



## Ultra-Precision 1:8 CML and LVPECL Fanout Buffer w/ Internal Termination

### SY58031/2/3U Evaluation Board

#### General Description

The SY58031U, SY58032U and SY58033U evaluation boards are designed for convenient setup and quick evaluation of the respective devices. The boards are optimized to interface directly to 50Ω oscilloscope.

For best AC performance, the boards are configured with AC-coupled inputs and DC-coupled outputs. For applications that require AC-coupled outputs 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](http://www.micrel.com).

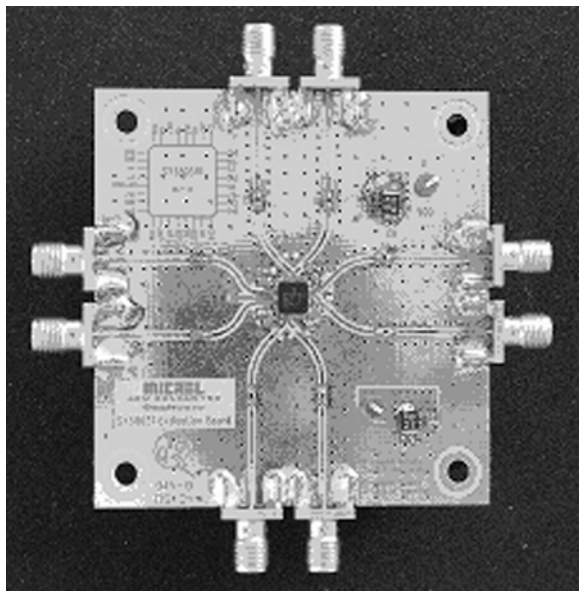
#### Features

- SY58031U, SY58032U, SY58033U
- +2.5V or +3.3V power supply
- AC-coupled input and DC-coupled output configuration for performance
- Fully assembled and tested
- Outputs can be reconfigured for AC-coupled output operation

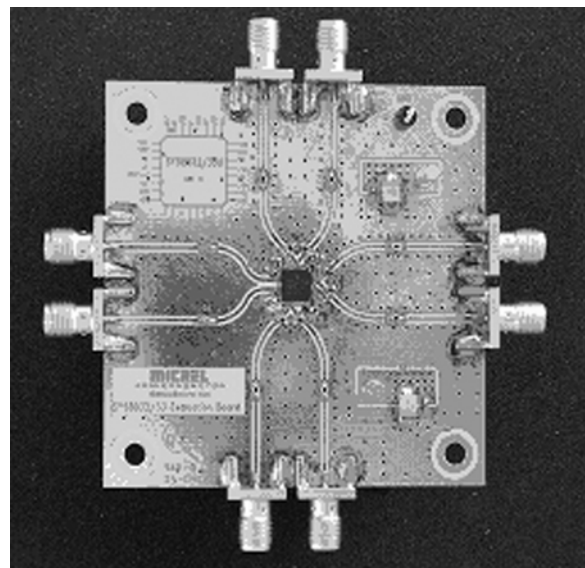
#### Related Documentation

- SY58031U, 3.3V/5V Ultra-Precision 1:8 CML Fanout Buffer w/Internal Termination Data sheet
- SY58032U, 3.3V/5V Ultra-Precision 1:8 LVPECL Fanout Buffer w/Internal Termination Data sheet
- SY58033U, 3.3V/5V Ultra-Precision 1:8 400mV LVPECL Fanout Buffer w/Internal Termination Data sheets

