SPECTRUM DIGITAL INCORPORATED

DMC550

Technical Reference

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DSP Development Systems

DMC550
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Contents

About This Manual

This manual details the board level operations of the DMC550. This Digital Motor Controller module is designed to be used with the F240, F243, LF2407 DSP Starter Kits (DSK) and eZdsp LF2407A supplied by Spectrum Digital.

The F240, F243, LF2407 DSKs or eZdsp LF2407A and the DMC550, form a table top motor development system allowing engineers and software developers to evaluate certain characteristics of the TMS320F240, TMS320F243, and TMS320LF2407 DSPs to determine if the processor meets the designers application requirements. Evaluators can create software to execute on board or expand the system in a variety of ways.

Notational Conventions

This document uses the following conventions.

The F240, F243, or LF2407 DSK will sometimes be referred to as the DSK.
The eZdsp LF2407A will sometimes be referred to as the eZdsp.
Both DSKs and eZdsps will sometimes be referred to as targets.

The DMC550 will sometimes be referred to as the DMC.

Program listings, program examples, and interactive displays are shown is a special italic typeface. Here is a sample program listing.

equations
!rd = rw &!strobe;

Information About Cautions

This book may contain cautions.
This is an example of a caution statement.
A caution statement describes a situation that could potentially damage your software, or hardware, or other equipment. The information in a caution is provided for your protection. Please read each caution carefully.

Related Documents

Texas Instruments TMS320F240, TMS320LF2407 Users Guide
Texas Instruments TMS320 Fixed Point Assembly Language Users Guide
Texas Instruments TMS320 Fixed Point C Language Users Guide
Texas Instruments TMS320 Fixed Point C Source Debugger Users Guide
Spectrum Digital F240, F243, LF2407 DSK Technical Reference
Spectrum Digital eZdsp LF2407A Technical Reference

Chapter 1

Introduction to the DMC550

This chapter provides a description of the DMC550, used with the F240, F243, LF2407 DSKs and eZdsp LF2407, key features and circuit board block diagram

Topic **Page**

1.0 Overview of the DMC550

The DMC550 is versatile digital motor controller allowing designers to examine certain characteristics of the TMS320F240, TMS320F243, or TMS320LF2407 Digital Signal Processors (DSPs) to determine if one of these DSPs meets their application requirements. Furthermore, the module is an excellent platform to develop and run motor control software for the TMS320F240, TMS320F243, or TMS320F2407 processor.

The DMC550 uses a F240, F243, LF2407 DSP Starter Kit (DSK) or an eZdsp LF2407 board as the computer engine to run algorithms. The DMC550, along with a DSK or eZdsp, allows full speed verification of F24x/LF24xx code.

Code development for the DMC can be done in two ways;

- Use the serial interface on the DMC with the symbolic assembler and debugger that comes with the DSK
- Use the XDS510PP PLUS JTAG emulator with the compiler/assembler/linker and Code Composer from Texas Instruments.
- Use the eZdsp LF2407 with its on board JTAG emulator with the compiler/assembler/linker and Code Composer from Texas Instruments.

1.1 Key Features of the DMC550

The DMC550 has the following features:

- Compatible with the F240, F243, or LF2407 DSK from Spectrum Digital
- Compatible with the eZdsp LF2407 from Spectrum Digital
- Allows development of algorithms for DC Brushless Motors
- Rated for Bus voltages of 24 VDC
- Rated current is 2.5 amps continuous

1.2 Functional Overview of the DMC550

Figure 1-1 shows a block diagram of the basic configuration for the DMC550. The major interfaces of the DMC550 include:

- 3 phase DC Brushless Interface
- Hall effect Sensor Interface
- Phase Voltage Sense
- Phase Current Sense
- Encoder Interface

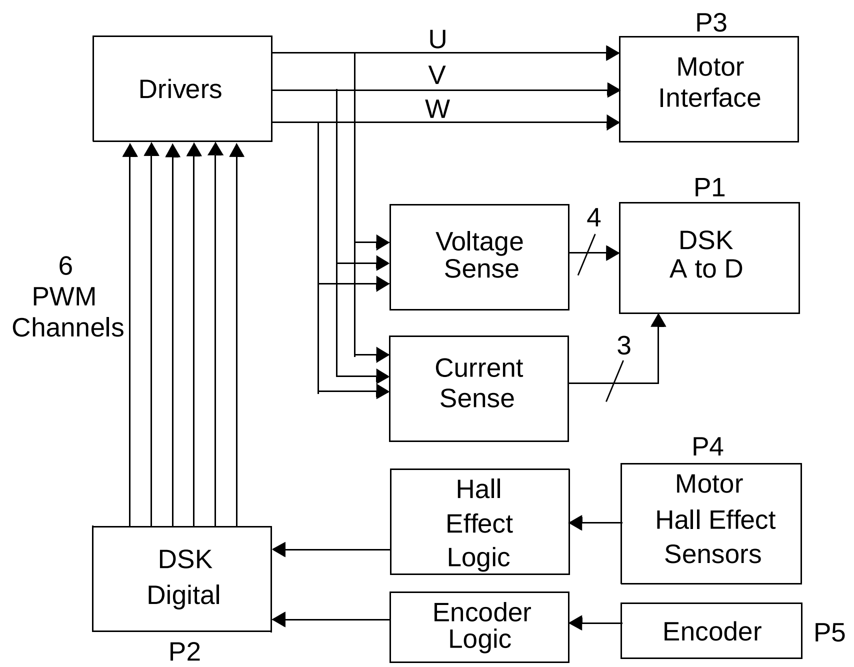


Figure 1-1, BLOCK DIAGRAM DMC550

Chapter 2

Operation of the DMC550

This chapter provides a technical description of the DMC550, key features, and description of the connectors.

2.1 Overview of the DMC550 with a DSK

The DMC550 is the power stage of a Digital Motor Controller development system.

The computing engine for the DMC550 is either a F240 DSK (#701023), a F243 DSK (#701024), an LF2407 DSK (#701025), or eZdsp LF2407 (701119) from Spectrum Digital. The DMC550 allows development to be done with DC Brushless motors.

A board outline of the DMC550 is shown below.

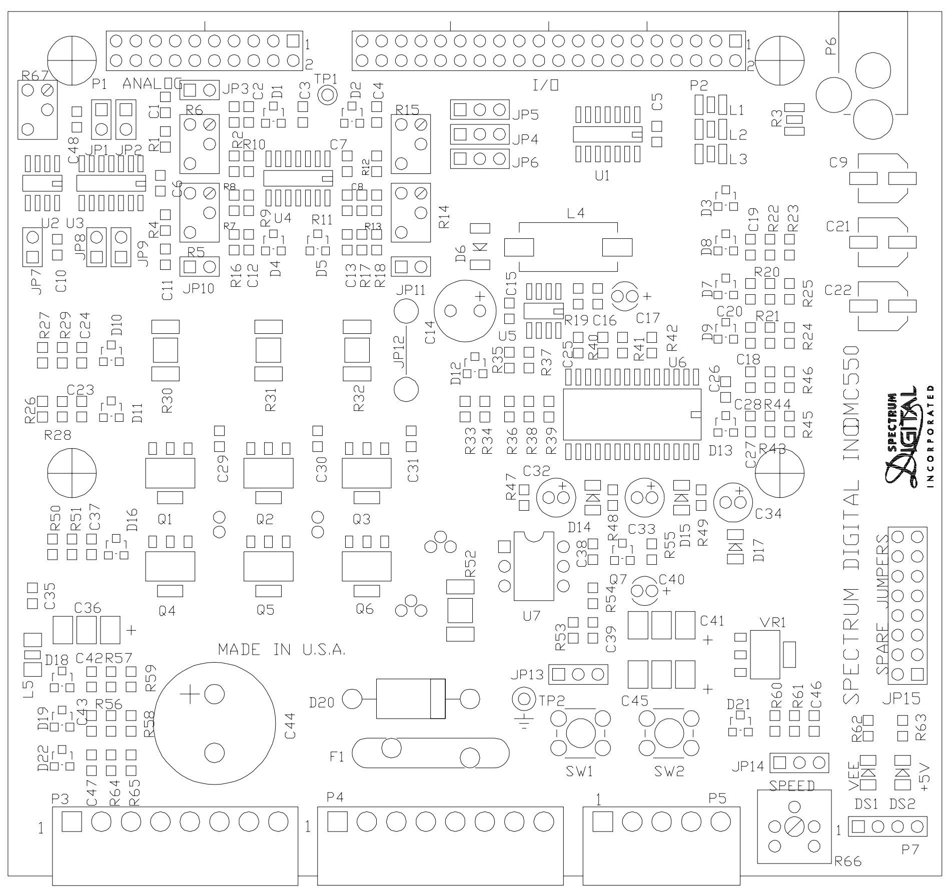


Figure 2-1, Board Outline of DMC550

2.2 Calibrating the DMC550

To get accurate readings from the DMC550 it is wise to calibrate the electronics on the DMC550 prior to using it.

> **WARNING !**
>
> VIO must be selected to either +3.3 volts or +5 volts prior to connecting the DSK or eZdsp

2.3 Installation of the DSK or eZdsp on the DMC550

The F240, F243, LF2407 DSK or eZdsp LF2407 is the computing engine of the DMC550 system. The DSK or eZdsp must be installed on the DMC550 by plugging the DSK into matching connectors. There are three ways to develop and debug algorithms for the DMC550:

- Use the serial interface on the DMC550 with the symbolic assembler and debugger that comes with the DSK
- Use the XDS510PP PLUS JTAG emulator from Spectrum Digital with a DSK along with the compiler/assembler/linker and Code Composer from Texas Instruments.
- Use the eZdsp LF2407 from Spectrum Digital, with the compiler/assembler /linker and Code Composer from Texas Instruments.

Software can be developed using the symbolic assembler and debugger included with the DSK. This allows the engineer to generate algorithms and load them into RAM memory on the DSK. The DSK communicates to the debugger on the host PC via the RS-232 serial port.

Using the XDS510PP PLUS JTAG emulator allows the engineer to debug algorithms with the JTAG interface on the DSK.

Engineers can also develop algorithms using the eZdsp LF2407 with its on board JTAG interface.

2.3.1 Installation of the DSK using the Serial Interface on the DMC550

To install the DSK on the DMC550 for serial debug, perform the following procedure:

1. Remove all power from the DMC550
2. Remove all power from the DSK.
3. Install connectors on the bottom of the DSK by soldering double row box connectors into connectors P1 (analog) and P2 (I/O).
4. Plug the DSK on to the DMC550 by aligning DSK connectors P1 and P2 with DMC550 connectors P1 and P2 respectively and pushing downward.

2.3.2 Installation of the DSK Using the XDS510PP PLUS

To install the DSK on the DMC550 for JTAG debug, perform the following procedure:

1. Remove all power from the DMC550
2. Remove all power from the DSK.
3. Install connectors on the bottom of the DSK by soldering double row box connectors into connectors P1 (analog) and P2 (I/O).
4. Plug the DSK on to the DMC550 by aligning DSK connectors P1 and P2 with DMC550 connectors P1 and P2 respectively and pushing downward.
5. Remove power from the XDS510PP PLUS emulator and attach the JTAG tail to the JTAG connector on the DSK.

