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.

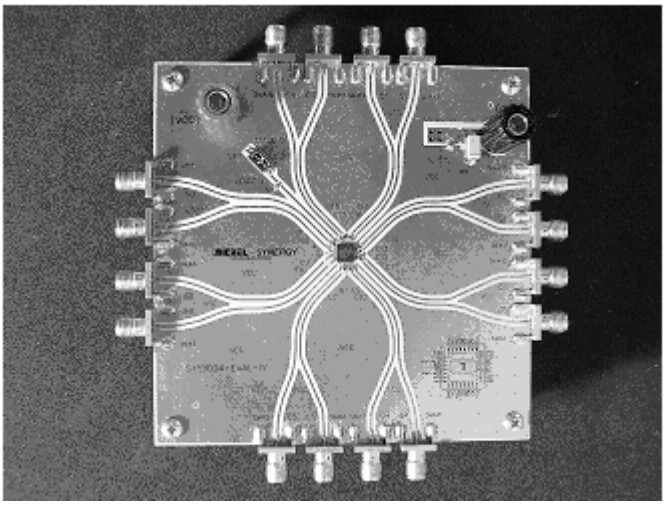
Features

- 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

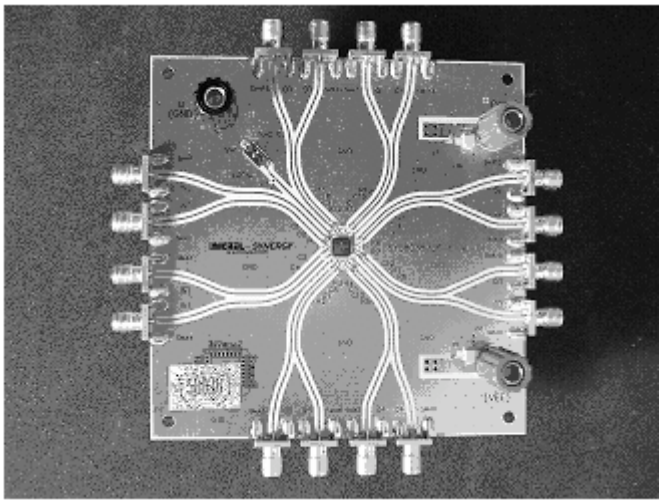
Related Documentation

- 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

hbwhelp@micrel.com or (408) 955-1690

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 ±5% or 3.3V ±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 50Ω to V_{CC} –2V. Split supply is an easy method to interface to a 50Ω (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.

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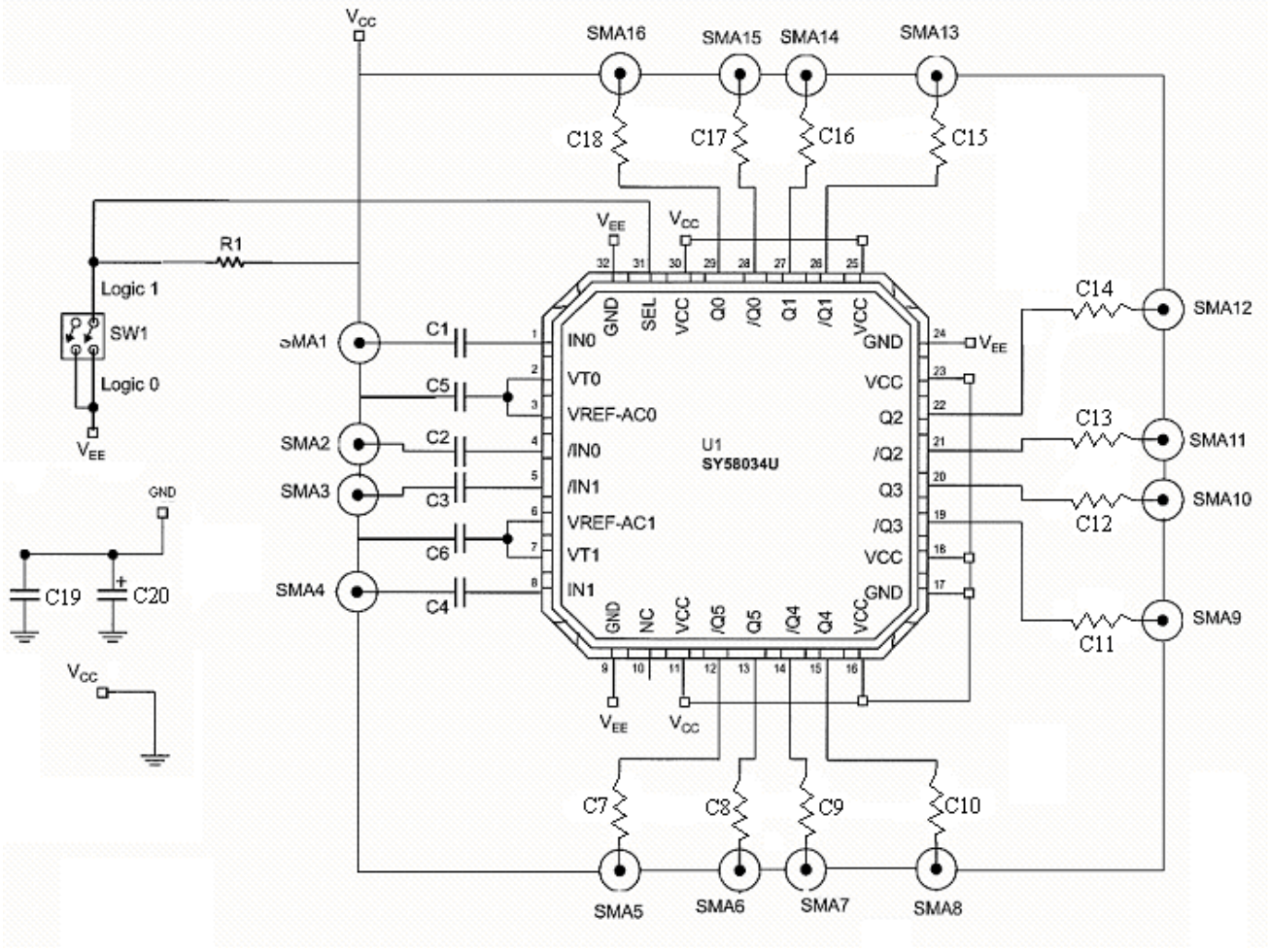
Evaluation Board



