicate the state of a single cinema.

If no LEDs in a column are illuminated, no status information has been received from the corresponding cinema for some time.

If SPD1s are used without CA21s, different meanings can be given to the CS30 status LEDs. The general scheme for generating status from the inputs can be selected (using jumpers B2 and B3) and the inputs driven as required.

Just remember that the LEDs on the front panel of the CS30 are labelled ARun≅, AStart/End≅ and AFault≅.

The Meaning of Each Status LED With CA21s

Description	Colour	Off	Flashing	On
Run (session)	Green	No Session	Slides or Previews	Main Feature
Start-End (of session)	Yellow	Session Running	Start/End of Session including Slides	No Session
Fault	Red	No Fault	Fault (Film Break, Xenon Fail, etc.)	Film Not Threaded

5 Diagnostic Tests

If the SPD1 is powered on whilst jumper B7 is installed, it enters a diagnostic test procedure.

After the jumper is removed the first test is commenced. Each time the jumper is inserted and removed again the SDP1 advances to the next test.

To allow information to be output during each test, the SDP1 must be connected to one or more CS30 Status Panels.

As usual there must be a terminating resistor installed at each end of the RS-485 cable. One of the CS30s must have its bias resistors enabled.

During the test procedure, the CS30 will use the baud rate selected by jumper A0. Apart from jumper B7, which is used to step through the tests, the meaning of all other jumpers is ignored.

When B7 is inserted and removed during the final test, the SPD1 returns to normal operation.

The diagnostic tests are summarised in the following Table.

Diagnostic Tests Performed

Test	Description
RS-485 Communication Test	This test demonstrates whether or not the SPD1 can communicate with a CS30. The LEDs on the CS30 are flashed column at a time at a rate of approximately two columns per second. If more than one column of LEDs stays on or the flash rate is irregular, the SPD1 is having difficulty communicating with the CS30.
A0-A4 Jumper Test	The five cinema number jumpers on the SDP1 are read. When a jumper is installed, the green LED on the CS30 in the corresponding column will be illuminated. For example if jumpers A0 and A3 are installed, the LEDs in column 1 and 4 will be on.
B0-B7 Jumper Test	This test works the same as the test described above for jumpers A0-A4. The green LEDs in columns 1 to 8 indicate which of the jumpers B0 to B7 are installed. Remember that installing jumper B7 will advance to the next test.
Input Test	This test uses the green LEDs in columns 1 to 6 to indicate when the corresponding optically isolated input is active. When an input is active the corresponding green LED will turn on.
Relay Test	When input 1 is active the relay should close and when the input is inactive the relay should open.