Jupiter EVM Getting Started

Rev C01 : 05/17/2007

.

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1 Introduction

Congratulations on your purchase of a Elevate Semiconductor Jupiter EVM evaluation system. You will find that it serves as an invaluable development platform to help get your product to market in the shortest possible time. The Jupiter EVM and Graphical User Interface (GUI) allow the customer to demonstrate and evaluate the Jupiter performance and functionality.

This document provides the instructions to install, setup, and operate the Jupiter EVM. Refer to the ***Elevate Semiconductor EVM User's Guide*** for a detailed description of the EVM system.

1.1 Unpacking - Jupiter EVM Contents

Please check the contents of the Jupiter EVM shipping carton to make sure you have received all of the items listed in Table 1. The system is already configured for the best setup, except for connections to the power supply, PC controller, and test equipment.

Table 1: Jupiter EVM Contents

Qty	Description
1 ea.	Jupiter EVM System (3 boards)
1 ea.	Jupiter EVM Getting Started (this document)
1 ea.	CD Contents List
1 ea.	Elevate Semiconductor User Interface Program Installation CD
1 ea.	DB25M-DB25M, 6 Foot Parallel Port Cable

1.2 Recommended Test and Measurement Setup

1.2.1 Power Supply

Table 2 provides the required power supplies and current rating. The power supplies are connected using standard banana plugs. The customer needs to provide the power supply cables.

It is recommended to use a triple supply to control the EVM supplies. This allows the 3 EVM supplies to be turned on at the same time. However, if this is not feasible, then the supplies should be enabled in the following sequence. Power down should be performed in the reverse order.

1. +20V
2. -15V
3. +5V

The Jupiter VCC, VCC_OUT and VEE are gated using an Opto-FET switch on the loadboard so it is safe to set and enable the Jupiter supplies before powering up the EVM and running the software.

Table 2: Power Supply Requirements

Module	Supply	Current Rating
Motherboard	+20V (1)	0.5 A
Motherboard	+5V	0.5 A
Motherboard	-15V	0.5 A
Jupiter VCC/VCC_OUT	+16V (2, 3)	2.0 A (4)
Jupiter VEE	-5V (2, 3)	2.0 A (4)

Notes:

1) The EVM +20V could also be used as the Jupiter VCC
2) Once the EVM operation is verified, the customer can adjust the VCC, VCCO, VEE supplies
3) The Jupiter VCC – VEE voltage should not exceed 34V. Refer to the ABS max section in the datasheet.
4) The VCC, VCC_OUT, and VEE current requirements are assuming a Master and Slave device is present. If only the Master is present, then a 1 Amp supply is adequate. The program does not have the ability to measure the Jupiter VCC and VEE currents

1.2.2 PC Controller

To use the Jupiter EVM User Interface Program (UIP), a PC with the following configuration is required:

- Win98, Win2000, WinNT 4.0+, or Win XP
- Parallel/Printer Port – 25-pin female connector (a parallel port cable is provided)

1.2.3 DMM or Source Measurement Unit

- Voltage and/or Current Meter
- Voltage and/or Current Source

1.3 Software Installation

There are 2 steps to install the Jupiter EVM demonstration program.

1. Install the Jupiter EVM UIP from the CD-ROM.
2. Install the parallel port driver (ParPort2k).

Figure 1 illustrates the default directory structure. The user may change the <root dir> during the installation.

Figure 1: Installation Directory Structure

```
<Root Dir>\Planet ATE\EVM\ EVM GUI
                          Documents (several folders)
                          ParPort2k
```

1.3.1 Jupiter EVM UIP Installation

To install the Jupiter EVM software package, run the SETUP program on the distribution CD and follow the prompts. The **PlanetATE.exe** executable will be installed in the ***EVM GUI*** sub-directory. In addition, a short cut will be installed onto the desktop and in the **Start->Programs** folder. The **Start->Programs** folder also contains links to the different product datasheets, EVM User's Guide, and documentation folder.

1.3.2 Parallel Port (ParPort2K) Installation

To install the ParPort2K parallel port driver, run the **setup.exe** from the ***ParPort2k*** sub-directory after the main installation is complete and click the **Install** button. For WinNT users, the user must have administration rights.

Note: ParPort2k is a copyright of Zeecube Software.

1.3.3 Reboot Machine

After the Jupiter EVM and Parallel Port software is installed, it is recommended to re-boot the machine.

1.3.4 Launching the Elevate Semiconductor Program

The user can launch the Elevate Semiconductor GUI from the **Desktop**, **Start->Programs** folder, or ***EVM GUI*** sub-directory.

1.3.5 Software Un-Installation

The Elevate Semiconductor demonstration program may be un-installed using the **Add/Remove Program** from the Windows Control Panel.

2 Getting Started

The Jupiter EVM is shipped in a pre-configured state that allows a customer to evaluate the DPS Force Voltage (FV), Force Current (FI), and Ganging.

Note: Any external equipment providing digital signals into the Jupiter device should only be enabled after the Jupiter EVM is enabled. Also, the external equipment should be disabled prior to disabling the Jupiter EVM.

2.1 Caution

Jupiter is a high voltage DUT Power Supply (DPS) capable of delivering several amps of current. Configuring the Jupiter device and EVM into an extremely high power condition could cause permanent damage to the Jupiter device, EVM components and/or external equipment.

