



Precision, Low Power 1:4 LVPECL Fanout Buffer/Translator w/ Internal Termination

SY89854U Evaluation Board

General Description

The SY89854U evaluation board is designed for convenient setup and quick evaluation of the LVPECL low power, fully differential 1:4 fanout buffer. The evaluation board is designed to interface directly to 50Ω test equipments using a single power source.

For ease of use, the evaluation board is configured with AC-coupled inputs and AC-coupled outputs. For applications that require DC-coupled outputs, step-by-step instructions for modifying the board are included.

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

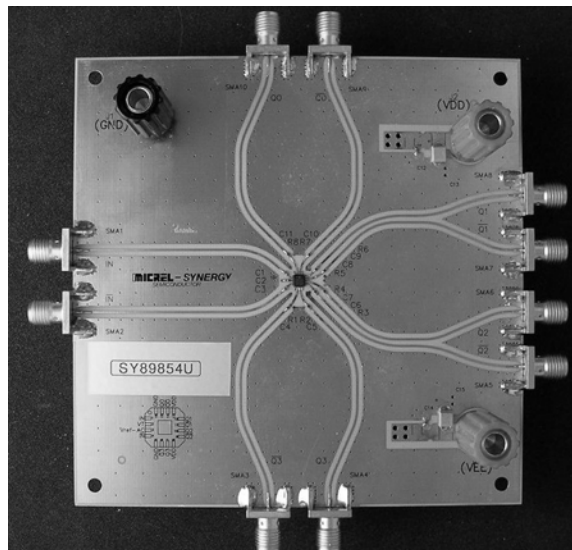
Features

- SY89854U low power 1:4 LVPECL fanout buffer/translator with internal termination
- +2.5V or +3.3V power supply
- AC-coupled inputs and AC-coupled outputs configuration for ease of use
- Outputs can be reconfigured for DC-coupled output operation

Related Documentation

- SY89854U Precision, Low Power 1:4 LVPECL Fanout Buffer/Translator with Internal Termination Data Sheet

Evaluation Board



Evaluation Board Description

The SY89854U is a low power, 1:4 LVPECL fanout buffer/translator evaluation board used to evaluate the AC-performance, jitter, and skew of the device.

The default configuration of the board is AC-coupled inputs and AC-coupled outputs. The outputs can be reconfigured for DC-coupled operation if needed.

AC-Coupled Mode

The AC-coupled output configuration is a standard configuration suited for ease of use. The SY89854U evaluation board requires a single power supply of either 2.5V $\pm 5\%$ or 3.3V $\pm 10\%$ and interfaces with a variety of input signal sources and interfaces directly to 50 Ω lab equipment.

