DS90CP22
2x2 LVDS Switch
Demonstration Kit
Documentation

Rev2

Interface Products

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Introduction:

National Semiconductor's Interface Products Group provides this demonstration kit of the DS90CP22 to help demonstrate the use and performance of the device. The user needs to provide the proper signal levels (TTL/CMOS, LVDS or LVPECL) to the inputs of the device. This board is mainly intended to allow the user to evaluate the performance of the device.

The DS90CP22 board is designed with a 50Ω single-ended transmission line, which accepts LVDS signals or LVPECL levels to the inputs IN0+/- and IN1+/- from a signal generator. The SEL0 and SEL1 pins can also be driven by a signal generator. These inputs to the DS90CP22 are terminated with a 50Ω to ground.

The EN0, EN1 (enable pins), SEL0 and SEL1 accepts TTL/CMOS logic. The maximum voltage to these pins is 3.6V.

Contents of Demonstration Kit:

1) One DS90CP22 board
2) DS90CP22 Demonstration kit documentation (LIT#LVDSCP22EVK.DOC)

Example of how to set-up the DS90CP22 demonstration board to take AC measurements

AC Set-Up:

1. Apply Vcc=3.3V and Ground to the board power pads.
2. Apply V_bias=8.25V from a separate source other than Vcc to the board. Depending on the resistor variation, this voltage should be changed to ensure that the output Vos is +1.2V. To do this, simply TRI-STATE the output and monitor the voltage node after the 1.62kΩ resistor (bottom PCB traces). This should be at +1.2V. In order to probe using 50Ω load the V_bias is used because LVDS cannot drive 50Ω load to ground. The resistors 10:1 (20dB) attenuation (453Ω with 50Ω scope load) are also used because 50Ω scopes have a max voltage of 1-2V.
3. Input signals
   A. Connect all 4 inputs (IN0+/-, IN1+/-) from the differential signal generator.
   B. Place shunt connectors to the 3 header connector of EN0 and EN1. The outputs are enabled when positioned to H (high).
   C. SEL0 and SEL1 are used for switch configurations. They accept TTL/CMOS logic signal (0-Vcc). Please reference the datasheet for the switch matrix table. When using a signal generator as a source, the shunt

connectors to the 3 header post of SEL0 and SEL1 must be removed. When any of the SEL are applied to Vcc using the shunt jumper, the current consumption increase (I=3.3V/50Ω = 6.6mA) because of the 50Ω termination resistor.

4. Output signals
   A. Connect all 4 output lines (OUT0+/-, OUT1+/-) to probe on scope (50Ω & High B/W).
5. Generate LVDS input signals or LVPECL to the device using a signal generator by setting the high and low voltage level.
6. EN0 and EN1 are used to enable the outputs (Vcc must be applied to these pins to enable).
7. Measure propagation delay between input at 0V differential crossing point to output 0V differential crossing point. Typical propagation delay is 1.3ns.
8. Measure rise and fall time by generating a third signal from the OUT+ and OUT- output signals
   Vdiff = (OUT+) – (OUT-) and measure from 20% to 80%

Recommended Equipment:

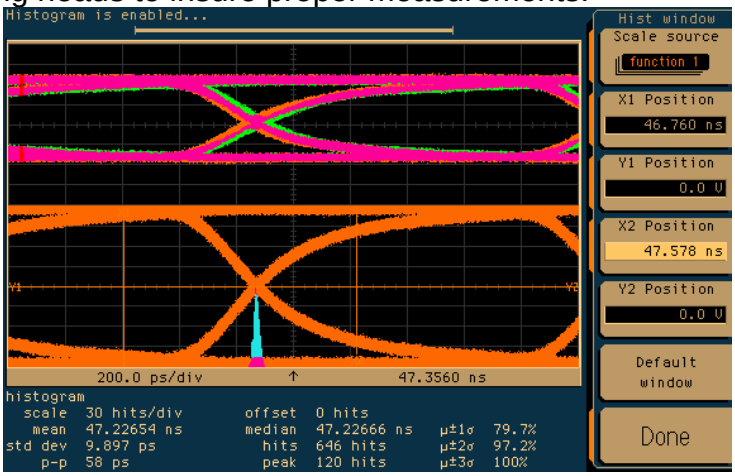
- HFS9009 Signal Generator (differential output for Din w/HFS9DG2, single-ended output for EN0, EN1, SEL0, SEL1 w/HFS9DG1)
- Tektronix SD-22 Sampling Heads in a SM-11 using a Tektronix 11801B Digital Sampling Scope
- Pasternack 20dB attenuators

Recommended Cables:

Matched length RG142B double-shielded cables for high speed measurements and RG58AX coax cables acceptable for low speed measurements.

