

### QDD4-400GB-SR4-BD-NPC

MSA and TAA 400GBase-BX SR4.2 PAM4 QSFP-DD Transceiver (MMF, 850nm to 902nm, 100m, MPO-12, DOM, CMIS 4.0)

#### Features:

- 8x50 Gbps MMF optical interface
- Supports 4x100G breakout function
- 850nm/908nm VCSEL 850nm/908nm PD Array Technology
- MPO-12 connector
- Multi-mode fiber
- CMIS V4.0 compliance
- Commercial Temperature 0 to 70 Celsius
- Hot Pluggable
- Excellent ESD Protection
- RoHS Compliant and lead-free



#### Applications:

- 400GBase Ethernet
- Access and Enterprise

#### Product Description

This MSA compliant QSFP-DD transceiver provides 400GBase-BX SR4.2 throughput up to 100m over multi-mode fiber (MMF) PAM4 using a wavelength of 850nm to 902nm via an MPO-12 connector. This bidirectional unit must be used with another transceiver or network appliance of complementing wavelengths. It can operate at temperatures between 0 and 70C. All of our transceivers are built to comply with Multi-Source Agreement (MSA) standards and are uniquely serialized and tested for data-traffic and application to ensure seamless network integration. Additional product features include Digital Optical Monitoring (DOM) support which allows access to real-time operating parameters. This transceiver is Trade Agreements Act (TAA) compliant. We stand behind the quality of our products and proudly offer a limited lifetime warranty.

ProLabs' transceivers are RoHS compliant and lead-free.

TAA refers to the Trade Agreements Act (19 U.S.C. & 2501-2581), which is intended to foster fair and open international trade. TAA requires that the U.S. Government may acquire only "U.S.-made or designated country end products.")



## Absolute Maximum Ratings

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Maximum Supply Voltage	Vcc	-0.5		3.6	V	1
Storage Temperature	Tstg	-40		85	°C	1
Storage Relative Humidity	RH	0		95	%	1, 2
Operating Case Temperature	Tc	0	25	70	°C	
Operating Relative Humidity	RH	0		85	%	1, 2
Signaling Speed Per Channel	S		26.56		GB	

### Notes:

1. Exceeding the Absolute Maximum Ratings may cause irreversible damage to the device. The device is not intended to be operated under the condition of simultaneous Absolute Maximum Ratings, a condition which may cause irreversible damage to the device.
2. Non-condensing condition.

## Electrical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Module Supply Voltage	Vcc	3.14	3.3	3.46	V	
Power Consumption	P			12	W	
Module Supply Current	I <sub>N</sub>		3500		mA	
<b>Transmitter</b>						
Tx_Data Differential Input Voltage	V <sub>IN</sub>			900	mV	
Tx_Data Differential Input Impedance	Z <sub>IN</sub>		100		Ω	
<b>Receiver</b>						
Rx_Data Differential Output Voltage	V <sub>OUT</sub>			900	mV	
Rx_Data Differential Output Impedance	Z <sub>OUT</sub>		100		Ω	

## Optical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
<b>Transmitter</b>						
Signaling Rate Per Lane	SR		26.56		GBd	
Signaling Speed Accuracy	SSA	-100		100	ppm	
Modulation Format		PAM4				
Average Launch Power Per Lane	POUT	-6.5		4	dBm	1
Outer Optical Modulation Amplitude Per Lane	OMAouter	-4.5		3	dBm	
Optical Output with Tx Off	POFF			-30	dBm	
Extinction Ratio	ER	3			dB	
$\lambda 1$ Center Wavelength (Range)	$\lambda$	840		868	nm	2
$\lambda 2$ Center Wavelength (Range)	$\lambda$	900		918	nm	3
RMS Spectral Width ( $\lambda 1$ )	$\Delta\lambda$			0.65	nm	
RMS Spectral Width ( $\lambda 2$ )	$\Delta\lambda$			0.65	nm	
Transmitter and Dispersion Eye Closure (TDECQ) Per Lane	TDECQ			4.5	dB	
Launch Power in OMAouter Minus TDECQ Per Lane (Minimum)		-5.9			dB	
Optical Return Loss Tolerance (Maximum)	ORLT			12	dB	
<b>Receiver</b>						
Signaling Rate Per Lane	SR		26.56		GBd	
Signaling Speed Accuracy		-100		100	ppm	
Modulation Format		PAM4				
Average Power at Receive Input Per Lane	PIN	-8.5		4	dBm	
Receive Power (OMAouter) Per Lane (Maximum)				3	dBm	
Receiver Sensitivity (OMAouter) Per Lane	S			Max. (-6.6, SECQ-8)	dBm	4
$\lambda 1$ Center Wavelength (Range)	$\lambda$	840		868	nm	2
$\lambda 2$ Center Wavelength (Range)	$\lambda$	900		918	nm	3
Rx_LOS - Assert	LOSA	-24.6			dBm	
Rx_LOS - De-Assert	LOSD			-8.6	dBm	
Rx_LOS - Hysteresis	LOSH	0.5			dB	