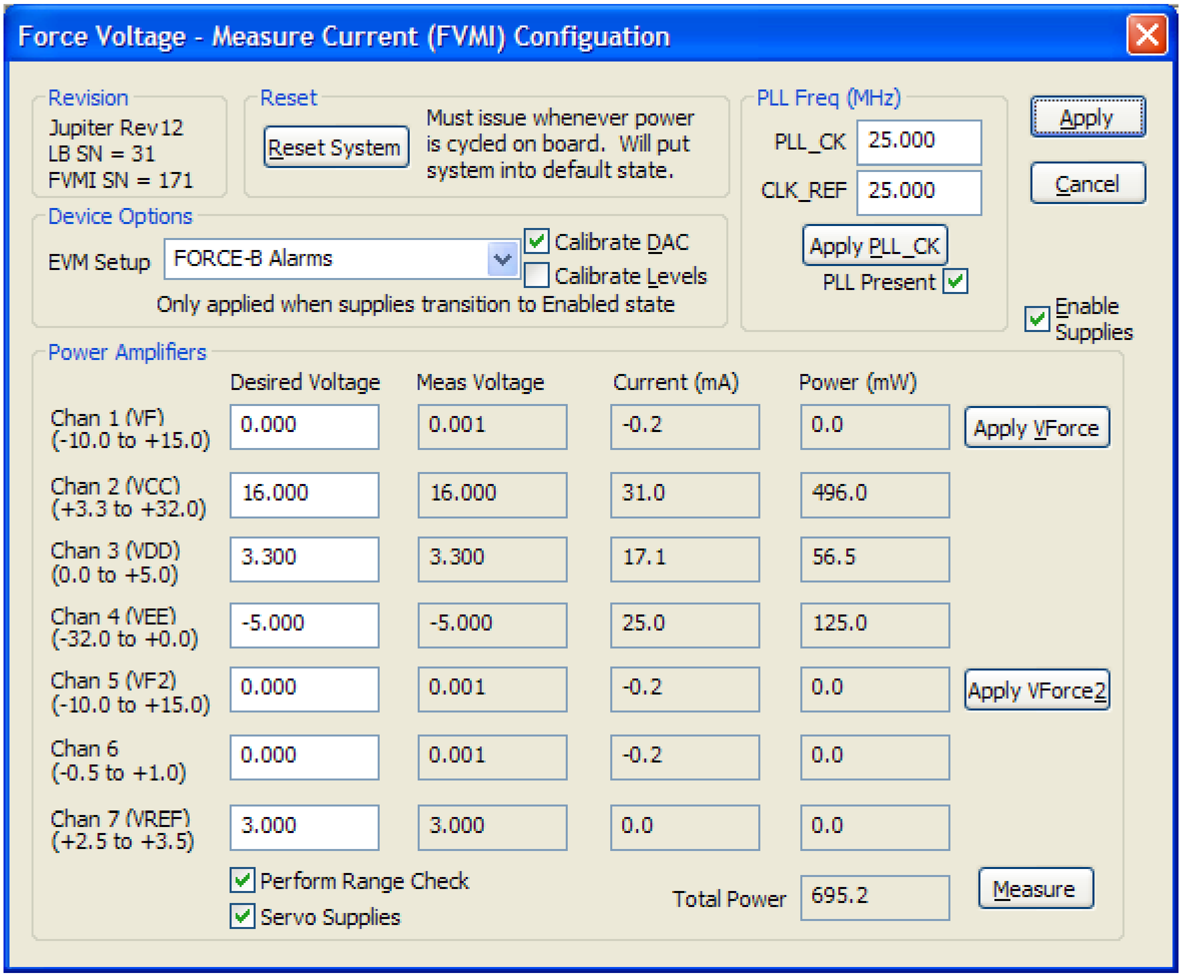
2.2 Jupiter Loadboard Rev B versus Rev C+

There are 2 different loadboard revisions; Rev B and Rev C+. This document focuses on the Rev C+ loadboard; refer to Section 3 for details. Refer to previous document revisions when using the Rev B loadboard. The software supports both loadboard revisions.

2.3 Quick Start Instructions

1. Disable external power supply
2. Connect the power supplies cables (not provided) from the power supply to the Elevate Semiconductor EVM Motherboard and Jupiter loadboard; refer to Figure 3.
3. Connect the parallel cable (provided) from the PC to J2 on the Octal FVMI board.
4. Connect the EVM to any external equipment; refer to Section 2.4.
5. Setup Motherboard Jumpers; refer to Section 2.5
6. Set external power supply voltages and current limits.
7. Enable external power supply.
8. Run the Elevate Semiconductor GUI software; refer to Section 1.3.4 for details.
9. At the Force Voltage – Measure Current dialog box (refer to Figure 2 below):
    a. Select the **EVM Setup** option based on the desired configuration, see Section 2.4
    b. Select the **Enable Supplies** check box
    c. Hit the **Apply** button to power up the Jupiter device.
    d. The software will also measure the current consumption. Figure 2 illustrates the expected current readings.
10. At this point, the Jupiter should be outputting the desired signal.

Figure 2: Expected Current Readings



The **Reset System** will put the EVM and Jupiter device into the default state. The **Reset System** should be issued whenever the power supply is powered OFF then ON. The **Reset System** is automatically performed when the program is initially launched.

2.4 Default Configuration Setup Options

The EVM has several default options for configuring for device and loadboard.

Table 3: Jupiter Default Configuration Options

Mode	See Section #	Brief Description
Hardware Reset	N/A	All registers default to the hardware default state. Note: Output is always present on FORCE_A. Sel-Force=GND
Three-State (High-Z)	N/A	Puts DPS in three-state (high-Z). Opens all switches. Note: Output is always present on FORCE_A. Sel-Force=GND
FV out FORCE-A with Alarms	2.4.2	FV mode with Alarms enabled. Connect DPS output to TEST_NODE via FORCE_A. VF0= 3.0V.
FV out FORCE-B with Alarms	2.4.2 (default)	FV mode with Alarms enabled. Connect DPS output to TEST_NODE via FORCE_B. VF0= 3.0V. Note: Output is always present on FORCE_A.
Ganging	2.4.3	Master (U1) placed into FV mode with Remote Sense. Slave (U2) placed into FI mode using Master's MI as reference. Master/Slave use FORCE-B output connected to TEST_NODE. Alarms are enabled. IR=512mA.
External DAC (FV Mode)	2.4.2	Bypass the internal DAC and use the FVMI resources as inputs into Gang2/Gang3. FV mode with Alarms enabled. Connect DPS output to TEST_NODE via FORCE_B. VFORCE2=1.5V, VFORCE=0V

Default: applies to all software configurations

- Loadboard: Jumpers E2, E4, and E7 are installed
- Jupiter: CPU-En = 1 and Local-Sense* = 1
- Jupiter: Monitor Enabled, Sel-MV = MV
- Jupiter: Iclamps = +/-700mA. Vclamps = 14V/-2V (but disabled)
- Jupiter: COMP_A, COMP_B, and External CAP_SR connected and SR-Adj = 15

FORCE-A default configuration

- Loadboard: FORCE_A is connected to TEST_NODE (Con-FA-TN)
- Loadboard: SENSE pin is connected to TEST_NODE (Con-Sense-TN)
- Jupiter: Sel-FB (feedback) = FORCE_A
- Jupiter: Con-FA-FB switch = open

FORCE-B default configuration

- Loadboard: FORCE_B is connected to TEST_NODE (Con-FB-TN)
- Loadboard: SENSE pin is connected to TEST_NODE (Con-Sense-TN)
- Jupiter: Sel-FB (feedback) = FORCE_B
- Jupiter: Con-FA-FB switch = closed

FORCE-A/B with Alarms configuration
The device is configured to automatically shut down if an Over Temperature alarm fault is detected

- Over Tempature enabled and set to code=4 (approximately 116'C)
- IClamp Alarm enabled but not routed to Global Alarm (won't shut down DPS)
- Sel-Con-FA-FB = 1 (use On-Chip-En)
- Sel-DPS-En = 1 (use Global-Alarm)
- For FORCE-A, the DPS_EN is used to control the FORCE_A to TEST_NODE relay

Note: the alarms are setup to latch the fault condition. To remove the fault, issue the appropriate 'reset' in the ***Jupiter Configuration*** dialog box. Use the LEDs or ReadBack to determine which alarm tripped.