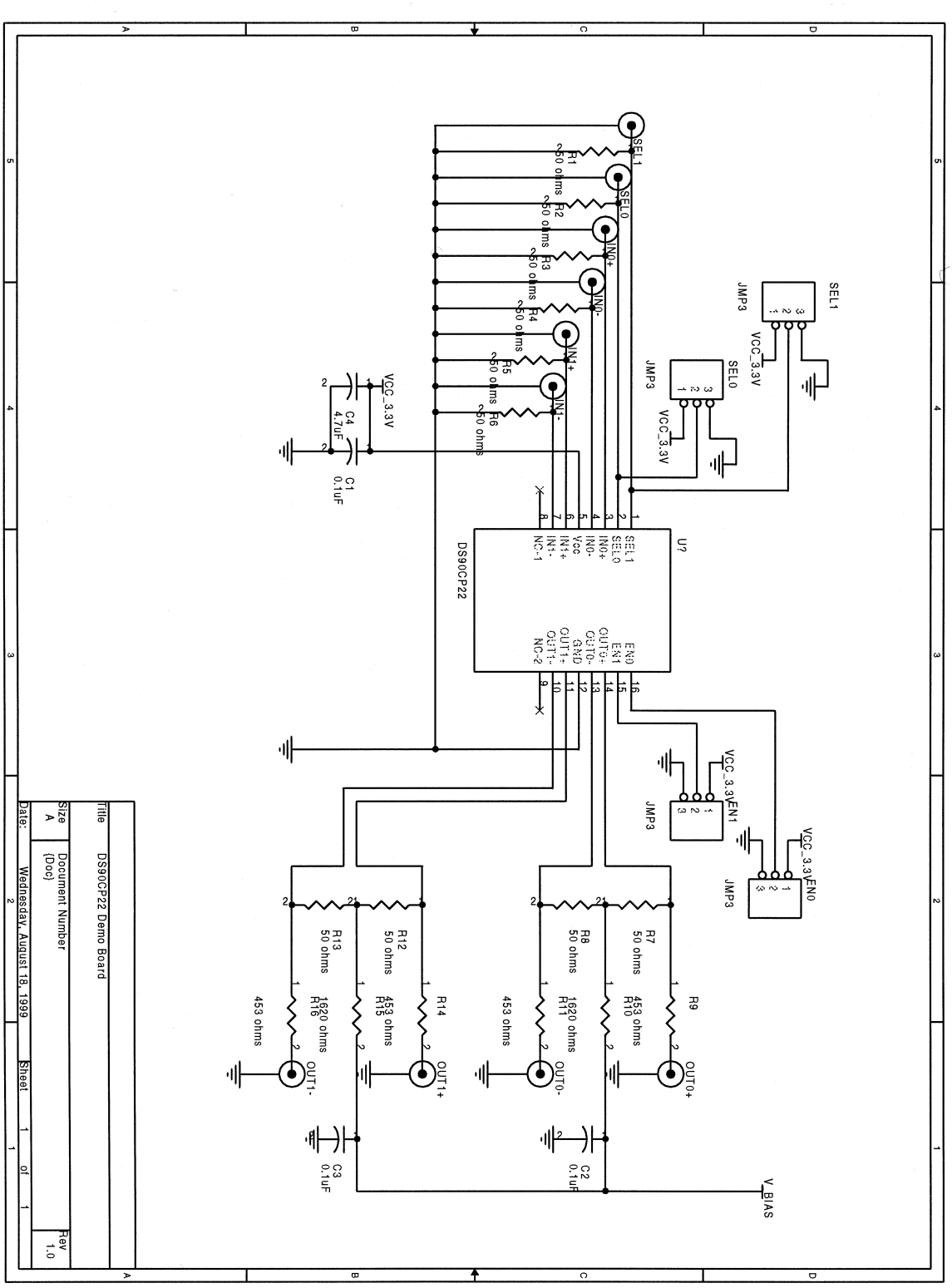
Notes:

Do not attempt to measure only 1 channel by connecting only one driver's inputs and outputs. All inputs/outputs must be connected to either the signal generator or 50Ω sampling heads to insure proper measurements.