### Notes:

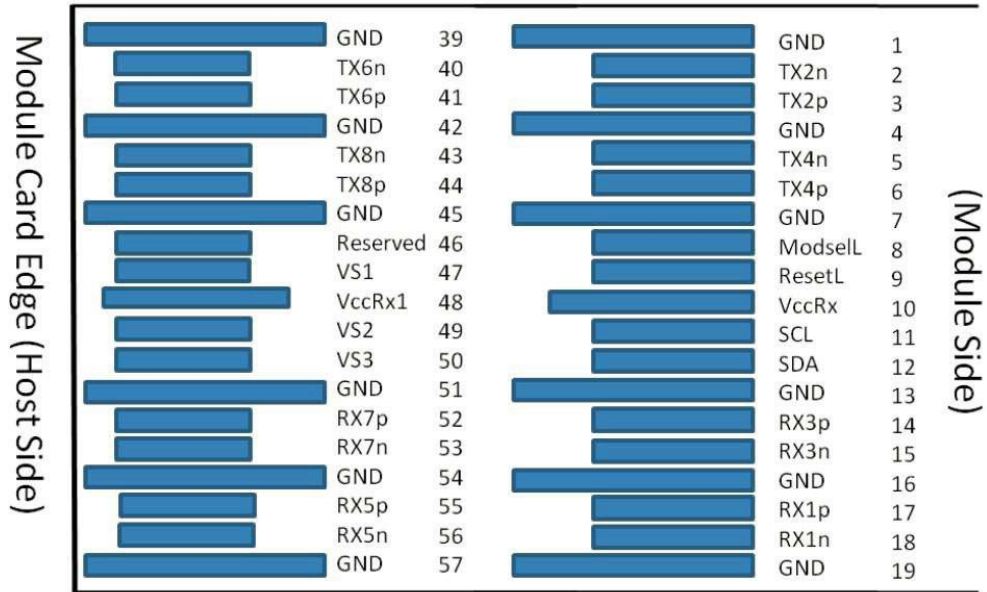
1. Average Optical Output.
2. TxRx pair type TR.
3. TxRx pair type RT.
4. Sensitivity where the BER=2.4E<sup>-4</sup> measured with a PRBS 31Q test pattern @26.56GBaud.