#### Evaluation Board



SY58031



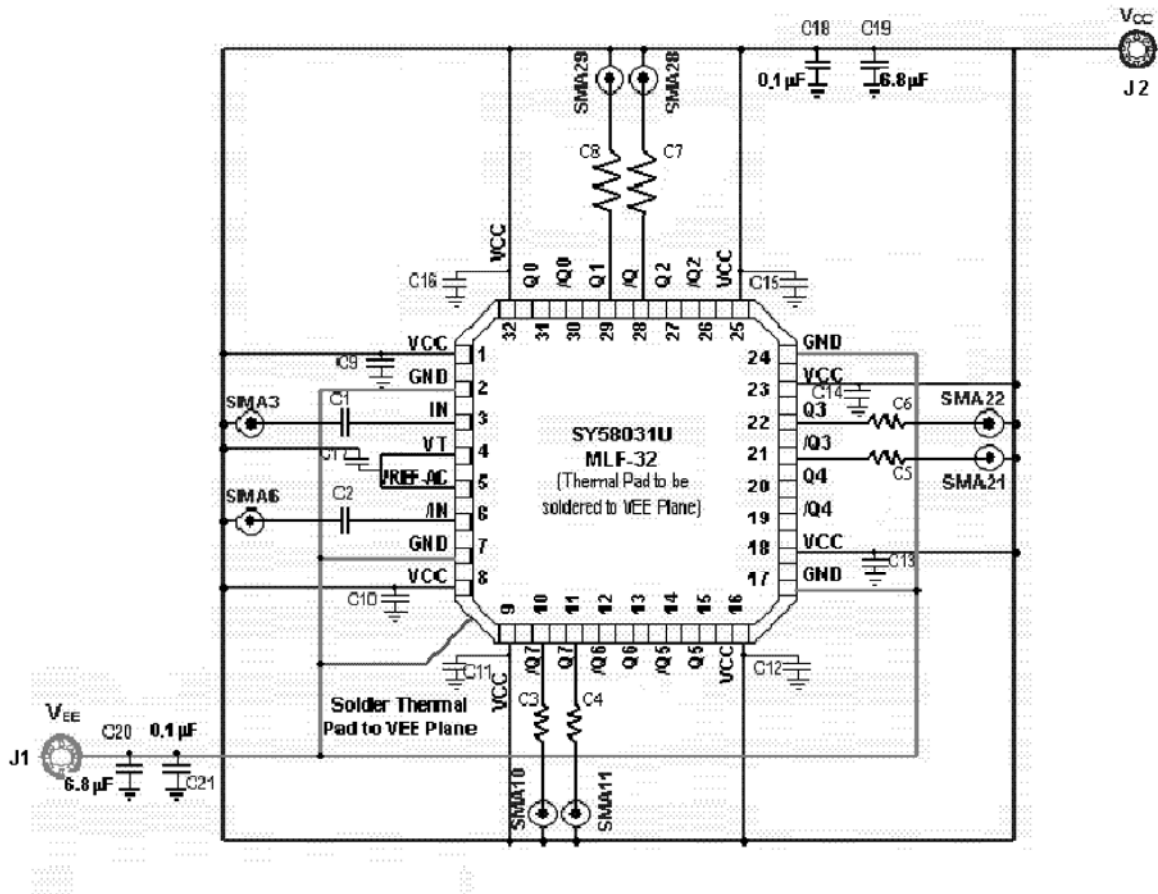
SY58032/3

## Evaluation Board Description

The SY58031U is a CML evaluation board and the SY58032U and SY58033U are LVPECL and 400mV LVPECL evaluation boards sharing the same design.

The default configuration for these boards is AC-coupled Inputs and DC-coupled outputs. The outputs can be reconfigured for AC-coupled output operation; therefore, the choice between the two configurations offers flexibility for specific applications.

