

APPLICATION		REVISION			
NEXTASSEMBLY	USED ON	LTR	DESCRIPTION	DATE	APPROVED
	A600, A500, A500+	A	Specification Release	8-2-91	G. Robbins
		B	Revised per ECO 920128	3/6/92	D. Shannon
		C	Revised per ECO 920266	5/8/92	D. Shannon
		D	Revised per ECO 920452	7/9/92	B. Bartling
		E	Revised per ECO 920466	7/16/92	B. BARTLING

### 1.0 DESCRIPTION

This specification describes the requirements for a 23-watt switching power supply for an Amiga computer system. The power supply shall be a stand-alone device housed in a plastic enclosure. The power supply shall provide regulated outputs of + 5 VDC, + 12 VDC, and - 12 VDC with maximum current outputs of 3.0, 0.5, and 0.1 amperes respectively. The printed circuit board used in the device shall have a fused and electromagnetic interference (EMI) filtered input circuit.

### 1.1 Configuration

The following power supplies shall have standard line cords with strain reliefs, meeting the requirements of the regulatory agencies shown:

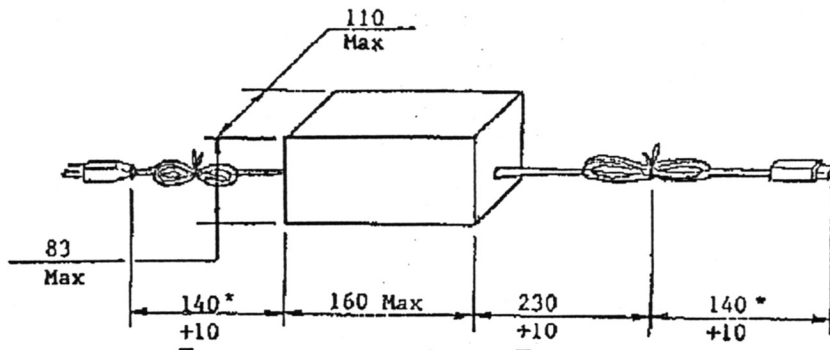
391029-X1 = 120 VAC unit (UL/CSA)	NOTE: X=	0 for cabinet/cable color to be limestone beige.
391029-X2 = 240 VAC unit (BSI)		
391029-X3 = 230 VAC unit (VDE)		1 for cabinet /cable color to be light beige.
391029-X4 = 230 VAC unit (SEV)		
391029-X5 = 240 VAC unit (SAA)		

Refer to Figure 1-1 for external dimensions, and for cable and connector information.

### 1.2 Sources

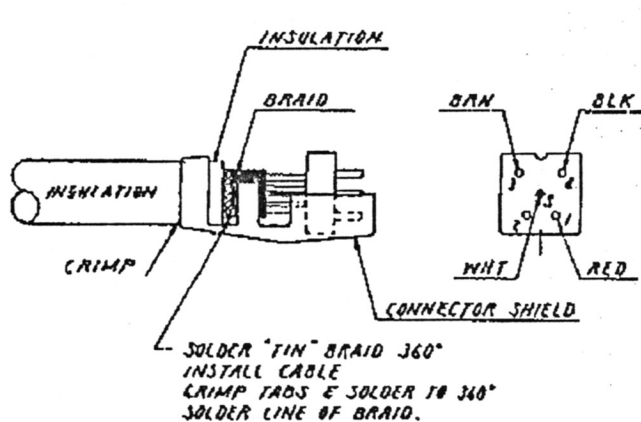
Refer to Approved Vendor List.