Bill of Materials

	Labels	Value	Footprint
Resistors	R1,R2,R3,R4,R5,R6,R7,R8,R12,R13	50Ω	SMT-0805
	R10,R15	1.62KΩ	SMT-0805
	R9,R11,R14,R16	453Ω	SMT-0805
Capacitors	C1,C2,C3	0.1uF	SMT-0805
	C4	4.7uF	SMT-caseB
Connectors	SEL0,SEL1,IN0+,IN0-,IN1+,IN1-, OUT0+,OUT0-,OUT1+,OUT1-	Johnson Components: 142-0701-231	SMA Straight Receptacle
	SEL0,SEL1,EN0,EN1	3 Header Posts	0.1” spacing
	VCC,GND,V_BIAS	Power pads	1/8” square
Device	U1	DS90CP22	16L SOIC


SEL1
SEL0
IN0+
IN0-
IN1+
IN1-
R1 50 ohms
R2 50 ohms
R3 50 ohms
R4 50 ohms
R5 50 ohms
R6 50 ohms
JMP3
VCC_3.3V
C4 4.7uF
C1 0.1uF
U?
DS90CP22
SEL1
SEL0
IN0+
IN0-
Vcc
IN1+
IN1-
NC-1
EN0
EN1
OUT0+
OUT0-
GND
OUT1+
OUT1-
NC-2
VCC_3.3V_EN1
VCC_3.3V_EN0
R13 50 ohms
R12 50 ohms
R14
R8 50 ohms
R7 50 ohms
R9
1620 ohms R16
453 ohms R15
1620 ohms R11
453 ohms R10
453 ohms
OUT1-
OUT1+
OUT0-
OUT0+
C3 0.1uF
C2 0.1uF
V_BIAS
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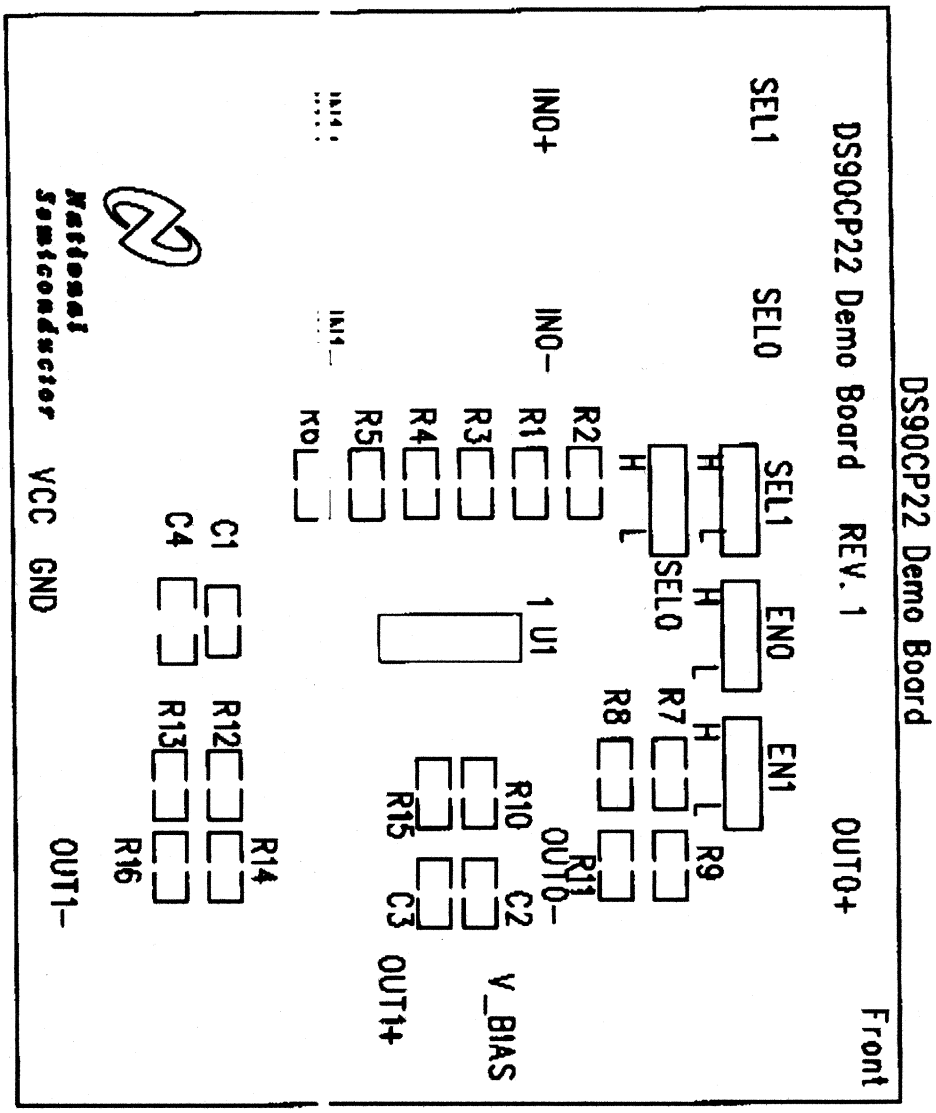
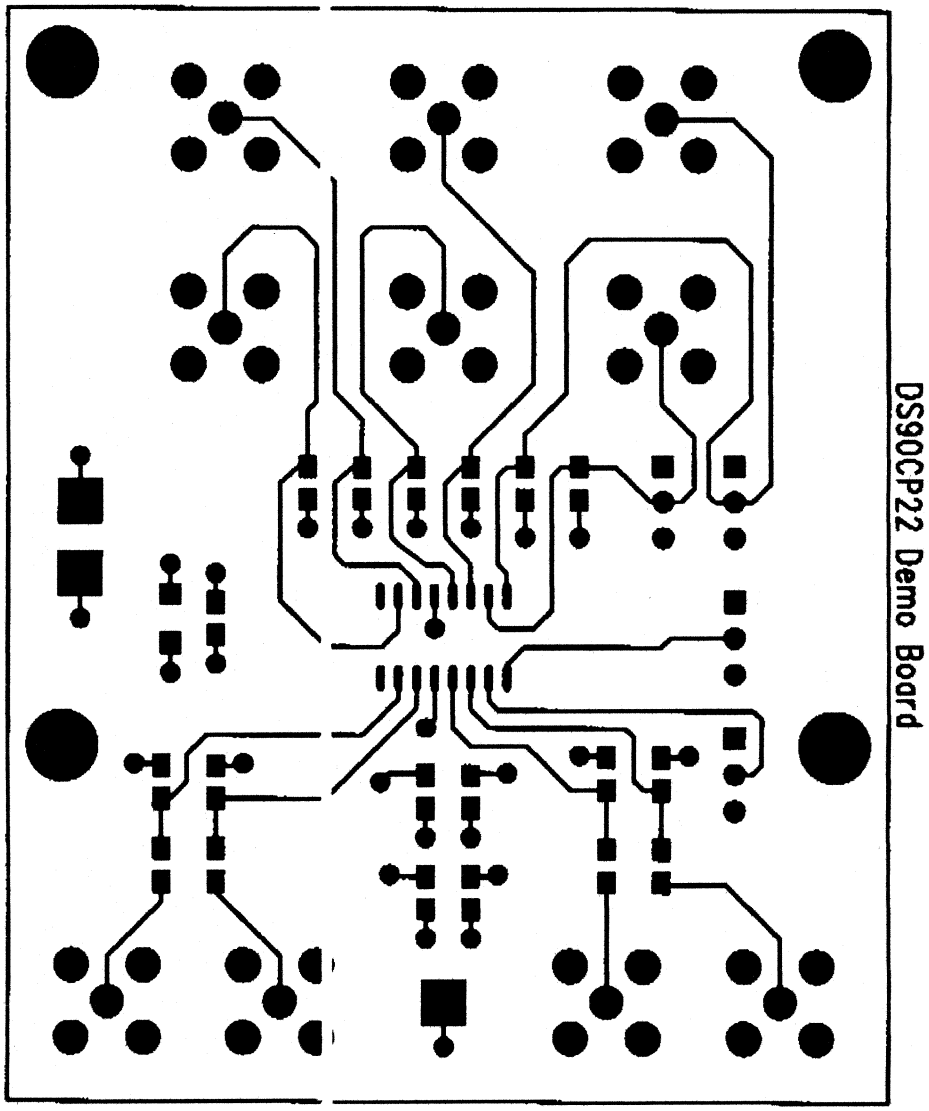
Size A
Document Number {Doc}
Rev 1.0
Date: Wednesday, August 18, 1999
Sheet 1 of 1


