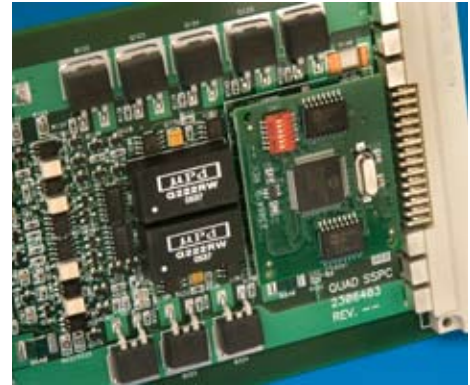


PART NUMBER	DESCRIPTION
SSPCB04028-0001	20-10-10-10A, 28 Vdc Quad-Channel, Solid-State Power Controller, Circuit-Card Assembly

This circuit-card assembly (CCA) of a four-channel solid-state power controller (SSPC) is designed for commercial aviation and military COTS programs. The form factor is standard 180mm 3U VME. It features short-circuit protection; I<sup>2</sup>t overload protection; trip status, flow status and load voltage status; switch temperature, load current, load voltage and supply voltage monitoring. A complementing daughter card provides a PIC microcontroller and dual RS485. Software-defined load-current trip levels can be changed by system communications upon startup or at user-defined setup periods. Card addresses can be either hardware or software defined. The SSPC CCA motherboard facilitates connections for other user-supplied daughterboards. For details, see data sheet for SSPCBIII without daughterboard.