## Pin Descriptions

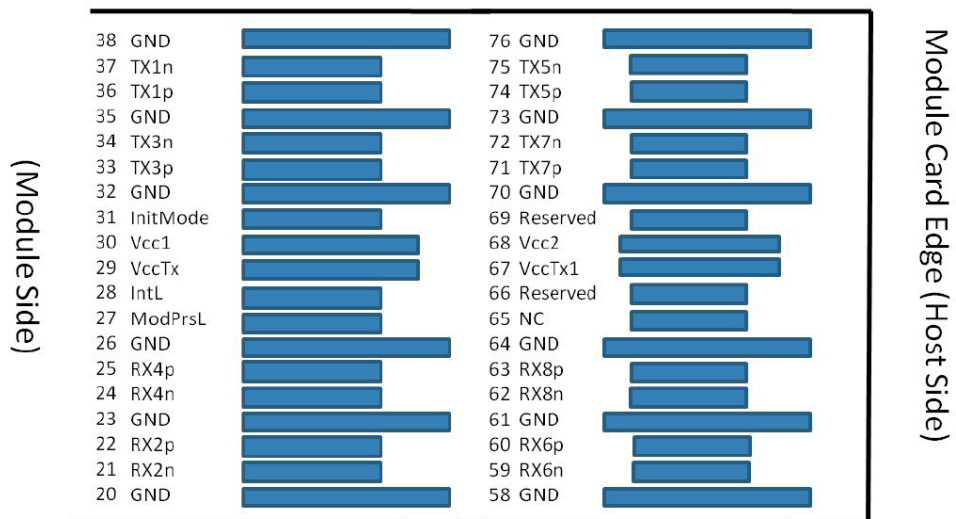
Pin	Logic	Symbol	Name/Descriptions
1		GND	Module Ground.
2	CML-I	Tx2-	Transmitter Inverted Data Input.
3	CML-I	Tx2+	Transmitter Non-Inverted Data Input.
4		GND	Module Ground.
5	CML-I	Tx4-	Transmitter Inverted Data Input.
6	CML-I	Tx4+	Transmitter Non-Inverted Data Input.
7		GND	Module Ground.
8	LVTTTL-I	ModSelL	Module Select.
9	LVTTTL-I	ResetL	Module Reset.
10		VccRx	+3.3V Power Supply Receiver.
11	LVC MOS-I/O	SCL	2-Wire Serial Interface Clock.
12	LVC MOS-I/O	SDA	2-Wire Serial Interface Data.
13		GND	Module Ground.
14	CML-O	Rx3+	Receiver Non-Inverted Data Output.
15	CML-O	Rx3-	Receiver Inverted Data Output.
16		GND	Module Ground.
17	CML-O	Rx1+	Receiver Non-Inverted Data Output.
18	CML-O	Rx1-	Receiver Inverted Data Output.
19		GND	Module Ground.
20		GND	Module Ground.
21	CML-O	Rx2-	Receiver Inverted Data Output.
22	CML-O	Rx2+	Receiver Non-Inverted Data Output.
23		GND	Module Ground.
24	CML-O	Rx4-	Receiver Inverted Data Output.
25	CML-O	Rx4+	Receiver Non-Inverted Data Output.
26		GND	Module Ground.
27	LVTTTL-O	ModPrsL	Module Present.
28	LVTTTL-O	IntL	Interrupt.
29		VccTx	+3.3V Power Supply Transmitter.
30		Vcc1	+3.3V Power Supply.
31	LVTTTL-I	InitMode	Initialization Mode.
32		GND	Module Ground.
33	CML-I	Tx3+	Transmitter Non-Inverted Data Input.
34	CML-I	Tx3-	Transmitter Inverted Data Input.
35		GND	Module Ground.
36	CML-I	Tx1+	Transmitter Non-Inverted Data Input.
37	CML-I	Tx1-	Transmitter Inverted Data Input.
38		GND	Module Ground.
39		GND	Module Ground.

40	CML-I	Tx6-	Transmitter Inverted Data Input.
41	CML-I	Tx6+	Transmitter Non-Inverted Data Input.
42		GND	Module Ground.
43	CML-I	Tx8-	Transmitter Inverted Data Input.
44	CML-I	Tx8+	Transmitter Non-Inverted Data Input.
45		GND	Module Ground.
46		Reserved	
47		VS1	Module Vendor-Specific 1.
48		VccRx1	+3.3V Power Supply.
49		VS2	Module Vendor-Specific 2.
50		VS3	Module Vendor-Specific 3.
51		GND	Module Ground.
52	CML-O	Rx7+	Receiver Non-Inverted Data Output.
53	CML-O	Rx7-	Receiver Inverted Data Output.
54		GND	Module Ground.
55	CML-O	Rx5+	Receiver Non-Inverted Data Output.
56	CML-O	Rx5-	Receiver Inverted Data Output.
57		GND	Module Ground.
58		GND	Module Ground.
59	CML-O	Rx6-	Receiver Inverted Data Output.
60	CML-O	Rx6+	Receiver Non-Inverted Data Output.
61		GND	Module Ground.
62	CML-O	Rx8-	Receiver Inverted Data Output.
63	CML-O	Rx8+	Receiver Non-Inverted Data Output.
64		GND	Module Ground.
65		NC	Not Connected.
66		Reserved	
67		VccTx1	+3.3V Power Supply.
68		Vcc2	+3.3V Power Supply.
69		Reserved	
70		GND	Module Ground.
71	CML-I	Tx7+	Transmitter Non-Inverted Data Input.
72	CML-I	Tx7-	Transmitter Inverted Data Input.
73		GND	Module Ground.
74	CML-I	Tx5+	Transmitter Non-Inverted Data Input.
75	CML-I	Tx5-	Transmitter Inverted Data Input.
76		GND	Module Ground.