Commodore P/N	Status	Commodore P/N	Status		
391029-01	Active	391029-05	Active		
391029-02	Active				
391029-03	Active				
391029-04	Active				
UNLESS OTHERWISE SPECIFIED, DIMENSIONS ARE IN MILLIMETERES. TOLERANCES: ANGLES +/- 1 DEGREE 2 PLACE DECIMALS +/- 0.5 3 PLACE DECIMALS +/- 0.25		DRAWN A. Young	DATE 7-31-91	<h1 style="text-align: center;">Commodore</h1> <p style="text-align: center;">1200 WILSON DRIVE WEST CHESTER, PA. 19380 (215) 431-9100</p>	
		SYSTEM ENGR. Brian Fenimore	DATE 7-31-91		
		TEST ENGR.	DATE		
COPYRIGHT 1991, 1992 COMMODORE ELECTRONICS LTD. INFORMATION CONTAINED HEREIN IS THE UNPUBLISHED AND CONFIDENTIAL PROPERTY OF COMMODORE ELECTRONICS LIMITED. USE, REPRODUCTION, OR DISCLOSURE OF THIS INFORMATION WITHOUT THE PRIOR WRITTEN PERMISSION OF COMMODORE IS STRICTLY PROHIBITED. ALL RIGHTS RESERVED.		COMPONENTS ENGR. D. Shannon	DATE 31JUL91	<b>POWER SUPPLY EXTERNAL</b>	
		CIRCUIT ENGR.	DATE		
		Last revised: 5/6/92		SIZE <b>A</b>	DRAWING NUMBER <b>391029</b>
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\* This is tied length. Total length is 1800 ± 10 mm.

Power Supply Cables



Wire List

PIN	SIGNAL	COLOR	GAUGE
1	+5VDC	RED	18 min.
2	SHIELDED GND		
3	+12VDC	BRN	22 min.
4	SIGNAL GND	BLK	18 min.
5	-12VDC	WHT	22 min.

DC Output Connector

FIGURE 1-1  
External Dimensions, Cables, and Connectors

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## 2.0 ELECTRICAL REQUIREMENTS

2.1	Input parameters	(-01, -11)	(-02, -05)	(-03, -04)	(-12)
		120 VAC	240 VAC	230 VAC	220-260 VAC
2.1.1	AC input voltage range	+/-10%	+10%/-6%	+6%/-10%	+4%/-6%
2.1.2	AC input frequency (+/-3%)	60Hz	50Hz	50Hz	50Hz
2.1.3	Surge protection	6KV, 1.2 x 50µSec., per IEEE Standard 587			
2.1.4	Current surge	50A (worst case, single cycle)			

## 2.2 Auxiliary Output Parameters

2.2.1	Power good signal:	None
2.2.2	Power fail signal:	None
2.2.3	Clock output:	None

## 2.3 DC Output Parameters

2.3.1	Continuous power: (any combination of loads)	Minimum: 4.5 Watts Maximum: 23 Watts	
2.3.2	Output current range	Output	Output current Min.    Max.
		#1 +5 VDC	0.75A. 3.0A.
		#2 +12VDC	0.05A. 0.5A.*
		#3 -12 VDC	0.01A. 0.1A.

\* Startup surge up to 1 amp for 20 mSec., while remaining within regulation requirements (See Section 2.3.10)

2.3.3	Worst case regulation	Output	Regulation
	This parameter includes line, load, initial set point, temperature, drift, cross regulation, and aging effects	#1 +5 VDC	+/-5%
		#2 +12VDC	+/-10%
		#3 -12 VDC	+/-10%

2.3.4	Ripple and Noise	Output	Ripple and Noise, Max.
	Power supply to be set at full load, minimum input conditions	#1 +5 VDC	50mV
		#2 +12VDC	120mV
		#3 -12 VDC	120mV

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2.3.5	Initial setting	Output	Setting
	Power supply to be set to nominal load, measured at the end of the cable	#1 + 5 VDC #2 +12VDC #3 -12 VDC	+/-0.05V N/A N/A
2.3.6	Overcurrent protection <sup>1</sup>	Output	Current
	Power supply to be at minimum load	#1 + 5 VDC #2 +12VDC #3 -12 VDC	8.0 A max. 3.0 A max. <sup>2</sup> 3.0 A max. <sup>2</sup>
2.3.7	Transient response	Output	Time
	Transient must not exceed maximum allowable regulation %	#1 + 5 VDC #2 +12VDC #3 -12 VDC	200 μSec (+/- 2%) 500 μSec (+/- 4%) 500 μSec (+/- 4%)
2.3.8	Overvoltage protection <sup>3</sup>	Output	Setting
		#1 + 5 VDC #2 +12VDC #3 -12 VDC	6.0 VDC - 7.0 VDC max. N/A N/A

