



## 1:6 CML & LVPECL Fanout Buffer w/2:1 Input MUX

### SY58034/5/6U Evaluation Board

#### General Description

The SY58034U, SY58035U and SY58036U evaluation boards are designed for convenient setup and quick evaluation of the respective devices. They allow the user to evaluate the part over the full voltage-range without any modifications to the boards.

For best AC performance, the boards are configured with AC-coupled input and DC-coupled output. For applications that require AC-coupled output configuration, step-by-step instructions for modifying the board are included.

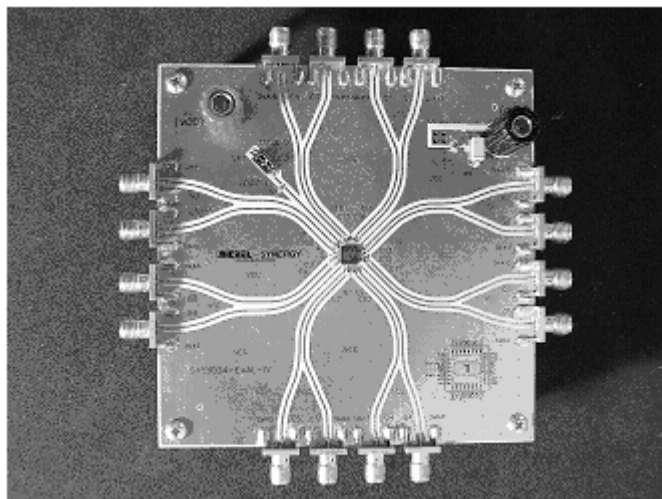
#### Features

- SY58034U, SY58035U, SY58036U
- +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

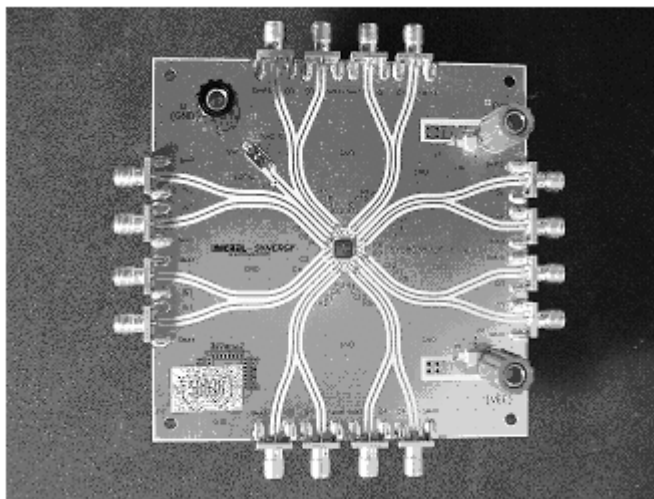
#### Related Documentation

- SY58034U, Ultra-Precision 1:6 CML Fanout Buffer with 2:1 MUX Input and Internal Termination Data Sheet
- SY58035U, Ultra-Precision 1:6 LVPECL Fanout Buffer with 2:1 MUX Input and Internal Termination Data Sheet
- SY58036U, Ultra-Precision 1:6 400mV LVPECL Fanout Buffer with 2:1 MUX Input and Internal Termination Data Sheet

#### Evaluation Boards



SY58034



SY58035/6

## Evaluation Board Description

The SY58034U is a CML evaluation board and the SY58035U and SY58036U are LVPECL evaluation boards sharing the same design.