# Evaluation Board

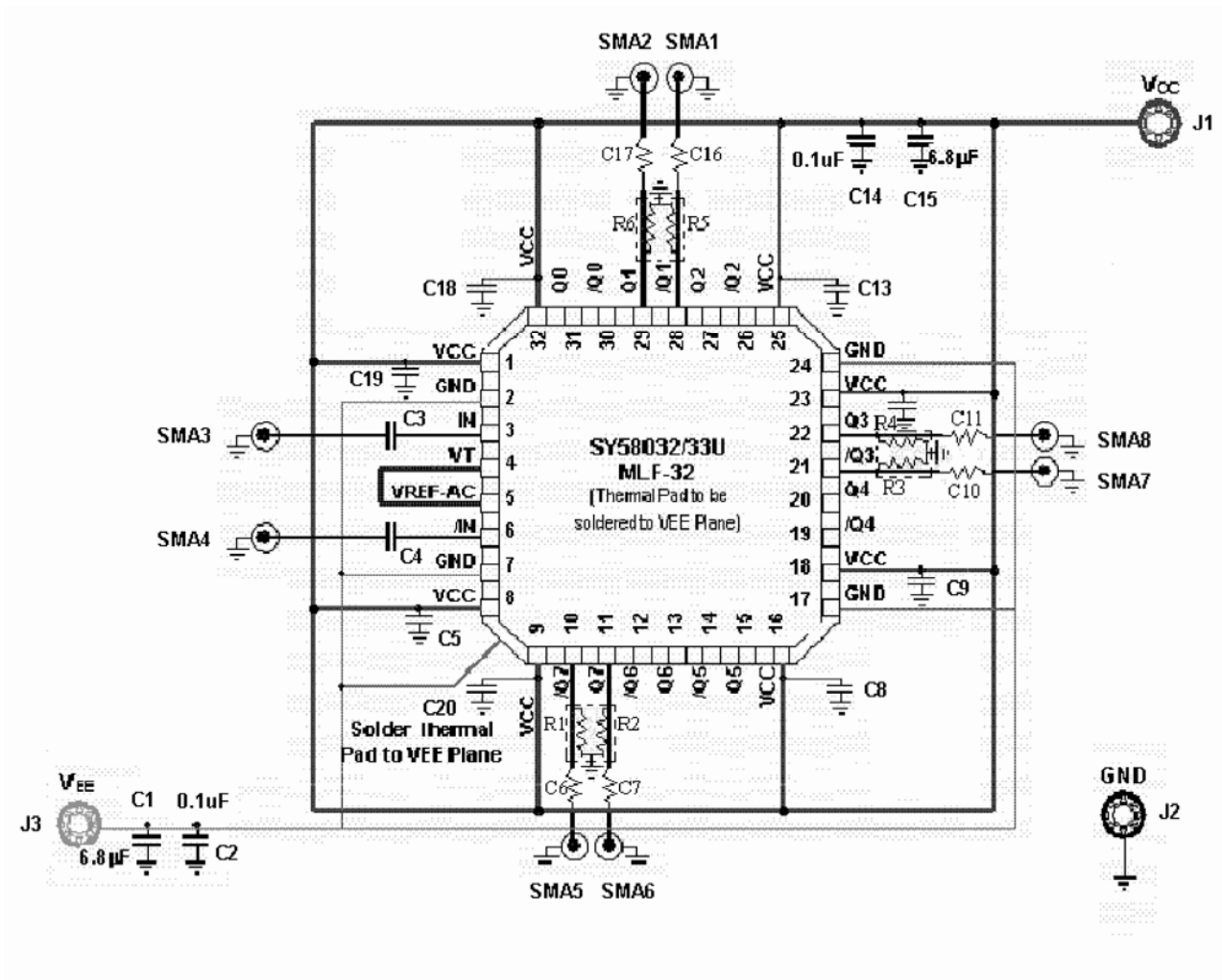


**SY58031U CML Evaluation Board**

| I/O          | Power Supply | V <sub>CC</sub> | GND | V <sub>EE</sub> | C3-C8 |
|--------------|--------------|-----------------|-----|-----------------|-------|
| AC-In/DC-Out | 2.5V         | 0V              | 0   | -2.5V           | 0Ω    |
| AC-In/DC-Out | 3.3V         | 0V              | 0   | -3.3V           | 0Ω    |
| AC-In/AC-Out | 2.5V         | +2.5V           | 0   | 0               | 0.1μF |
| AC-In/AC-Out | 3.3V         | +3.3V           | 0   | 0               | 0.1μF |

**Table 1. SY58031U Configuration**

Note: The default configuration is AC-In/DC-Out.



