1:8 CML & LVPECL Fanout Buffer

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 a 50Ω oscilloscope.

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.

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

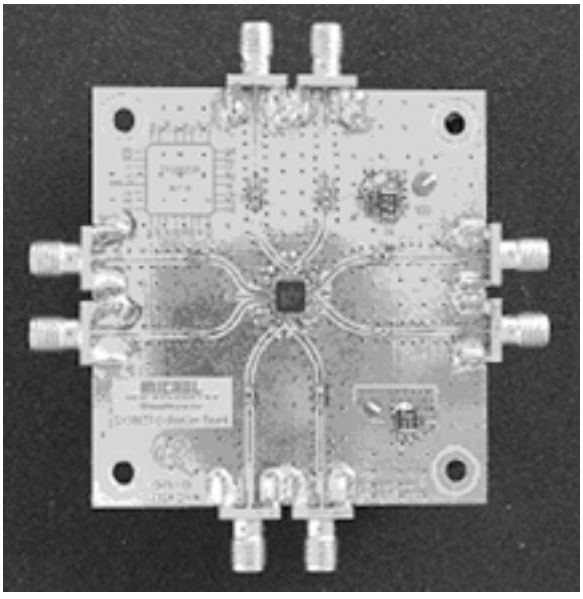
Features

- 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

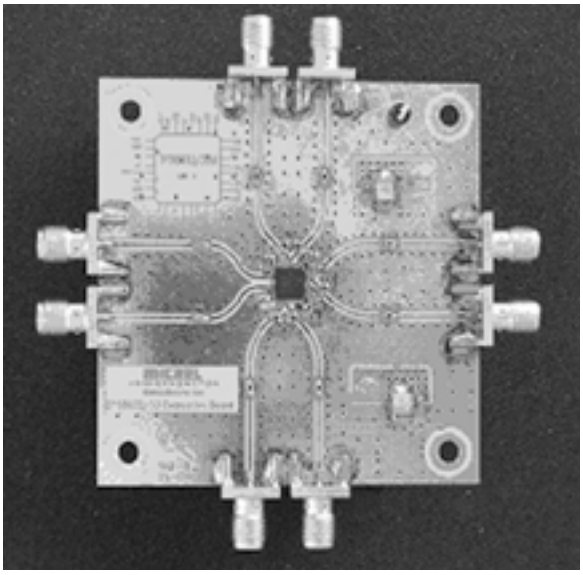
Related Documentation

- 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

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

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 Input and DC-coupled output. The output 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 enhanced AC performance. The CML SY58031U 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.

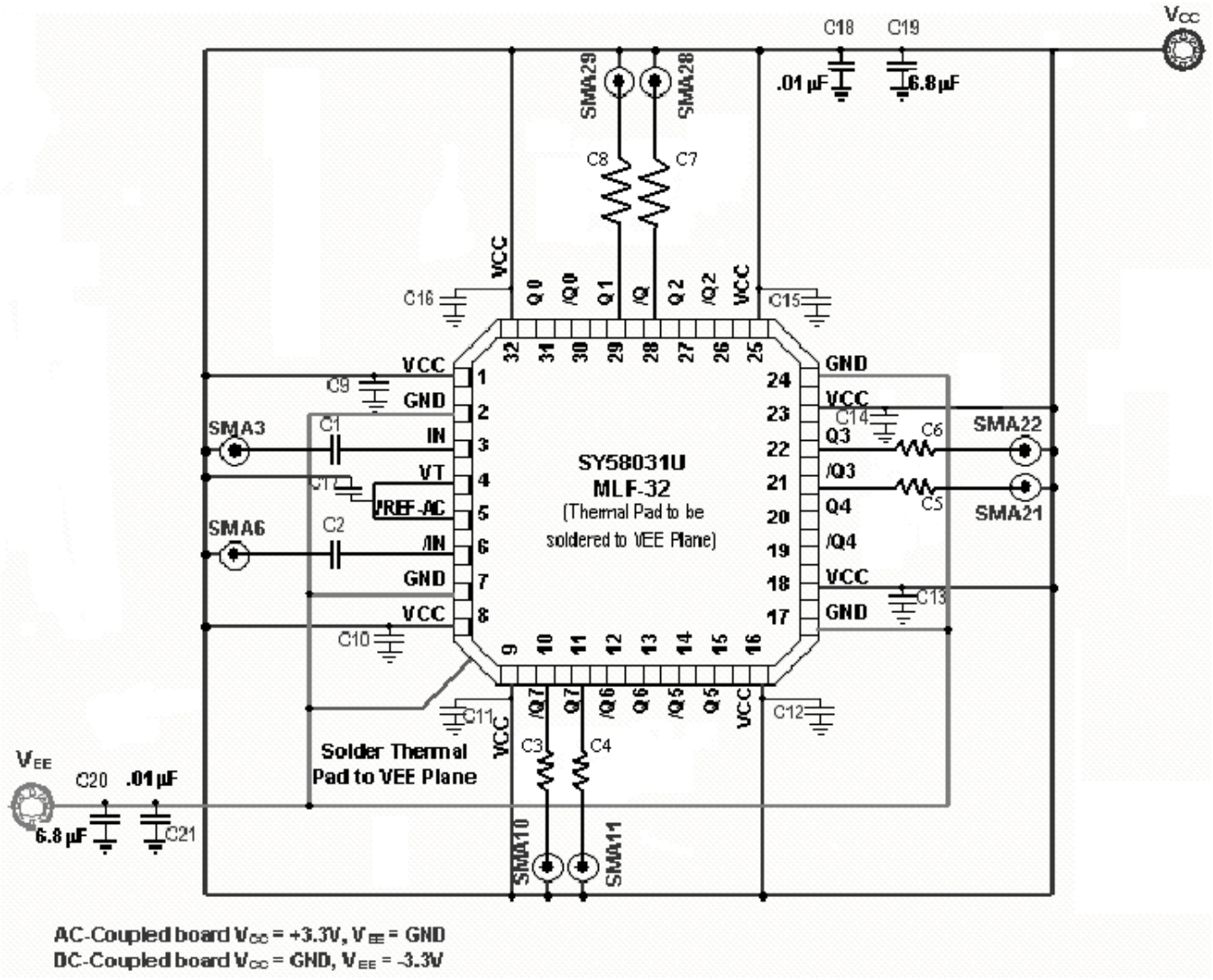
Therefore, a 3.3V supply will be split into +2V and –1.3V, and a +2.5V supply will be split into +2V and –0.5V. The +2V offset in the two-power supply configuration provides the correct termination for the device by setting the GND potential on the board to 2V below the V_{CC} supply. The V_{EE} voltage 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

