

General Description

This evaluation board allows for checking the performance of the SY88216 burst mode driver while driving a laser.

Datasheet and support documentation can be found on Micrel's web site at: www.micrel.com.

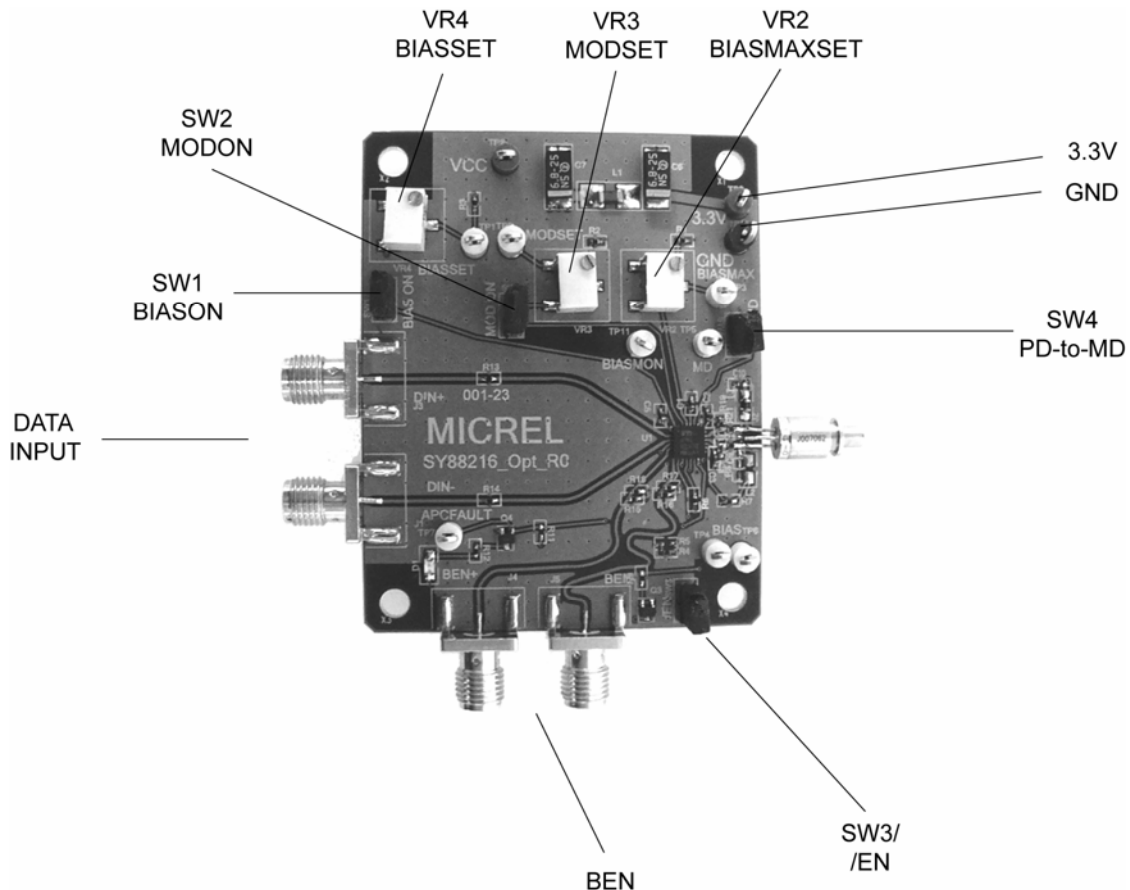
Features

- Open loop or close-loop operation
- Manual modulation, biasmax and bias setting

Related Support Documentation

- SY88216L Datasheet

Evaluation Board



TOSA Installation

Check the pin-out of the laser and install according to the diagrams shown in Figure 1.