## Electrical Pin-Out Details

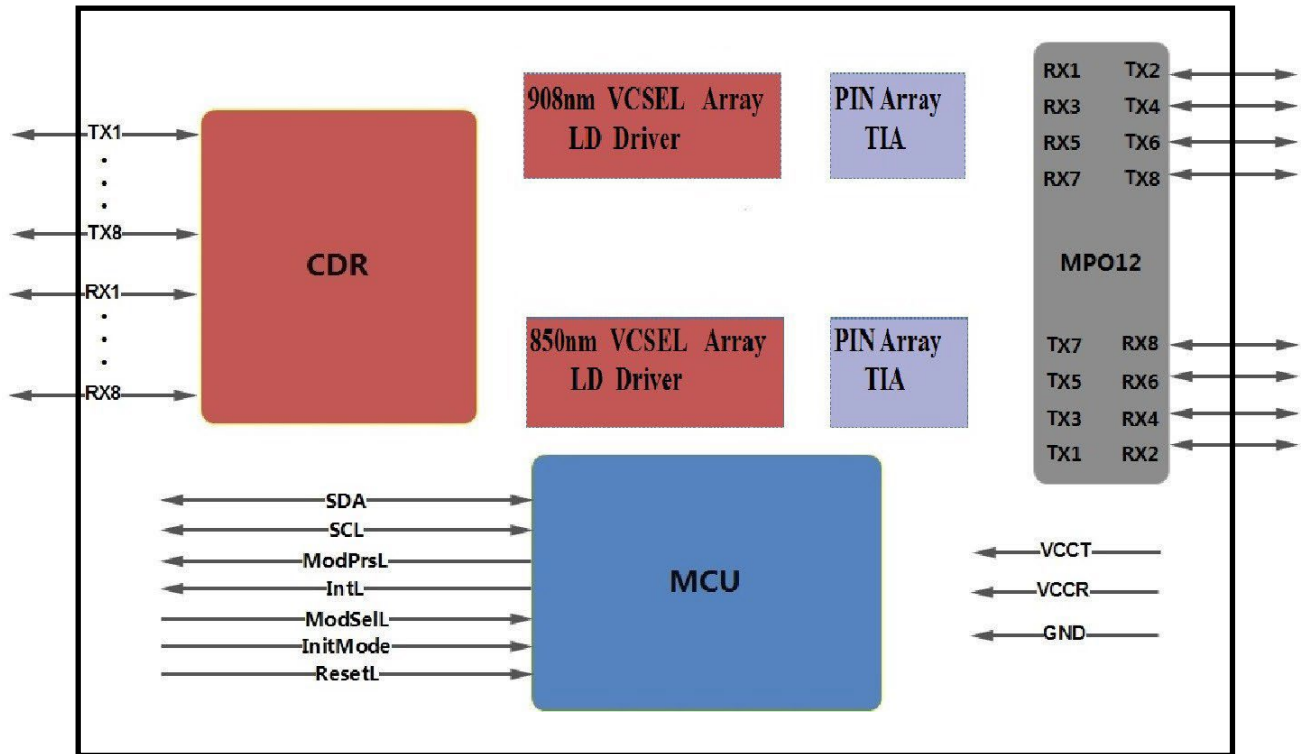


Bottom side viewed from bottom

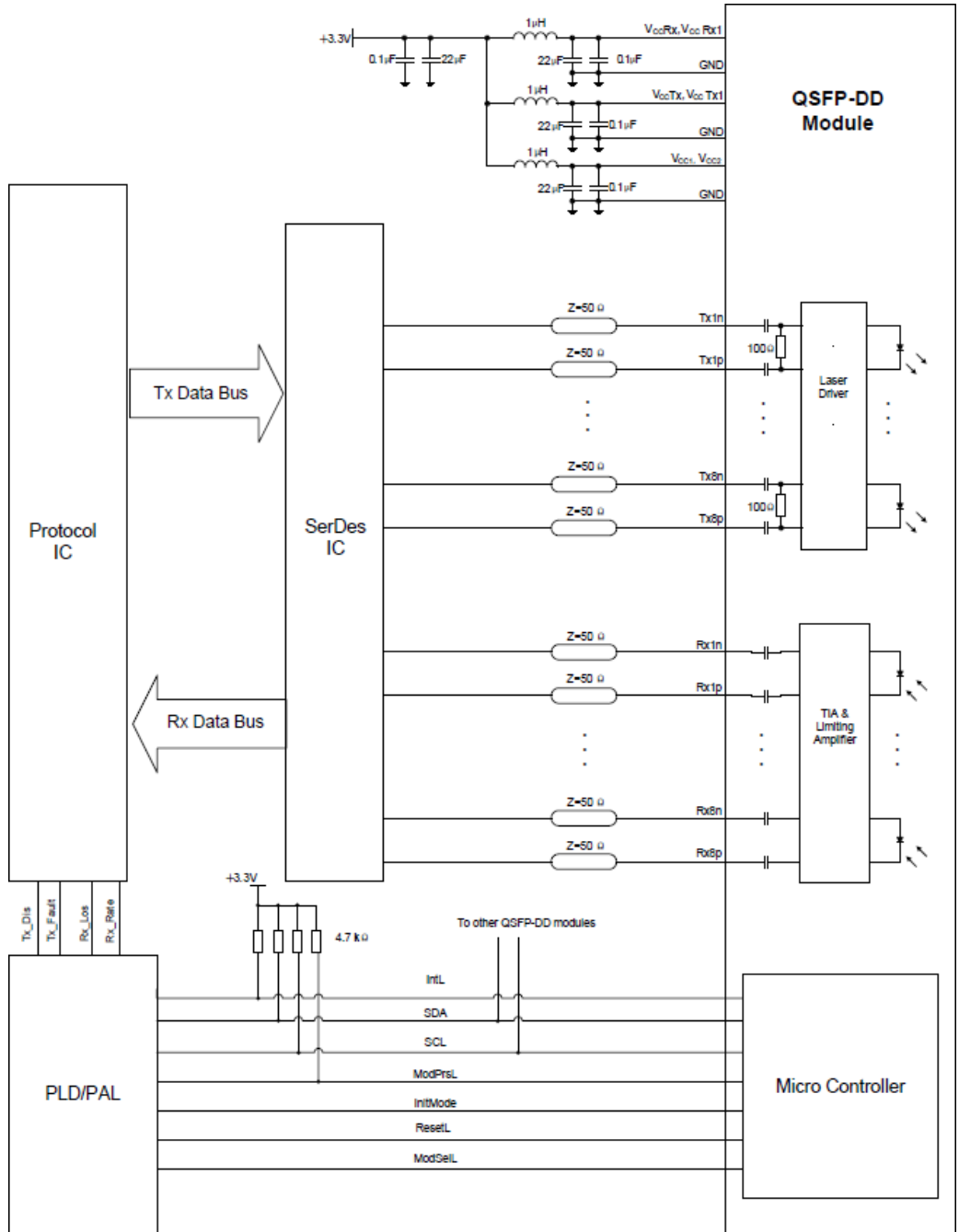


Top side viewed from top

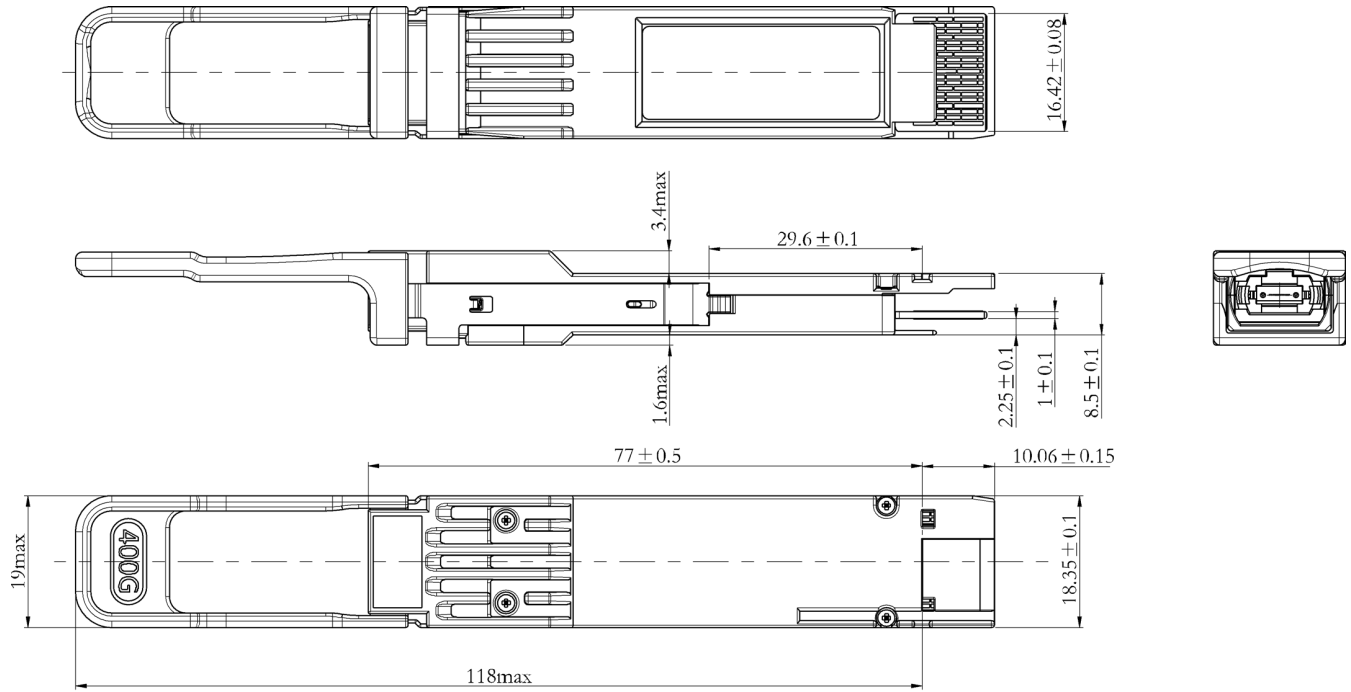
# Transceiver Block Diagram



# Electrical Interface



## Mechanical Specifications



**NOTES:**

1. TOLERANCE:  $\pm 0.1\text{MM}$ .
2. OTHERS ACCORDING WITH QFP-DD MSA OR CUSTOMER SPEC.
3. LIGHT PORT ACCORDING WITH FIBER CONNECTOR SPEC.

## About ProLabs

Our extensive experience comes as standard. For over 20 years ProLabs has delivered optical connectivity solutions that give our customers freedom and choice through our ability to provide seamless interoperability. At the heart of our company is the ability to provide state-of-the-art optical transport and connectivity solutions that are compatible with more than 100 optical switching and transport platforms.

## A Complete Portfolio of Network Solutions

ProLabs is focused on innovations in optical transport and connectivity. The combination of our knowledge of optics and networking equipment enables ProLabs to be your single source for optical transport and connectivity solutions from 100Mb to 1.6T while providing innovative solutions that increase network efficiency. We provide the optical connectivity expertise that is compatible with and enhances your switching and transport equipment.

## The Trusted Partner

Customer service is our number one value. ProLabs has invested in people, labs and manufacturing capacity to ensure compatible products, and immediate answers to your questions. With Engineering and Manufacturing offices in the U.K. and U.S. augmented by field offices throughout the U.S., U.K. and Asia, ProLabs is able to be our customers best advocate 24 hours a day.



## Contact Information

ProLabs US

Email: [sales@prolabs.com](mailto:sales@prolabs.com)

Telephone: 952-852-0252

ProLabs UK

Email: [salessupport@prolabs.com](mailto:salessupport@prolabs.com)

Telephone: +44 1285 719 600