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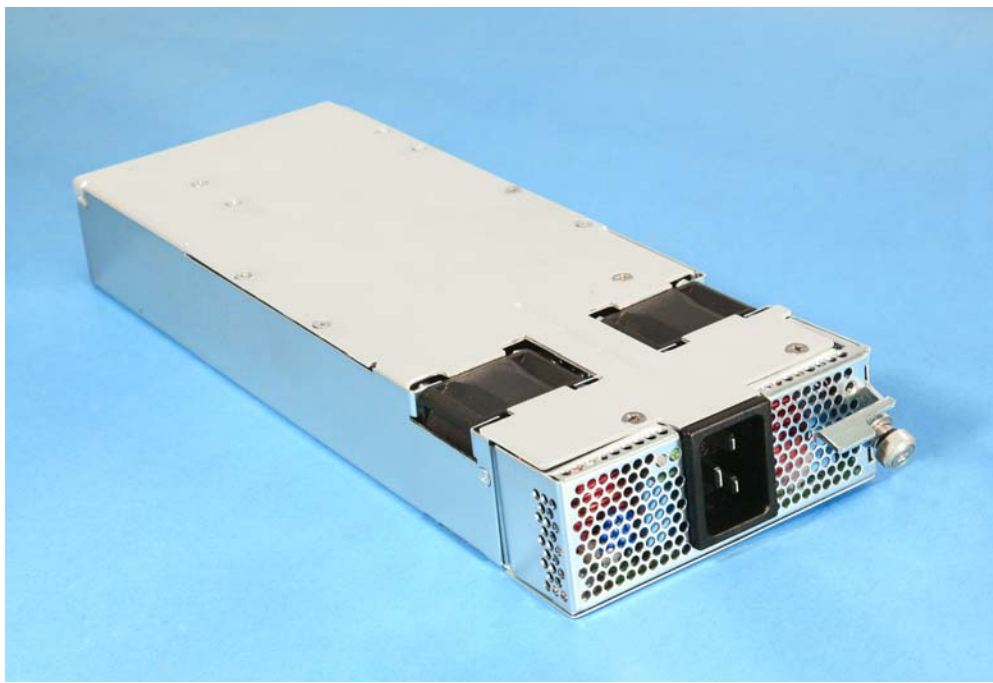
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# **HHL1200 SERIES**

**1200 WATTS, SINGLE OUTPUT**

### **Features:**

- Universal input
- Front-end power supply
- 0.99 line power factor
- High density, 17 W/cu in.
- High efficiency
- Hot Swap-Redundancy.
- Internal Oring MOSFETs
- I<sup>2</sup>C interface status and control
- Extended operating temperature range
- Status LEDs
- Choice of 5V or 12V standby voltage
- Single wire current share



## General Product Specifications:

### -INPUT-

Voltage/Current .....	AC 90-264V, 12.4Arms max, 47-63Hz, 1 Phase.
Fusing .....	AC 15.0A, 250V internal line fuse provided, non-user serviceable.
Power Factor .....	>0.99 line PFC typical at AC 115V, full load.
Inrush Current .....	Thermistor soft start (~25°C cold start). 35 Apk @ AC 115V, 70 Apk @ AC 230V.
Transient Protection .....	Withstands transients as specified by EN61000-4-5 (differential and common mode).
Under Voltage Protection .....	Auto DC output shutdown when AC input falls below safe operating limits ( $\approx$ 80V or 150VAC). Output automatically recovers when AC input rises to within normal operating limits.
EMI Filtering .....	Meets FCC Level A, and EN 55022 Level A.
Efficiency .....	90% typical at AC 230V, full load.
Redundant/Hot Swap .....	Full power N+1 redundant, hot swap capable.

### -OUTPUTS-

Voltage/Current (V/A) .....	V1 <sup>(1)</sup>	V2 Standby <sup>(2)</sup>
<b>HHL1201-2</b>	12.0V @ 100.0A / 83.3A	5.0V @ 2.0A
<b>HHL1201-5</b>	24.0V @ 50.0A / 41.7A	"
<b>HHL1201-6</b>	28.0V @ 42.8A / 35.7A	"
<b>HHL1201-8</b>	48.0V @ 25.0A / 20.8A	"
<b>HHL1201-9</b>	54.0V @ 22.2A / 18.5A	"

- 1) Total loading not to exceed **1200 Watts** at high line (180V-250V), and **1000 Watts** at low line (90V-132V). Outputs also derate linearly above 50°C ambient. See Op. Temp. specification.
- 2) Optional 12V, 1.0A standby output available.

