

Loranger SmartSocket

WHAT IT IS... The SmartSocket™ consists of a base socket and cover design for any package along with a combination of components to monitor and control the temperature of each individual device package during burn-in.

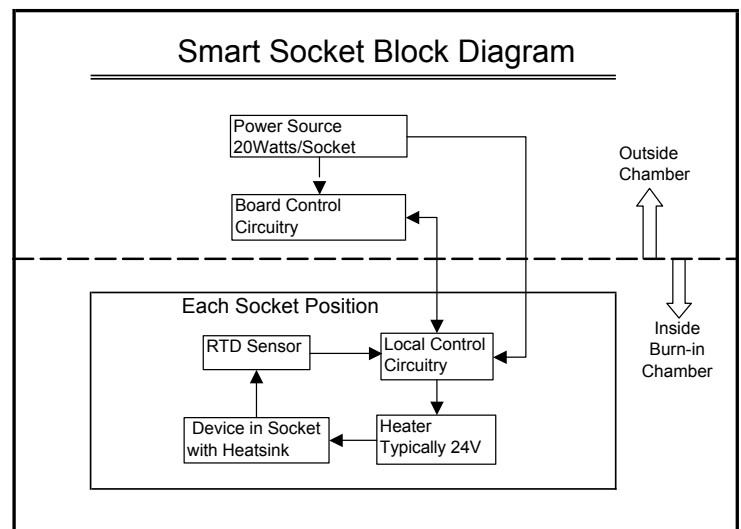
HOW IT WORKS... A temperature setpoint for the heater control is programmed by the user using Loranger software. If a device under burn-in has diode input/outputs, the SmartSocket™ can monitor the diode output, instead of the RTD, to control the heater output and maintain a given temperature setpoint.

DESIGN FEATURES...

- SmartSockets are available with a combination of an RTD temperature sensor, heater, heatsink, and control circuitry within the socket.
- Heaters and RTDs without control circuitry are optionally available for connection to customer-supplied monitoring and controlling equipment.
- Forward voltage drop monitoring of the DUT's diodes (when accessible) can be used to monitor the junction temperature and control the heater within the SmartSocket™.
- Loranger Software can be used to set and monitor the temperature of each socket.
- Compensates for varying DUT output wattages in the same chamber to achieve a consistent burn-in temperature for each socket.
- Lower chamber temperatures achieved while maintaining a given package temperature.



Loranger Smart Socket
with Control Circuitry



“Your Complete Burn-in Source for Sockets, Boards and Systems”

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Loranger SmartSocket

FEATURES

- Individual Temperature Monitor/Controller embedded on each socket.
- Heater wattage outputs can be customized for customer applications. Typical heater cartridges are 24V at 20 Watts.
- Electronics located on the heat sink are rated to operate to 125°C ambient temperature. (The setpoint for the temperature reading within the socket can be higher than 125°C. The requirement is that the air outside the socket around the electronics is less than or equal to 125°C.)
- Overall accuracy of the measured temperature is $\pm 2^{\circ}\text{C}$.
- Overshoot/undershoot of temperature setpoint controller is $\pm 1^{\circ}\text{C}$.
- The SmartSocket™ has four connections, including +24V. Interface to burn-in board can be by plunger pins or wire leads.
- Up to 100 SmartSockets™ can be bussed together on a burn-in board before additional electronic switching hardware would be required. Switching hardware could be on the burn-in board or back plane board.
- SmartSocket™ software is installed on the connecting PC to program the temperature setpoint of each socket and monitor the sockets. Once programmed, the PC does not actually need to be connected to the socket for the socket to operate.
- A SmartCable™ is used to connect the SmartSocket™ to a Serial Port of a PC for setting temperature setpoint and reading of the temperature data. For PC's without a standard Serial Port, a USB to Serial Adapter can be used to connect the SmartSocket™ to a USB port.
- The four electrical connections required by each SmartSocket™ are 24VDC input, 24VDC return, Clock, and Data. All four of these can be bussed on the burn-in board, meaning that all 24VDC inputs can be tied together, 24VDC returns can be tied together, Clock lines can be tied together, and Data lines can be tied together. However, because of the high currents required by the 24VDC input and return lines, care must be taken that edgefinders or other input connections to the burn-in board do not have their current ratings exceeded. For example, a typical edgefinder is rated to at most 5 Amps current. So if 20 SmartSockets™ each drawing 0.9 Amps are on one board, then at least 4 edgefinders would be required for the 24VDC input and at least 4 edgefinders would be required for the 24VDC return. Since Clock and Data lines are low current, each needs only a single edgefinder or connector contact.



**Loranger Smart Socket
with heater and
temperature sensor for
external control**



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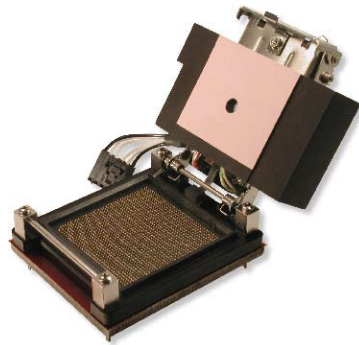
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Loranger SmartSocket Specifications

FEATURE	Loranger SmartSocket
Input Power	16 - 25 Volts DC (nominal 24V); Other DC voltages possible with component changes.
Temperature Range	Software capable of 0C to +160C but temperature of package determined by Burn-in System Environment. RTD and Heater are rated to 200C. Other electronic components on SmartSocket are rated to 125C.
Output Power to Control Load	Pulse Width Modulated (PWM) using 24VDC at 20 to 80 Watts (0.83 to 3.33 Amps). Other DC voltages possible.
Load Type	Resistive Heater(s) located in the base of the heat sink.
Displayability and Settability	1 C
Overshoot/Undershoot	+/-1C
Accuracy	+/-2C
End User Calibration	Both offset and gain (span) adjustments.
Basic Control Algorithm	Proportional/Integral (PI) – Proportional Band is +/- 2C
Sensor	100 Ohm Platinum RTD located at the tip of the heat pipe near the device; Internal package Diode optional
Interface to Burn-in Board	Four connections (Data, Clock, 24V, Common) by plunger contacts or wire leads. Connections on burn-in board from multiple SmartSockets can be bussed together.
Mechanical Mounting	Smart Socket Circuitry on PC Board (0.45" x 0.8" x 1.78") is attached via standoffs and screws to socket heatsink. Other arrangements are possible.
PC Computer Control	Through Software Application
PC Computer Interface	Through RS-232 port with SmartCable.
Addressability	Each SmartSocket has identifying number/address from 1 to 100. Software allows user to change socket number.
SmartSockets per PC	Up to 100; More than 100 with Additional Electronic Switching Hardware/Software
SmartSockets per Power Supply	Determined by Wattage per Socket and Size of Power Supply.
Datalogging	Temperature data from all SmartSockets logged to PC disk at user set interval. Graphs of temperature can be displayed on monitor.



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