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

### DC-Coupled Output

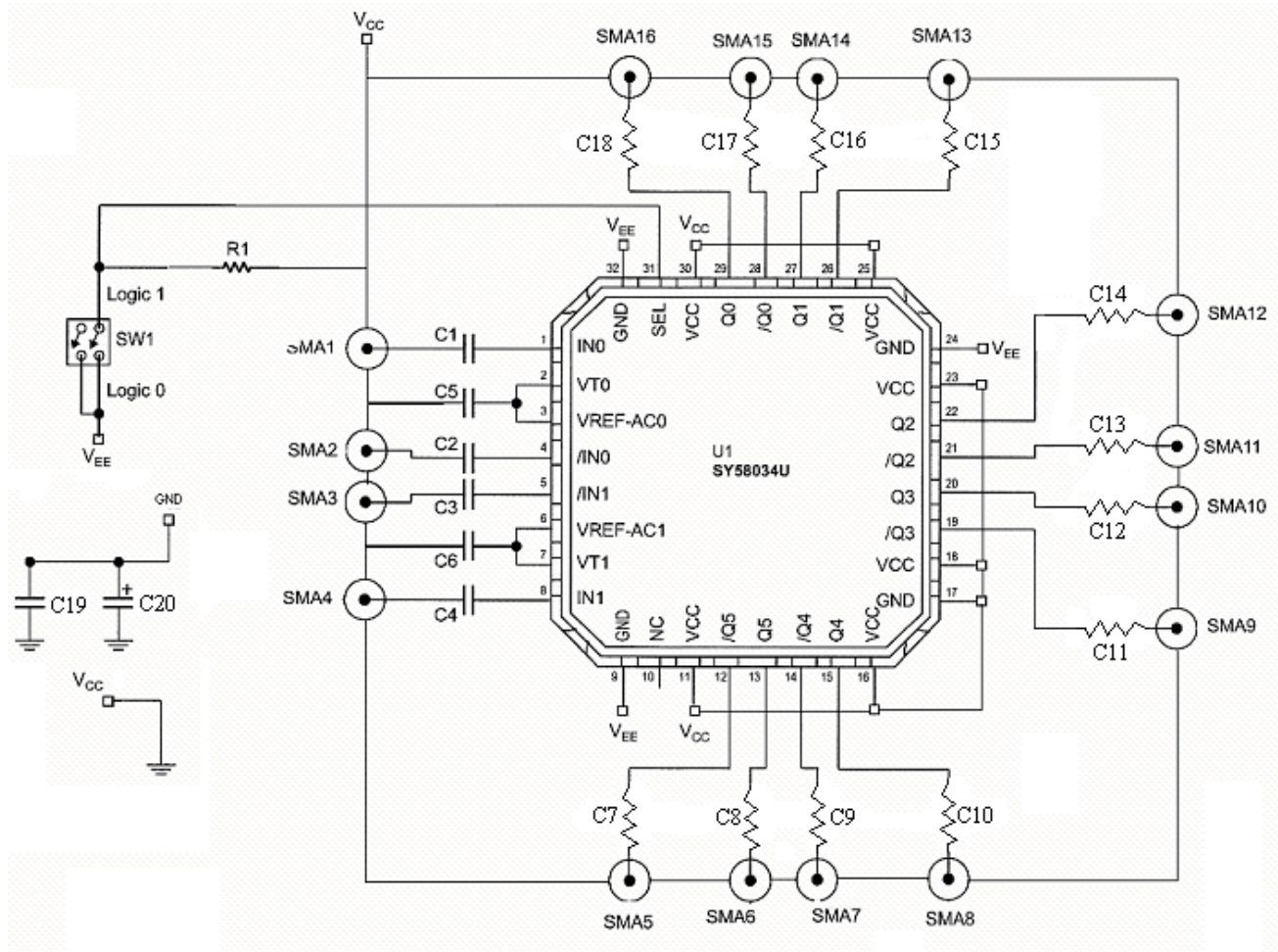
The DC-Coupled configuration is an industry standard configuration suited for best AC performance. The CML SY58034U requires a single power supply of either 2.5V  $\pm 5\%$  or 3.3V  $\pm 10\%$  and offers the most flexibility in interfacing to a variety of signal sources.