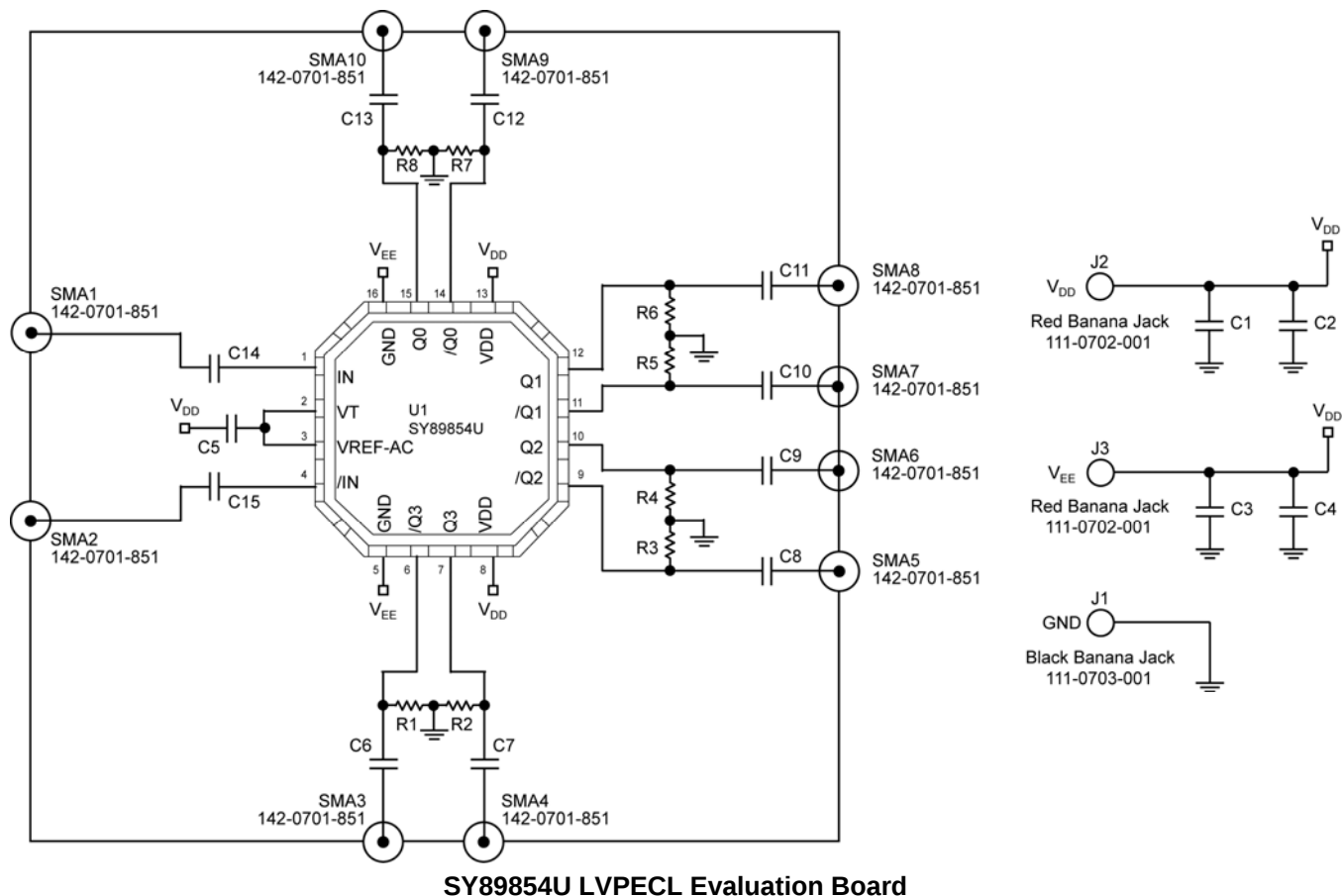
Any-Input Interface

The SY89854U device is designed with a unique internal input termination that sets the input common mode voltage by connecting VREF-AC to VT. The evaluation board makes use of this feature; therefore, the inputs interface with any differential signal as small as 100mV (200mVpp) over the supply voltage without modifying the evaluation board.

DC-Coupled Mode

The SY89854U evaluation board can be reconfigured for DC-coupled mode by replacing the 0.1 μ F capacitors at C6 to C13 with 0402 size 0 Ω resistors, and removing resistors R1 to R8. Standard DC-coupled LVPECL termination is 50 Ω to $V_{CC}-2V$, which can be achieved by split supplies, making it easy to interface the evaluation board to 50 Ω lab equipment. To do this, a 3.3V supply is split into +2V and $-1.3V$, and a +2.5V supply is split into +2V and $-0.5V$. The +2V offset in the power supply configuration provides the correct termination for the device by setting the GND potential to 2V below the V_{CC} supply into 50 Ω . The V_{EE} voltage is then set at $-0.5V$ for 2.5V operation or $-1.3V$ for 3.3V to ensure proper V_{CC} to V_{EE} voltage potential.