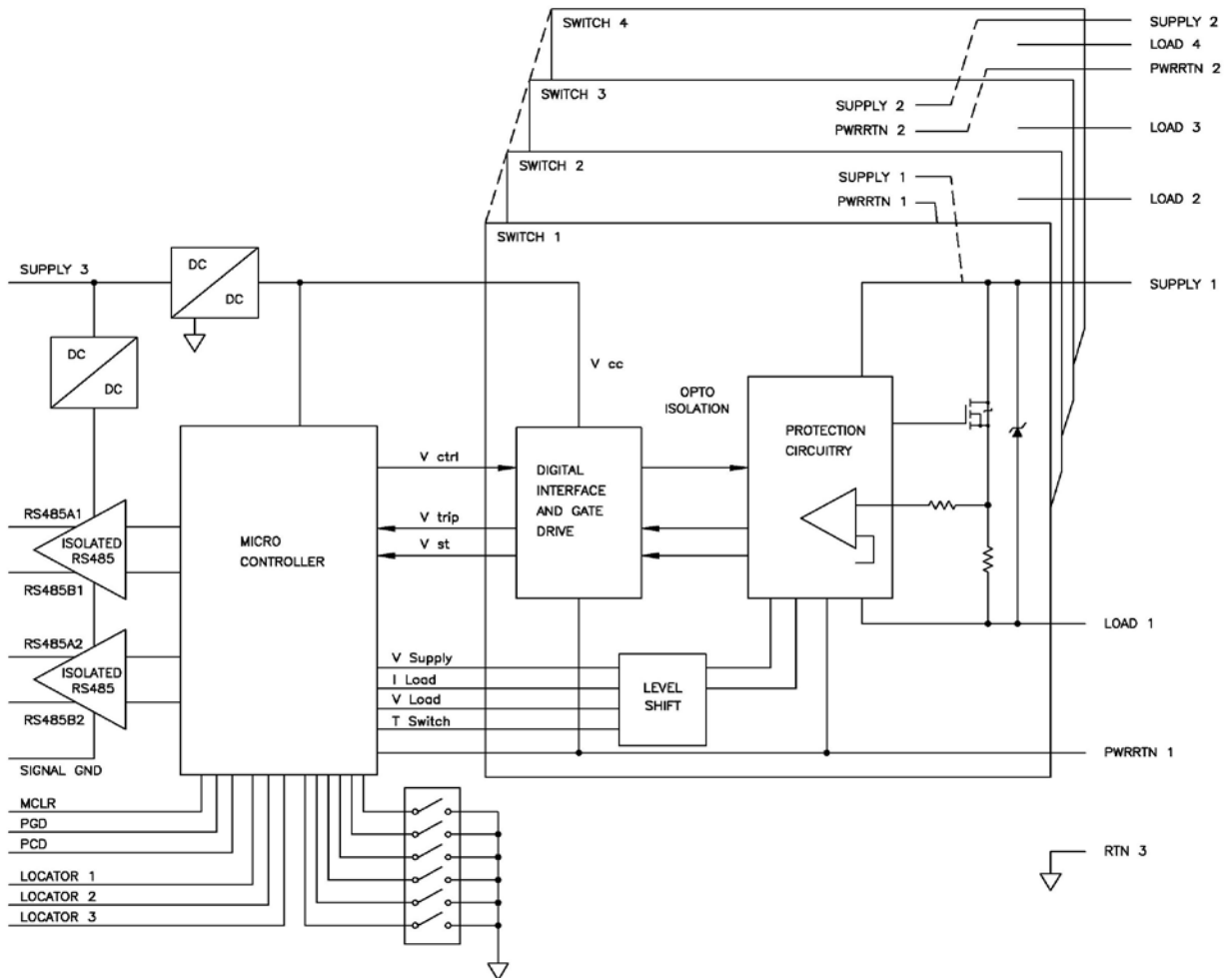
**TABLE 1 – ABSOLUTE MAXIMUM RATINGS (STEADY STATE)**

PARAMETER	MIN	MAX	UNIT
Line Voltage	0	50	V
Switch Junction Temperature @ Rated Current (T <sub>j</sub> max)		+125	°C
Storage Temperature	-40	+85	°C

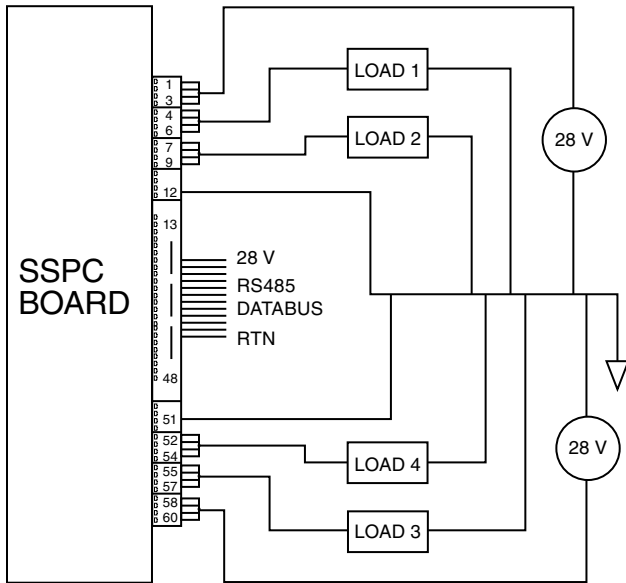
**TABLE 2 – RECOMMENDED OPERATING RANGE**

PARAMETER	MIN	MAX	UNIT
Operating Temperature	-40	+85	°C
Line Voltage 1-3 Range	18	32	Vdc

