SY10/100EP16U and SY10/100EP16V Evaluation Board

2.5V/3.3V/5V Precision ECL Differential Receiver/Driver

General Description

The SY10/100EP16U and SY10/100EP16V evaluation boards are designed for convenient set-up and quick evaluation. They allow the user to evaluate the part over the full voltage-range of the part without requiring any modification to the board.

The evaluation board standard configuration is AC-coupled inputs with AC-coupled outputs for direct interface to a 50Ω-compatible oscilloscope. For applications that require a DC-coupled configuration, step-by-step instructions for modifying the board are included.

All datasheets and support documentation can be found at Micrel's web site at: www.micrel.com.

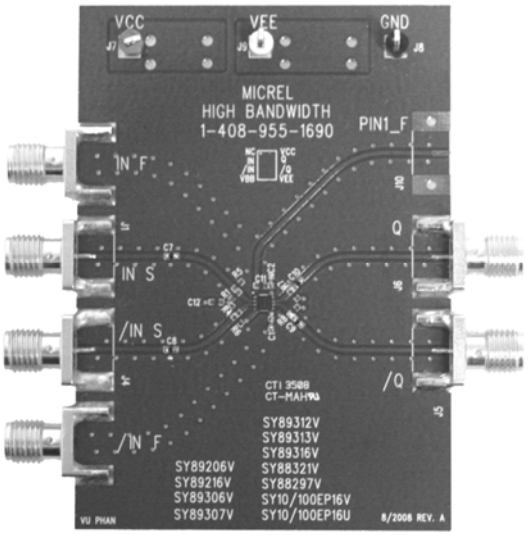
Features

- SY10/100EP16UM ECL output
- SY10/100EP16VM ECL output
- Single 2.5V, 3.3V, or 5V power supply
- AC-coupled configuration for ease-of-use
- I/O interface includes on-board termination
- Fully assembled and tested
- Reconfigurable for DC-coupled operation

Applications

- SY10/100EP16U 2.5/3.3V Precision ECL Differential Receiver/Driver
- SY10/100EP16V 3.3V/5V Precision ECL Differential Receiver/Driver

Evaluation Board



Evaluation Board Description

The SY10/100EP16U and SY10/100EP16V evaluation boards are designed to accept an AC-coupled input with AC-coupled or DC-coupled outputs.

The choice between the two configurations offers the user flexibility in selecting the board that is right for the given application.

Step-by-step instructions for modifying an AC-coupled evaluation board for DC-coupled operation are supplied in the sub-section "Modifying your AC-Coupled Board for DC-Coupled Operation."

AC-Coupled Evaluation Board (AC-Coupled Input, AC-Coupled Output)

The AC-coupled configuration is suited for most customer applications and is preferred by the majority of users because of its ease-of-use. It requires only a single power supply and offers the most flexibility when interfacing to a variety of signal sources.

The DC-bias levels and AC-coupling capacitors are supplied on-board for the input. The user only needs to supply a minimum input voltage swing and the bias voltage will automatically adjust the input to the correct level as the power supply voltage varies.

DC-Coupled Evaluation Board (AC-Coupled Input, DC-Coupled Output)

For DC-coupled operation, the boards can be modified to use two power supplies in a "split-supply configuration". The SY10/100EP16U operates with a 2.5V or 3.3V supply while the SY10/100EP16V operates with a 3.3V or 5V supply. The term split-supply simply means a +2.5V supply is split into +2V and –0.5V, a +3.3V supply is split into +2V and -1.3V, and a +5V supply is split into +2V and -3.0V. This effectively offsets the board by +2V. The +2V offset in this two-power supply configuration then provides the correct terminations for the device by setting the ground potential on the board to be exactly 2 volts below the V_{CC} supply. The V_{EE} voltage is then set to –0.5V for 2.5V devices, –1.3V for 3.3V devices, and -3.0V for 5V devices so the device power pins still see a full 2.5V, 3.3V, or 5V potential between V_{CC} and V_{EE}.

Step-by-step instructions for modifying an AC-coupled evaluation board for DC-coupled operation are supplied in the sub-section, "Modifying your AC-Coupled Board for DC-Coupling Operation."