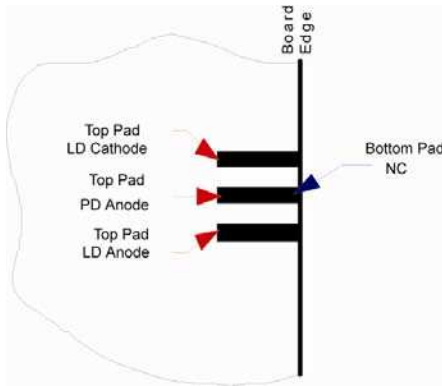


Figure 1. Mounting of the Laser

Evaluation Board Setting and Operation

1. Install a jumper on SW3 to enable the driver.
2. **Continuous Mode Operation:** Connect BEN- to GND or connect BEN+ to V_{CC} to operate the chip in continuous mode first.
3. Adjust potentiometers VR2 (BIASMAX), VR3 (MODSET), and VR4 (BIASSET) completely counterclockwise to set bias and modulation currents to zero "0" before powering the board.
4. If the inputs DIN+/DIN- are DC-coupled, set the output of the pattern generator high level within the range 0.5V-2V, first. Then connect the input (DIN+/DIN-) to the output of the pattern generator.
5. Connect the laser output to the optical module of the scope with a SMF jumper.
6. Open Loop Operation: Install a jumper on SW2 (MOD ON) and make sure that there is no jumper on SW4 (PD-MD).
7. Connect 3.3V to TP9 (red) and GND to TP10 (black) to power the board.
8. Turn VR2 (BIASMAX) clockwise, BIASMAX sets the bias current in open loop, to increase the bias current until the laser starts output some light then turn VR3 clockwise to set modulation current. Keep adjusting bias (VR2) and modulation (VR3) until an acceptable eye diagram is seen on the scope.
9. Bias Current can be deduced from the voltage across R7 between TP4 and TP6.

$$I_{BIAS} = (V_{TP6} - V_{TP4}) / R7$$

10. The voltage between TP11 (BIASMON) and GND (across R4) is proportional to (Bias Current + Half modulation current):

$$(I_{BIAS} + I_{MOD} / 2) / 50 = V_{R4} / R4$$

11. Close-loop operation: Install jumpers on SW1 (BIAS ON) and SW4 (PD-MD) to close the loop and turn VR4 clockwise to increase the bias current. Keep adjusting BIASSET (VR4) and modulation (VR3) until an acceptable eye diagram is seen on the scope.

Performance

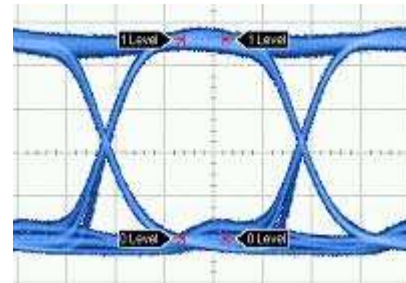


Figure 2. Optical Eye Diagram 1.25Gbps with 2.3G Filter

Laser Response Tuning

Overshoot/Undershoot

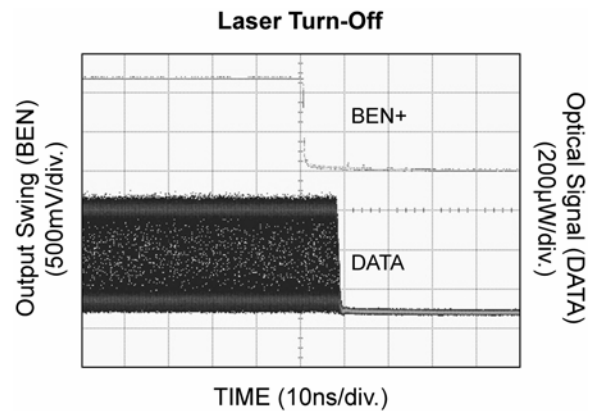
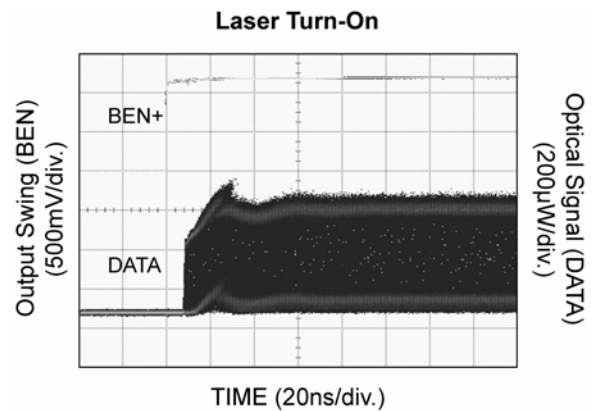
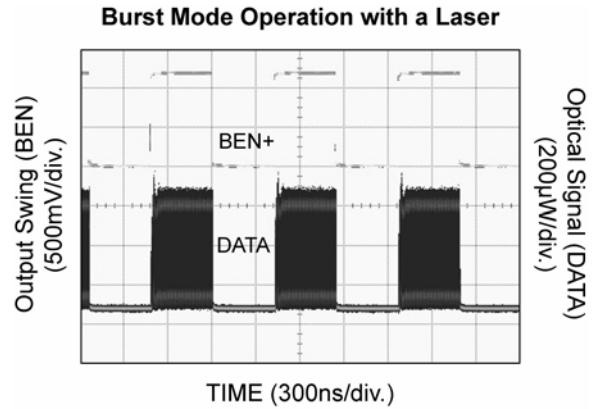
The damping resistors R21 and R22 installed in series with the laser are 10Ω. This value might be changed to a higher value to minimize or suppress any overshoot or undershoot on the optical signal out of the laser, but keep in mind that higher value damping resistors will lead to higher rise/fall time and lower maximum modulation current.