2.3.3 Installation of the eZdsp LF2407

To install the eZdsp LF2407 on the DMC550 for JTAG debug, perform the following procedure:

1. Remove all power from the DMC550
2. Remove all power from the eZdsp.
3. Install connectors on the bottom of the eZdsp by soldering double row box connectors into connectors P1 (analog) and P2 (I/O).
4. Plug the eZdsp on to the DMC550 by aligning connectors P1 and P2 with DMC550 connectors P1 and P2 respectively and pushing downward.

2.4 Connecting Motors to the Digital Motor Controller

The DMC550 will support the development of algorithms for a variety of motors. Each type of motor requires a specific type of connection. These connections are discussed in the following sections.

2.4.1 Connecting a DC Brushless Motor to the DMC550

To connect a DC brushless motor to the DMC550 perform the following steps:

1. Remove all power from the DMC550
2. Attach Phase U from the motor to connector P3-6.
3. Attach Phase V from the motor to connector P3-7.
4. Attach Phase W from the motor to connector P3-8.
5. Attach +5 volts to the Hall Effect Sensor from connector P3-7.
6. Attach Hall Effect 1 from the motor to connector P3-2.
7. Attach Hall Effect 2 from the motor to connector P3-3.
8. Attach Hall Effect 3 from the motor to connector P3-4.
9. Attach Hall Effect ground from the motor to connector P3-1.
10. Attach Power Bus Pins 3 and 4 (3 is Bus Power Input, 4 is ground)

These connections are shown in the figure below.

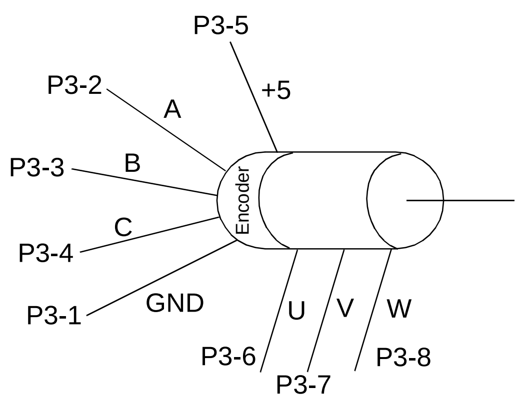


Figure 2-2, DC Brushless Motor connections for the DMC550

2.5 DMC550 Connectors

The DMC550 has 7 connectors. These connectors are used to bring power to the DMC550, signals to/from the DSK, and power to the motor. These connectors are shown in the table below and discussed in the following sections.

Table 1: DMC550 Connectors

Connector	# Pins	Function
P1	20 (2 x 10)	DSK Analog Connector
P2	40 (2 x 20)	DSK I/O Connector
P3	8 (1 x 8)	Motor Interface Connector
P4	8 (1 x 8)	Motor Power Connector
P5	5 (1 x 5)	Encoder Option Connector
P6	3	+5 Volt Power Input (optional)
P7	4	PWM DAC Channels (LF2407 only)

The position of each connector on the DMC550 is shown in the figure below.

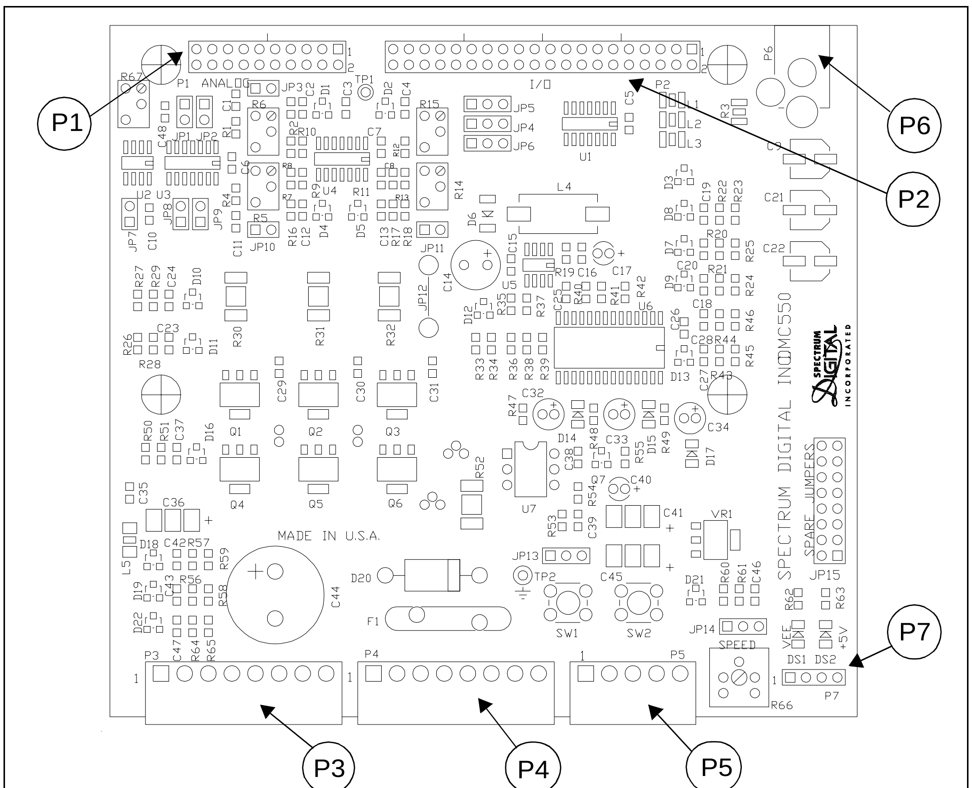


Figure 2-3, DMC550 Connector Positions

2.5.1 P1, DSK Analog Connector

Connector P1 provides the analog signal interface to the DSK attached to the DMC550. The signals on this connector are defined in the table below:

Table 2: P1, Analog Interface

Pin #	Signal	Pin #	Signal
1	GND	2	ADC0
3	GND	4	ADC1
5	GND	6	ADC2
7	GND	8	ADC3
9	GND	10	ADC4
11	GND	12	ADC5
13	GND	14	ADC6
15	GND	16	ADC7
17	GND	18	RESERVED
19	GND	20	RESERVED

2.5.2 P2, DSK I/O Connector

Connector P2 provides the analog signal interface to the DSK plugged onto the DMC550. The signals on this connector are defined in the table below

Table 3: P2, DSK I/O Connector

Pin #	Signal	Pin #	Signal
1	+5 Volts	2	+5 Volts
3	Reserved	4	Reserved
5	In1	6	Cap1
7	Cap2	8	Cap3
9	Pwm1	10	Pwm2
11	Pwm3	12	Pwm4
13	Pwm5	14	Pwm6
15		16	
17	Enable-	18	
19	Gnd	20	Gnd
21	Reserved	22	In2
23	Reserved	24	Reserved
25	Reserved	26	Reserved
27	Reserved	28	Reserved
29	Reserved	30	Reserved
31	Reserved	32	Reserved
33	Hall Effect 1	34	Hall Effect 2
35	Hall Effect 3	36	Reserved
37	Fault	38	Reserved
39	Gnd	40	Gnd

2.5.3 P3, Motor Interface Connector

Connector P3 provides the Motor Driver Phases and hall Effect feedback interface which plug onto the DMC550. The signals on this connector are defined in the table below:

Table 4: P3, Motor Interface Connector

Pin #	Signal
1	GND
2	HALL1
3	HALL2
4	HALL3
5	+5 VDC
6	Motor U+
7	Motor V+
8	Motor W+

For convenience, these signal names are printed on the bottom side of the board.

2.5.4 P4, Motor Option Connector

Connector P4 provides the Motor input power, Analog speed input and option inputs which plug onto the DMC550. The signals on this connector are defined in the table below:

Table 5: P4, Motor Option Connector

Pin #	Signal
1	BUS- (GND)
2	BUS+
3	Bus Input Voltage
4	GND
5	VCONTROL (0-5V Analog)
6	IN2 (0-5V Digital)
7	IN1 (0-5V Digital)
8	+5 VDC

2.5.5 P5, Encoder Option Connector

Connector P5 provides the encoder interface to the DMC550. The signals on this connector are defined in the table below:

Table 6: P5, Encoder Option Connector

Pin #	Signal
1	GND
2	Capture 3 (Index)
3	Capture 1 (Channel A)
4	Vsensor (5 VDC)
5	Capture 2 (Channel B)

2.5.6 P6, Power Input

Connector P6 is the +5 Volt power input to power the DMC logic and the target processor (DSK or eZdsp). This input is convenient for powering the DMC550 during calibration.

2.5.6 P7, PWM DAC Output

On the LF2407 DSPs the 3 PWM channels, PWM7, 9, 11 can be used to convert pulse width modulators into DAC output via a 2 pole filter provided. The table below shows the PWM channels and the DAC channels they control.

Table 7: P7, PWM DAC Output

Pin #	DAC Channel	PWM Signal
1	DAC A	PWM 7
2	DAC B	PWM 9
3	DAC C	PWM 11
4	GND	

2.6 Jumpers

The DMC550 has 14 jumpers. Their designator, size, and function are shown in the table below:

Table 8: DMC550 Jumpers

Jumper #	Size	Function
JP1	1 x 2	Voltage Sense U
JP2	1 x 2	Voltage Sense Bus
JP3	1 x 2	Current Offset Phase U
JP4	1 x 3	Capture 2/Hall Effect 2
JP5	1 x 3	Capture 1/Hall Effect 1
JP6	1 x 3	Capture 3/Hall Effect 3
JP7	1 x 2	Voltage Control
JP8	1 x 2	Voltage Sense V
JP9	1 x 2	Voltage Sense W
JP10	1 x 2	Current Offset Phase V
JP11	1 x 2	Current Offset
JP12	1 x 2	I Sense Bus Shorting Plug
JP13	1 x 3	VIO, Voltage Range Select
JP14	1 x 3	Voltage control (Pot or P4)

The position of each jumper on the DMC550 is shown in the figure below.