Since LVPECL is referenced to  $V_{CC}$ , the standard PECL termination is  $50\Omega$  to  $V_{CC} - 2V$ . Split supply is an easy method to interface to a  $50\Omega$  (to ground) scope. Therefore, a 3.3V supply will be split into +2V and -1.3V, and a +2.5V supply will be split into +2V and -0.5V. The +2V offset in the two-power supply configuration provides the correct termination for the device by setting the GND potential on the board to 2V below the  $V_{CC}$  supply. The  $V_{EE}$  voltage is then set to -0.5V for 2.5V operation or -1.3V for 3.3V to ensure proper  $V_{CC}$  to  $V_{EE}$  voltage difference.

### Any-Input Interface

The unique internal input termination sets the input common mode voltage. This enables the input to interface with any differential signal over the supply voltage without modifying the evaluation board.

## Evaluation Board

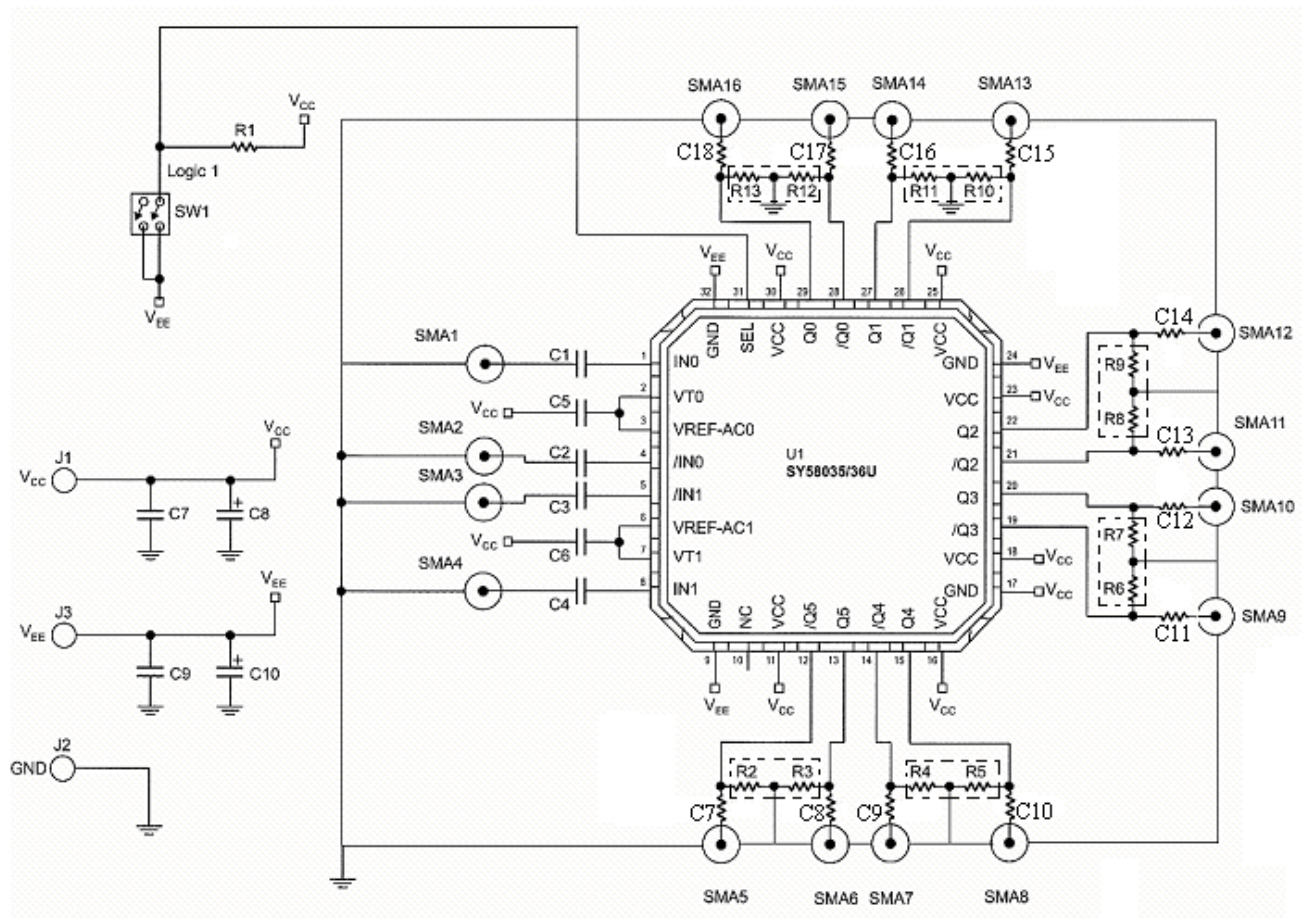


**SY58034U CML Evaluation Board**

| I/O                                | C7-C18 |
|------------------------------------|--------|
| AC-Coupled Input/DC-Coupled Output | 0Ω     |
| AC-Coupled Input/AC-Coupled Output | 0.1μF  |

**Table 1. SY58034U Configuration**

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



SY58035/6U LVPECL Evaluation Board

| I/O          | Power Supply | V <sub>CC</sub> | GND | V <sub>EE</sub> | R2-R13 | C7-C18 |
|--------------|--------------|-----------------|-----|-----------------|--------|--------|
| 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. SY58035/6U Configuration

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

## DC-Coupled Evaluation Board Setup

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

### **SY58034U**

Set the voltage setting for a DC supplies to either 2.5V or 3.3V, depending on the application, and turn off the supply. Connect the GND terminal to the negative side of a DC power supply. This is the 0V ground potential. Connect the  $V_{CC}$  terminal to the positive side of a DC power supply.