Output Voltage Setpoint .	Factory preset within $\pm 0.2\%$ of nominal voltage.
Line/Load Regulation .....	1% at the sense point over full AC input range and 0 – 100% output loading, with sense leads connected.
Minimum Loading .....	None required.
Stability .....	Output drift $\leq \pm 0.2\%$ after 20 minute warm-up.
Temp. Coefficient .....	$\leq \pm 0.02\%/^{\circ}\text{C}$ , 0° - 50°C, after 20 minute warm-up.
Dynamic Response .....	Less than 5% deviation with a 25% load change at 1A/ $\mu\text{sec}$ , locally sensed. Output recovers to within 1% in less than 500 $\mu\text{sec}$ .
Ripple and Noise (PARD) .....	<1% nominal with a 20 MHz bandwidth limit, measured with a 0.1 $\mu\text{F}$ ceramic capacitor in parallel with a 20 $\mu\text{F}$ tantalum capacitor connected between the measured output and its return at the connector.
Current Sharing/ Parallel N+1 Operation...	Single wire connection. CS Accuracy is $\pm 10\%$ of rated current between any number of units.
Remote Sense .....	Output compensates for up to the lesser of 5% or 1.0V total line drop in the load cables. Output is internally sensed if leads are opened. $\Delta V_o \leq 1V$ .
Output Turn-on Delay .....	<1sec from AC turn-on. <100msec from remote enable.
Over/Under Shoot .....	< 1% at turn-on or turn-off.

Hold-Up Time .....	Output remains in regulation 16mSec <i>minimum</i> following loss of AC power at low line, full load.
Over Current/Short Circuit Protection .....	Standard hiccup mode (cycles on/off) current limit when output current is 110% to 130% of full load.
Over Temperature Protection .....	Internal temperature sensing. Causes output to shut down. Automatic recovery.
Over Voltage Protection .....	Non-crowbar type. V-out exceeding 115% of nominal will cause output to latch off. Remote enable or AC input recycle required to reset.

### -SIGNALS, INDICATORS and CONTROLS-

Remote Enable .....	Enabled by closed circuit or TTL logic 0. Disabled by open circuit or TTL logic 1.
Remote Adjust .....	External 0-5V DC on remote adjust pin referenced to negative sense equals -5% to +5% change of nominal output voltage.
Power Good (DC-OK) Signal .....	High signal when V-out is above 97% of nominal voltage. Signal goes low when V-out drops below 95% of nominal.
Power Fail Warning .....	Loss of input AC causes a TTL compatible signal to go low >4msec prior to any output dropping out of regulation. At AC turn-on, signal stays low until outputs are in regulation.
Indicator LEDs .....	Dual, front mounted. Single-color AC input: Amber indicates power ON. Dual color DC output: green indicates the output is within tolerance, and red indicates an output fault.

### -I<sup>2</sup>C Serial Communication-

Optional. This power supply can be operated as an I <sup>2</sup> C slave device capable of operating up to 100kHz.	
SCL: Driven by the system interface controller and defines the clock interface protocol.	
SDA: Single wire data path.	
A0: Module address selection. Pulled high or low (GND) dependent on system slot used.	
A1: Module address selection. Pulled high or low (GND) dependent on system slot used.	
A2: Module address selection. Pulled high or low (GND) dependent on system slot used.	
I <sup>2</sup> C Monitoring Logic:	
DC-OK:	Output voltage within regulation.
AC-OK:	AC input within safe operating limits.
FAN FAIL:	Monitors fan RPM. Signal goes low if fan speed drops below 35%-55% of nominal.
OVER TEMP:	Early warning signal. Trigger point approximately 10% lower than output shutdown thermal switch.
OVER CUR:	Early warning signal. Trigger point approximately 10% lower than I-Lim trip point.
PS PRES:	Signal indicates power supply installed.
I <sup>2</sup> C Command Logic:	
REM ON/OFF:	Enable or disable DC output. 2 second disable delay.
REM CYCLE:	Cycles output OFF/ON. Output OFF 2.0-2.5 seconds.
The EEPROM is programmed to supply the users system with the following information:	
	- Manufacturers name.
	- Manufacturers model description.
	- Manufacturers internal part number.
	- Construction configuration revision letter code.
	- Unit serial number.
	- Date code WWYY (shipment week/year).
	- Identifies the power supply type as AC.

## -OPERATING ENVIRONMENT-

Operating Temperature... 0 - 50°C ambient at full load. V1 output derates linearly to 60% of full load at 70°C.

Cooling ..... Dual internal, front end mounted DC ball bearing fans provided. Rated 24cfm each. Forward airflow direction is front (AC input) to rear (DC output).

Audible Noise ..... 45dba at 25°C, 110V/220Vac operation. Fan speed adjusts as a function of load and ambient temperature.

Relative Humidity ..... Up to 90% RH, non-condensing.

Operational Vibration ..... 0.75G peak, 5 – 500Hz along three orthogonal axis.

Storage Temperature ..... -40° to 85°C.

Altitude ..... Operating to 10,000 ft. Storage to 30,000 ft.

MTBF ..... Designed for 150,000 hrs at 25°C.

## -INTERCONNECT-

AC Inlet Connector:  
Standard ..... Recessed 3-circuit, IEC 60320/C20 receptacle. User accessible on the front panel.