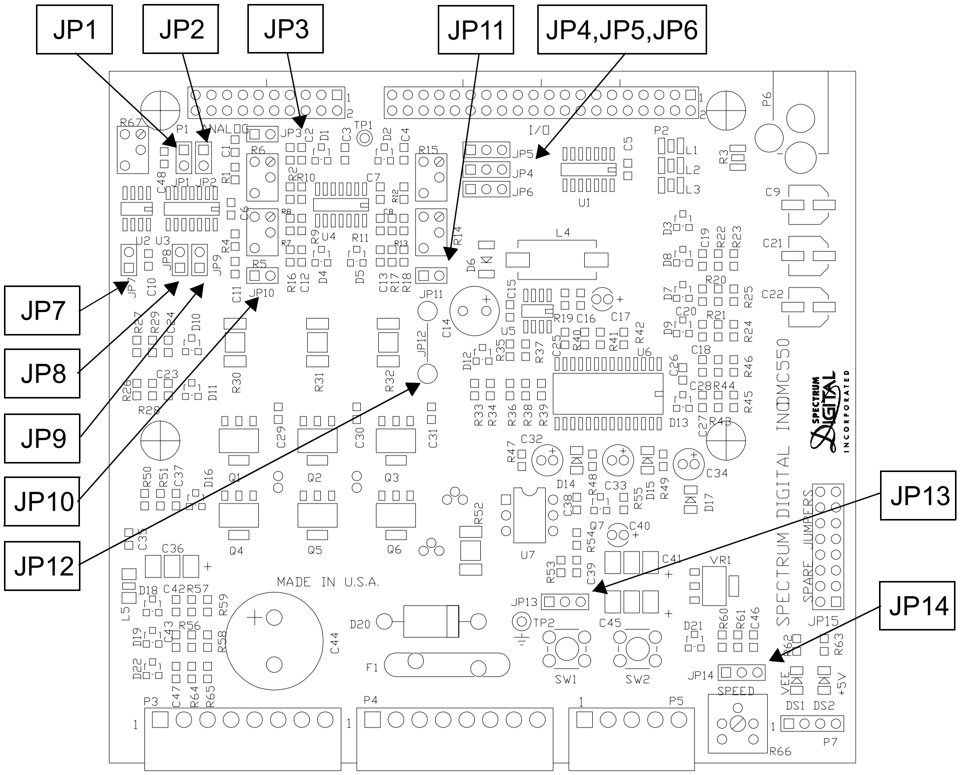
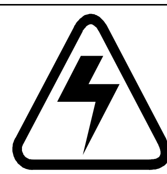


Figure 2-4, DMC550 Jumper Locations



DANGER !

Remove all power to the unit, motors, and associated electronics when connecting/disconnecting jumpers, wires, or connectors.

2.6.1 JP1, Voltage Sense U

Jumper JP1 is used to aid in setup for debugging. When the jumper is inserted a known voltage can be provided to the A/D via the potentiometer R67.

Normal operation is to remove this jumper.

2.6.2 JP2, Voltage Sense Bus

Jumper JP2 is used to aid in setup for debugging. When the jumper is inserted a known voltage can be provided to the A/D via the potentiometer R67.

Normal operation is to remove this jumper.

2.6.3 JP3, Current Offset Phase U

Jumper JP2 is used to select an offset for the current. The potentiometer R15 can be used to add an offset to the current sense.

2.6.4 JP4, Capture 2/ Hall Effect 2

Jumper JP4 is used to select an optical encoder or hall Effect sensor to DSK capture channel. In the 1-2 position the Hall Effect sensor is mapped to the DSK capture channel 2. When the 2-3 selection is used the encoder is mapped to the capture channel 2. The setting are shown in the table below.

Table 9: JP4, Capture2/Hall Effect 2

Position	Function
1-2	Hall Effect mapped to Capture 2
2-3	Encoder mapped to Capture 2

2.6.5 JP5, Capture 1/ Hall Effect 1

Jumper JP5 is used to select an optical encoder or hall Effect sensor to DSK capture channel. In the 1-2 position the Hall Effect sensor is mapped to the DSK capture channel 1. When the 2-3 selection is used the encoder is mapped to the capture channel 1. The setting are shown in the table below.

Table 10: JP5, Capture1/Hall Effect 1

Position	Function
1-2	Hall Effect mapped to Capture 1
2-3	Encoder mapped to Capture 1

2.6.6 JP6, Capture 3/ Hall Effect 3

Jumper JP6 is used to select an optical encoder or hall Effect sensor to DSK capture channel. In the 1-2 position the Hall Effect sensor is mapped to the DSK capture channel 3. When the 2-3 selection is used the encoder is mapped to the capture channel 3. The setting are shown in the table below.

Table 11: JP6, Capture3/Hall Effect 3

Position	Function
1-2	Hall Effect mapped to Capture 3
2-3	Encoder mapped to Capture 3

2.6.7 JP7, Voltage Control

Jumper JP8 is used to aid in setup for debugging. When the jumper is inserted a known voltage can be provided to the A/D via the potentiometer R67.

Normal operation is to remove this jumper.

2.6.8 JP8, Voltage Sense V

Jumper JP8 is used to aid in setup for debugging. When the jumper is inserted a known voltage can be provided to the A/D via the potentiometer R67.

Normal operation is to remove this jumper.

2.6.9 JP9, Voltage Sense W

Jumper JP8 is used to aid in setup for debugging. When the jumper is inserted a known voltage can be provided to the A/D via the potentiometer R67.

Normal operation is to remove this jumper.

2.6.10 JP10, Current Offset Phase V

Jumper JP10 is used to select an offset for the current. The potentiometer R15 can be used to add an offset to the current sense.

2.6.11 JP11, Current Offset Bus

Jumper JP11 is used to select an offset for the current. The potentiometer R15 can be used to add an offset to the current sense.

2.6.12 JP12, I Sense Bus Shorting Plus

Jumper JP12 is used to short the sensing resistor from **BUSIN-**.

Some algorithms do not use this on leg currents so this allows for only leg current measurements.

2.6.13 JP13, VIO Voltage Range Select

Jumper JP13 is used to select the I/O voltage. In the 1-2 position the logic outputs 0-5 volts. When the 2-3 selection is used the logic outputs 0-3.3 volts. The setting are shown in the table below..

Table 12: JP13, VIO Voltage Range Select

Position	Function
1-2	+5 Volts (TMS320F240/F243)
2-3	+3.3 Volts (TMS320LF2407)

2.6.14 JP14, Voltage Control (Pot or P4)

Jumper JP14 is used to select analog input from either the on board potentiometer R66 or connector P4, pin 5. For example, this input is useful for speed control by application software. In the 1-2 position input is from connector P4, pin 5. When the 2-3 selection is used the onboard pot is selected. The setting are shown in the table below..

Table 13: JP14, Voltage Control

Position	Function
1-2	Connector P4, Pin 5 drives V Control
2-3	Potentiometer R66 controls V Control

2.7 A/D Channel Configuration

The following table shows the input to the A/D channels on the DSP.

Table 14: A/D Channel Configuration

A/D Channel	Input Signal
ADC0	I Sense Phase U
ADC1	I Sense Phase V
ADC2	I Sense Bus
ADC3	V Sense Phase U
ADC4	V Sense Phase V
ADC5	V Sense Phase W
ADC6	V Bus Sense
ADC7	V Control

2.8 Test Points

The DMC550 has 2 test points. The user should use the test point #2 as ground when probing signals with a meter or scope. The signals on each test point are shown in the table below:.

Table 15: DMC550 Test Points

Test Point	Signal
TP1	Offset voltage for current channels
TP2	Ground

DANGER !

Remove all power to the unit, motors, and associated electronics when connecting/disconnecting probes, jumpers, wires or connectors.

<u>Warning:</u>

1. Remove all input power to the DMC550 and DSK prior to connecting any probes. LED DS1 should **not** be illuminated.

The positions of the test points, switches, and potentiometer on the DMC550 are shown in the figure below.

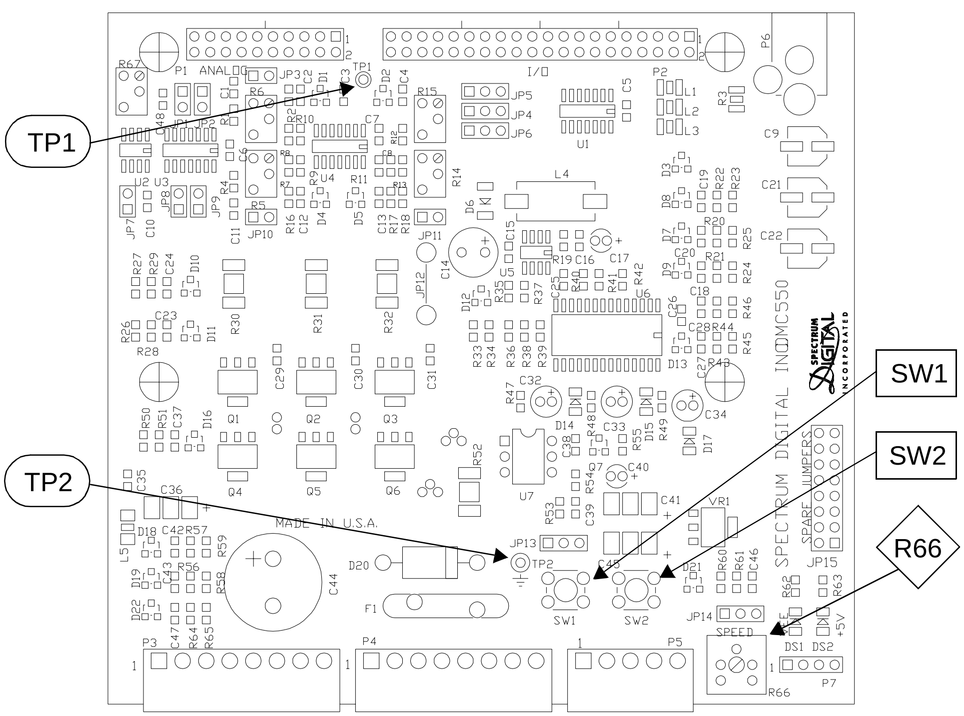


Figure 2-5, Test Points, Switches, and Potentiometer Locations

2.9 Potentiometer

The DMC550 has one potentiometer. This potentiometer provides a mechanism for speed control or other functions in application programs. The range is 0 to +5 volts, or 0 to +3.3 volts depending on the setting of the VIO jumper on the DMC550. The table below shows the potentiometer designator, its function, and range of adjustment:

Table 16: DMC550 Potentiometer

Potentiometer #	Function	Jumper JP13	Adjustment Range
R66	VCONTROL	1-2	0-5 Volts
R66	VCONTROL	2-3	0-3.3 Volts

2.10 Switches

The DMC550 has two push button switches. These switches can be used for user defined functions. Switches SW1 and SW2 can be read on I/O bits of the DSP. These switches are wired in parallel with inputs from connector P4.

The position of these switches are shown in Figure 2-3 on the previous page. The signal used by each switch is shown in the table below.

Table 17: DMC550 Switches

Led #	Signal
SW1	IN1
SW2	IN2

2.11 Phase Current

The DMC550 supports reading the phase current in the lower transistor leg. The currents are measured across three .05 ohm resistors. These sense signals are then filtered for a 40Khz cutoff frequency, clamped to the rails and applied to the non-inverting input of an opamp. For all inputs there is one variable offset voltage adjustment. This allows bipolar current measurements. The gain of each amplifier is adjustable. The example below shows the scaling.