Evaluation Board



I/O	Power Supply	V _{CC}	GND	V _{EE}	R1–R8	C6–C13
AC-Coupled Input/AC-Coupled Output ⁽¹⁾	2.5V	+2.5V	0V	0V	83Ω	0.1μF
AC-Coupled Input/AC-Coupled Output ⁽¹⁾	3.3V	+3.3V	0V	0V	83Ω	0.1μF
AC-Coupled Input/DC-Coupled Output	2.5V	+2V	0V	–0.5	n/a	0Ω
AC-Coupled Input/DC-Coupled Output	3.3V	+2V	0V	–1.3	n/a	0Ω

Table 1. SY89854U Configuration

Note:

1. Default configuration.

AC-Coupled Evaluation Board Setup

Setting up the SY89854U

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

For 2.5V Operation

- $V_{CC} = 2.5V$
- $V_{EE} = 0V$
- $GND = 0V$

For 3.3V Operation

- $V_{CC} = 3.3V$
- $V_{EE} = 0V$
- $GND = 0V$

1. Signal Generator: Using a differential signal source, set the amplitude of each side of the differential pair to 400mV (800mV measured differentially). Set the offset to a positive value, the value of the offset is not critical, since the AC-coupled inputs will be automatically biased. Turn off or disable the outputs of the signal source.
2. I/O Cable Interface: Using equal length 50 Ω impedance coaxial cables connect the signal source to the inputs on the evaluation board. Using equal length 50 Ω impedance coaxial cables connect the outputs of the evaluation board to the oscilloscope or other measurement device with a 50 Ω input. Unequal length cables are not recommended since they introduce duty cycle distortion and unwanted signal delays.
3. Connect the trigger input of the scope to the trigger output of the signal generator.
4. Enable the signal source and monitor the outputs.

Evaluation Board Layout

PC Board Layout

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

L1	GND and Signal
L2	GND
L3	VCC
L4	GND

Table 2. Layer Stack

Modifying AC-Coupled Outputs for DC-Coupled Operation

1. Replace 0.1 μ F capacitors at C6–C13 with 0402, 0 Ω resistors.
2. Remove pull-down resistors R1–R8.

Bill of Materials

SY89858U AC-Coupled Evaluation Board

Item	Part Number	Manufacturer	Description	Qty.
C1, C3, C5–C15	VJ0402Y104KXXAT	Vishay ⁽¹⁾	0.1μF, 25V, 10% Ceramic Capacitor, Size 0402, X7R, Dielectric	13
C2, C4	293D685X0025C2T	Vishay ⁽¹⁾	6.8μF, 20V, 10% Tantalum Electrolytic Capacitor, Size C	2
J1		Johnson Components ⁽²⁾	Black Banana Jack	1
J2		Johnson Components ⁽²⁾	Red Banana Jack	1
J3		Johnson Components ⁽²⁾	White Banana Jack	1
R1–R8		Vishay ⁽¹⁾	83Ω, Size 0402, Surface Mount Resistors	8
SMA–SMA10	142-0701-851	Johnson Components ⁽²⁾	Jack Assembly End Launch SMA	10
U1	SY89854U	Micrel⁽³⁾	1:4 Low Power, LVPECL Fanout Buffer	1

Additional Components for DC-Coupled Outputs

Item	Part Number	Manufacturer	Description	Qty.
C6–C13	VJ0402Y104KXXAT	Vishay ⁽¹⁾	0.1μF, 25V, 10% Ceramic Capacitor, Size 0402, X7R, Dielectric	13

Notes:

1. Vishay: www.vishay.com
2. Johnson Components: www.johnsoncomponents.com
3. **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 products 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."

MICREL, INC. 2180 FORTUNE DRIVE SAN JOSE, CA 95131 USA
TEL +1 (408) 944-0800 FAX +1 (408) 474-1000 WEB <http://www.micrel.com>

The information furnished by Micrel in this data sheet is believed to be accurate and reliable. However, no responsibility is assumed by Micrel for its use. Micrel reserves the right to change circuitry and specifications at any time without notification to the customer.

Micrel Products are not designed or authorized for use as components in life support appliances, devices or systems where malfunction of a product can reasonably be expected to result in personal injury. Life support devices or systems are devices or systems that (a) are intended for surgical implant into the body or (b) support or sustain life, and whose failure to perform can be reasonably expected to result in a significant injury to the user. A Purchaser's use or sale of Micrel Products for use in life support appliances, devices or systems is a Purchaser's own risk and Purchaser agrees to fully indemnify Micrel for any damages resulting from such use or sale.

© 2005 Micrel, Incorporated.