2.4.1 Remote Sense Option

Extreme caution should be used when configuring the feedback (SENSE) path to ensure the DPS does not become open loop. The Jupiter device has 2 output pin options (FORCE-A or FORCE-B) and internal mux options. The Loadboard has several jumper and switch options to directly connect to the FORCE-A/B pin or to connect to the TEST_NODE.

Note: To put the Jupiter device in remote sense, after selecting the FORCE-A or FORCE-B configuration option then change the 'CPU-Sel-FB' option to SENSE

2.4.2 General DPS Configurations

Figure 3 illustrates the recommended configuration for Jupiter EVM evaluation. After the configuration is completed, use the **Jupiter->DPS Levels** dialog box the change the Jupiter output levels. Use the **Jupiter Loadboard** dialog box to connect to the on-board resistor network and/or capacitive load.

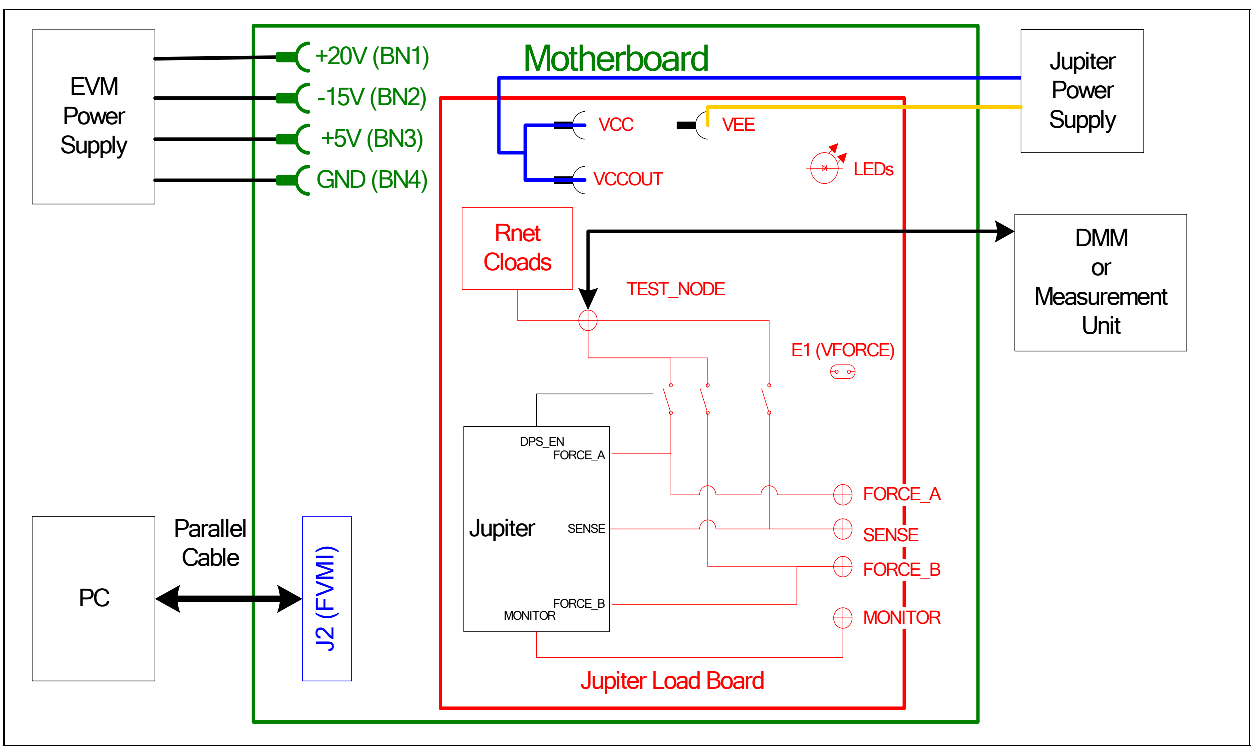
For the External DAC mode, jumper E1 must be installed. The VFORCE2 voltage is connected to the Gang2 (V+) input and the VFORCE voltage is connected to the Gang3 (V-) input. Use the **EVM->FVMI (DPS) Config** dialog box to change the VFORCE and VFORCE2 voltage values.

If using an external measurement unit (MU), the MU should be configured in the opposite mode as Jupiter.

Jupiter	MU
FVMI	FIMV
FIMV	FVMI

Important note: the FORCE_A is always connected to the high power op-amp stage and can not be put into HiZ (disabled). Therefore when using the FORCE_A option, it is recommended to connect any load to the TEST_NODE SMA so the Con-FA-TN relay can be opened in the event of an alarm condition.