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

Evaluation Board

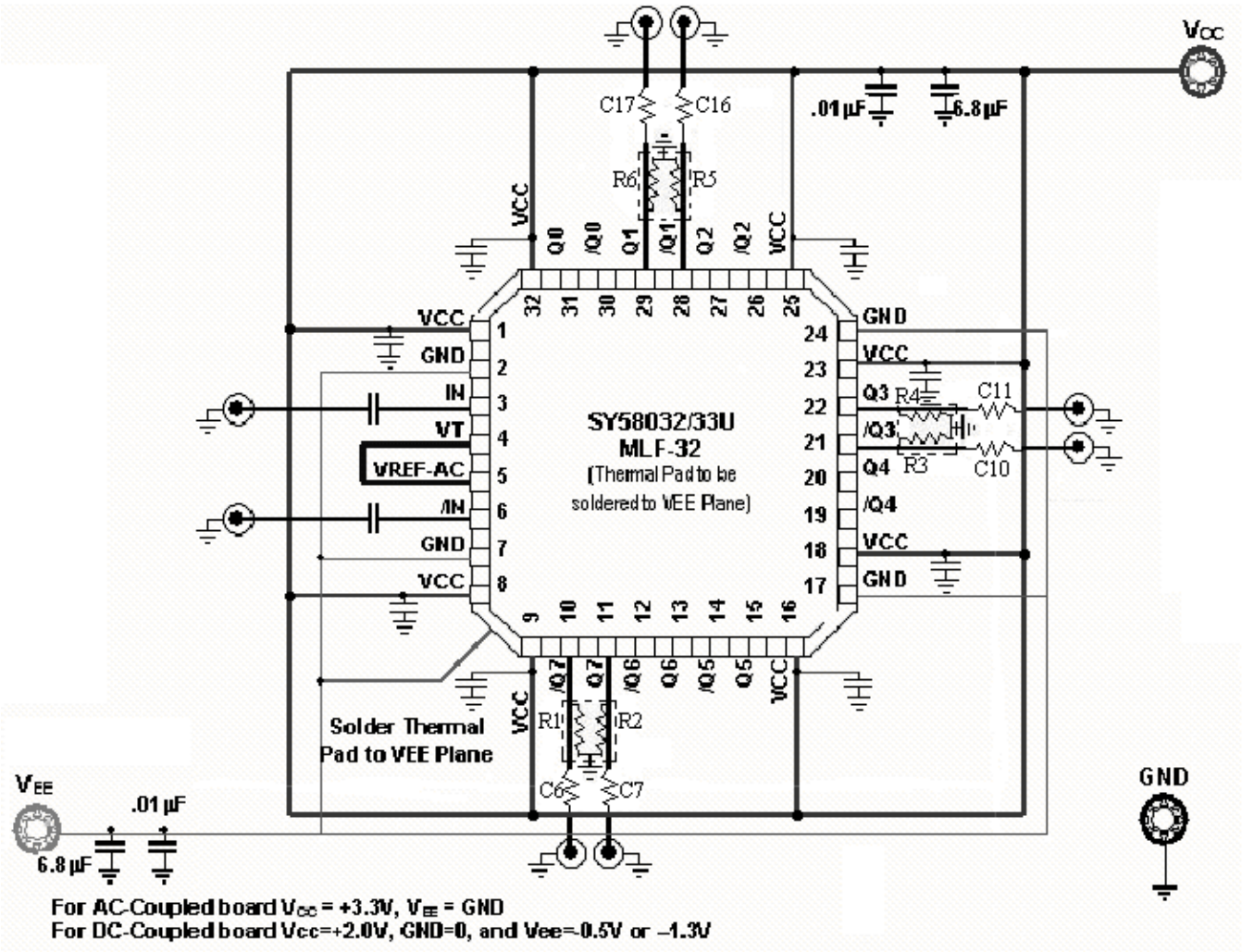


SY58031U CML Evaluation Board

I/O	Power Supply	V_{CC}	GND	V_{EE}	C3-C8
AC-In/DC-Out	2.5V	+2V	0	–0.5	0Ω
AC-In/DC-Out	3.3V	+2V	0	–1.3	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_{CC}	GND	V_{EE}	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.

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

DC-Coupled Evaluation Board Setup

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

SY58031U

Set the voltage setting for the DC supply 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.

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.

Bill of Materials

SY58031U Evaluation Board

Item	Part Number	Manufacturer	Description	Qty.
C1-C2,C9-C16	VJ0402Y104KXXAT	Vishay[1]	0.1μF, 25V, 10% Ceramic Capacitor, Size 0402, X7R, Dielectric	10
C18,C21	VJ0402Y103KXXAT	Vishay[1]	0.01μF, 25V, 10% Ceramic Capacitor, Size 0402, X7R, Dielectric	2
C3-C8	CRCW0402000Z	Vishay[1]	0Ω, 1/16W Resistor SMD, Size 0402	6
C19, C20	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
SMA3, SMA6, SMA10, SMA11, SMA21, SMA22, SMA28,SMA29	142-0701-851	Johnson Components[2]	Jack Assembly End Launch SMA	8
U1	**SY58031U**	**Micrel, Inc.[3]**	1:8 CML/LVPECL Fanout Buffer	1

Additional Components for AC-Coupled Outputs

Item	Part Number	Manufacturer	Description	Qty.
C3-C8	VJ0402Y104KXXAT	Vishay[1]	0.1μF, 25V, 10% Ceramic Capacitor, Size 0402, X7R, Dielectric	6

Notes:

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