SY58032/3U LVPECL Evaluation Board

| I/O          | Power Supply | V <sub>CC</sub> | GND | V <sub>EE</sub> | R1-R6 | C6-C7, C10-C11, C16-C17 |
|--------------|--------------|-----------------|-----|-----------------|-------|-------------------------|
| AC-In/DC-Out | 2.5V         | +2V             | 0   | -0.5            | None  | 0Ω                      |
| AC-In/DC-Out | 3.3V         | +2V             | 0   | -1.3            | None  | 0Ω                      |
| AC-In/AC-Out | 2.5V         | +2.5V           | 0   | 0               | 50Ω   | 0.1μF                   |
| AC-In/AC-Out | 3.3V         | +3.3V           | 0   | 0               | 100Ω  | 0.1μF                   |

Table 2. SY58032/3U Configuration

Note: The default configuration is AC-In/DC-Out.

## DC-Coupled Evaluation Board Setup

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

### SY58031U

- GND = 2.5V or 3.3V
- $V_{CC} = 0V$

### SY58032/3U

For 2.5V operation:

- $V_{CC} = 2.0V$
- $V_{EE} = -0.5V$
- GND = 0V

For 3.3V operation:

- $V_{CC} = 2.0V$
- $V_{EE} = -1.3V$
- 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 50Ω impedance coaxial cables connect the signal source to the inputs on the evaluation board. 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. 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, coplanar in design, fabricated to minimize noise, achieve high bandwidth and minimize crosstalk.

| Layer | SY58031U            | SY58032/3U     |
|-------|---------------------|----------------|
| L1    | $V_{CC}$ and Signal | GND and Signal |
| L2    | $V_{CC}$            | GND            |
| L3    | GND                 | $V_{CC}$       |
| L4    | $V_{CC}$            | GND            |

Table 3. Layer Stack

## Modifying DC-Coupled Outputs for AC-Coupled Operation

### SY58031U

1. Remove 0Ω resistors at C3, C4, C5, and C6.
2. Replace C3, C4, C5, and C6 with 0.1μF low ESR, 0402 capacitors.

### SY58032/3U

1. Remove 0Ω resistors at C6, C7, C10, C11, C16, and C17.
2. Replace at C6, C7, C10, C11, C16, and C17 with 0.1μF low ESR, 0402 capacitors.
3. For 2.5V operation: Add 50Ω 0402 pull-down resistors to R1-R6.
4. For 3.3V operation: Add 100Ω 0402 pull-down resistors to R1-R6.

## Bill of Materials

### SY58031U Evaluation Board

| Item  | Part Number     | Manufacturer                      | Description   | Qty. |
|---|-----------------|-----------------------------------|---|------|
| C1-C2,C9-C16,<br>C18, C21                                       | VJ0402Y104KXXAT | Vishay <sup>(1)</sup>             | 0.1 $\mu$ F, 25V, 10% Ceramic Capacitor, Size 0402, X7R, Dielectric | 12   |
| C3-C8   | CRCW0402000Z    | Vishay <sup>(1)</sup>             | 0 $\Omega$ , 1/16W Resistor SMD, Size 0402                          | 6    |
| C19, C20  | 293D685X0025C2T | Vishay <sup>(1)</sup>             | 6.8 $\mu$ F, 20V, Tantalum Electrolytic Capacitor, Size C           | 2    |
| J1  | 111-0703-001    | Johnson Components <sup>(2)</sup> | Black Banana Jack   | 1    |
| J2  | 111-0702-001    | Johnson Components <sup>(2)</sup> | Red Banana Jack   | 1    |
| SMA3, SMA6,<br>SMA10,<br>SMA11, SMA21,<br>SMA22,<br>SMA28,SMA29 | 142-0701-851    | Johnson Components <sup>(2)</sup> | Jack Assembly End Launch SMA  | 8    |
| U1  | <b>SY58031U</b> | <b>Micrel, Inc.<sup>(3)</sup></b> | 1:8 CML/LVPECL Fanout Buffer  | 1    |

