



Precision/Differential 1:2 LVDS Fanout Buffer with Internal Termination

SY89835U Evaluation Board

General Description

The SY89835U evaluation board is designed for convenient setup and quick evaluation of the SY89835U. The board is optimized to interface directly to a 50Ω oscilloscope.

The board is designed in multiple layers for better performance and simple signal evaluation. For best AC performance, the board is configured in AC-coupled In and AC-coupled Out configuration. For applications that require a DC-coupled configuration, step-by-step instructions for modifying the board are included.

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

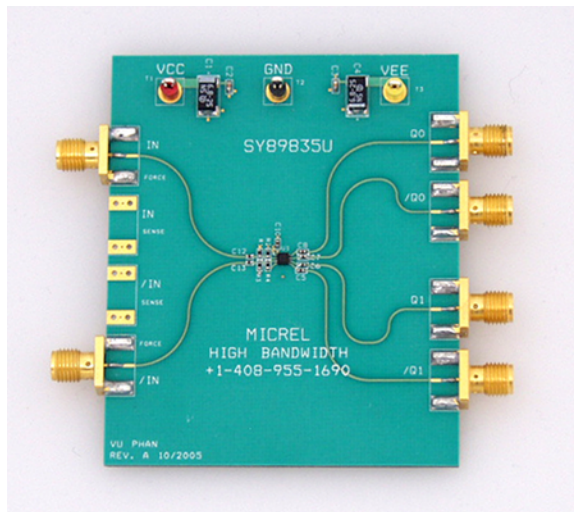
Features

- +2.5V power supply
- AC-coupled configuration for ease-of-use
- I/O interface includes on-board termination
- Fully assembled and tested
- Can be reconfigured for DC-coupled operation

Related Documentation

- SY89835U, Precision LVDS 1:2 Fanout Buffer with Internal Termination and Fail-Safe Inputs

Evaluation Board



Evaluation Board Description

The default configuration for the SY89835U board is AC-coupled. The choice between AC-coupled and DC-coupled configurations offers the user flexibility for specific applications.

AC-Coupled Evaluation Board

The AC-coupled configuration is suited to 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 in interfacing to a variety of signal sources.

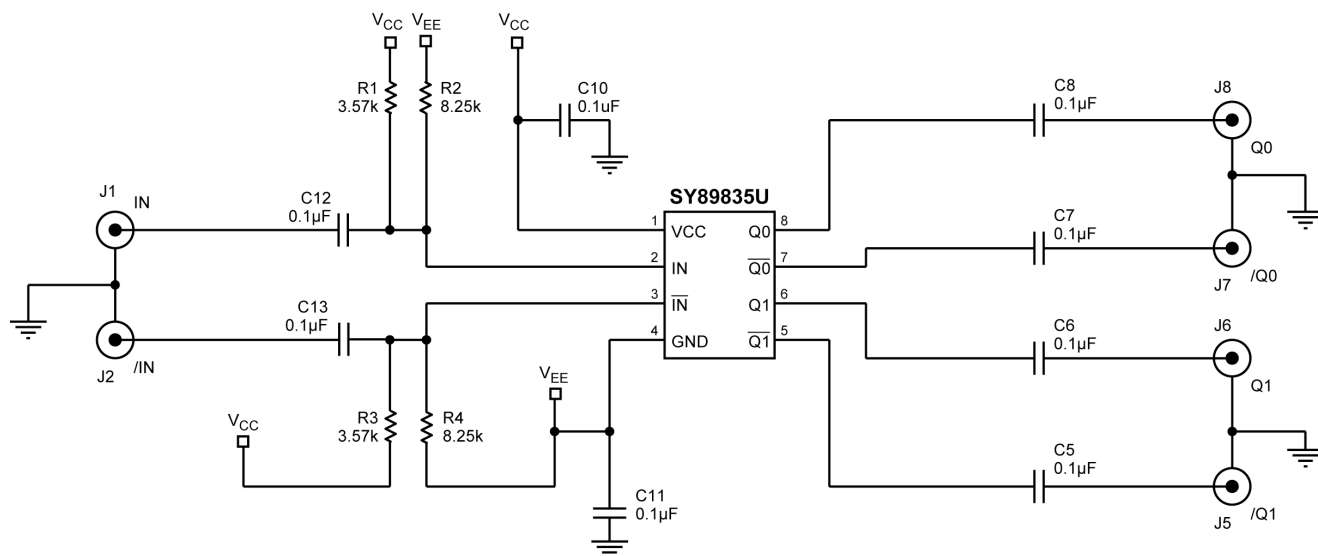
The DC-bias levels and AC-coupling capacitors are supplied on-board for each input. The user needs only to supply a minimum input voltage swing and the bias voltage will automatically adjust the input to the correct level as the power supply voltage varies.