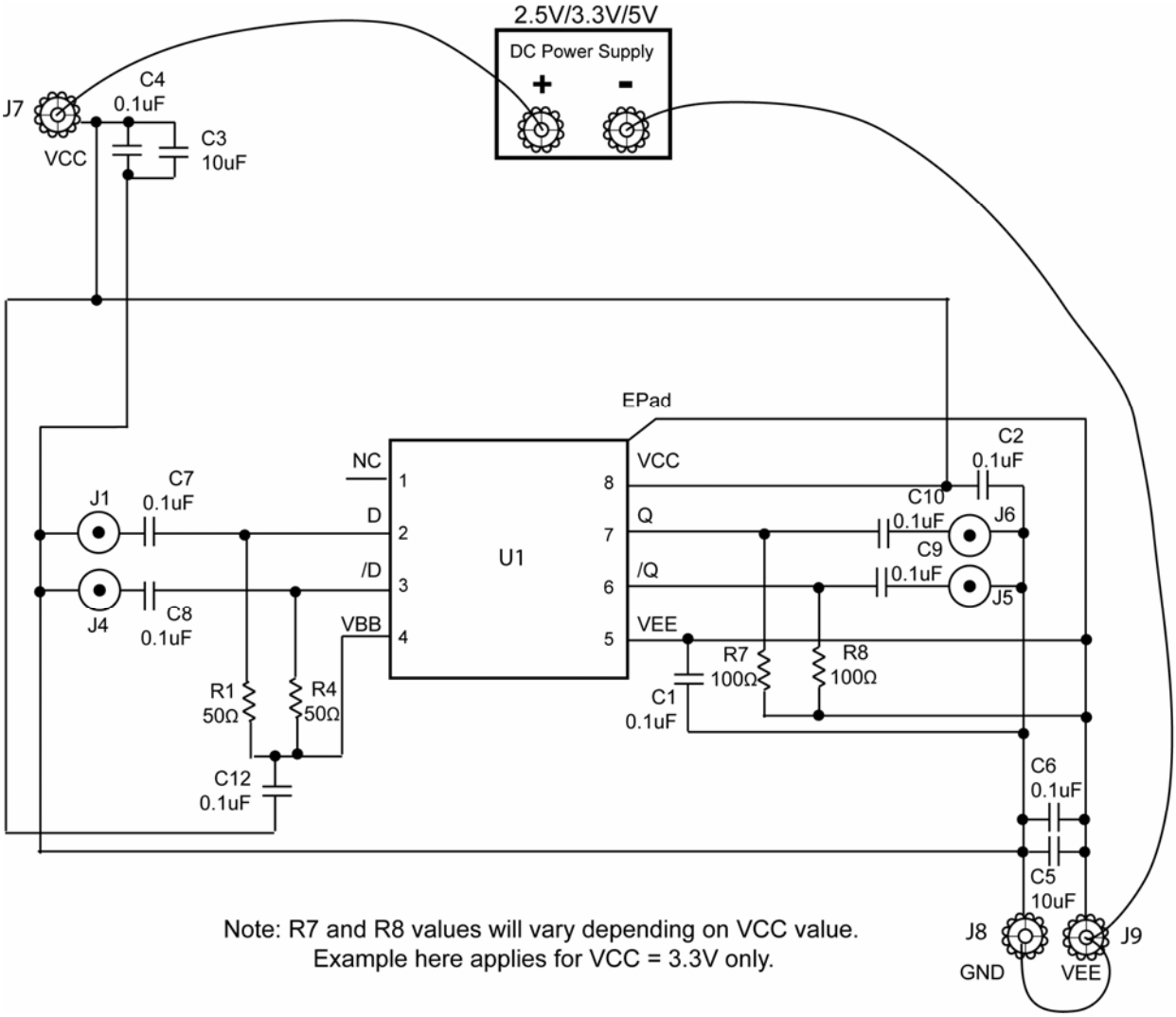
AC-Coupled Evaluation Board Setup
(AC-Coupled Input, AC-Coupled Output)

Setting up the SY10/100EP16U and SY10/100EP16V AC-Coupled Evaluation Board

The following steps describe the procedure for setting up the evaluation board:

1. Set the voltage setting for a DC supply to be 2.5V or 3.3V (SY10/100EP16U only) or 3.3V or 5V (for SY10/100EP16V only) and turn off the supply.
2. On the evaluation board, short the GND terminal to the V_{EE} terminal and connect them to the negative side of the DC power supply.
3. Connect the V_{CC} terminal to the positive side of the DC power supply.
4. Turn on the power supply and verify that the power supply current is <45mA.
5. Turn off the power supply.
6. Using a differential signal source, set the amplitude of each side of the differential pair to be 800mV (1600mV measured differentially). The offset is not critical, as the AC-coupled inputs will be automatically biased to the correct offset. Turn off or disable the outputs of the signal source.
7. Using equal length 50Ω impedance coaxial cables connect the signal source to the SMA inputs on the evaluation board.
8. Using equal length 50Ω impedance coaxial cables connect the outputs of the evaluation board to the oscilloscope or other measurement device that has an internal 50Ω termination.
9. Turn on the power and verify the current is <50mA.
10. Enable the signal source and monitor the output.