Figure 3: Jupiter EVM Simplified Block Diagram



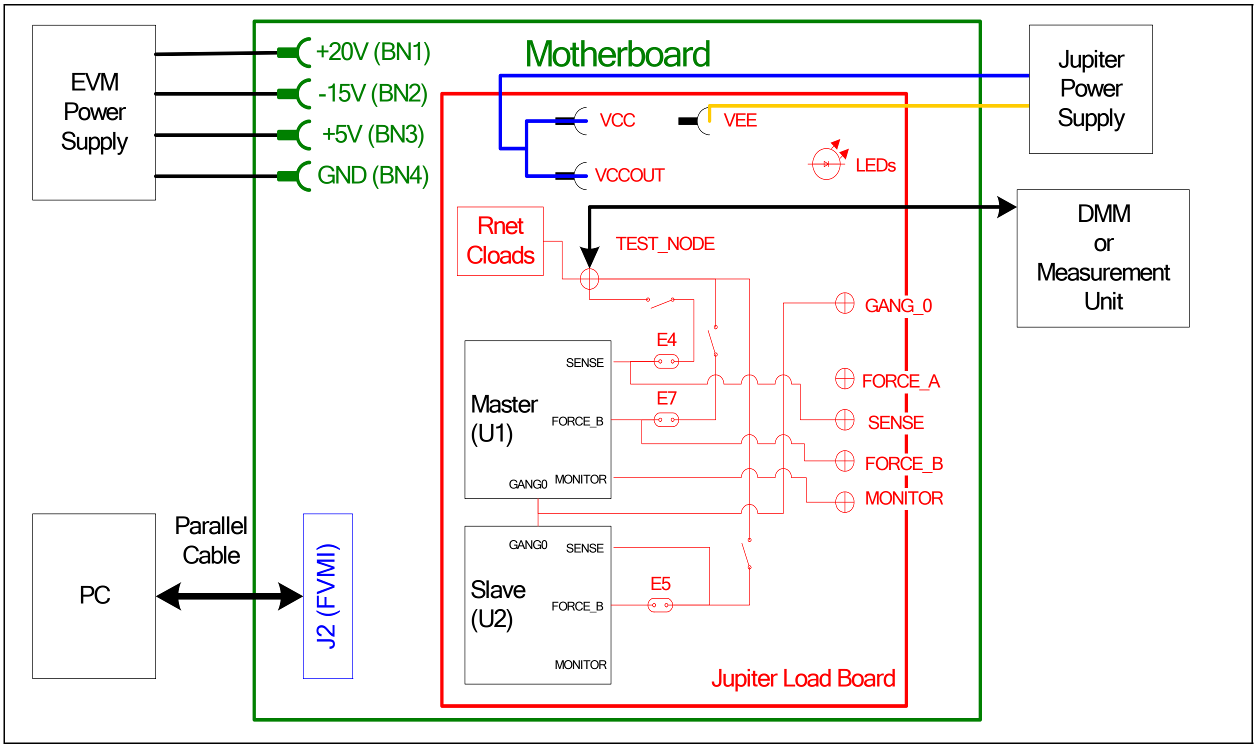
2.4.3 Ganging (Merging) Configuration

Figure 4 illustrates the recommended configuration for the ganging application. The Master (U1) is configured in FV mode in Remote Sense while the Slave (U2) is configured in FI mode. The Master and Slave both use the FORCE_B output pin which allows for internal alarm shut down. The Master and Slave are connected to the TEST_NODE SMA via the loadboard relays and 2-pin jumpers (E7 for Master and E5 for Slave). The E4 jumper must also be installed which provides the SENSE return path. The GANG_0 node is used to provide the Master MI signal to the Slave device.

The loadboard SLAVE_EN (CBit4) control bit is used to completely isolate and/or connect the Slave device supplies. The Slave device has the VCC and VCCO power pins tied together therefore the user should tie the Master (main) VCC and VCCOUT together. The Slave shares the Master's CPU_CK and SDIO signals while the Master and Slave have dedicated STB and RESET signals. The Slave's input signals are tied low so there is no real-time control. The Slave's Alarm is connected to an LED. The Slave's CBit outputs are not connected. The Slave's MONITOR and TJ pins are accessible by the A/D on the FVMI board; these results can be found in the ***EVM Config->FVMI Measure*** dialog box.

Note: The hardware supports Ganging via the FORCE_A pins; however, the software does not have a default configuration for using FORCE_A.

Figure 4: Jupiter EVM Ganging Configuration Simplified Block Diagram



2.5 Jupiter Loadboard Jumper Definitions

Table 5 lists the Jupiter Loadboard Jumper definitions. These jumpers provide different remote sense options, the ability to isolate analog pins for low current leakage measurements, and other test options.

Important Note: Extreme caution should be used when configuring for different feedback options. Always ensure there is a proper feedback so the DPS op-amp isn't open loop.

Table 4: Jupiter Loadboard Jumper Definitions

Jumper	Description	Default Configuration
E1	Connect VFORCE	Installed (for ExtDAC)
E2	FORCE_A to TEST_NODE	Installed
E3	FORCE_A to SENSE	Open
E4	SENSE to TEST_NODE	Installed
E5	Slave FORCE_B to TEST_NODE	Installed (for Ganging)
E7	FORCE_B to TEST_NODE	Installed
E8	FORCE_B to SENSE	Open
E9	Use DPS_EN to control FORCE_A select switch	Installed
E10	Use EVM Latch to control FORCE_A select switch	Open
E11	Slave FORCE_A to TEST_NODE	Open
E12	Fan PWR	TBD
E13	Fan PWR	TBD

2.6 Motherboard Jumper and SMA Definition

Table 5 lists the Motherboard Jumper/SMA definitions for the Jupiter EVM. Only the EN (E3) jumper/SMA would be optionally used by a customer. The other jumpers must be shorted between pin 1&2 (towards back of board) to ensure proper operation.

Table 5: Motherboard SMA and Jumper Definitions (Jupiter Input Signals)

TC#	Jumper	Usage	Configuration
TC30	E12	Reserved	Short Pin 1 & 2. towards back of board
TC29	E11	Reserved	Short Pin 1 & 2. towards back of board
TC28	E14	SDI_DATA	Short Pin 1 & 2. towards back of board
TC27	E15	SDI_SCK	Short Pin 1 & 2. towards back of board
TC26	E2	SDI_RCK	Short Pin 1 & 2. towards back of board
TC25	E10	Slave RESET	Short Pin 1 & 2. towards back of board
TC24	E9	Slave STB	Short Pin 1 & 2. towards back of board
TC23	E8	EXT_MON_OE	Short Pin 1 & 2. towards back of board
TC22	E7	Unused	Short Pin 1 & 2. towards back of board
TC21	E1	EXT_TJ_EN	Short Pin 1 & 2. towards back of board
TC20	E6	EXT_LD	Short Pin 1 & 2. towards back of board
TC19	E5	EXT_UD	Short Pin 1 & 2. towards back of board
TC18	E4	EXT_ADDR_CK	Short Pin 1 & 2. towards back of board
TC17	E3	EN	Short Pin 1 & 2: source from latch Short Pin 2 & 3: source from SMA
TC16	E13	N/A	Don't care
TC15	E20	N/A	Don't care

The following table defines the Jupiter output signals. These are always present at the motherboard SMAs.

Table 6: Motherboard SMA Definitions (Jupiter Output Signals)

TC#	MB EVM
TC14	KEL_ALARM_N
TC13	V_ALARM_N
TC12	I_ALARM_N
TC11	OT_ALARM_N
TC9	ALARM_N
TC8	C_BIT_N
TC6	CAP_DIS_N
TC5	DPS_EN_N

2.7 Jupiter EVM Menu and Dialog Boxes

Figure 5 illustrates the Jupiter EVM menu options that provide access to the Jupiter dialog boxes. For each Jupiter register, there is a control field allowing the customer to have full control over the Jupiter device. These screen shots show the default '***FV out FORCE-B with Alarms***' configuration.

There are separate menu and dialog boxes for the Master and Slave device. The Slave dialog boxes are only available if the Slave is detected.