### **SY58035/6U**

*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 50 $\Omega$  impedance coaxial cables connect the signal source to the inputs on the evaluation board. Using equal length 50 $\Omega$  impedance coaxial cables connect the outputs of the evaluation board to the oscilloscope or other measurement device that has an internal 50 $\Omega$  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. Set the evaluation board dipswitch to the appropriate input selection.
5. Enable the signal source and monitor the outputs.

## Bill of Materials

### SY58034U Evaluation Board

| Item       | Part Number     | Manufacturer                       | Description                                                   | Qty. |
|------------|-----------------|------------------------------------|---------------------------------------------------------------|------|
| C1-C7,C9   | VJ0402Y104KXXAT | Vishay <sup>(1)</sup>              | 0.1μF, 25V, 10% Ceramic Capacitor, Size 0402, X7R, Dielectric | 8    |
| C11-C22    | CRCW0402000Z    | Vishay <sup>(1)</sup>              | 0Ω, 1/16W Resistor SMD, Size 0402                             | 12   |
| C8,C10     | 293D685X0025C2T | Vishay <sup>(1)</sup>              | 6.8μF, 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    |
| J3         | 111-0703-001    | Johnson Components <sup>(2)</sup>  | Black Banana Jack                                             | 1    |
| R1         | CRCW04023001F   | Vishay <sup>(1)</sup>              | 3kΩ, 10%, 1/16W Resistor SMD, size 0402                       | 1    |
| SMA1-SMA16 | 142-0701-851    | Johnson Components <sup>(2)</sup>  | Jack Assembly End Launch SMA                                  | 16   |
| SW1        | CT2182LPST-ND   | Digi-Key <sup>(3)</sup>            | 2-Position Dip                                                | 1    |
| U1         | <b>SY58034U</b> | <b>Micrel, Inc.</b> <sup>(4)</sup> | 1:6 CML/LVPECL Fanout Buffer w/2:1 MUX                        | 1    |

### Additional Components for AC-Coupled Outputs

| Item    | Part Number     | Manufacturer          | Description                                                   | Qty. |
|---------|-----------------|-----------------------|---------------------------------------------------------------|------|
| C11-C22 | VJ0402Y104KXXAT | Vishay <sup>(1)</sup> | 0.1μF, 25V, 10% Ceramic Capacitor, Size 0402, X7R, Dielectric | 12   |