The user can adjust the values of (R19, C8) and/or (R8, C9) to get better performance with his laser.

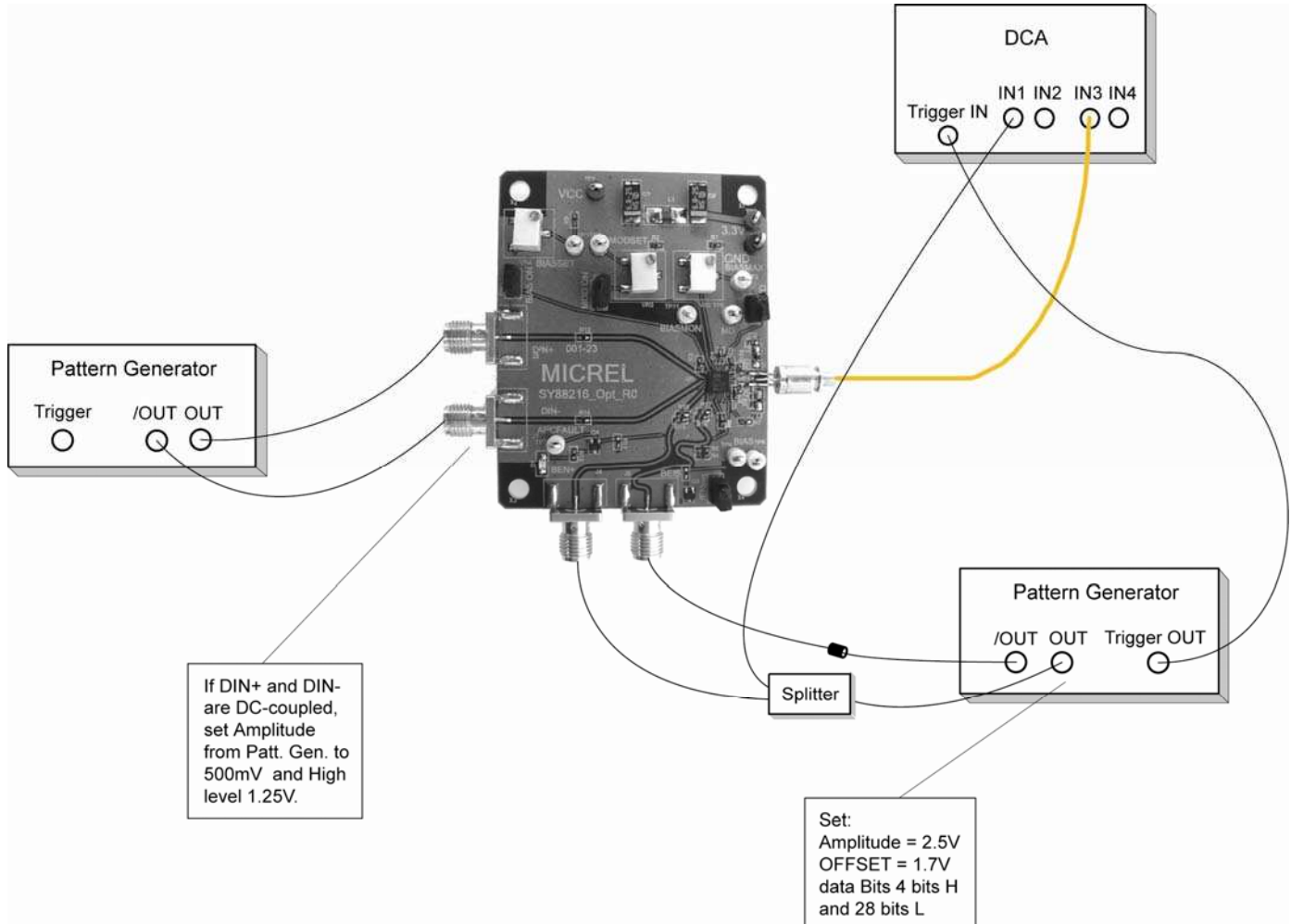
Burst Mode Operation

1. Use the setup diagram below to perform burst mode operation measurements.
2. Disconnect BEN+ from V_{CC} and BEN- from GND whichever is connected and connect BEN inputs to the output of the BEN signal generator.
3. Connect the trigger output of the BEN signal generator to the trigger input on the scope.
4. Select the frequency of the BEN signal to have BEN high for at least 100ns per cycle to give enough time to the optical signal to settle.