Figure 5: Device Config Menu Options

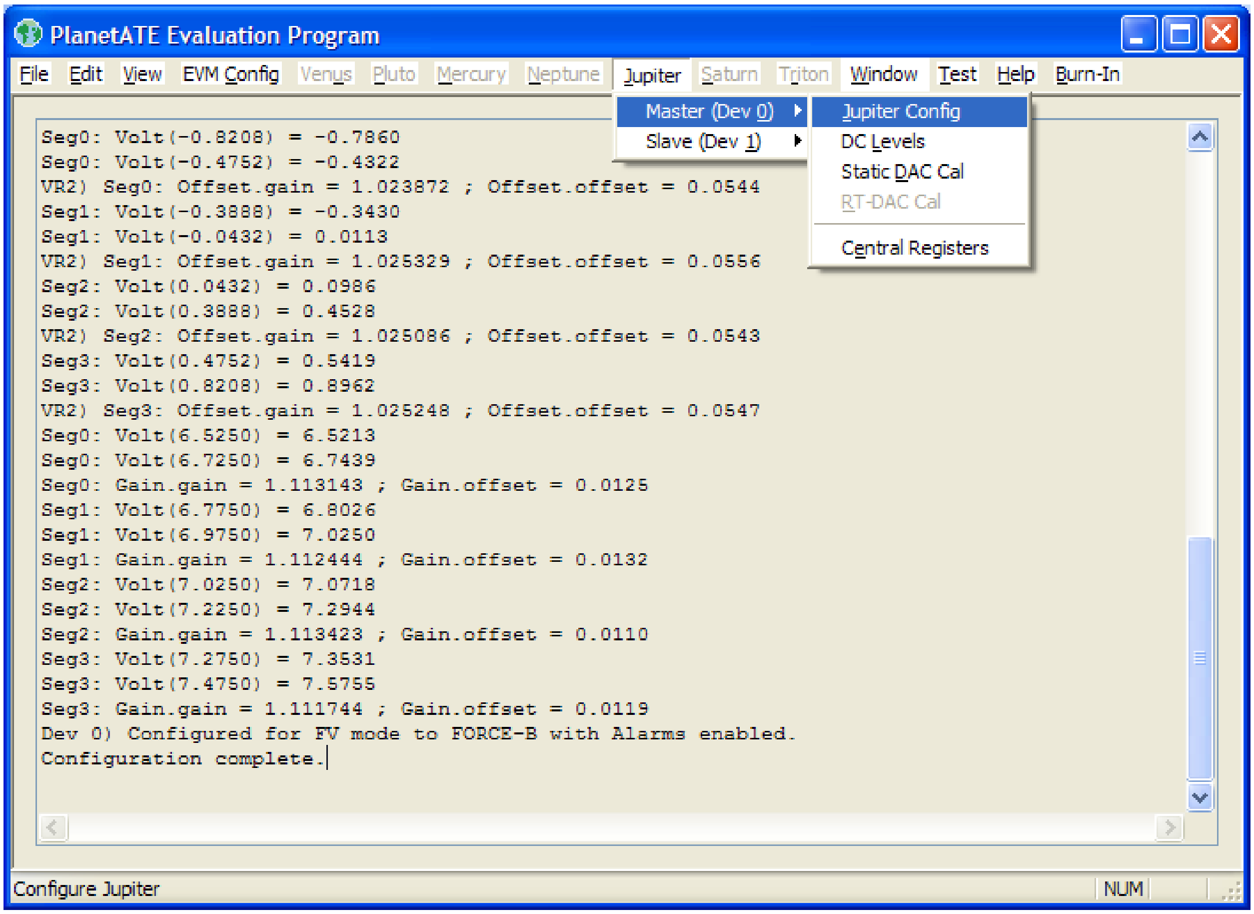


Figure 6: Jupiter Configuration Dialog Box

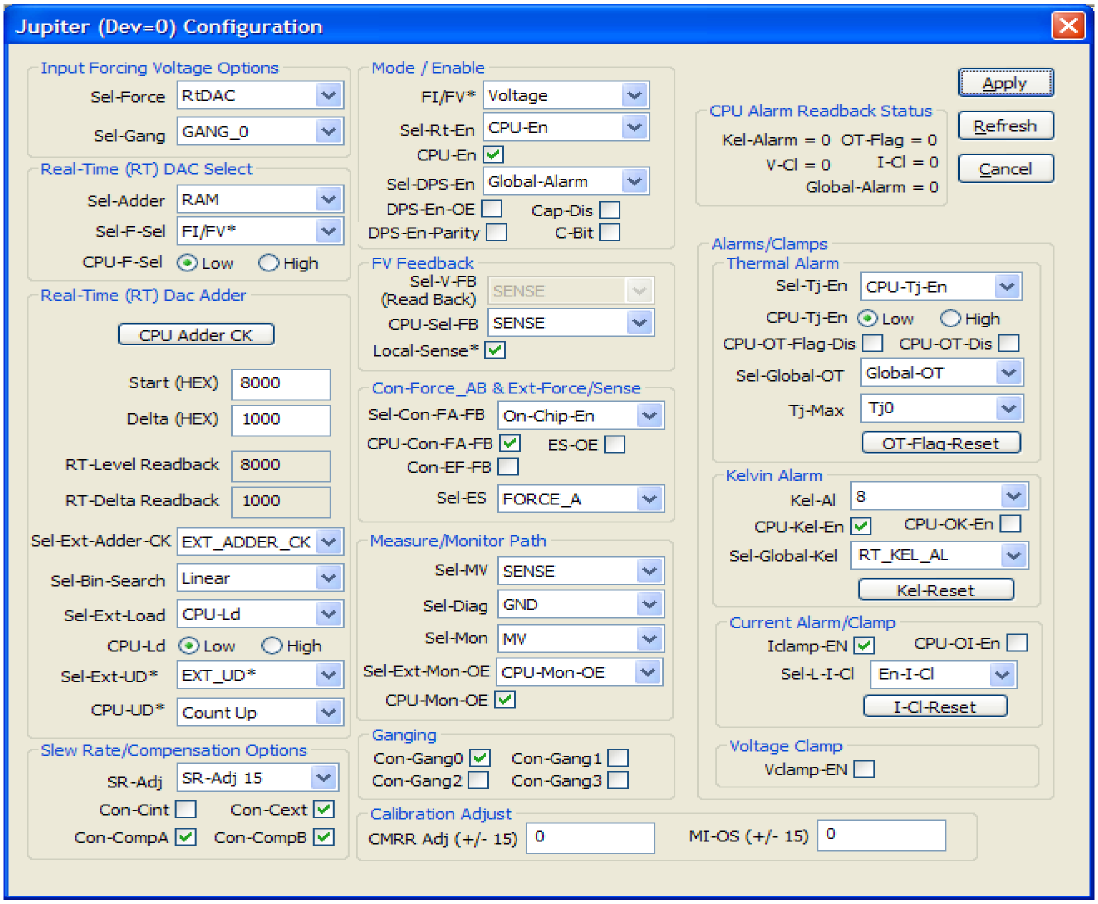


Figure 7: Jupiter DC Levels Dialog Box