DS90CP22 Demo Board REV. 1
DS90CP22 Demo Board
SEL1
SEL0
IN0+
IN0-
IN1+
IN1-
R0L
R1
R2
R3
R4
R5
SEL1
SEL0
EN0
EN1
R7
R8
R9
R10
R11
R15
C1
C2
C3
C4
R12
R13
R14
R16
1 U1
V_BIAS
OUT0+
OUT0-
OUT1+
OUT1-
VCC
GND
Front
National Semiconductor

Layer: SILK



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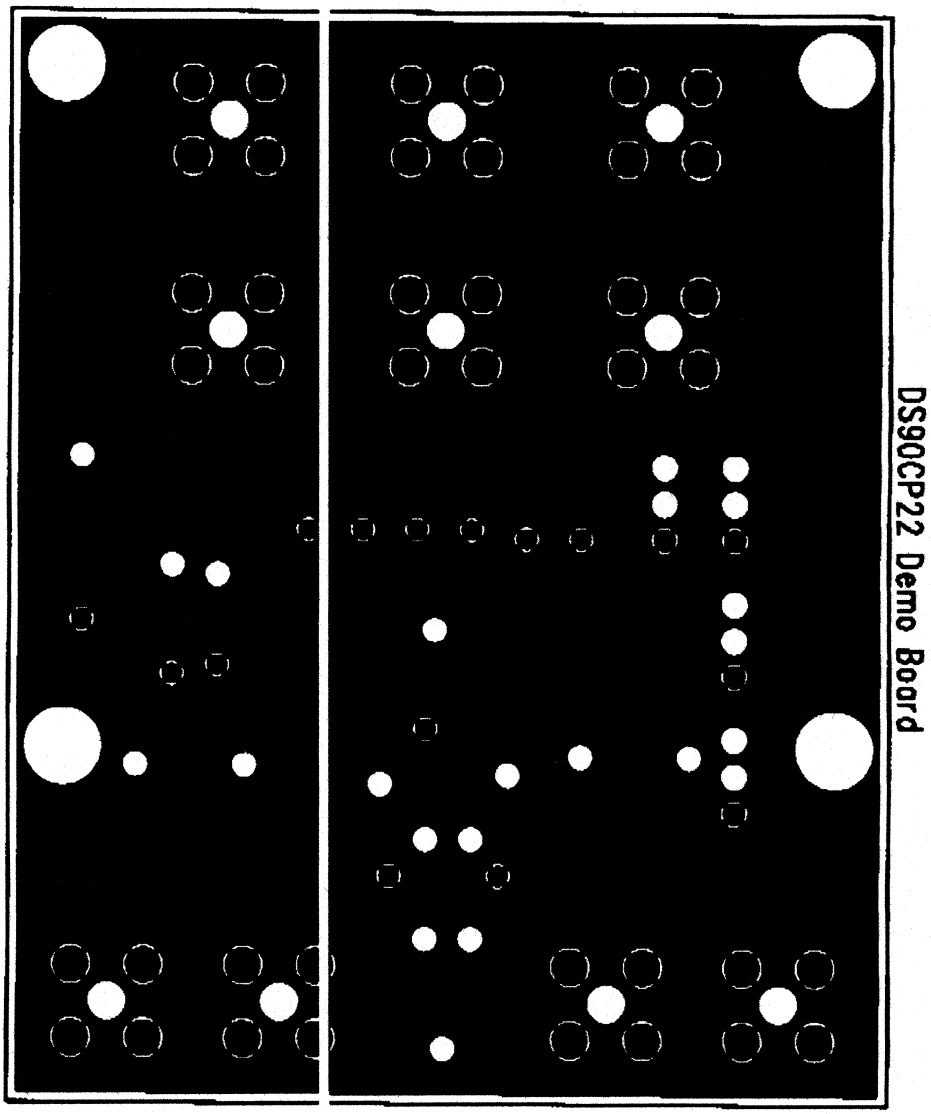