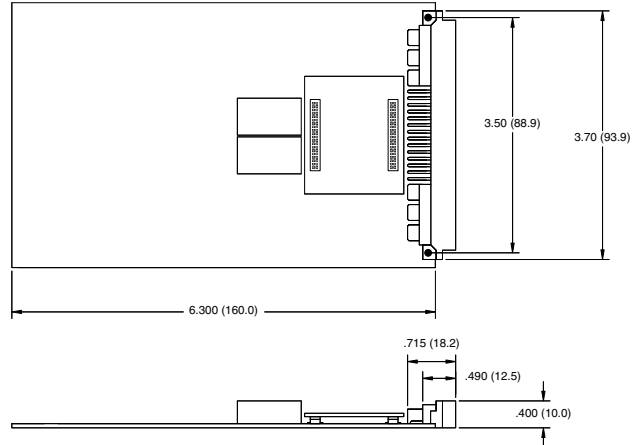
**FIGURE 1 – FUNCTIONAL DIAGRAM**



**FIGURE 2 – TYPICAL WIRING DIAGRAM**

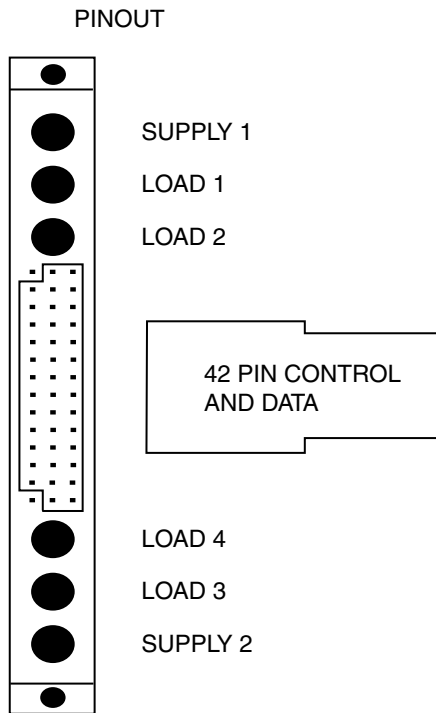


**FIGURE 2 – MECHANICAL OUTLINE**



NOTES: MEASUREMENTS IN INCHES (MM)  
 WEIGHT: 6 OZ. (170g)  
 PINS: GOLD PLATED  
 COATING: PARYLENE  
 ADDITIONAL: CONDUCTION COOLED MOUNTING 20 OZ. WEIGHT

**FIGURE 4 – MECHANICAL PINOUTS**



Only 15 pins of the available 42 are used in this configuration of the SSPCB.

**TABLE 3 – PINOUTS**

PIN	DESCRIPTION	ALTERNATE (SEE WIRING DIAGRAM)
1-3 ABC	SUPPLY 1	1-3 30 Amp Input
4-6 ABC	LOAD 1	4-6 20Amp output
7-9 ABC	LOAD 2	7-9 10 Amp Output
10B	SIGNAL GND	11 Isolated RS485 reference voltage
10C	PWRRTN1	12 To be connected to RTN3
15A	RTN3	25 To be connected with PWRRTNs
15B	LOCATOR1	26 Board ID
15C	LOCATOR2	27 Board ID
16A	RS485A1	28 Port 1
16B	RS485B1	29 Port 1
16C	LOCATOR3	30 Board ID
17A	RS485B2	31 Port 2
17B	RS485A2	32 Port 2
17C	MCLR	33 Required for programming only
18A	SUPPLY3	34 28V <1Amp Input
18B	PGD	35 Required for programming only
18C	PCD	36 Required for programming only
23C	PWRRTN2	51 To be connected to RTN3
24-26 ABC	LOAD 4	52-54 10 Amp Output
27-29 ABC	LOAD 3	55-57 10 Amp Output
30-32 ABC	SUPPLY2	58-60 20- 30 Amp Input

Note: Locator or Board ID Pins 15B, 15C and 16C should either be grounded to RTN3 or held at 4 to 5 volts relative to RTN3. A 4.7V zener diode in series with a 50Kohm resistor to the 28V can supply the required bias of 4 to 5 V. Five additional digits for board identification are available through onboard DIP switches.