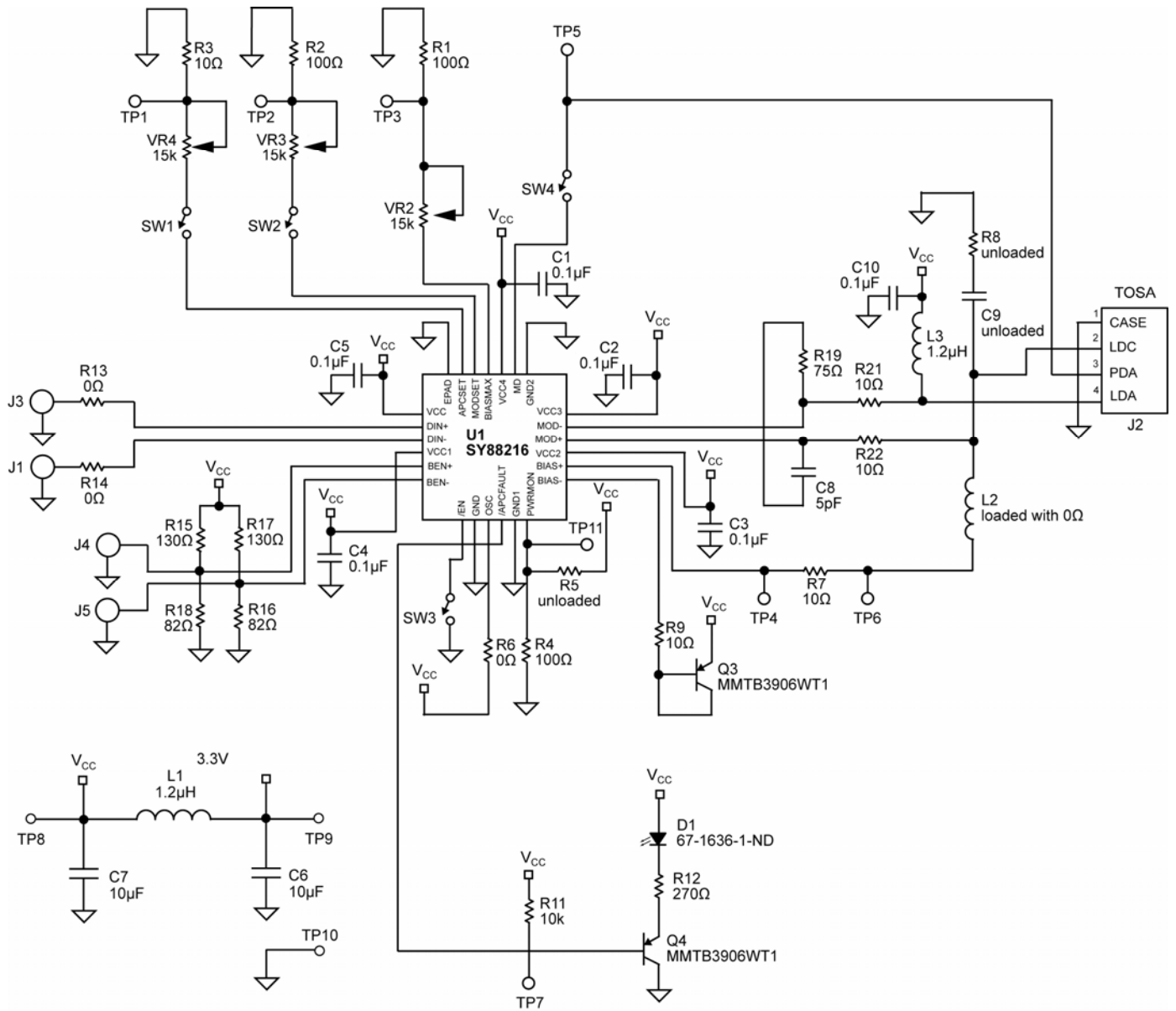
Performance



Evaluation Board Timing Set-Up



Evaluation Board Schematic



Bill of Materials

Item	Part Number	Manufacturer	Description	Qty.
C1-5, C10		Vishay ⁽¹⁾	0.1 μ F, Size 0402, Ceramic Capacitor	6
C6, C7	ECSH0GY106R	Panasonic ⁽²⁾	10 μ F, Y, Tantalum Solid Electrolytic Capacitor	2
C8		Vishay ⁽¹⁾	5pF, Size 0402, Ceramic Capacitor	1
D1	67-1636-1-ND	Digikey ⁽³⁾	Red LED	1
J1, J3-5	142-0701-851	Johnson Components ⁽⁴⁾	SMA End Launch Receptacle Connector	4
J2		Vishay ⁽¹⁾	TOSA, Laser Subassembly	1
L1		Vishay ⁽¹⁾	1.2 μ H Ferrite Bead Inductor, Size 1206	1
L2		Vishay ⁽¹⁾	0 Ω Resistor	1
L3		Vishay ⁽¹⁾	1.2 μ H Ferrite Bead Inductor, Size 0805	1
Q3, Q4	MMTB3906WT1	ON Semiconductor ⁽⁵⁾	N-MOSFET	2
R6, R13, R14	CRCW04020R00F	Vishay ⁽¹⁾	0 Ω Resistor	3
R3, R7, R9, R21, R22	CRCW040210R0F	Vishay ⁽¹⁾	10 Ω Resistor	5
R19	CRCW040275R0F	Vishay ⁽¹⁾	75 Ω Resistor	1
R16, R18	CRCW040282R0F	Vishay ⁽¹⁾	82 Ω Resistor	2
R1, R2, R4	CRCW04021000F	Vishay ⁽¹⁾	100 Ω Resistor	3