In our example we will use the maximum +/- 2.5 amps. The maximum voltage across the sense resistor would then be:

V = I x R
V = 5.00 Amps x .05 Ohms
V = .25 Volts

A gain must be selected that will not saturate the ADC on the processor module, yet use the maximum range possible. So if VIO is +5 volts the maximum gain in our example is 5/.25 = 20. With the gain offset at 20 we now need an offset to have positive and negative current measurements. To achieve mid-scale (+2.5 volts) in our example with no current we have an Voffset * Gain = 2.5.

2.5/20 = 0.125 volts for Voffset

At maximum current (2.5 amps) the output is:

Voutput = (Voffset + Vinput) * Gain
= (.125 + (2.5 * .05)) * 20
= 5 volts

The graph below shows current vs. voltage for our example:

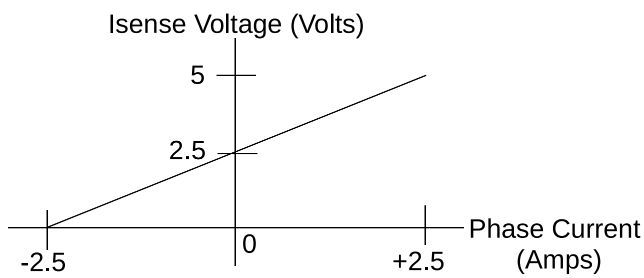


Figure 2-6, Vinput Gain

2.12 Phase Voltage

The phase voltages are measured from the top transistor with respect to Bus-. Each phase is divided by a resistive divider consisting of 6.49K and 1.00K. This gives a division of 7.5. In our example we will assume a maximum voltage of 24 volts.

At maximum voltage Vsense = 24/7.5 = 3.2 volts. See graph below.

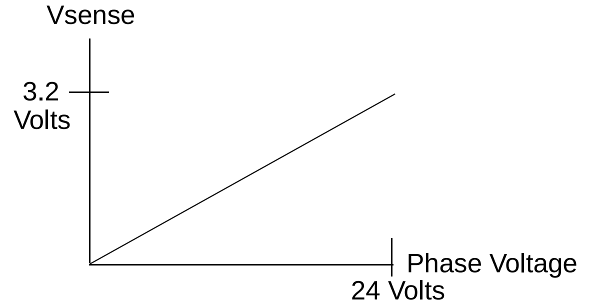
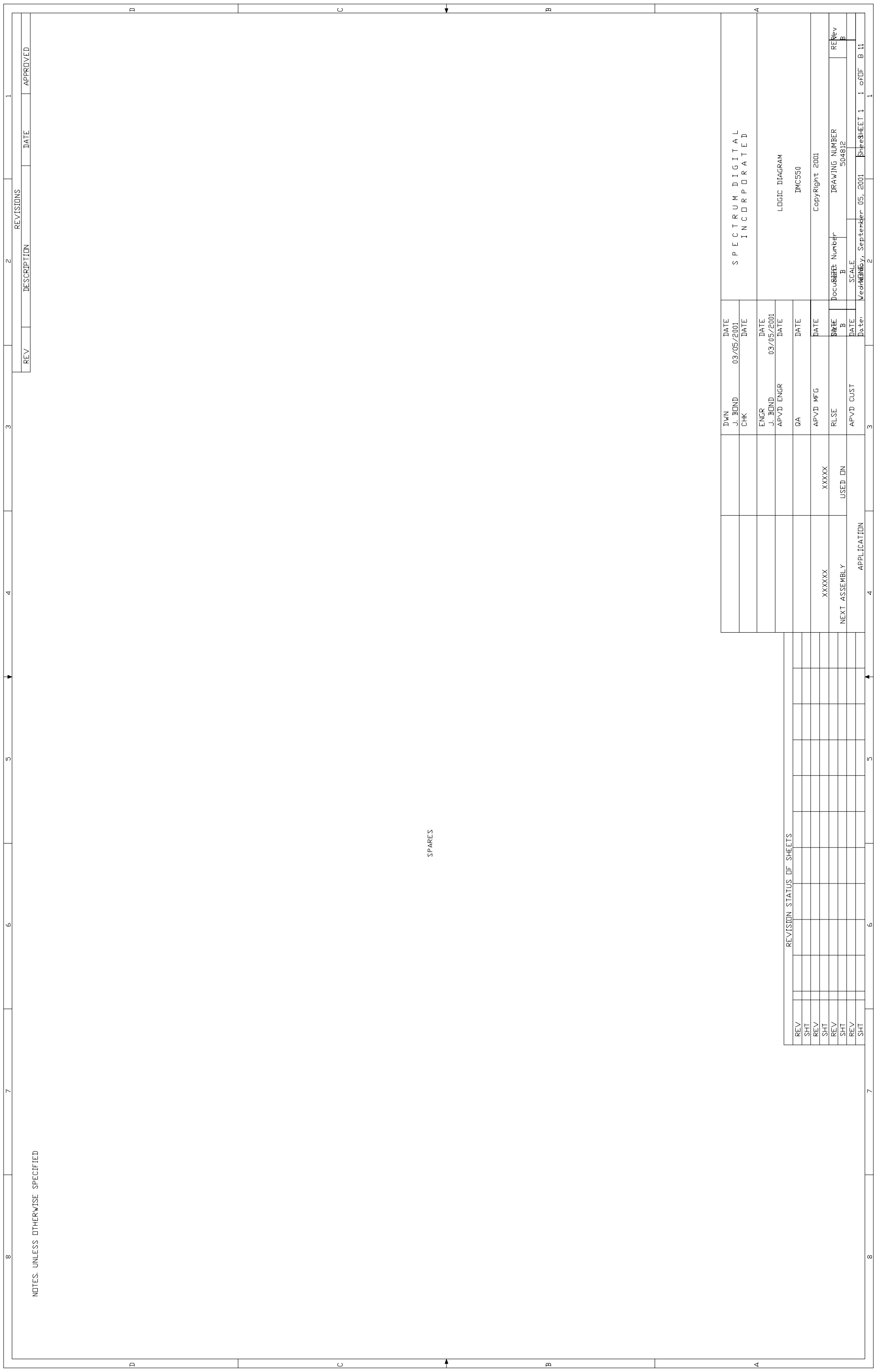


Figure 2-7, Phase Voltage

Appendix A
DMC550 Schematics

This appendix contains the schematics for the DMC550. The schematics were drawn on ORCAD.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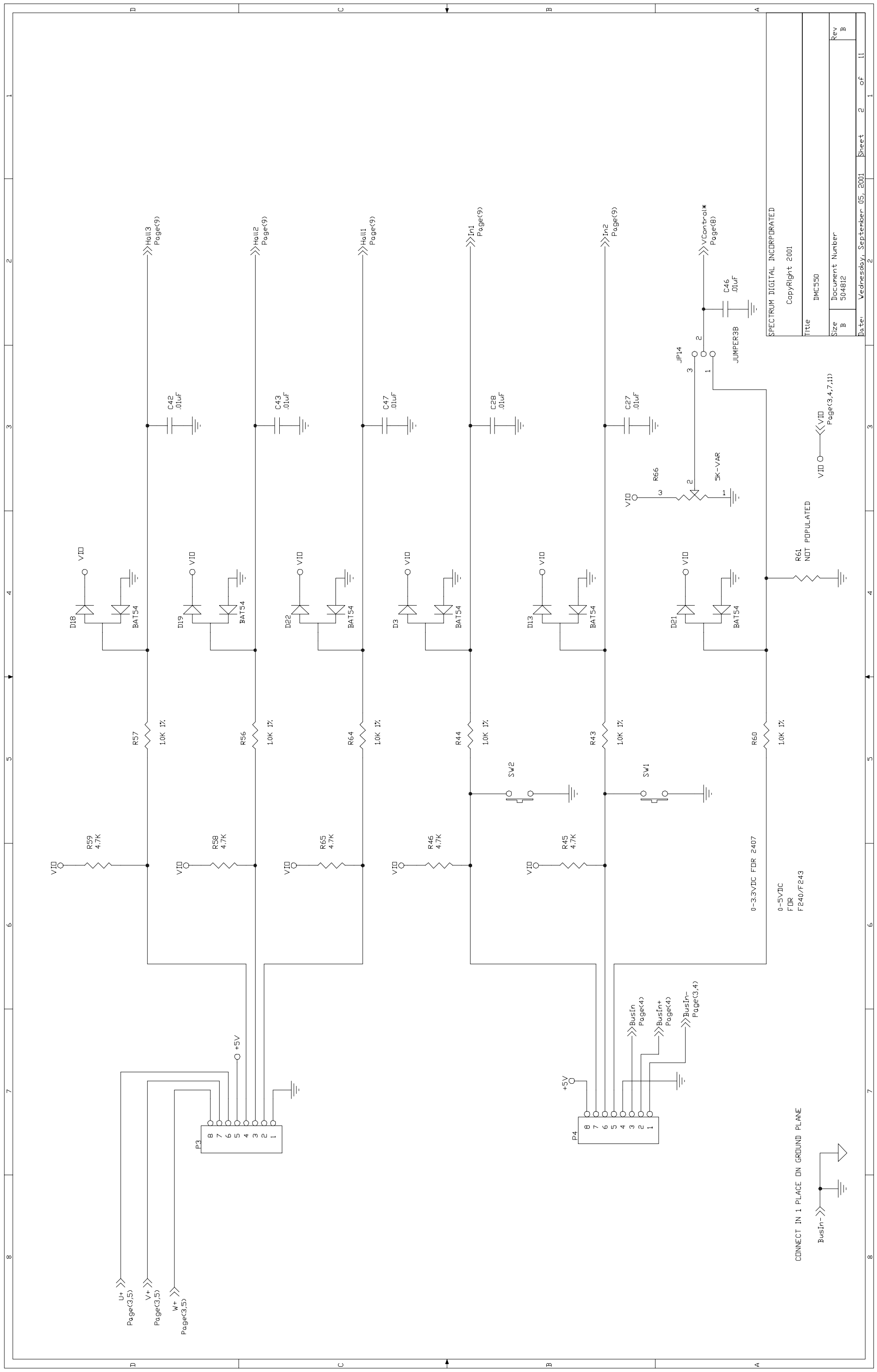
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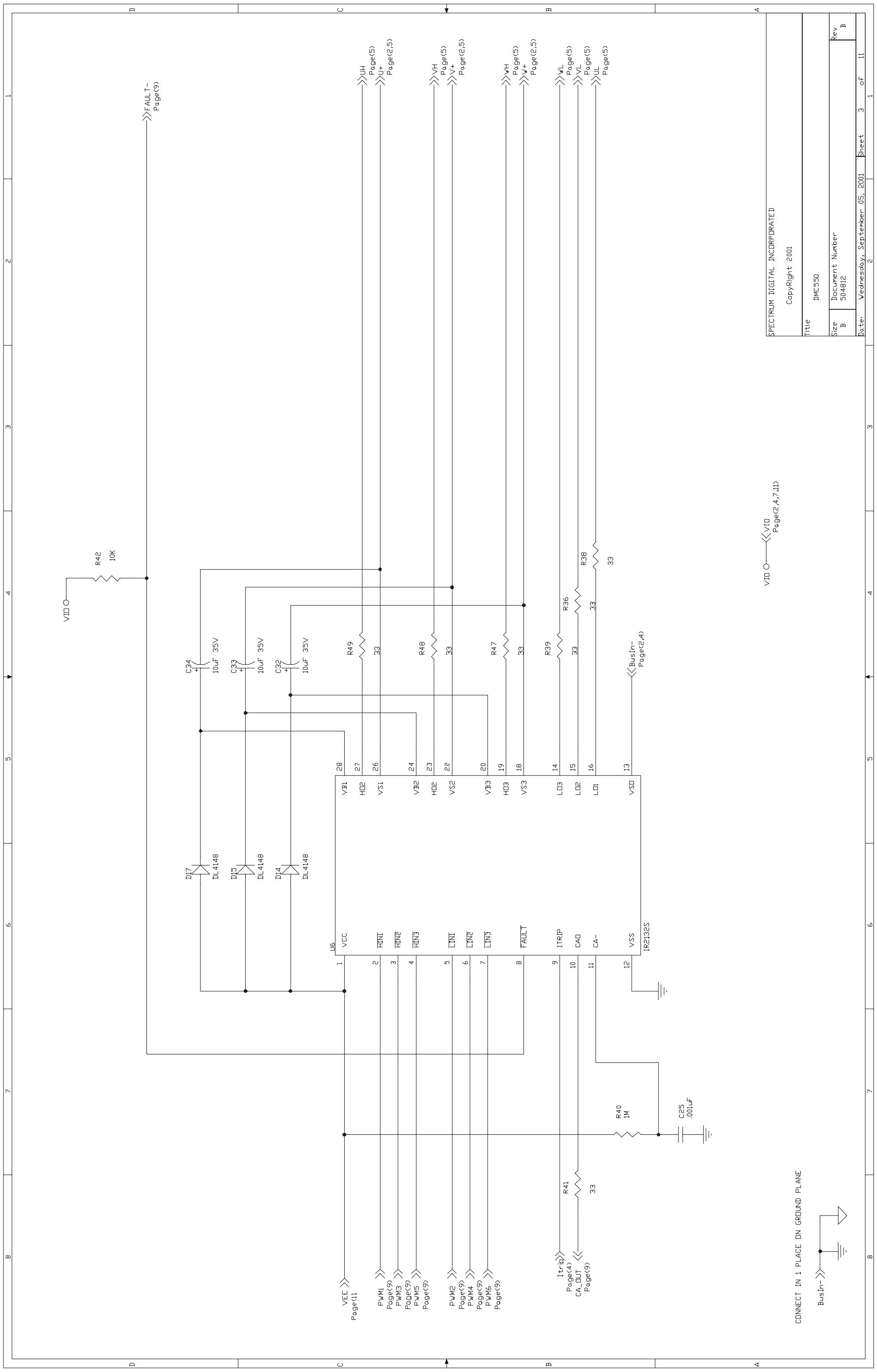
Date: Wednesday, September 05, 2001
Sheet 2 of 11
CONNECT IN 1 PLACE ON GROUND PLANE
0-3.3VDC FOR 2407
0-5VDC FOR F240/F243
R61 NOT POPULATED
JUMPER3B
5K-VAR