SY58032/3U Evaluation Board

Item	Part Number	Manufacturer	Description	Qty.
C2, C14	293D685X0025C2T	Vishay[1]	6.8µF, 20V, Tantalum Electrolytic Capacitor, Size C	2
C3-C5,C8-C9,C12-C13,C18-C19	VJ0402Y104KXXAT	Vishay[1]	0.1µF, 25V, 10% Ceramic Capacitor, Size 0402, X7R, Dielectric	9
C6-C7,C10-C11, C16-C17	CRCW0402000Z	Vishay[1]	0Ω, 1/16W Resistor SMD, Size 0402	6
J1	111-0703-001	Johnson Components[2]	Black Banana Jack	1
J2, J3	111-0702-001	Johnson Components[2]	Red Banana Jack	2
SMA1-SMA8	142-0701-851	Johnson Components[2]	Jack Assembly End Launch SMA	8
U1	SY58032/3U	Micrel, Inc.[3]	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[1]	0.1µF, 25V, 10% Ceramic Capacitor, Size 0402, X7R, Dielectric	6
R3-R6	CRCW040249R9F CRCW04021000F	Vishay[1]	10% 1/16W Resistor SMD, Size 0402[4]	4

Notes:

1. Vishay: www.vishay.com
2. Johnson Components: www.johnsoncomponents.com
3. Micrel, Inc.: www.micrel.com
4. For 2.5V operation: R1-R6 are 50Ω resistors: For 3.3V operation: R1-R6 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	SY58031U	SY58032/3U
L1	V_{CC} and Signal	GND and Signal
L2	GND	GND
L3	V_{CC}	V_{CC}
L4	GND	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.

   For 3.3V operation: Add 100Ω 0402 pull-down resistors to R1-R6.

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

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 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. 1849 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.

© 2004 Micrel, Incorporated.