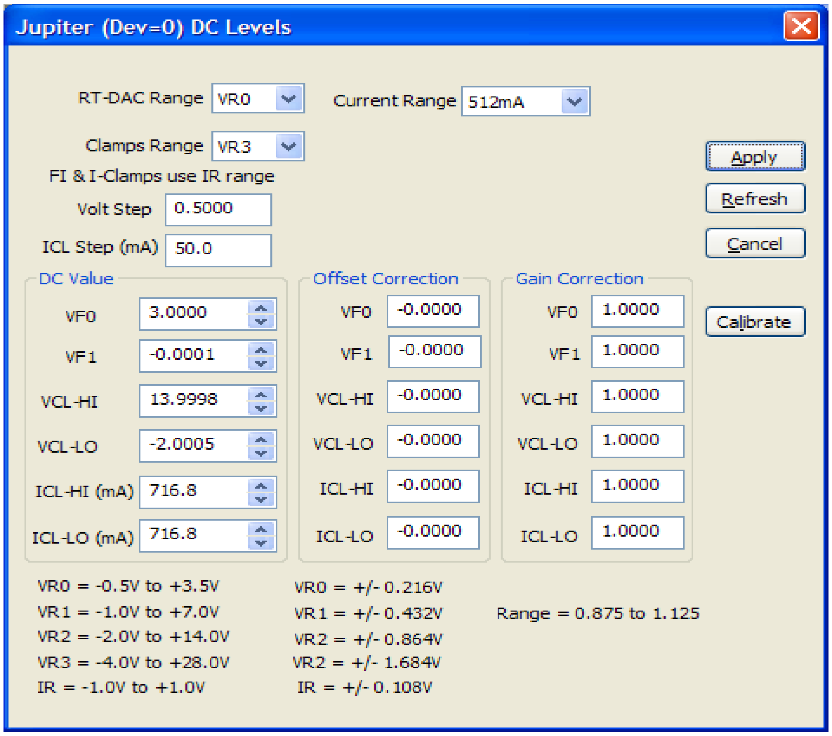


Figure 8: Jupiter DAC Configuration Dialog Box

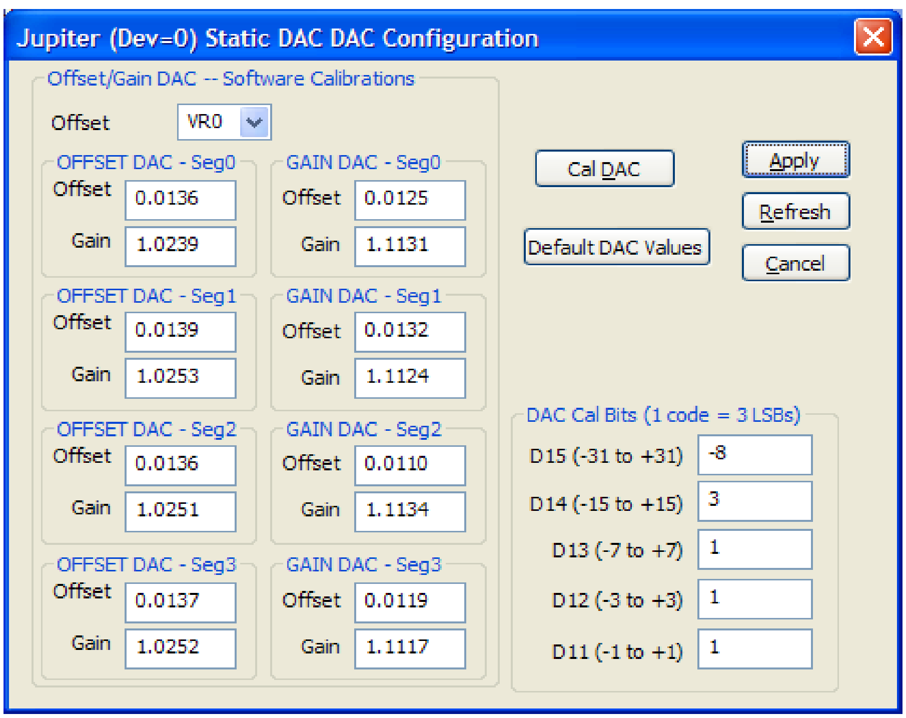
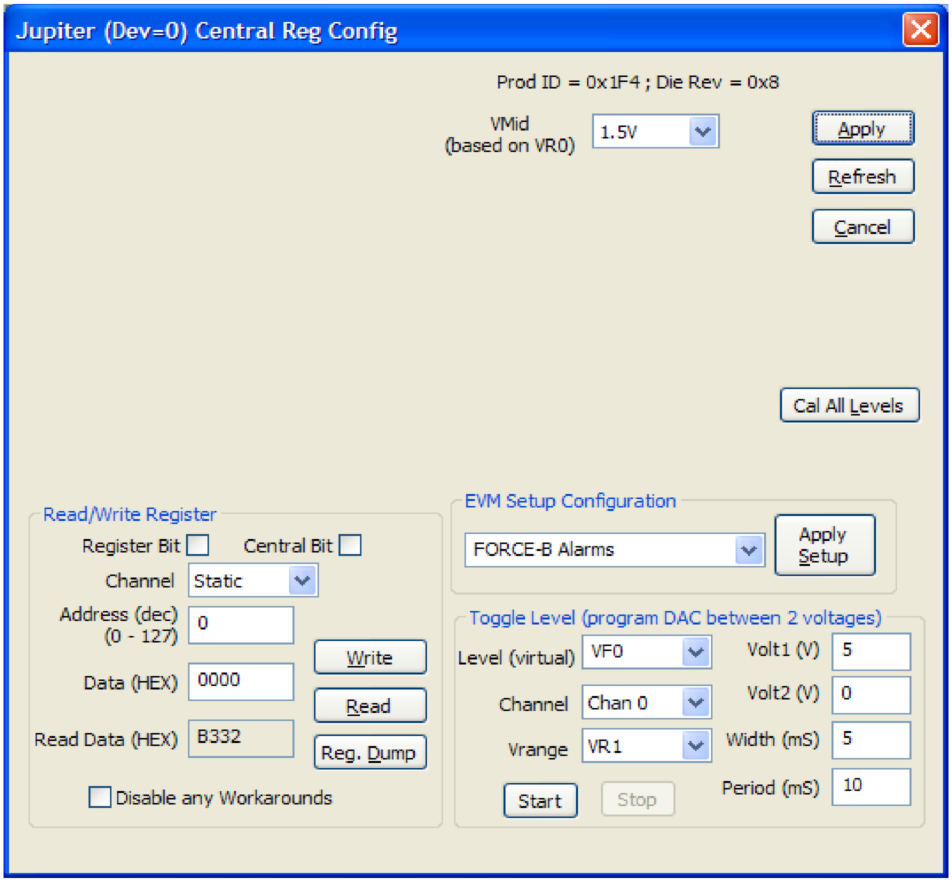