SPECTRUM DIGITAL INCORPORATED
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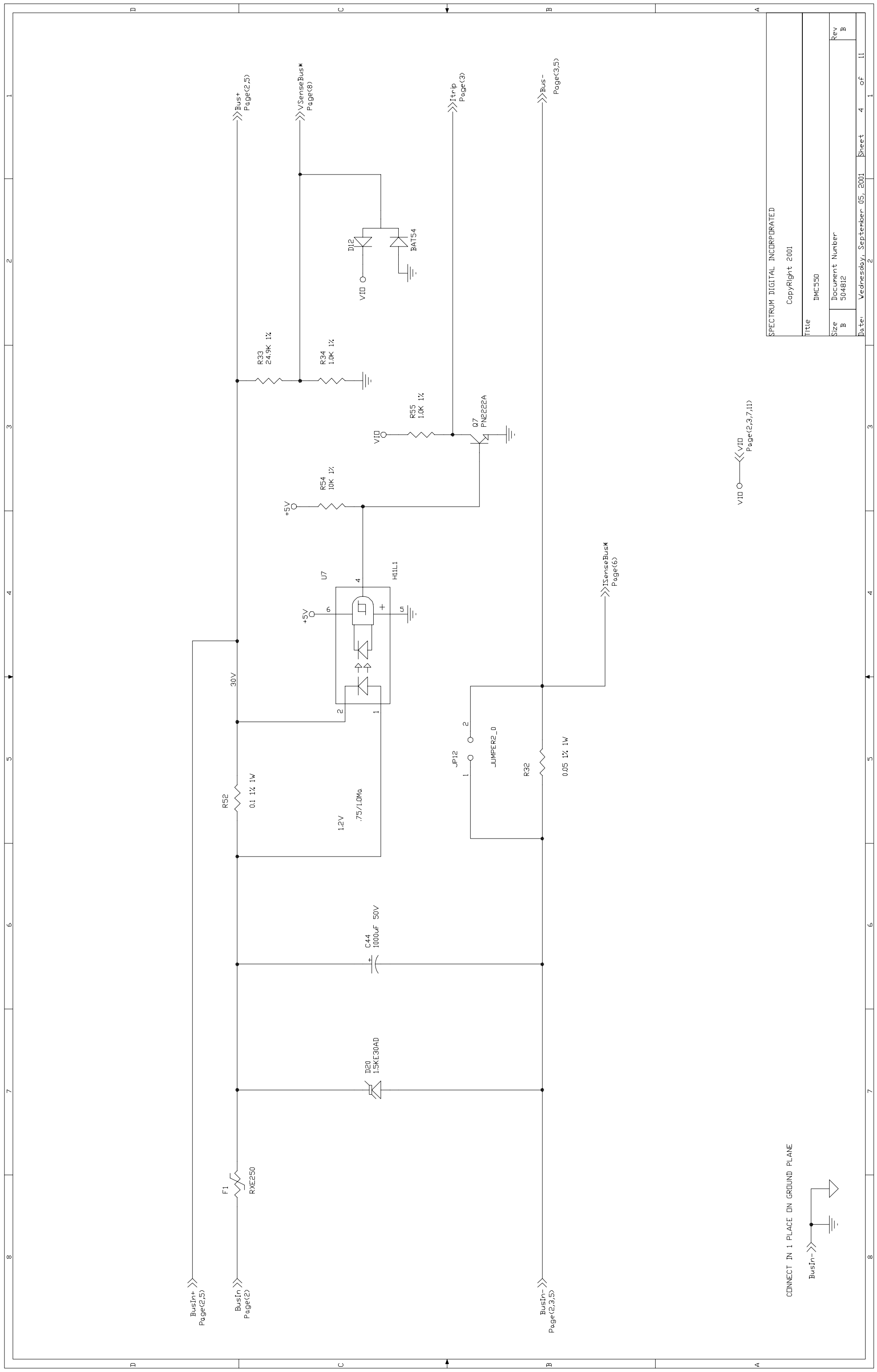
Title
DMC550
Size
B
Document Number
504812
Rev
B
Date: Wednesday, September 05, 2001
Sheet 3 of 11
U6
IR2132S
VCC
HIN1
HIN2
HIN3
LIN1
LIN2
LIN3
FAULT
ITRIP
CAO
CA-
VSS
VB1
HO1
VS1
VB2
HO2
VS2
VB3
HO3
VS3
LO3
LO2
LO1
VSO
R42
10K
VDD
FAULT-
Page(9)
C34
10uF 35V
C33
10uF 35V
C32
10uF 35V
D17
DL4148
D15
DL4148
D14
DL4148
R49
R48
R47
R39
R36
R38
33
R40
1M
C25
.001uF
R41
33
VCC
Page(1)
PWM1
PWM3
PWM5
PWM2
PWM4
PWM6
Page(9)
Itrip
Page(4)
CA_OUT
Page(9)
BusIn-
Page(2,4)
VDD
Page(2,4,7,11)
Page(5)
Page(2,5)
CONNECT IN 1 PLACE ON GROUND PLANE


SPECTRUM DIGITAL INCORPORATED
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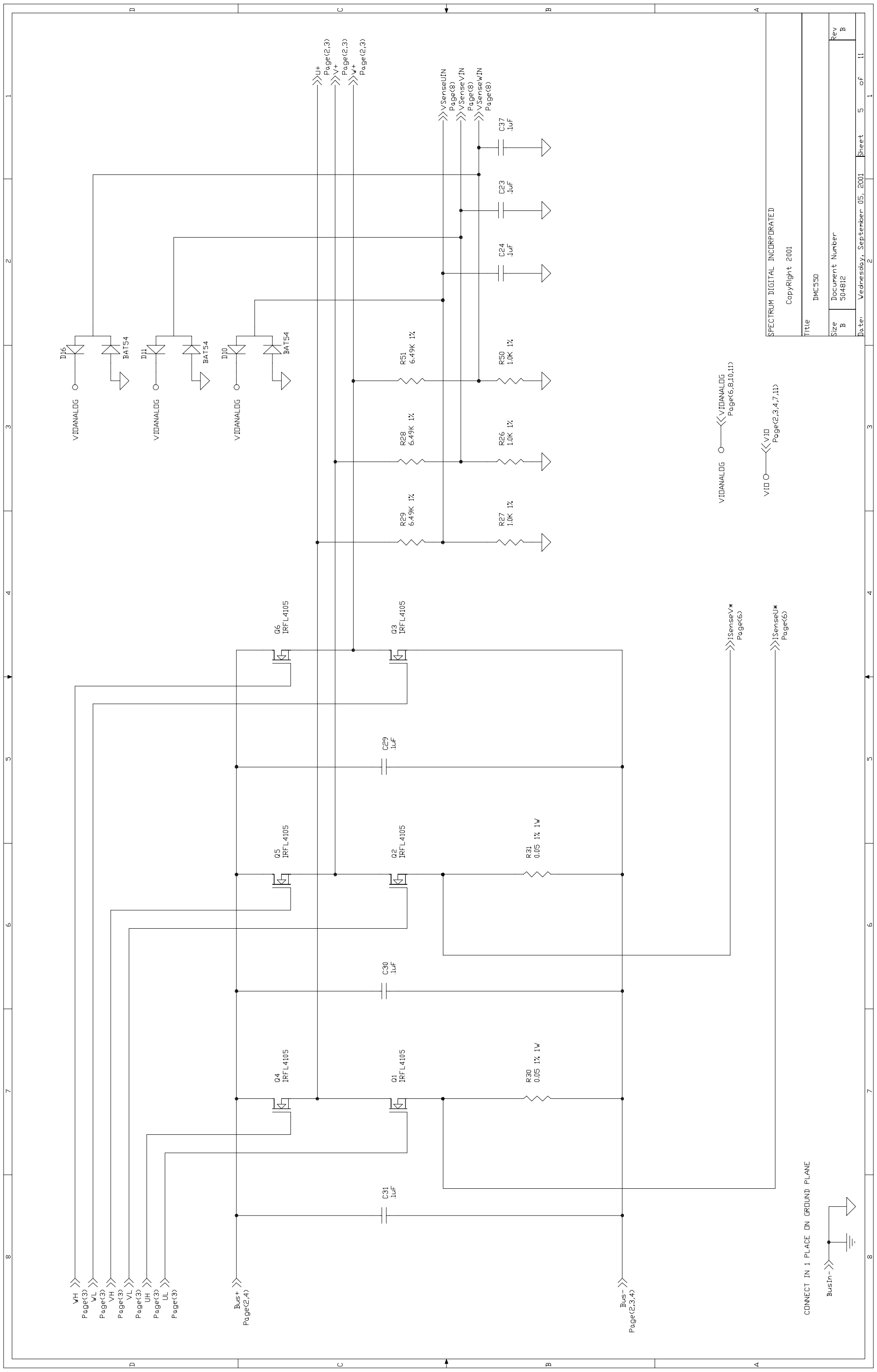
Title
DMC550
Size
B
Document Number
504812
Rev
B
Date: Wednesday, September 05, 2001
Sheet 4 of 11
Bus+
Page(2,5)
VSenseBus*
Page(8)
Itrip
Page(3)
Bus-
Page(3,5)
D12
BAT54
VIO
R33
24.9K 1%
R34
1.0K 1%
R55
10K 1%
Q7
PN2222A
R54
10K 1%
+5V
U7
H11L1
VIO
Page(2,3,7,11)
ISenseBus*
Page(6)
30V
JP12
JUMPER2_0
R32
.005 1% 1W
R52
.01 1% 1W
1.2V
.75/10Ma
C44
1000uF 50V
D20
15KE30AD
F1
RXE250
BusIn+
Page(2,5)
BusIn
Page(2)
BusIn-
Page(2,3,5)
CONNECT IN 1 PLACE ON GROUND PLANE
BusIn-