**TABLE 4 – ELECTRICAL SPECIFICATIONS**

PARAMETER	SYMBOL	MIN	NOM	MAX	UNIT
<b>Microcontroller PIC18FXX</b>					
Clock Rate				20	MHz
<b>RS-485 Buss</b>					
Data Rate	R <sub>d</sub>			500	kBps
Response Time Delay After Request for Data	T <sub>resp</sub>			3	mS
Input-Output Isolation (Total)	C <sub>io</sub>			500	pF
Dielectric Withstanding Voltage RS485 & Signal GND to RTN 3	V <sub>dw</sub>			1000	V
Insulation Resistance RS485 & Signal GND to RTN 3 @500Vdc	R <sub>ins</sub>	10			MΩ
<b>Bias Specifications</b>					
BIAS Voltage (Supply 3)	V <sub>3</sub>	18	28	32	V
BIAS Current (Supply 3) (@ nominal 28V in addition to load current)	I <sub>3</sub>			120	mA
BIAS Current (off) (each channel)	I <sub>cc</sub> Standby			TBD	mA
<b>Output Specifications</b>					
Rated Line Voltage (Supply 1 and 2)	V <sub>1</sub> V <sub>2</sub>	18	28	32	Vdc
Rated Load Current Steady State	I <sub>R1</sub> I <sub>R2</sub> I <sub>R3</sub> I <sub>R4</sub>			20 10 10 10	A
Output Leakage Current	I <sub>lk</sub>			1	mA
Output On-Resistance @ Rated Current	R <sub>on</sub>			0.020	Ω
Output Voltage Drop @ Rated Current	V <sub>drop</sub>			0.40	Vdc
Capacitive Load @ Rated Line Voltage with Rated Resistive Load	C <sub>load</sub>			300	uF
Transient Voltage (T=1 sec) Supply 1–3	V <sub>tr</sub>			50	Vdc
Guaranteed No Trip (Hardware Trip Only)	I <sub>carry</sub>			Figure 4	
Guaranteed Trip (Hardware Trip Only)	I <sub>trip</sub>			Figure 4	

**TABLE 4 – ELECTRICAL SPECIFICATIONS**

PARAMETER	SYMBOL	MIN	NOM	MAX	UNIT
<b>Sensors</b>					
Maximum Total Error Load Current Monitor	E <sub>iload</sub>			15*	%
Maximum Total Error Load Voltage Monitor	E <sub>vload</sub>			15	%
Maximum Total Error Board Temperature	E <sub>temp</sub>			20	°C
Maximum Total Error Source Voltage Monitor of Rated Current	E <sub>source</sub>			10	%
<b>Environmental Specifications</b>					
Operating Temperature	T <sub>op</sub>	-40		+85	°C
Storage Temperature	T <sub>stg</sub>	-40		+125	°C

\*15% of rated current

**TABLE 5 – SSPC FUNCTION DEFINITIONS AND REQUIREMENTS**

Each SSPC operates as described in the following paragraphs. Refer to Figure 1 for the functional block diagram and Figure 2 for typical wiring diagram.

Table 6 is the status diagnosis table. In case of SSPC malfunction, a single point failure is assumed for the diagnosis.

Table 7 is the set of commands and responses that the SSPC CCA will be programmed to respond through the dual RS485 ports.

**TABLE 6 - DIAGNOSIS TABLE**

VCTRL	TRIP STATUS	*FLOW STATUS	LOAD STATUS	DIAGNOSIS
0	0	0	0	Normal OFF state
0	0	0 or 1	1	SSPC output short or control section damage
0	1	0 or 1	0	SSPC control section damage
0	1	0 or 1	1	SSPC control section damage
1	0	0	0	SSPC fails to turn on
1	0	1	1	Normal ON state
1	1	0	0	SSPC tripped due to overload or over temperature.
1	1	0 or 1	1	Damaged SSPC

\*Software only

**TABLE 7 – RS485 COMMUNICATIONS DATA**

Command to SSPC CCA	Response from SSPC CCA
Current Limit	Current Limit
Switch Command	Switch Command
	Trip status
	Flow Status (>25% of setting)
	Load Status
	Input Voltage
	Load Current
	Load Voltage
	Switch temperature
Request for ID	Identifier
RS485 port selection	Receiving port
Port timeout	Port timeout

**FIGURE 5 – TRIP CHARACTERISTICS**