**Notes:**

1. See Sections 2.4.2 and 2.3.12 (2).
2. Use of typical 3-terminal regulator overcurrent protection is acceptable. Power limiting may be used for over-current protection:  
The output power limit must be a maximum of 40 Watts.
3. See Sections 2.4.1 and 2.3.12 (2).

2.3.9 Special output considerations

#1 + 5 VDC	None
#2 +12 VDC	Surge of up to 1 amp for 20 mSec
#3 -12 VDC	None

2.3.10 Hold up time

Minimum holdup time shall be 10 mSec (nominal load, nominal line input).

2.3.11 Efficiency

Efficiency shall be 50 % min. at full load.

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### 2.3.12 Reference notes

- (1) Ripple and noise shall be measured at full rated load and shall be the peak-to-peak value combining noise and ripple levels for each output. (Measurements shall be recorded directly at each output connector, with each output bypassed with a 10 $\mu$ F and 0.01 $\mu$ F capacitor.)
- (2) Overcurrent or overvoltage at any output shall cause an immediate and complete power supply shutdown.
- (3) Short circuit between any output(s) and/or ground shall cause the power supply to shut down without damage. Upon removal of the short circuit, the power supply shall resume normal operation.
- (4) Definitions
  - (A) Ripple is defined as power supply fluctuations below 50 KHz.
  - (B) Noise is defined as power supply fluctuations above 50 KHz.

### 2.4 Fault conditions

#### 2.4.1 Overvoltage

Unit shall detect an overvoltage condition within the specified range and either shut down or limit the maximum voltage to within the specified range, then resume normal operation when fault(s) are removed or power is cycled.

#### 2.4.2 Overcurrent or short circuits

Unit shall tolerate an overcurrent condition or short circuit ( $\leq 0.1$  ohm) between any two or any combination of outputs and/or ground for an indefinite duration and shall resume normal operation when fault(s) are removed or power is cycled.

### 3.0 PHYSICAL

#### 3.1 Input line cord

The input line cord shall be strain relieved, for all dash numbers.

#### 3.2 Output cable and connector

The DC output cable shall be strain-relieved, and shall consist of five conductors with copper braid (90% coverage) or foil shielding with drain wire soldered to the connector shield. The DC connector shall be a 5-pin keyed square DIN plug and shall include shielding clamped and soldered to the cable shield. (Refer to Figure 1-1.)

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### 3.3 Line switch

An externally accessible switch (SPST) shall be included in series with AC input.

### 3.4 Fan

Not required.

### 3.5 Convenience receptacle

Not Required.

### 3.6 Line/EMI filter

Units shall conform to pertinent regulatory RFI/EMI requirements.

### 3.7 Line fuse

Unit shall contain protective line fuse as required by applicable regulatory requirements.

### 3.8 Case temperature

Maximum case temperature shall be 60 ° C during normal operation.

### 3.9 Case Material

Case shall be made of ABS thermoplastic (UL 94 V0), such as Cyclic-KJB or equivalent. (See also Section 7.1.1.)

### 3.10 Case color

Case color shall be Commodore limestone beige: 363744-01 for -0X series and light beige: 363744-03 for -1X series.

### 3.11 Cable color

Cable color shall be Commodore limestone beige: 363744-01 for -0X series or light beige: 363744-03 for -1X series. (An alternative color which may be accepted by special waiver from the Commodore qualification engineering group is Commodore dark accent beige: 363744-04.) NOTE: X refers to voltage versions.

