



JASPER ELECTRONICS

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HHL1500 SERIES

1500 WATTS, SINGLE OUTPUT

Features:

- Universal input
- Front-end power supply
- 0.99 line power factor
- High density, 20 W/cu in.
- High efficiency
- Hot Swap-Redundancy.
- Internal Oring Diodes
- I²C interface status and control
- Status LEDs
- Choice of 5V or 12V standby voltage
- Single wire current share
- cULus, TUV and CE Marked



General Product Specifications:

-INPUT-

Voltage/Current	AC 103-264V, 13.0Arms max, 47-63Hz, 1 Phase.
Fusing	AC 16.0A, 250V internal line fuse provided, non-user serviceable.
Power Factor	>0.99 line PFC typical at AC 230V, full load.
Inrush Current	Thermistor soft start (~25°C cold start). 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 90V AC). Automatic recovery when input is within normal operating range.
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 ⁽¹⁾	V2 Standby ⁽²⁾
HHL1501-8	48.0V @ 31.0A/25.0A	5.0V @ 2.0A
HHL1501-9	54.0V @ 27.5A/22.2A	5.0V @ 2.0A
1) Total loading not to exceed	1500 Watts at high line (180V-264V), and 1200 Watts at low line (103V-132V). Outputs also derate linearly above 40°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%/°C, 0° - 50°C, after 20 minute warm-up.	
Dynamic Response	Less than 5% deviation with a 25% load change at 1A/ μ sec, locally sensed. Output recovers to within 1% in less than 500 μ sec.	
Ripple and Noise (PARD)	$<$ 1% nominal with a 20 MHz bandwidth limit, measured with a 0.1 μ F ceramic capacitor in parallel with a 20 μ 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 5% or 1V whichever is smaller total line drop in the load cables. Output is internally sensed if leads are opened. Δ Vo \leq 2.5V.	
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 Temperature Protection	Internal temperature sensing. Causes output to shut down. Automatic recovery.
Over Current/Short Circuit Protection	Standard hiccup mode (cycles on/off) current limit when output current is 105% to 115% of full load.
Over Voltage Protection	Non-crowbar type. V-out exceeding 110% max. 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 or off indicates an output fault.

-I²C Serial Communication-

Optional. This power supply can be operated as an I ² 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 ² 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 ² 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 will identify the power supply type as AC.

-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.

-OPERATING ENVIRONMENT-

Operating Temperature.. 0 - 40°C ambient at full load. V1 output derates linearly to 50% of full load at 70°C.

Cooling Internal front panel mounted, dual DC ball bearing fans provided. CFM rating TBD. Forward airflow direction is front to rear.

Audible Noise 50dba at 25°C, 230VAC 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 320/C14 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.

Notes: Use of the specified mating connector is required to insure proper "make/break" sequential contact sequence. When standard AC input configuration selected, optional Line and Neutral pluggable connections are still present but disabled.

Input/Output and Signal Connector Type and Pin

Functions:

<u>PIN#</u>	<u>FUNCTION</u>
01-04	-V1 V1 Return.
05-08	+V1 +V1 Output.
09	V1 ADJ Remote Adjust.
10	I-SHR Current Share.
11	n/c No Connection.
12	VSB +Standby Output.
13-16	n/c No Connection.
17	R/EN Remote Enable.
18-20	n/c No Connection.
21	DC-OK Output Power Good.
22	A0 I ² C Address.
23	P/S Power Supply Present.
24	n/c No Connection.
25	AC-OK Input Power Good.
26	A1 I ² C Address.
27	SDA I ² C Data Path.
28	+S +Sense V1.
29	n/c No Connection.
30	A2 I ² C Address.
31	SCL I ² C Clock.
32	-S -Sense Return..

-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, First (1st) Edition (cULus or cCSAus); and for approval by TUV Product Services to IEC EN60950. 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:

HHL1501-	(1)	(2)-	(3)	(4)	(5)
Base Model.	V1 Output Voltage Code.	Standby Output Voltage.	I ² C Serial Comm.	-MXXXX Custom Configuration.	RoHS Compliant Model

- Configuration Options -

Option:

Code:

- (1) V1 Output 8 = 48.0V,
9 = 54.0V,
- (2) Standby Voltage..... -1 = 5.0V, standard.
-2 = 12.0V, optional.
- (3) I²C Serial
Comm..... Blank = 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 this requirement is generally defined in the user specification documentation on file with the factory. Consult the factory for exact requirements.
- (5) RoHS 6 CompliantG: 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.

Examples: HHL1501-81-G
HHL1501-82-IG5
HHL1501-8-M6341G

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Mechanical Outline

(Dimensions in millimeters [inches])