Evaluation Board



SY10/100EP16U and SY10/100EP16V AC-Coupled Evaluation Board

Power Supply	V_{CC}	GND	V_{EE}	I/O
2.5V	2.5V	0V	0V	AC-Coupled Input/AC-Coupled Output
3.3V	3.3V	0V	0V	AC-Coupled Input/AC-Coupled Output
5V	5V	0V	0V	AC-Coupled Input/AC-Coupled Output

Table 1. SY10/100EP16U and SY10/100EP16V AC-Coupled Evaluation Board Power Supply Connections

Modifying the AC-Coupled Board for DC-Coupled Operation

When DC-Coupling is Necessary

For applications where AC-coupling of the output is not appropriate, the board can be reconfigured for DC-coupled output operation. The inputs remain AC-coupled.

Reconfiguring AC-Coupled Outputs to be DC-Coupled Outputs

The following procedure details the steps for converting an AC-coupled board to a DC-coupled board.

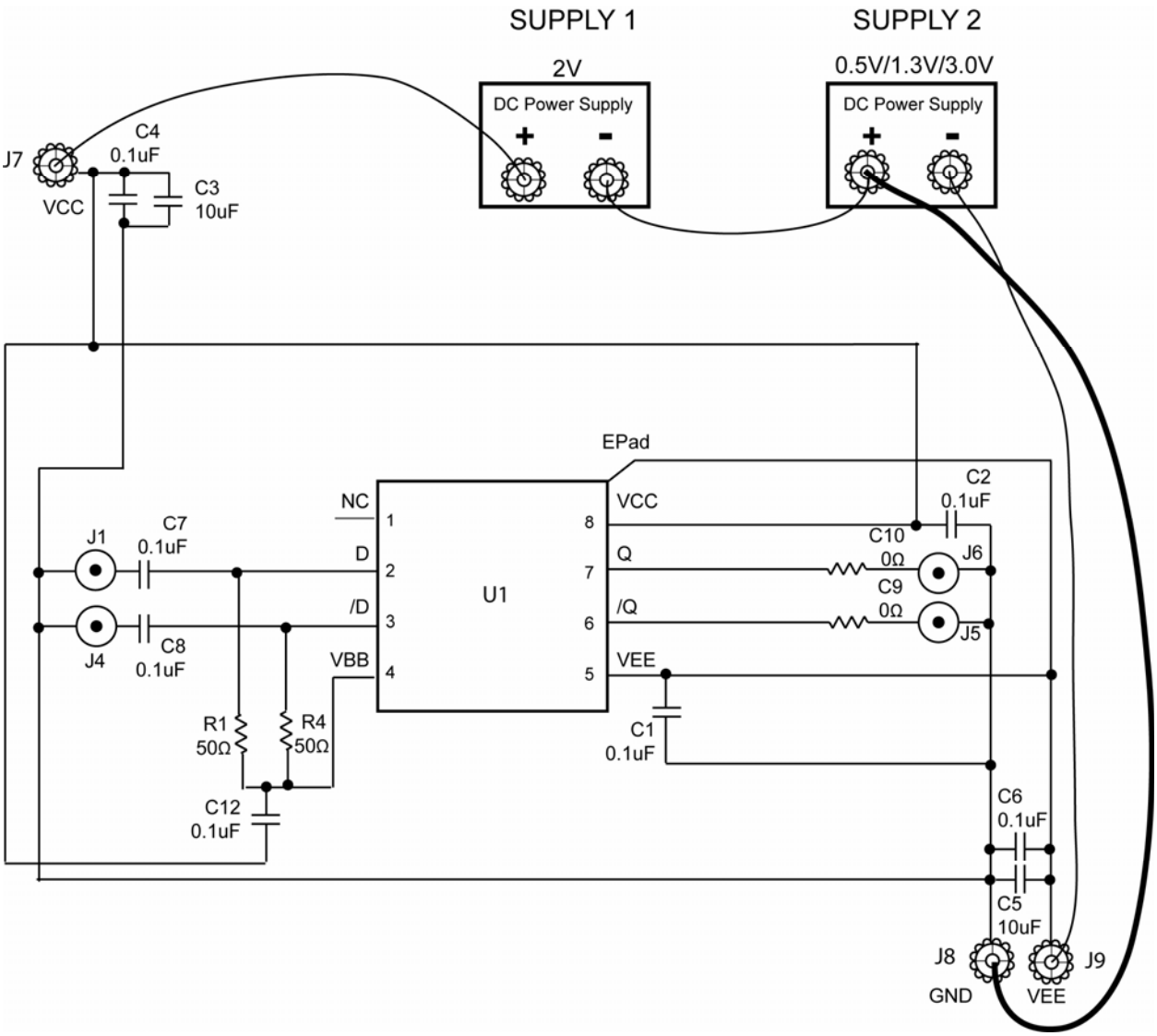
1. Replace capacitors C9 and C10 with 0Ω resistors.
2. Remove R7 and R8.