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.

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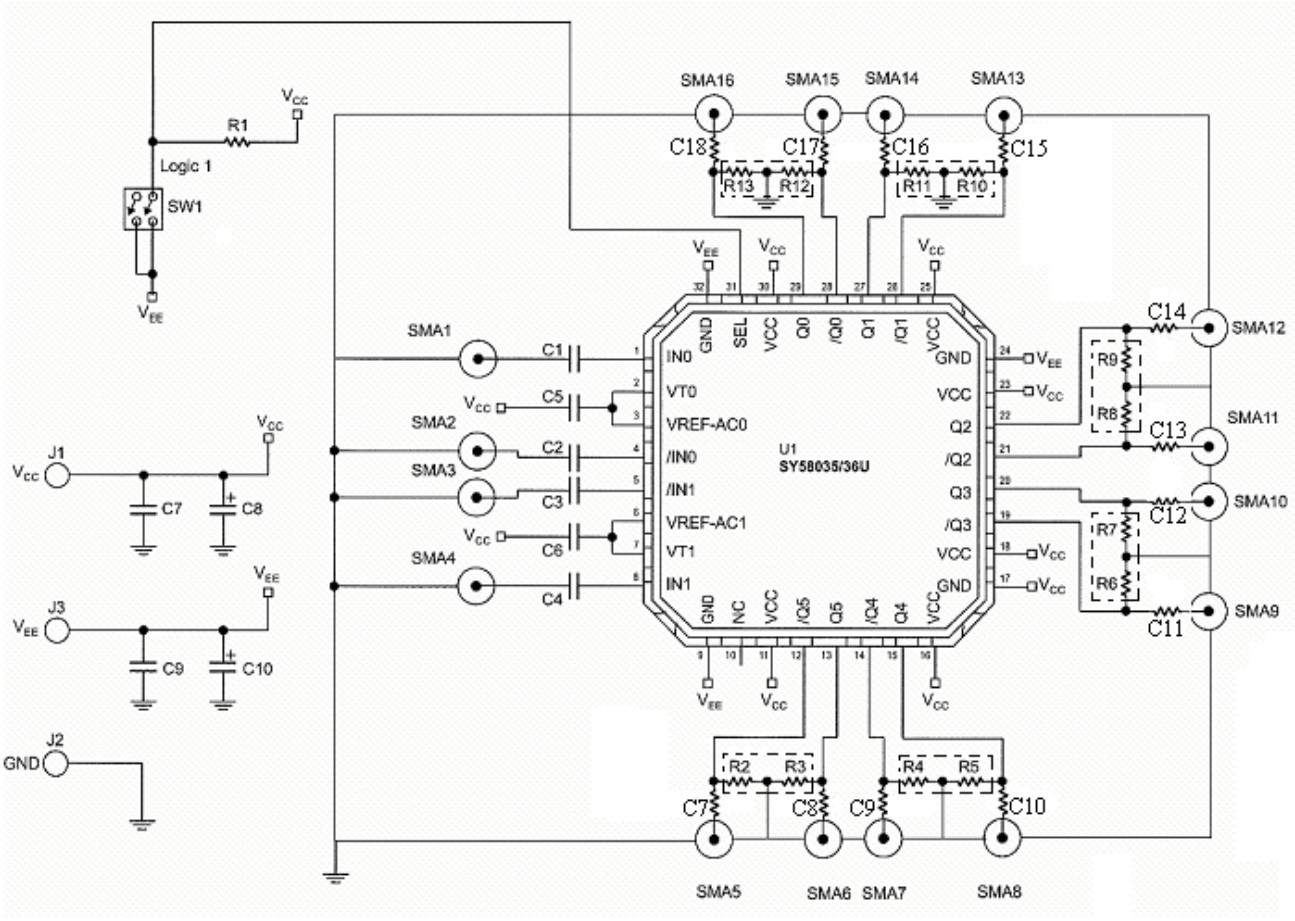