R15, R17	CRCW04021300F	Vishay ⁽¹⁾	130 Ω Resistor	2
R12	CRCW04022700F	Vishay ⁽¹⁾	270 Ω Resistor	1
R11	CRCW04021002F	Vishay ⁽¹⁾	10k Ω Resistor	1
SW1, SW2, SW3, SW4	TSW-1-2-07-G-S	Samtec ⁽⁶⁾	Header, 2 positions	4
TP10	5011	Keystone ⁽⁷⁾	Color Coded PCB test point, Black	1
TP1-TP8, TP11	5014	Keystone ⁽⁷⁾	Color Coded PCB test point, Yellow	9
TP9	5010	Keystone ⁽⁷⁾	Color Coded PCB test point, Red	1
U1	SY88216L	Micrel, Inc.⁽⁸⁾	2.5G Burst Mode Laser Driver	1
VR2, VR3, VR4	3269 W-1-503 GLF	Bourns ⁽⁹⁾	50K SMD Trimming Potentiometer	3

Notes:

1. Vishay: www.vishay.com.
2. Panasonic: www.panasonic.com.
3. Digikey: www.digikey.com.
4. Johnson components: www.johnsoncomponents.com.
5. ON Semiconductor: www.onsemi.com.
6. Samtec: www.samtec.com.
7. Keystone: www.keyelco.com.
8. **Micrel, Inc.:** www.micrel.com.
9. Bourns: www.bourns.com.

HBW Support

Hotline: 408-955-1690

Email Support: HBWHelp@micrel.com

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.

© 2008 Micrel, Incorporated.