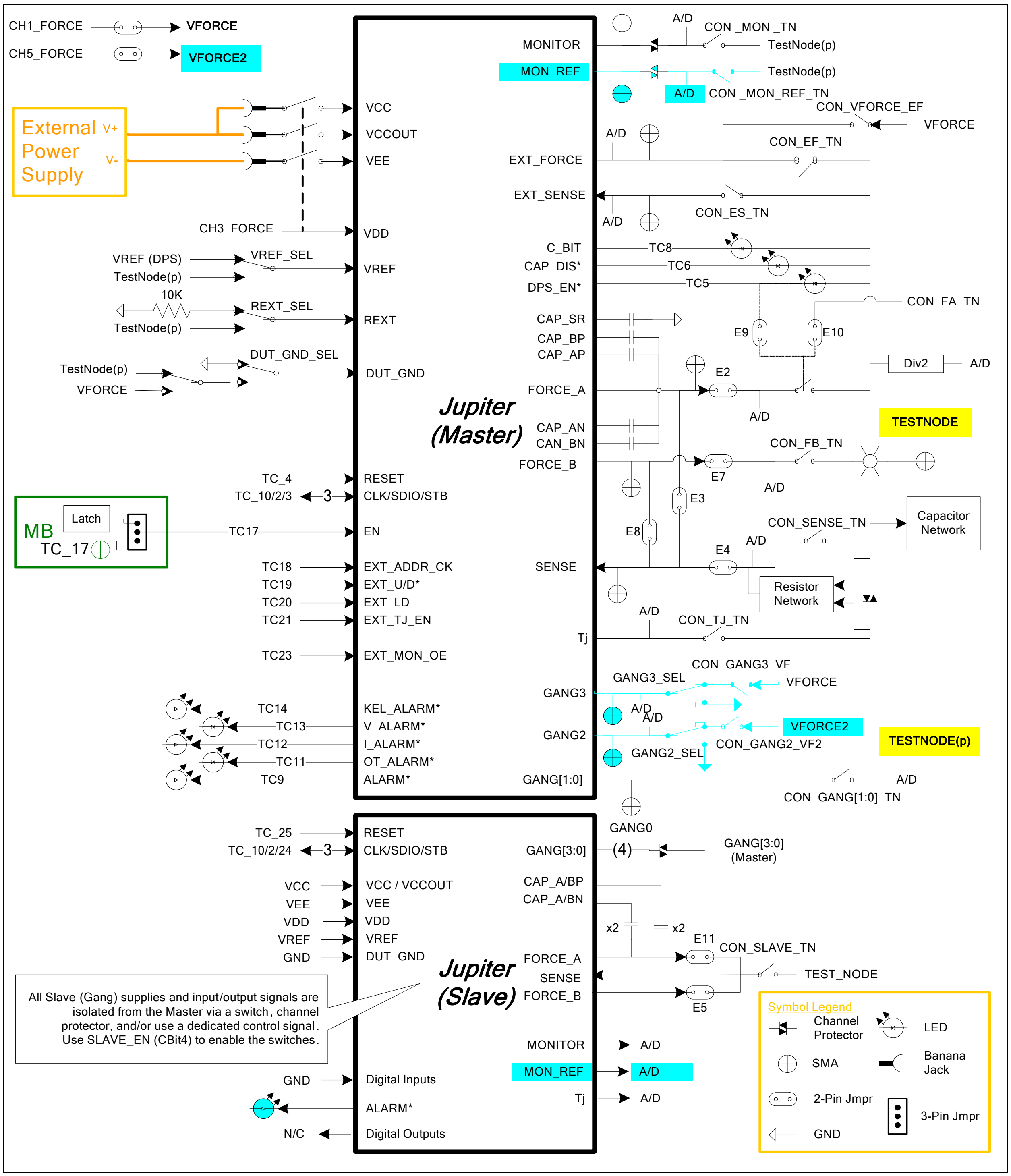
Figure 9: Jupiter Central Register Dialog Box



3 Jupiter EVM Loadboard Detailed Description

Figure 10 illustrates the Jupiter EVM loadboard. The loadboard contains the Jupiter device as well as the necessary circuitry to validate & characterize on the bench environment. Circuitry highlighted in turquoise is new or modified on the Rev C loadboard.

Figure 10: Jupiter EVM Detailed Block Diagram



3.1 Capacitor and Resistor Network Definitions

Figure 11 illustrates while Table 7 and Table 8 list the Jupiter EVM capacitor/resistor load network definitions. Any capacitor combination can be switched in. The software only allows a single resistor value to be switched in. The CON_RNET_TN provides the ability to switch in a 1K resistor between FORCE_B (TestNode) and SENSE; this is used to create an IR drop in order to test/characterize the Kelvin Alarm threshold circuit.

Figure 11: Jupiter EVM Capacitor/Resistor Network Block Diagram

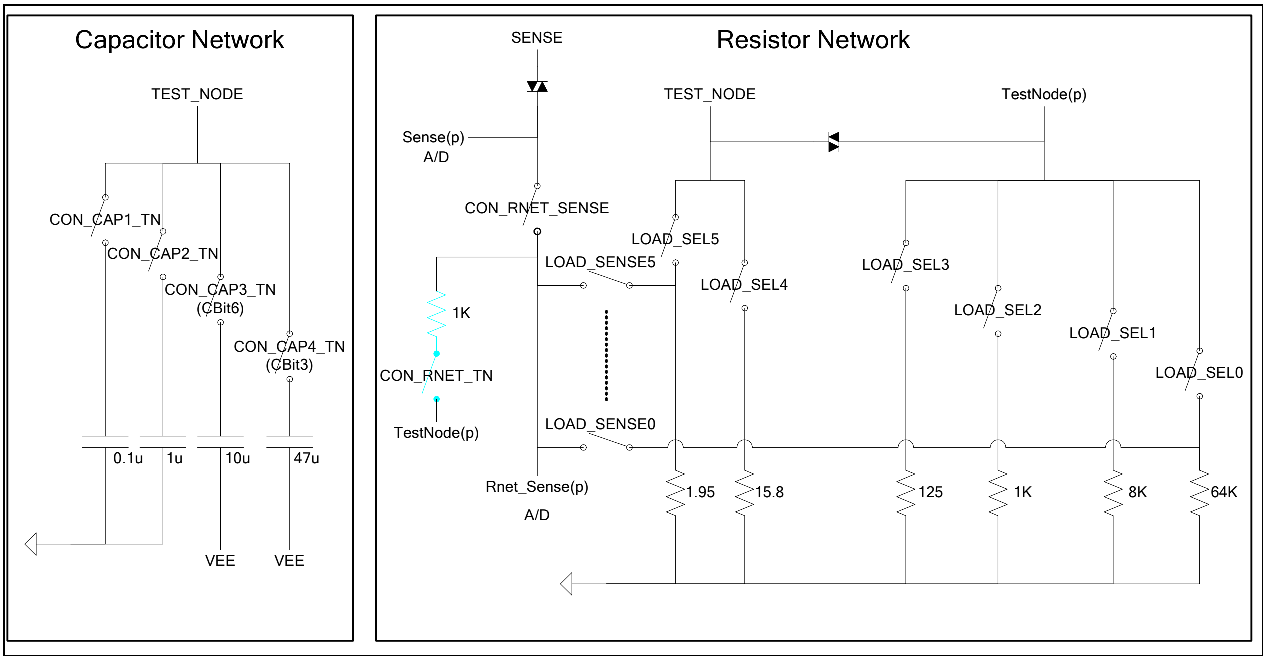


Table 7: Capacitor Network Definitions

CAP_#	Code	Capacitor Value
	-1 or 0	Open All
CAP1	1	0.1uF
CAP2	2	1.0uF
CAP3	4	10uF
CAP4	8	47uF

Table 8: Resistor Network Definitions

Code	Current Range	Resistor Value(s)
-1	0	Open All
0	15.625uA	64K
1	125uA	8K
2	1mA	1K
3	8mA	125
4	64mA	15.8
5	512mA	1.95

3.2 ADC and Analog Mux

The Octal FVMI contains a 24-bit ADC and analog muxes. Table 9 lists the Jupiter EVM loadboard specific mux input sources. Table 10 lists the Jupiter EVM loadboard LB_AMUX analog mux which is routed to the VINP13 and VINN8 nodes.

