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**BIST REFERENCES**

D9 CAL CONNECTOR P3

MUX

BIST REF

POWER SUPPLIES

**SHEETS**

1 BLOCK DIAGRAM	17 CHANNEL 15
2 CHANNEL 0	18 BIST
3 CHANNEL 1	19 BIST ADC
4 CHANNEL 2	20 RELAY & ADC DRIVERS
5 CHANNEL 3	21 VOLTAGE REFERENCES
6 CHANNEL 4	22 FPGA 1
7 CHANNEL 5	23 FPGA 2
8 CHANNEL 6	24 FPGA 3
9 CHANNEL 7	25 CPU DATA & FLASH
10 CHANNEL 8	26 CPU MEMORY BUS
11 CHANNEL 9	27 CPU/FPGA POWER
12 CHANNEL 10	28 VME BUS 1
13 CHANNEL 11	29 VME BUS 2
14 CHANNEL 12	30 VME P2 CONNECTOR
15 CHANNEL 13	31 POWER SUPPLIES
16 CHANNEL 14	

**BLOCK DIAGRAM**

CHANNEL CONNECTORS J1, J2

RTD

E+

S+

S-

E-

GND

GND

ISRC

24 BIT ADC

IN+

REF

IN-

VREF

FPGA

DATA

CONFIG

SPI1

VME INTERFACE

VME P1

VME P2

BIST BUS

4

1 CHANNEL OF 16

BIST RELAY

16

POWER SUPPLIES CHECK

BIST ADC

VREF

BOOT/CONFIG FLASH

CALIBRATION FLASH

ARM PROCESSOR

LED

SPI0

SPI1

RELAY DRIVERS

RS232 INTERFACE

P4

UNMARKED PARTS ARE 0603

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ENGINEER J LARKIN	DATE 12/30/14	HIGHLAND TECHNOLOGY INC.	
DRAWN L LARKIN	12/30/14	SCHEMATIC, V410	
CHECKED		RESISTANCE MEASUREMENT MODULE	
APPROVED		DRAWING NO: 22S410	
RELEASED		REV: B	
SHEET: 1 OF 31		FILENAME: 22S410B.SCH	

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BLOCK DIAGRAM

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Detailed description of the Block Diagram:

- Channel Connectors J1, J2:** Provide inputs E+, S+, S-, E- to the 24-bit ADC. S+ and S- are connected to RTD sensors.
- RTD:** Resistance Temperature Detector sensors.
- 24 BIT ADC:** Receives inputs from channel connectors and provides output to the FPGA. Includes ISRC and REF pins.
- BIST RELAY:** Controlled by the 24-bit ADC, it switches the input to the BIST ADC.
- BIST ADC:** Performs Built-In Self Test measurements, receiving VREF and feedback from the BIST relay.
- D9 CAL CONNECTOR P3:** Provides calibration inputs to the BIST MUX.
- MUX:** Multiplexer for BIST references, controlled by the BIST bus.
- BIST REFERENCES:** Provided by the MUX to the BIST ADC.
- POWER SUPPLIES:** Supply power to the system, connected to the VME interface and the BIST ADC.
- FPGA:** Central processing unit handling DATA and CONFIG signals, interfaced via SPI1 to the ARM processor.
- VME INTERFACE:** Manages VME P1 and VME P2 connections.
- ARM PROCESSOR:** Controls the system, interfaced via SPI0 to the BOOT/CONFIG FLASH and SPI1 to the CALIBRATION FLASH and RELAY DRIVERS.
- LED:** Status indicator for the system.
- RELAY DRIVERS:** Control the BIST relay based on commands from the ARM processor.
- RS232 INTERFACE:** Provides serial communication through port P4.
- BOOT/CONFIG FLASH:** Stores initial configuration data for the ARM processor.
- CALIBRATION FLASH:** Stores calibration data for the measurement channels.

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**Block Diagram Description:**

- Channel Connectors (J1, J2):** Provide input to the 24-bit ADC via E+, S+, S-, and E- terminals. S+ and S- are connected to the IN+ and IN- of the 24-bit ADC. E+ and E- are connected to the ISRC and BIST RELAY respectively.
- BIST RELAY:** A relay controlled by the BIST RELAY input, connected to the BIST RELAY output of the 24-bit ADC.
- 24-bit ADC:** Receives input from the channel connectors and outputs to the FPGA. It also has a REF input connected to VREF.
- FPGA:** Receives input from the 24-bit ADC and outputs to the VME INTERFACE. It also has a DATA output connected to the ARM PROCESSOR.
- VME INTERFACE:** Connects the FPGA to the VME P1 and VME P2 connectors.
- ARM PROCESSOR:** Receives input from the FPGA and outputs to the RELAY DRIVERS and RS232 INTERFACE. It also has a SPI0 output connected to the BOOT/CONFIG FLASH and a SPI1 output connected to the CALIBRATION FLASH.
- RELAY DRIVERS:** Receive input from the ARM PROCESSOR and output to the RELAY DRIVERS.
- RS232 INTERFACE:** Connects the ARM PROCESSOR to the P4 connector.
- POWER SUPPLIES:** Provide power to the BIST ADC, BOOT/CONFIG FLASH, CALIBRATION FLASH, and the VME INTERFACE.
- BIST ADC:** Receives input from the POWER SUPPLIES and outputs to the BIST ADC.
- BOOT/CONFIG FLASH:** Receives input from the ARM PROCESSOR and outputs to the ARM PROCESSOR.
- CALIBRATION FLASH:** Receives input from the ARM PROCESSOR and outputs to the ARM PROCESSOR.
- LED:** Connected to the ARM PROCESSOR.
- Legend:**
  - 1 BLOCK DIAGRAM
  - 2 CHANNEL 0
  - 3 CHANNEL 1
  - 4 CHANNEL 2
  - 5 CHANNEL 3
  - 6 CHANNEL 4
  - 7 CHANNEL 5
  - 8 CHANNEL 6
  - 9 CHANNEL 7
  - 10 CHANNEL 8
  - 11 CHANNEL 9
  - 12 CHANNEL 10
  - 13 CHANNEL 11
  - 14 CHANNEL 12
  - 15 CHANNEL 13
  - 16 CHANNEL 14
  - 17 CHANNEL 15
  - 18 BIST
  - 19 BIST ADC
  - 20 RELAY & ADC DRIVERS
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  - 31 POWER SUPPLIES

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