#### Notes:

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

**SY58035/6U Evaluation Board**

| Item       | Part Number       | Manufacturer                       | Description                                                   | Qty. |
|------------|-------------------|------------------------------------|---------------------------------------------------------------|------|
| C8, C10    | 293D685X0025C2T   | Vishay <sup>(1)</sup>              | 6.8μF, 20V, Tantalum Electrolytic Capacitor, Size C           | 2    |
| C1-C7,C9   | VJ0402Y104KXXAT   | Vishay <sup>(1)</sup>              | 0.1μF, 25V, 10% Ceramic Capacitor, Size 0402, X5R, Dielectric | 8    |
| C11-C22    | CRCW0402000Z      | Vishay <sup>(1)</sup>              | 0Ω, 1/16W Resistor SMD, Size 0402                             | 12   |
| J2,J3      | 111-0703-001      | Johnson Components <sup>(2)</sup>  | Black Banana Jack                                             | 2    |
| J1         | 111-0702-001      | Johnson Components <sup>(2)</sup>  | Red Banana Jack                                               | 1    |
| R1         | CRCW04023001F     | Vishay <sup>(1)</sup>              | 3kΩ, 10%, 1/16W Resistor SMD, size 0402                       | 1    |
| SMA1-SMA16 | 142-0701-851      | Johnson Components <sup>(2)</sup>  | Jack Assembly End Launch SMA                                  | 16   |
| SW1        | CT2182LPST-ND     | DigiKey <sup>(3)</sup>             | 2-Position Dip                                                | 1    |
| U1         | <b>SY58025/6U</b> | <b>Micrel, Inc.</b> <sup>(4)</sup> | 1:6 CML/LVPECL Fanout Buffer w/2:1 MUX                        | 1    |

**Additional Components for AC-Coupled Outputs**

| Item    | Part Number                    | Manufacturer          | Description                                                   | Qty. |
|---------|--------------------------------|-----------------------|---------------------------------------------------------------|------|
| C11-C22 | VJ0402Y104KXXAT                | Vishay <sup>(1)</sup> | 0.1μF, 25V, 10% Ceramic Capacitor, Size 0402, X5R, Dielectric | 12   |
| R2-R13  | CRCW040249R9F<br>CRCW04021000F | Vishay <sup>(1)</sup> | 10% 1/16W Resistor SMD, size 0402 <sup>(5)</sup>              | 12   |

**Notes:**

1. Vishay: [www.vishay.com](http://www.vishay.com)
2. Johnson Components: [www.johnsoncomponents.com](http://www.johnsoncomponents.com)
3. DigiKey: [www.digikey.com](http://www.digikey.com)
4. Micrel, Inc.: [www.micrel.com](http://www.micrel.com)
5. For 2.5V operation: R2-R13 are 50Ω resistors.  
For 3.3V operation: R2-R13 are 100Ω resistors.



## 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.

| Layer | SY58034U                   | SY58035/6U      |
|-------|----------------------------|-----------------|
| L1    | V <sub>CC</sub> and Signal | GND and Signal  |
| L2    | V <sub>CC</sub>            | GND             |
| L3    | GND                        | V <sub>CC</sub> |
| L4    | V <sub>CC</sub>            | GND             |

**Table 3. Layer Stack**

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

### SY58034U

1. Remove 0Ω resistors at C11-C22.
2. Replace C11-C22 with 0.1mF low ESR, 0402 capacitors.

### SY58035/6U

3. Remove 0Ω resistors at C11-C22.
4. Replace C11-C22 with 0.1mF low ESR, 0402 capacitors.
5. For 2.5V operation: Add 50Ω 0402 pull-down resistors to R2-R13.
6. For 3.3V operation: Add 100Ω 0402 pull-down resistors to R2-R13.



## Micrel Cross Reference

To find an equivalent Micrel part, go to Micrel's website at: <http://www.micrel.com> and following 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 product go to Micrel's 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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**MICREL, INC. 1849 FORTUNE DRIVE SAN JOSE, CA 95131 USA**  
TEL +1 (408) 944-0800 FAX +1 (408) 474-1000 WEB <http://www.micrel.com>

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