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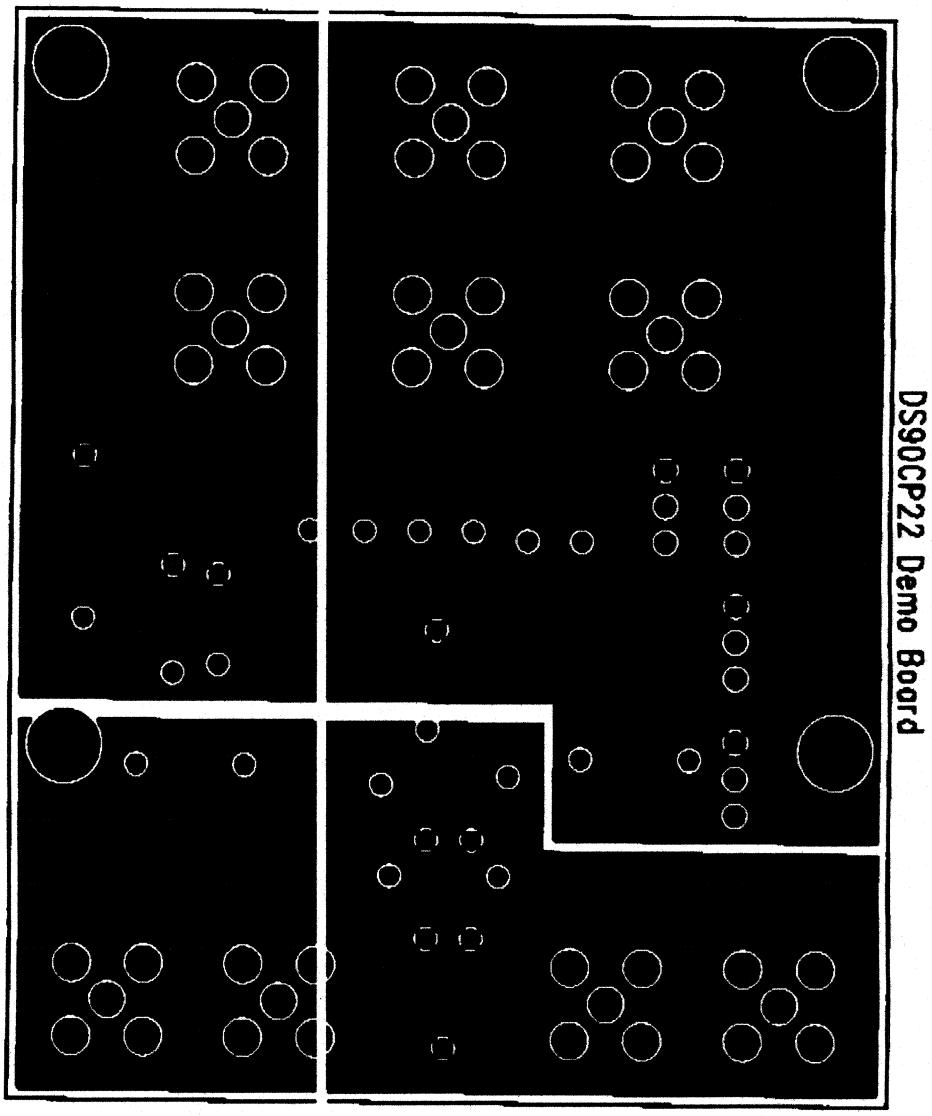