Note: Most signals go through channel protectors or voltage dividers (i.e. VCC) since they could exceed FVMI Supplies (+20V/-15V).

Table 9: FVMI Analog Mux – VINPOS(A) & VINNEG(A) Mapping

Addr	VINP#	VINPOS(A)	VINN#	VINNEG(A)
7	VINP8	Reserved	VINN8	VREF Div Sense
8	VINP9	GANG_MON(p)	VINN9	TJ (Master)
9	VINP10	EXT_SENSE(p)	VINN10	LB_AMUX (see below)
10	VINP11	MONITOR(p)	VINN11	TJ (Slave)
11	VINP12	SENSE(p)	VINN12	MON_REF(p)
12	VINP13	LB_AMUX (see below)	VINN13	GANG3(p)
13	VINP14	TEST_NODE(p)	VINN14	REXT

Table 10: Jupiter Loadboard Analog Mux Definitions - LB_AMUX Mapping

Addr	Loadboard Amux
0	DUT_GND
1	VCCOUT_DIV
2	EXT_SENSE(p)
3	VCC_DIV
4	CAP_AP(p)
5	CAP_AN(p)
6	TN_DIV
7	CAP_SR(p)
8	GANG2(p)
9	CAP_BP(p)
10	EXT_FORCE(p)
11	VEE_DIV
12	CAP_BN(p)
13	RNET_SENSE
14	FORCE_A(p)
15	FORCE_B(p)

Note: Addr#8 was connected to SENSE(p) on the RevB loadboard. However, the software never used it.

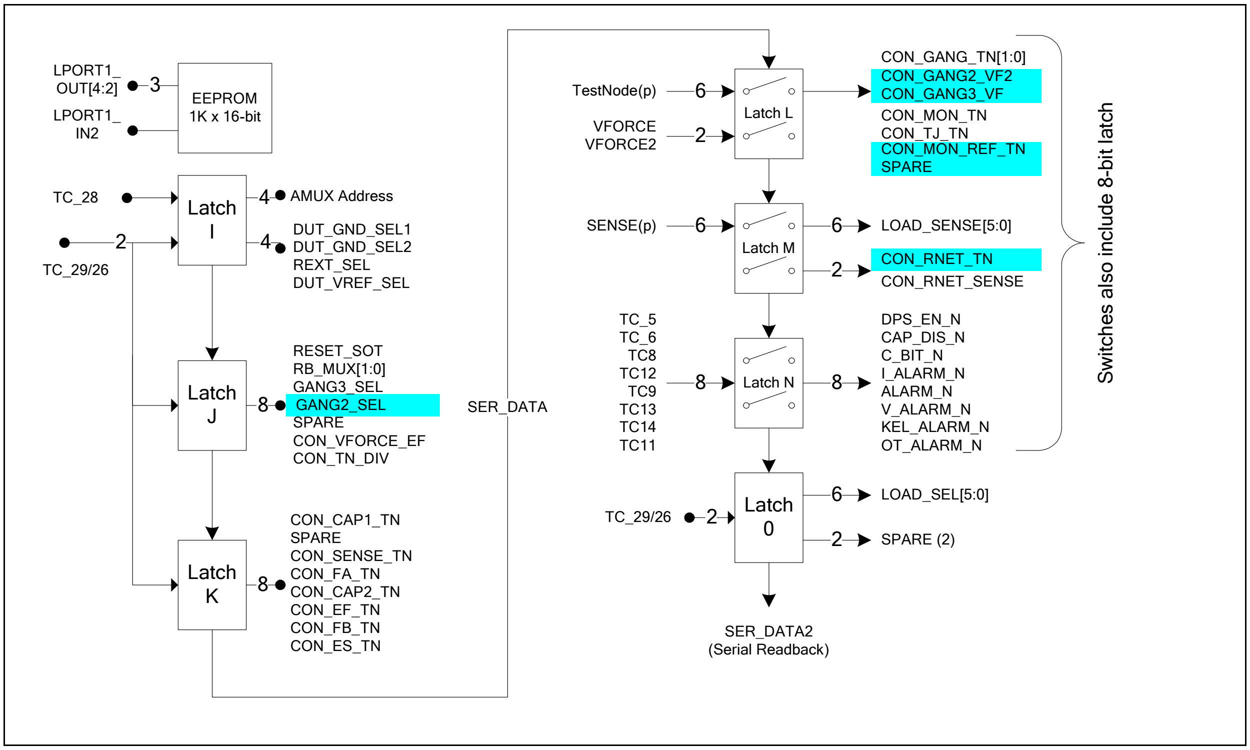
3.3 Jupiter Loadboard Controller

The Jupiter loadboard contains seven 8-bit latches (registers) and a 16K EEPROM. Figure 12 illustrates the Jupiter EVM controller section.

The latches are daisy chained together using the SDI_SCK/RCK/CS signals originating from the Motherboard. The EEPROM is controlled by the LPORT1_OUT[4:2] signals originating from the motherboard. The loadboard latches are labeled STB_I to STB_O. This was named as an extension to the REG_A to REG_H Octal FVMI / Motherboard registers.

The Cbit1 to CBit7 are also used to control various relays, the C-Bits originate from the Octal FVMI board.

Figure 12: Controller Section Detailed Block Diagram



4 Document Revision History

Revision	Date	Description
A01		Initial Draft. Jupiter Rev 3- and Loadboard Rev A support
B01	Dec 13, 2005	Overhauled for Jupiter Rev 4+ and Loadboard Rev B support
B02	May 31, 2006	Jupiter R8+ support. Added ForceA/B with Alarms option
B03	Nov 24, 2006	Jupiter Slave support. Added screen shots for all dialog boxes Remove E3/E8 jumpers from Figure 3; was misleading Updated Table 4 : E9 is Installed. E10 is left Open
C01	May 17, 2007	Jupiter R10+ support and Loadboard Rev C support