### Additional Components for AC-Coupled Outputs

| Item  | Part Number     | Manufacturer          | Description   | Qty. |
|-------|-----------------|-----------------------|---|------|
| C3-C8 | VJ0402Y104KXXAT | Vishay <sup>(1)</sup> | 0.1 $\mu$ F, 25V, 10% Ceramic Capacitor, Size 0402, X7R, Dielectric | 6    |

#### Notes:

1. Vishay: [www.vishay.com](http://www.vishay.com)
2. Johnson Components: [www.johnsoncomponents.com](http://www.johnsoncomponents.com)
3. Micrel, Inc.: [www.micrel.com](http://www.micrel.com)

**SY58032/3U Evaluation Board**

| Item                        | Part Number     | Manufacturer                      | Description   | Qty. |
|-----------------------------|-----------------|-----------------------------------|---|------|
| C1, C15                     | 293D685X0025C2T | Vishay <sup>(1)</sup>             | 6.8 $\mu$ F, 20V, Tantalum Electrolytic Capacitor, Size C           | 2    |
| C2-C5,C8-C9,C12-C14,C18-C19 | VJ0402Y104KXXAT | Vishay <sup>(1)</sup>             | 0.1 $\mu$ F, 25V, 10% Ceramic Capacitor, Size 0402, X7R, Dielectric | 11   |
| C6-C7,C10-C11, C16-C17      | CRCW0402000Z    | Vishay <sup>(1)</sup>             | 0 $\Omega$ , 1/16W Resistor SMD, Size 0402                          | 6    |
| J1                          | 111-0702-001    | Johnson Components <sup>(2)</sup> | Red Banana Jack   | 1    |
| J2, J3                      | 111-0703-001    | Johnson Components <sup>(2)</sup> | Black Banana Jack   | 2    |
| SMA1-SMA8                   | 142-0701-851    | Johnson Components <sup>(2)</sup> | Jack Assembly End Launch SMA  | 8    |
| U1                          | SY58032/3U      | Micrel, Inc. <sup>(3)</sup>       | 1:8 CML/LVPECL Fanout Buffer  | 1    |

**Additional Components for AC-Coupled Outputs**

| Item                   | Part Number                    | Manufacturer          | Description   | Qty. |
|------------------------|--------------------------------|-----------------------|---|------|
| C6-C7,C10-C11, C16-C17 | VJ0402Y104KXXAT                | Vishay <sup>(1)</sup> | 0.1 $\mu$ F, 25V, 10% Ceramic Capacitor, Size 0402, X7R, Dielectric | 6    |
| R3-R6                  | CRCW040249R9F<br>CRCW04021000F | Vishay <sup>(1)</sup> | 10% 1/16W Resistor SMD, Size 0402 <sup>(4)</sup>                    | 4    |

**Notes:**

1. Vishay: [www.vishay.com](http://www.vishay.com)
2. Johnson Components: [www.johnsoncomponents.com](http://www.johnsoncomponents.com)
3. Micrel, Inc.: [www.micrel.com](http://www.micrel.com)
4. For 2.5V operation: R1-R6 are 50 $\Omega$  resistors: For 3.3V operation: R1-R6 are 100 $\Omega$  resistors

## Micrel Cross Reference

To find an equivalent Micrel part, go to Micrel's website at: <http://www.micrel.com> and follow the steps below:

1. Click on Dynamic Cross Reference.
2. Enter competitor's part number in the Dynamic Cross Reference field.
3. To download a PDF version of this information, click on the Cross Reference PDF tab.

## HBW Support

Hotline: 408-955-1690

Email Support: [HBWHelp@micrel.com](mailto: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.