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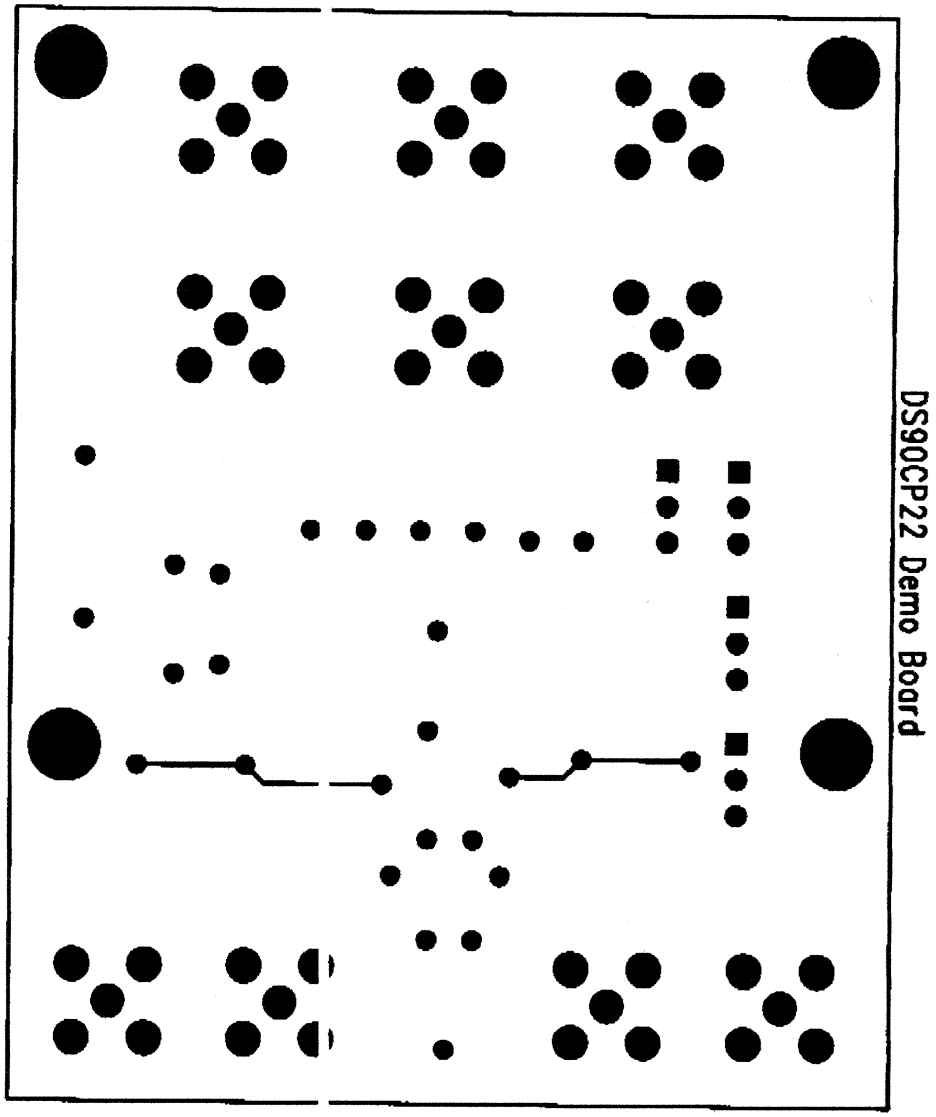

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References & helpful hints:

For more information on LVDS, refer to the Datasheets and Application notes.

Datasheets:
DS90CP22 – 2x2 800Mbps LVDS Crosspoint Switch

Application Notes:
- An Overview of LVDS Technology: AN-971
- Low-Voltage Signal Yields Megatransfers per second with Milliwatts of Power: AN-1060
- Common Data Transmission Parameters and their Definitions: AN-912

Additional Information available on the Internet:
http://www.national.com/appinfo/lvds