### 3.12 Markings

Unit shall be marked on top with the Commodore logo and on the underside with input voltage requirements, output voltages, maximum output power, Commodore 8-digit part number, EIA date code, Commodore Logo, Commodore bar code per specification 310071, safety labels, and regulatory agency logos.

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#### 4.0 ENVIRONMENTAL REQUIREMENTS

Units shall be capable of operation to the requirements of this specification, without failure, operating under the following operating environmental conditions and after exposure to the following storage environments.

- 4.1 Operating temperature 0 ° to 50 ° degrees C
- 4.2 Operating humidity 5% to 95% relative humidity, non-condensing
- 4.3 Operating altitude 0 to 3,000 meters
- 4.4 Storage temperature - 20 ° to +70 ° degrees C
- 4.5 Storage humidity 5% to 95% relative humidity, non-condensing
- 4.6 Storage altitude 0 to 15,000 meters
- 4.7 Shock (non-operational) 30 g's, two 11mSec, 1/2 sinewave shocks in each of six directions
- 4.8 Vibration (non-operational) 5.2 g's per MIL-STD 202, Method 214, 15 minutes in each of three axes (random frequency)

#### 5.0 TRANSPORTATION/PACKAGING

The power supply shall be packaged for shipment in a manner which assures compliance with NSTA standards for drop testing and transportation simulation.

#### 6.0 RELIABILITY

Mean time between failures (MTBF) shall be 50,000 hours min., with 35 ° C ambient air temperature, nominal input line voltage, and power supply loaded to 75% load.

#### 6.1 Demonstrated Mean Time Between Failures (MTBF)

Ten qualification units and periodic production samples will be tested under full load at 50 ° C for 1000 hours. Units shall meet all the performance requirements of this specification, including shock and vibration, after this test is completed.

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## 7.0 SAFETY AND REGULATORY STANDARDS

### 7.1 Safety requirements

- (-01) shall be UL and CSA approved
- (-02) shall be BSI approved
- (-03) shall be VDE approved
- (-04) shall be SEV approved
- (-05) shall be SAA approved

#### 7.1.1 Material Safety

No components containing poly-chlorinated biphenyls (PCBs) or polybromides shall be used in this device.

### 7.2 Electromagnetic interference (EMI) requirements

- (-01) shall conform to the requirements of FCC Part 15, Class B.
- (-02, -03, -04, -05) shall conform to the requirements of FTZ and VDE 0871, Class B.

## 8.0 ENGINEERING CHANGES

No change(s) or alteration(s) which affect the fit, form, function, or reliability of the power supply shall be made without prior written approval from Commodore Engineering. Any change(s) or alteration(s) to the power supply may require the vendor to retest units and/or resubmit them to regulatory agencies for recertification. Change(s) or alteration(s) may require Commodore to retest units to assure compliance with quality standards and UL, CSA, VDE, BSI, SEV, SAA, FCC, and FTZ standards.

## 9.0 DOCUMENTATION

Vendor shall supply all necessary schematic diagrams, assembly drawings, and parts lists for the unit.

Vendor shall notify Commodore of any change(s) or alteration(s) to the power supply prior to implementation. When change(s) or alteration(s) are made to the power supply (with prior approval as required), the vendor shall supply new documentation to Commodore.

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**APPROVED VENDOR LIST**

THIS SHEET MUST BE REMOVED FROM THIS DOCUMENT  
BEFORE THE DOCUMENT IS SHOWN OR TRANSMITTED TO A VENDOR.

<b>Commodore P/N</b>	<b>Vendor</b>	<b>Vendor P/N</b>
391029-01	LITON ELECTRONIC CO.	PB3230-01
391029-02	DYNACOMP LITON ELECTRONIC CO.	DCC253-02 TBD
391029-03	SPEEDY-TECH ELECTRONICS DYNACOMP LITON ELECTRONIC CO.	STP4691-VDE DCC253-03 PE3230-1
391029-04	TBD	TBD
391029-05	SPEEDY-TECH ELECTRONICS DYNACOMP LITON ELECTRONIC CO.	STP4691-5AA DCC253-05 TBD

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