SPECTRUM DIGITAL INCORPORATED
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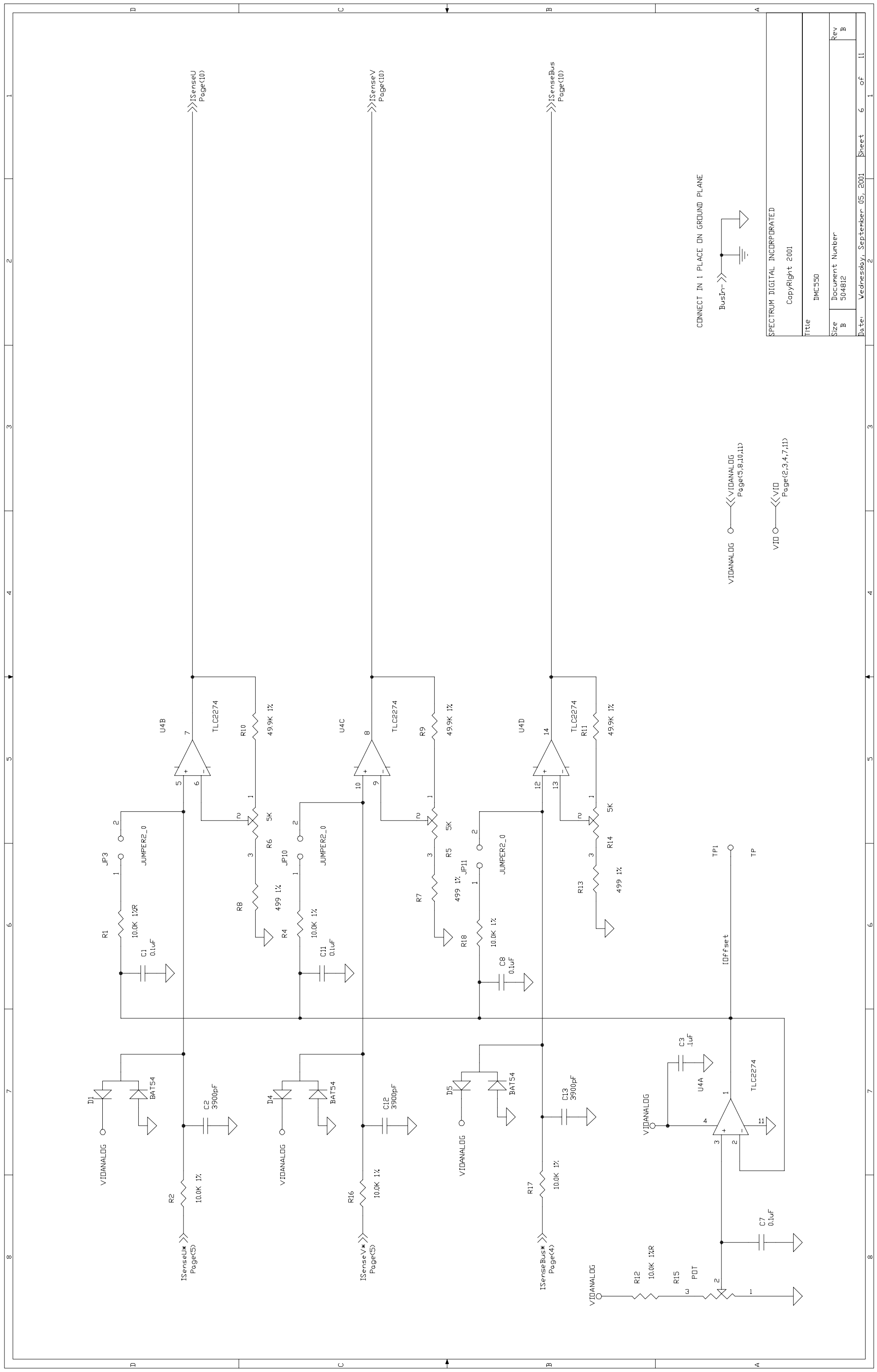
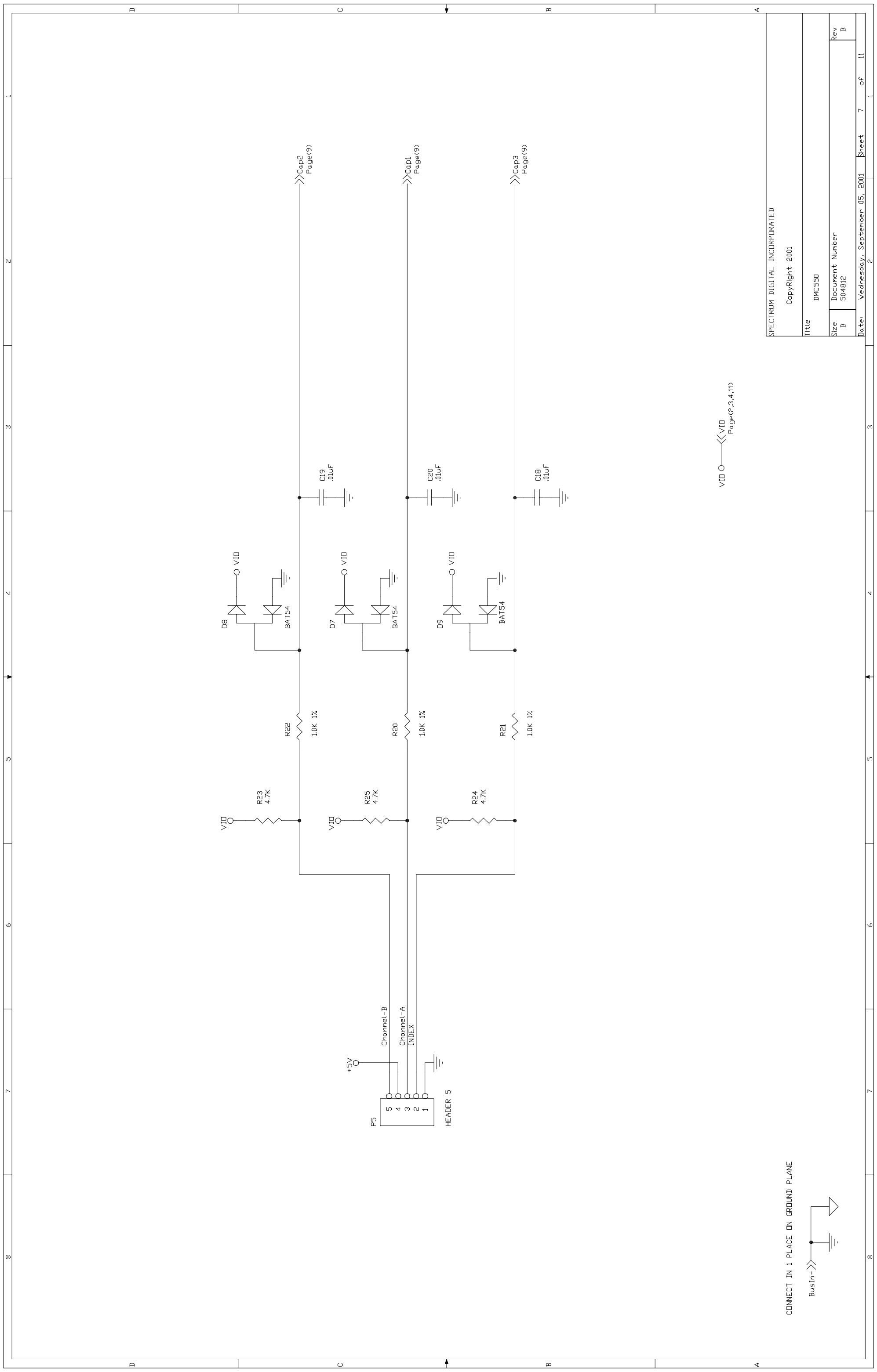
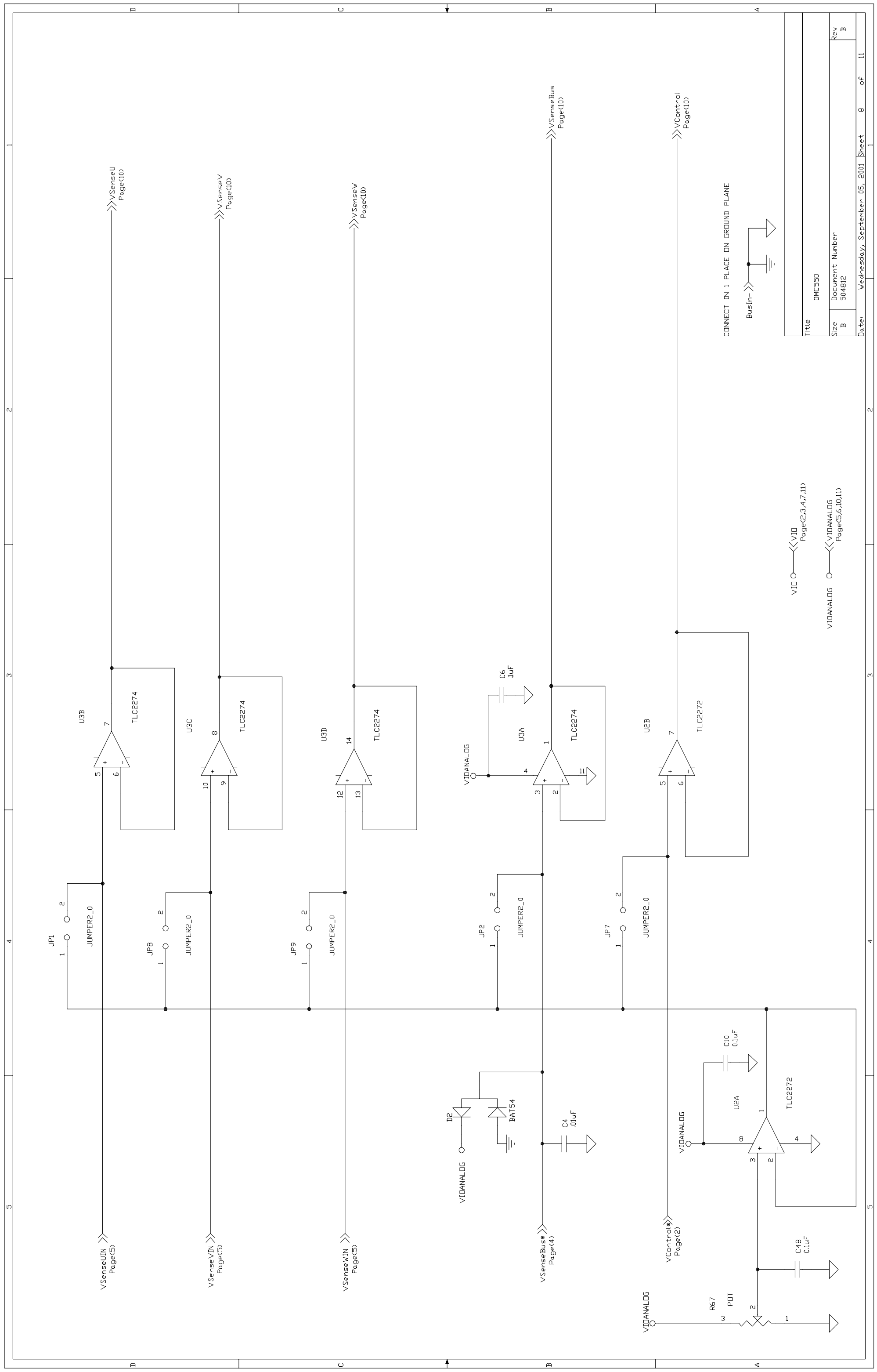
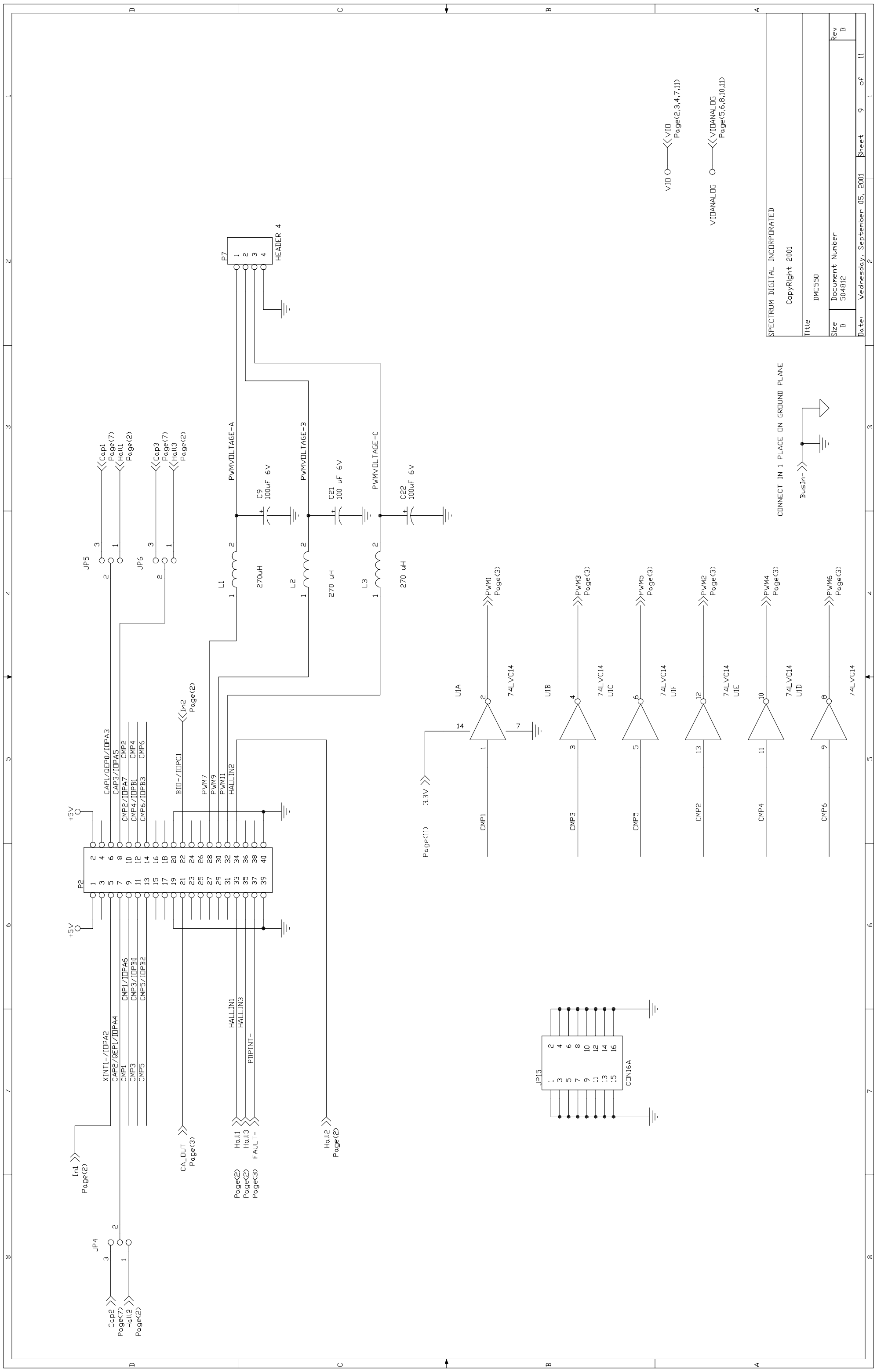
Title
DMC550
Size
B
Document Number
504812
Rev
B
Date: Wednesday, September 05, 2001
Sheet 5 of 11
CONNECT IN 1 PLACE ON GROUND PLANE
Q1 IRFL4105
Q2 IRFL4105
Q3 IRFL4105
Q4 IRFL4105
Q5 IRFL4105
Q6 IRFL4105
R30 0.05 1% 1W
R31 0.05 1% 1W
R26 10K 1%
R27 10K 1%
R28 6.49K 1%
R29 6.49K 1%
R50 10K 1%
R51 6.49K 1%
C23 1uF
C24 1uF
C29 1uF
C30 1uF
C31 1uF
C37 1uF
D10
D11
D16
BAT54
VIDANALOG
VID
ISenseV*
ISenseU*
Bus+
Bus-
BusIn-