SY58035/6U LVPECL Evaluation Board

I/O	Power Supply	V_{CC}	GND	V_{EE}	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.

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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 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. 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[1]	0.1μF, 25V, 10% Ceramic Capacitor, Size 0402, X7R, Dielectric	8
C11-C22	CRCW0402000Z	Vishay[1]	0Ω, 1/16W Resistor SMD, Size 0402	12
C8,C10	293D685X0025C2T	Vishay[1]	6.8μF, 20V, Tantalum Electrolytic Capacitor, Size C	2
J1	111-0703-001	Johnson Components[2]	Black Banana Jack	1
J2	111-0702-001	Johnson Components[2]	Red Banana Jack	1
J3	111-0703-001	Johnson Components[2]	Black Banana Jack	1
R1	CRCW04023001F	Vishay[1]	3kΩ, 10%, 1/16W Resistor SMD, size 0402	1
SMA1-SMA16	142-0701-851	Johnson Components[2]	Jack Assembly End Launch SMA	16
SW1	CT2182LPST-ND	Digi-Key[3]	2-Position Dip	1
U1	**SY58034U**	**Micrel, Inc.[4]**	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[1]	0.1μF, 25V, 10% Ceramic Capacitor, Size 0402, X7R, Dielectric	12

Notes:

1. Vishay: www.vishay.com
2. Johnson Components: www.johnsoncomponents.com
3. Digi-Key: www.digikey.com
4. Micrel, Inc.: www.micrel.com

SY58035/6U Evaluation Board

Item	Part Number	Manufacturer	Description	Qty.
C8, C10	293D685X0025C2T	Vishay[1]	6.8μF, 20V, Tantalum Electrolytic Capacitor, Size C	2
C1-C7,C9	VJ0402Y104KXXAT	Vishay[1]	0.1μF, 25V, 10% Ceramic Capacitor, Size 0402, X5R, Dielectric	8
C11-C22	CRCW0402000Z	Vishay[1]	0Ω, 1/16W Resistor SMD, Size 0402	12
J2,J3	111-0703-001	Johnson Components[2]	Black Banana Jack	2
J1	111-0702-001	Johnson Components[2]	Red Banana Jack	1
R1	CRCW04023001F	Vishay[1]	3kΩ, 10%, 1/16W Resistor SMD, size 0402	1
SMA1-SMA16	142-0701-851	Johnson Components[2]	Jack Assembly End Launch SMA	16
SW1	CT2182LPST-ND	DigiKey[3]	2-Position Dip	1
U1	**SY58025/6U**	**Micrel, Inc.[4]**	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[1]	0.1μF, 25V, 10% Ceramic Capacitor, Size 0402, X5R, Dielectric	12
R2-R13	CRCW040249R9F CRCW04021000F	Vishay[1]	10% 1/16W Resistor SMD, size 0402[5]	12

Notes:

1. Vishay: www.vishay.com
2. Johnson Components: www.johnsoncomponents.com
3. DigiKey: www.digikey.com
4. Micrel, Inc.: 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_{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

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.

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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

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 Micrels' 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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