Output Connector ..... 32 circuit sequential contact, hot pluggable type. 8 power contacts rated 30.0A each, 24 signal contacts rated 3.0A each. UL94V-0 glass filled thermoplastic material, secured to the main circuit board assembly in the rear of the unit. FCI PowerBlade® p/n: 51722-10802400AA. Mates with FCI p/n: 51742 or 51762 series.

**Note:** Use of the specified mating connector is required to insure proper "make/break" sequential contact sequence.

### J6 Output and Signal Connector Type and Pin Functions:

PIN#	FUNCTION
P1-P4	-V1 V1 Return.
P5-P8	+V1 +V1 Output.
U1	V1 ADJ Remote Adjust.
U2	VSB +Standby Output.
U3	-S -Sense Return.
U4,U5	n/c No Connection.
U6	+S +Sense V1.
T1	I-SHR Current Share.
T2	n/c No Connection.
T3	R/EN Remote Enable.
T4	DC-OK Output Power Good.
T5	AC-OK Input Power Good.
T6	-S -Sense Return.
S1,S2,S3	n/c No Connection.
S4	A0 I <sup>2</sup> C Address.
S5	A1 I <sup>2</sup> C Address.
S6	A2 I <sup>2</sup> C Address.
R1,R2,R3	n/c No Connection.
R4	P/S Power Supply Present.
R5	SDA I <sup>2</sup> C Data Path.
R6	SCL I <sup>2</sup> C Clock.

## -MECHANICAL-

Size ..... 4.2" x 1.6" x 11.2"

Weight ..... TBD.

Retaining Latch ..... Side mounted, lever type with positive retaining screw. User accessible on the front panel.

Mounting Orientation ..... Horizontal or vertical at user's option. Requires user to provide appropriate latching point. Refer to mechanical outline drawing.

## -SAFETY-

Designed to comply with the relevant industry standards of the authorities having jurisdiction. Pending JE engineering evaluation of the final design configuration, this model series may be submitted for certification to the U.S. and Canadian Bi-National Standard CSA C22.2 No. 60950 / UL 60950-1, Second (2<sup>nd</sup>) Edition (cULus or cCSAus); and for approval by TUV Product Services to IEC EN60950-1. CE Mark pending final configuration acceptance.

## -LIMITED WARRANTY POLICY-

All Jasper Electronics (JE) standard model power supplies and products are guaranteed to be free of defects in workmanship and materials for a minimum of two (2) years from the date of original shipment, when operated within specification. This warranty applies only to defects that result in a failure to comply or perform to published specifications. Non-standard (custom) power supplies and products may be warranted on an individual basis. The unused portion of this warranty is fully transferable with the original equipment in which the power supply is installed.

ORDERING INFORMATION:

A multi-character option code is required following the base model description to define the required model configuration. Codes added in the following sequence, 1 from each category:

HHL1201-	(1)	(2) -	(3)	(4)	(5)
Base Model.	V1 Output Voltage Code.	Standby Output Voltage.	I <sup>2</sup> C Serial Comm.	-MXXXX Custom Configuration.	RoHS Compliant Model

- Configuration Options -

- Option:

Code:
- (1) V1 Output.....

2 = 12.0V,  
5 = 24.0V,  
6 = 28.0V,  
8 = 48.0V,  
9 = 54.0V.
- (2) Standby Voltage.....

-1 = 5.0V, standard.  
-2 = 12.0V, optional.
- (3) I<sup>2</sup>C Serial Comm. ....

N = Not required.  
I = Included, optional.
- (4) Custom  
Configuration.....

MXXXX: Modified, where XXXX is a factory assigned 4-digit number to identify a user specified configuration. Such models may include special or non-standard features and/or options, or be in a configuration differing sufficiently from the design of the approved similar standard model from which it is derived to require re-evaluation of all or part of the design to insure continuing compliance with all safety requirements. Option code 3 may not be present in the model description as these requirements are generally defined in the user specification documentation on file with the factory. Consult the factory for exact requirements.

Examples: HHL1201-21-IG5  
HHL1201-52-M6341G
- (5) RoHS 6 Compliant .....

G: Jasper products that are fully compliant with the requirements of Directive 2002/95/EC Restrictions of Hazardous Substances (RoHS) are identified with the letter code “G” either included in or adjacent to the model description on the unit labels and related documents (sales orders, etc). All materials, processes and packaging used in the assembly and shipping of this product comply.  
G5: For user determined applications that require the use of lead based solder for component connections to printed circuit boards, specify “G5” for RoHS 5 compliance.

All statements and technical information contained herein are believed by JE to be reliable as of the publication date of this document, but the accuracy or completeness is not guaranteed, and JE reserves the right to change specifications without prior notification. However, every reasonable effort will be made by JE to inform users of JE products of changes to design form, fit or function that may affect the user's applications. JE manufactures a quality product, equal to any available in the marketplace; however, these products are intended to be used in accordance with the specifications described in this catalog. Any use or application that deviates from the stated operating specifications is not recommended and may be unsafe.

Mechanical Outline

(Dimensions in millimeters [inches])