DC-Coupled Evaluation Board

For applications that are not suited to AC-coupling, such as clock that can be turned off for extended periods of time, the board can be user-configured for DC-coupled operation.

DC-coupled operation can be accomplished by modifying the board to use two power supplies into a "split-supply configuration." In order to correctly interface LVDS to a 50 Ω (to ground) scope, V_{CC} must be V_{OCM} above the GND level. Therefore, a 2.5V supply will be split into +1.2V and -1.3V to ensure proper V_{CC} to V_{EE} voltage difference.

Evaluation Board

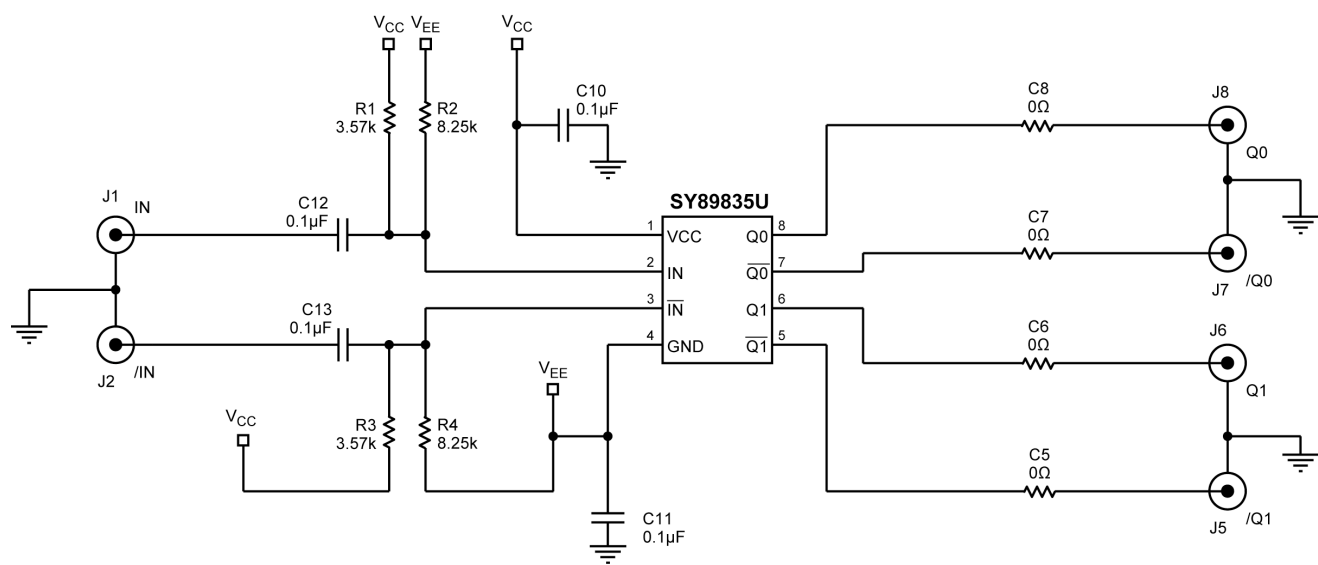


SY89835U AC-Coupled Evaluation Board

I/O	Power Supply	V _{CC}	GND	V _{EE}
AC-Coupled Input/AC-Coupled Output	2.5V	+2.5V	0V	0V

Table 1. SY89835U AC-Coupled Evaluation Board Power Supply Connections

Evaluation Board



DC-Coupled Evaluation Board

I/O	Power Supply	V _{CC}	GND	V _{EE}
SY89835U AC-Coupled Input/DC-Coupled Output	2.5V	+1.3V	0V	-1.2V

Table 2. DC-Coupled Evaluation Board Power Supply Connections

AC-Coupled Evaluation Board Setup

Setting up the SY89835U 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 2.5V and turn off the supply.
2. Connect the GND and V_{EE} terminal to the negative side of a DC power supply. This is the 0V ground potential.
3. Connect the V_{CC} terminal to the positive side of a DC power supply.
4. Turn on the power supply and verify the power supply current is <70mA.
5. Turn off the power supply.
6. Using a differential signal source set the amplitude of each side of the differential pair to be 325mV (650mV 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 50 Ω impedance coaxial cables, connect the signal source to the inputs on the evaluation board.
8. Using equal length 50 Ω impedance coaxial cables, connect the outputs of the evaluation board to the oscilloscope or other measurement device that has an internal 50 Ω termination. Any of these two outputs that are not connected to a scope or other instrument should be terminated with a 50 Ω -to-ground at the SMA on the board.
9. Turn on the power supply and verify the current is <80mA.
10. Enable the signal source and monitor the outputs.