ISenseU Page(10)
ISenseV Page(10)
ISenseBus Page(10)
CONNECT IN 1 PLACE ON GROUND PLANE
BusIn-
VIDANALOG Page(5,8,10,11)
VID Page(2,3,4,7,11)
SPECTRUM DIGITAL INCORPORATED
CopyRight 2001
Title
DMC550
Size B
Document Number 504812
Rev B
Date: Wednesday, September 05, 2001
Sheet 6 of 11
U4B
U4C
U4D
U4A
TLC2274
JUMPER2_0
BAT54
IOffset
TP1
TP
ISenseU* Page(5)
ISenseV* Page(5)
ISenseBus* Page(4)


SPECTRUM DIGITAL INCORPORATED
CopyRight 2001
Title DMC550
Size B
Document Number 504812
Rev B
Date: Wednesday, September 05, 2001
Sheet 7 of 11
Cap2 Page(9)
Cap1 Page(9)
Cap3 Page(9)
VIO Page(2,3,4,11)
C19 .01uF
C20 .01uF
C18 .01uF
D8
D7
D9
BAT54
R22 10K 1%
R20 10K 1%
R21 10K 1%
R23 4.7K
R25 4.7K
R24 4.7K
Channel-B
Channel-A
INDEX
+5V
P5
HEADER 5
CONNECT IN 1 PLACE ON GROUND PLANE
BusIn-