Setting up the SY10/100EP16U and SY10/100EP16V DC-Coupled Evaluation Board (AC-Coupled Input, DC-Coupled Output)

The following steps describe the procedure for setting up the ECL-output evaluation board:

1. Set the voltage for DC supply number 1 to be 2V and connect the positive side to $V_{CC.}$
2. Set the voltage for DC supply number 2 to be 0.5V, 1.3V, or 3V for 2.5V, 3.3V, or 5V supplies, respectively, and connect the negative side to V_{EE}.
3. Connect the negative side of power supply 1 to the positive side of power supply 2. This is the 0V ground potential for the board.
4. Turn off the power supplies and connect the GND terminal on the board to the negative side of DC power supply 1 and the positive side of DC power supply 2.
5. Verify that the power supply current is <45mA.
6. Turn off the power supply.
7. Using a differential signal source, set the amplitude of each side of the differential pair to be 800mV (1600mV measured differentially). The offset is not critical, as the AC-coupled inputs will be automatically biased to the correct offset. Turn off or disable the outputs of the signal source.
8. Using equal length 50Ω impedance coaxial cables connect the output pair of the evaluation board to the oscilloscope or other measurement device that has an internal DC-couple 50Ω termination. Any outputs that are not connected to a scope or any other instrument should be terminated with a 50Ω termination-to-ground at the SMA on the board.
9. Turn on the power and verify the current is <50mA.
10. Enable the signal source and monitor the output.

Evaluation Board



SY10/100EP16U and SY10/100EP16V DC-Coupled Evaluation Board

Power Supply	V_{CC}	GND	V_{EE}	I/O
2.5V	2V	0V	-0.5V	AC-Coupled Input/DC-Coupled Output
3.3V	2V	0V	-1.3V	AC-Coupled Input/DC-Coupled Output
5V	2V	0V	-3V	AC-Coupled Input/DC-Coupled Output

Table 2. SY10/100EP16U and SY10/100EP16V DC-Coupled Evaluation Board Power Supply Connections

Bill of Materials

SY10/100EP16U and SY10/100EP16V Evaluation Board

Item	Part Number	Manufacturer	Description	Qty.
C1, C2, C7-C10, C12	VJ0402Y104KXXAT	Vishay[1]	0.1µF, 25V, 10% Ceramic Capacitor, Size 0402, X7R Dielectric	7
C3, C5	293D106X0010	Vishay[1]	10µF, 20V, Tantalum Electrolytic Capacitor, Size C	2
C4, C6	VJ0805Y104KXXAT	Vishay[1]	0.1µF, 25V, 10% Ceramic Capacitor, Size 0805	2
R1, R4	CRCW04020500F	Vishay[1]	50Ω, 1%, Resistor, Size 0402	2
R7, R8	CRCW0402820F	Vishay[1]	100Ω, 1/16W, 5% Thick-film Resistor, Size 0402	2
J7			Red Test Point (V_{CC})	1
J8			Black Test Point (GND)	1
J9			Yellow Test Point (V_{EE})	1
J1, J4, J5, J6	142-0701-851	Johnson Components[2]	Jack Assembly End Launch SMA	6
U1	**SY10/100EP16U or SY10/100EP16V**	**Micrel [3]**	2.5V/3.3V Precision 8-pin MLF ECL Differential Receiver/Driver 3.3V/5V Precision 8-pin MLF ECL Differential Receiver/Driver	1

Additional Bill of Materials for SY10/100EP16U and SY10/100EP16V DC-Coupled Evaluation Board

Item	Part Number	Manufacturer	Description	Qty.
C9, C10	CRCW040200R0F	Vishay[1]	Add 0Ω, 1/16W, 5% Thick-film Resistor, Size 0402	2

Notes:

1. Vishay: www.vishay.com.
2. Johnson Components: www.johnsoncomponents.com.
3. **Micrel, Inc.: www.micrel.com.**

PC Board Layout

Board Layout

The evaluation boards are constructed with Rogers 4003 material, are co-planer in design, fabricated to minimize noise, achieve high bandwidth and minimize crosstalk.

Top	Signal
L1	GND
L2	V_{CC}
L3	V_{EE}
L4	GND
Bottom	Signal and GND

Table 3. Layer Stack

HBW Support

Hotline: 408-955-1690

Email Support: **HBWHelp@micrel.com**

Application Hints and Notes

For application notes on high speed termination on PECL and LVPECL products, clock synthesizer products, SONET jitter measurement, and other High Bandwidth product go to Micrel Inc., website at http://www.micrel.com/. Once in Micrel's website, follow the steps below:

1. Click on "Product Info".
2. In the Applications Information Box, choose "Application Hints and Application Notes."

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