Modifying AC-Coupled for DC-Coupled Operation

When DC-Coupling is Necessary

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

Reconfiguring an AC-Coupled Board into a DC-Coupled Board

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

1. Signal Generator Source (50Ω-to-GND):
 - a. Replace capacitors C5 to C8 with 0Ω resistors.
2. System Generated Source:
 - a. Replace capacitors C5 to C8, C12, and C13 with 0Ω resistors.
 - b. Remove R1 to R4.

DC-Coupled Evaluation Board Setup

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

1. Set the voltage for DC supply number 1 to be 1.3V and connect it to V_{CC} .
2. Set the voltage for DC supply number 2 to be -1.2V and connect it 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 a DC power supply 1 and the positive side of DC power supply 2.
5. Using a voltmeter, turn on the power supply and verify that the power supply current is <70mA.
6. Turn off the power supply.
7. a. Signal Generator Source (50Ω-to-GND):
Using a differential signal source set the amplitude of each side of the differential pair to be 325mV (650mV 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.

b. System Generated Source:

Connect the outputs of the system directly to the inputs of the evaluation board using equal length 50Ω impedance coaxial cables.

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. Any of these two outputs that are not connected to a scope, or other instrument, should be terminated with a 50Ω termination-to-ground at the SMA on the board.
If output pairs are going to another system (not a 50Ω scope), short V_{EE} to GND and set the DC power supply to 2.5V. The result is a single supply configuration.
9. Turn on the power and verify the current is <80mA.
10. Enable the signal source and monitor the outputs.

Evaluation Board Layout

PC Board Layout

The evaluation board is constructed with Rogers 4003 material and is coplanar in design; fabricated to minimize noise, achieve high bandwidth and minimize crosstalk.

Top	Signal
L1	GND
L2	VCC
L3	VEE
L4	GND
Bottom	Signal

Table 6. Layer Stack

Bill of Materials

Item	Part Number	Manufacturer	Description	Qty.
C1, C4	293D685X06R3A	Vishay ⁽¹⁾	6.8μF, 20V, Tantalum Electrolytic Capacitor, Size C	2
C2, C3, C5-C8, C10-C13	VJ0402Y104KXXAT	Vishay ⁽¹⁾	0.1μF, 25V, 10% Ceramic Capacitor, Size 0402, X7R Dielectric	10
R1, R3	CRCW04023571F	Vishay ⁽¹⁾	3.57kΩ, 1%, Resistor, Size 0402	2
R2, R4	CRCW04028251F	Vishay ⁽¹⁾	8.25kΩ, 1%, Resistor, Size 0402	2
J1	5005K-ND	Keystone ⁽²⁾	Red Test Point PC Compact, .063" D	1
J2	5006K-ND	Keystone ⁽²⁾	Black Test Point PC Compact, .063" D	1
J3	5009K-ND	Keystone ⁽²⁾	Yellow Test Point PC Compact, .063" D	1
SMA1-SMA6	142-0701-851	Johnson ⁽³⁾	Jack Assembly End Launch SMA	6
U1	SY89835U	Micrel, Inc. ⁽³⁾	Precision 1:2 LVDS Fanout Buffer with Internal Termination	1

Additional Components for DC-Coupled Boards

Item	Part Number	Manufacturer	Description	Qty.
C5-C8	CRCW0402000Z	Vishay ⁽¹⁾	0Ω, 1/16W, Resistor SMD, Size 0402	4

Notes:

1. Vishay: www.vishay.com.
2. Keystone Electronics: www.keyelco.com.
3. Johnson Components: www.johnsoncomponents.com.
4. Micrel, Inc.: www.micrel.com.

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's website at <http://www.micrel.com/>. Once in Micrel's website, follow the steps below:

1. Click on "Product" Menu Button
2. On bottom page, under "Additional Information" choose "Application Notes."

http://www.micrel.com/page.do?page=product-info/app_notes.shtml/

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