VSenseU Page(10)
VSenseV Page(10)
VSenseW Page(10)
VSenseBus Page(10)
VControl Page(10)
CONNECT IN 1 PLACE ON GROUND PLANE
BusIn-
Title
DMC550
Size B
Document Number 504812
Rev B
Date: Wednesday, September 05, 2001
Sheet 8 of 11
VIO Page(2,3,4,7,11)
VIOANALOG Page(5,6,10,11)
U3B TLC2274
U3C TLC2274
U3D TLC2274
U3A TLC2274
U2B TLC2272
U2A TLC2272
C6 1uF
C10 0.1uF
C4 .01uF
C48 0.1uF
D2 BAT54
R67 POT
JP1 JUMPER2_0
JP8 JUMPER2_0
JP9 JUMPER2_0
JP2 JUMPER2_0
JP7 JUMPER2_0
VSenseUIN Page(5)
VSenseVIN Page(5)
VSenseWIN Page(5)
VSenseBus* Page(4)
VControl* Page(2)
VIOANALOG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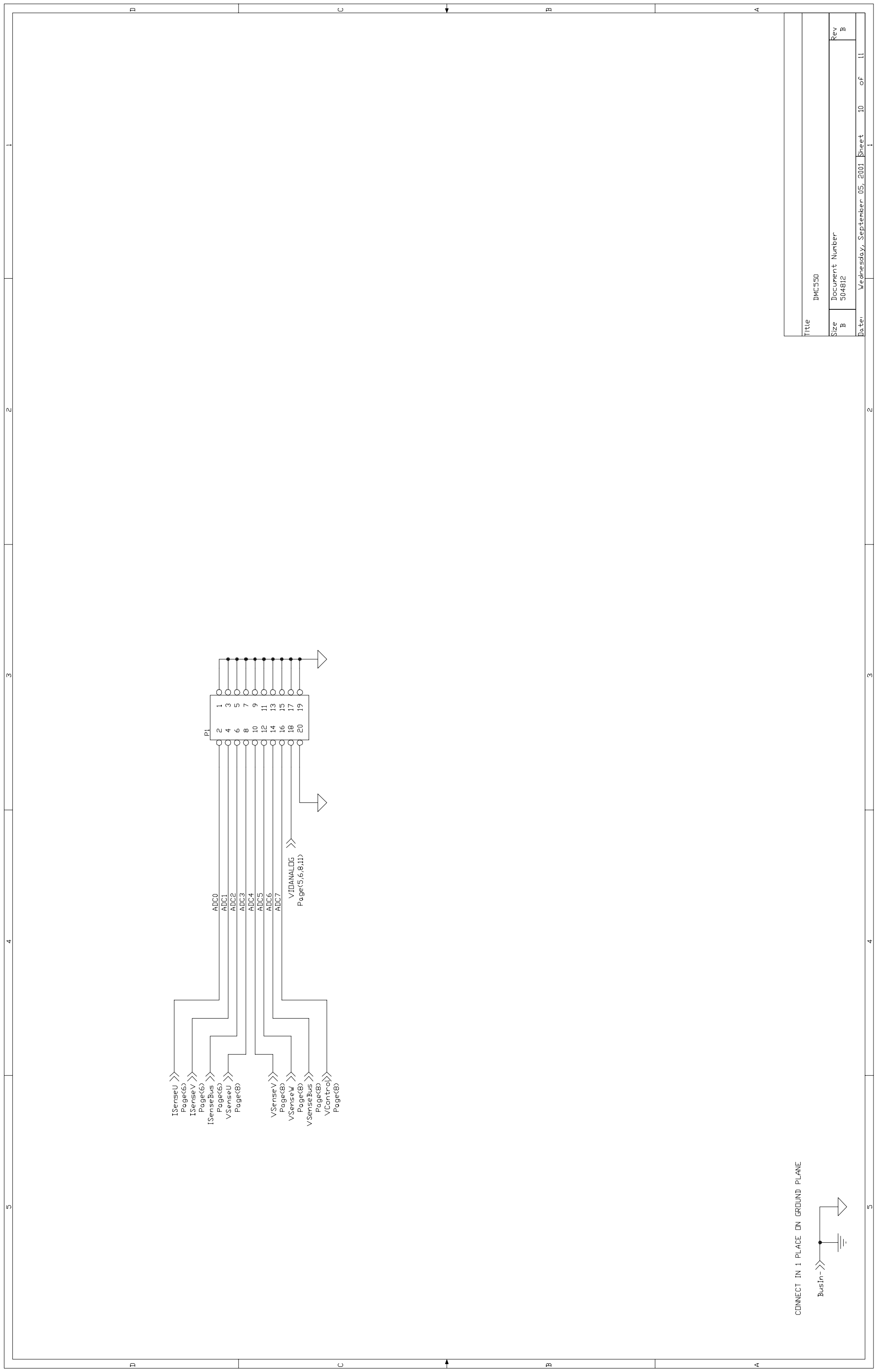
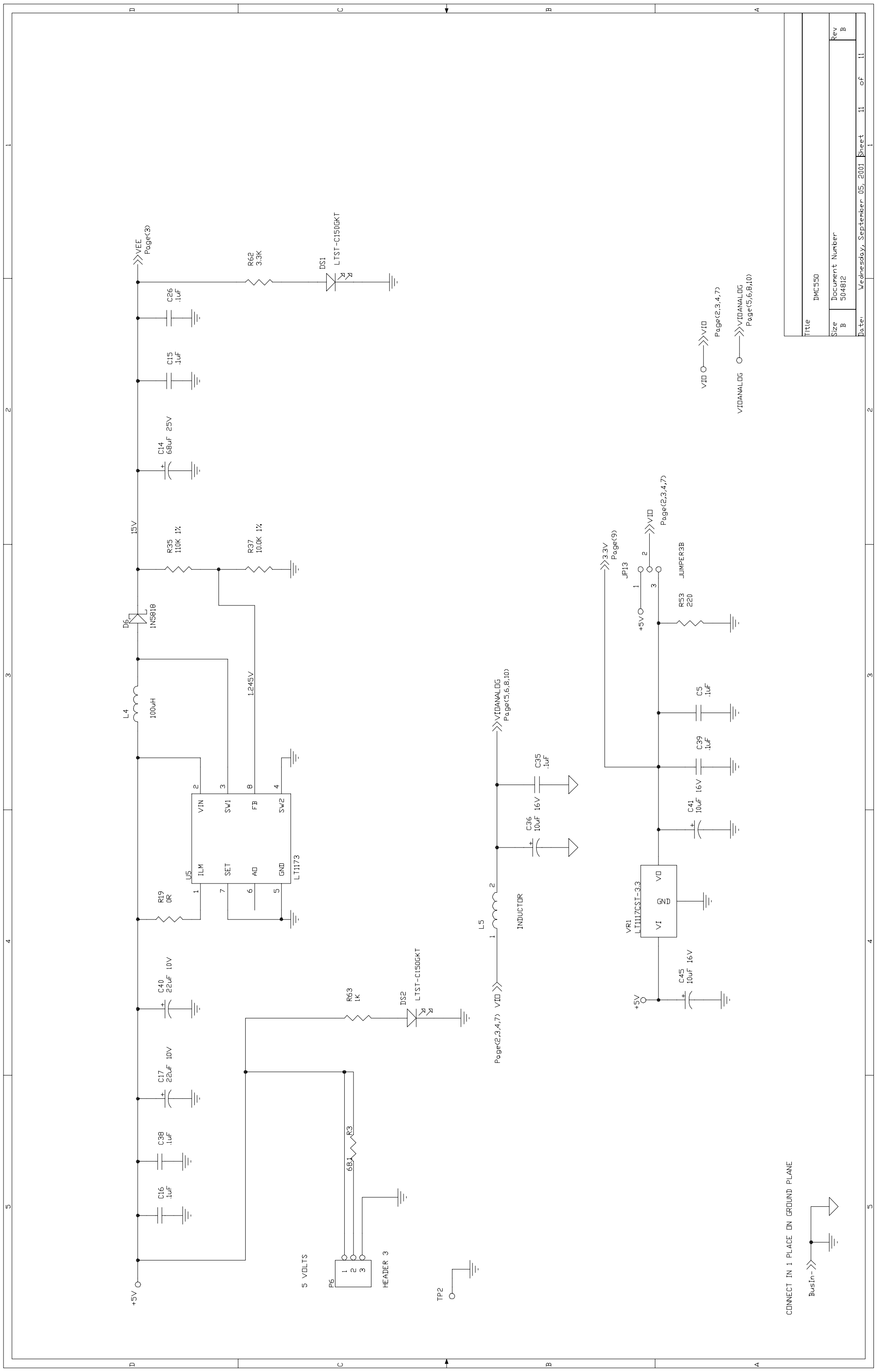
Title
DMC550
Size
B
Document Number
504812
Rev
B
Date: Wednesday, September 05, 2001
Sheet 9 of 11
CONNECT IN 1 PLACE ON GROUND PLANE
HEADER 4
PWMVOLTAGE-A
PWMVOLTAGE-B
PWMVOLTAGE-C
74LVC14
CON16A

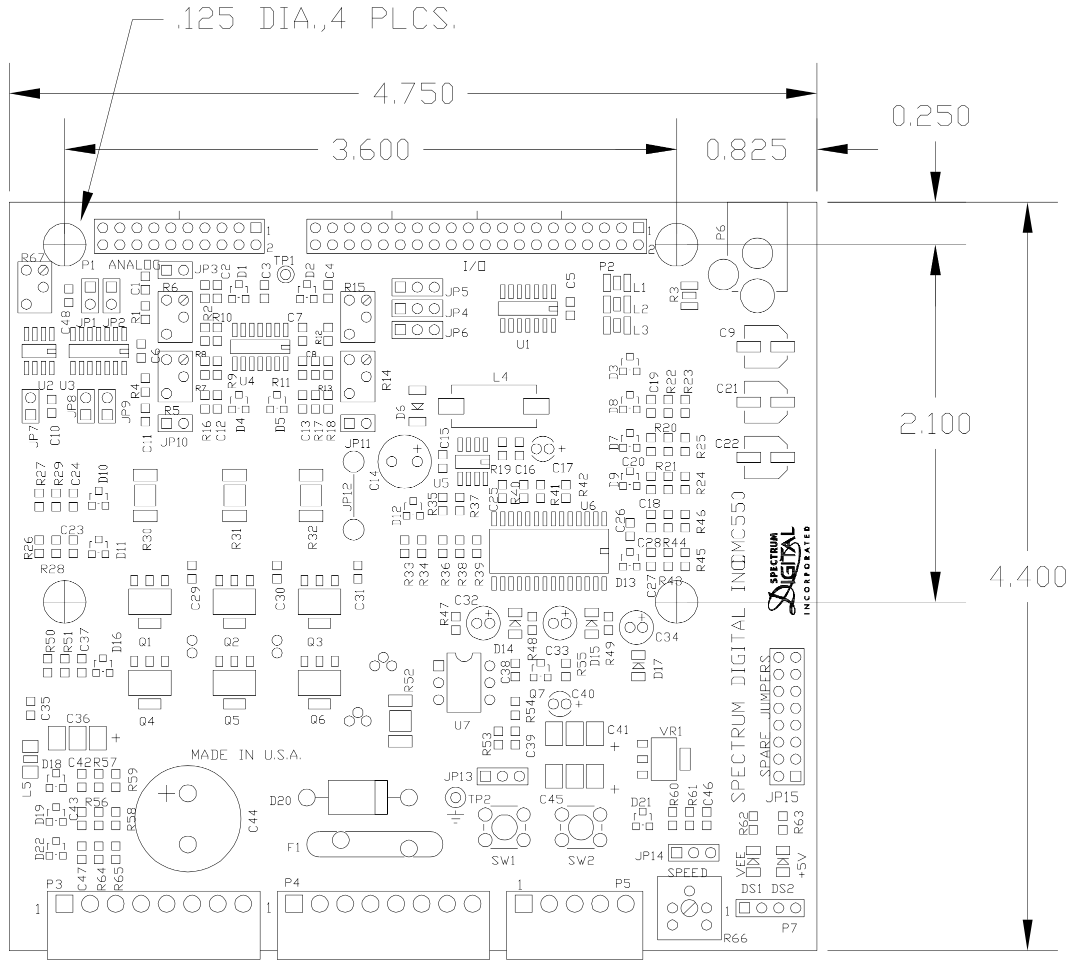

Title
DMC550
Size
B
Document Number
504812
Rev
B
Date: Wednesday, September 05, 2001
Sheet 10 of 11
CONNECT IN 1 PLACE ON GROUND PLANE
BusIn-
P1
ADC0
ADC1
ADC2
ADC3
ADC4
ADC5
ADC6
ADC7
VIDANALOG
Page(5,6,8,11)



Title
DMC550
Size
B
Document Number
504812
Rev
B
Date: Wednesday, September 05, 2001
Sheet 11 of 11
CONNECT IN 1 PLACE ON GROUND PLANE
LT1173
LT1117CST-3.3
JUMPER3B
HEADER 3
5 VOLTS
INDUCTOR

Appendix B
DMC550 Mechanicals

This appendix contains the mechanical dimensions for the DMC550.



Note: The dimensions are not a 1-1 scale

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