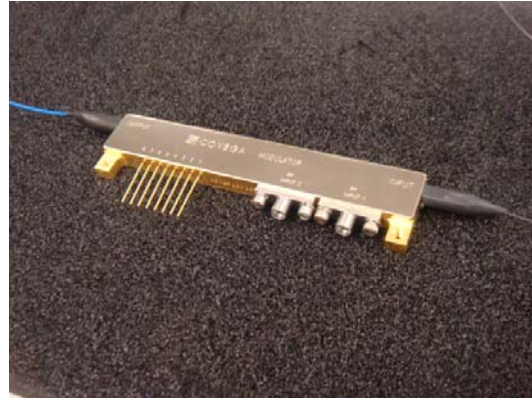


## Mach-40<sup>®</sup> 086: Dual Parallel Modulator with RF detectors

7.1.2.SP.LN86 Rev B

### Description

COVEGA's Dual-Parallel Modulator is part of the Mach-40<sup>®</sup> product line, a family of high performance, Telcordia compliant external optical modulators with industry leading long-term stability. The modulator consists of two Mach Zehnder Interferometers (MZI's) in parallel and is designed for quadrature modulation (QPSK or 4QAM) and single side-band suppressed carrier (SSB-SC) transmission. The Dual-Parallel Modulator is fabricated using titanium-indiffused lithium niobate substrates. Each MZI has an independently controlled bias section to achieve maximum performance.



### Features

### Applications

- ✓ (D) QPSK Transmission for Telecom
- ✓ SSB-SC Transmission for Telecom

- Dual, parallel MZIs on a single x-cut lithium niobate chip
- Separate DC bias for both MZIs
- High Reliability - Long-Term Bias Stability
- Hermetic Packaging

### Ordering Information

Mach-40 086-XX-X-X-X

Part #	Bandwidth	Output Fiber Type	Input Connector	Output Connector	
086	14=14GHz	S = SMF*	S = SC/PC*	S = SC/PC*	
		P = PMF	B = Bare Fiber	B = Bare Fiber	
			F = FC/uPC	F = FC/uPC	
			L = LC/PC	L = LC/PC	
			A = FC/aPC	A = FC/aPC	
			M = Mu	M = Mu	
* Default options unless otherwise specified					

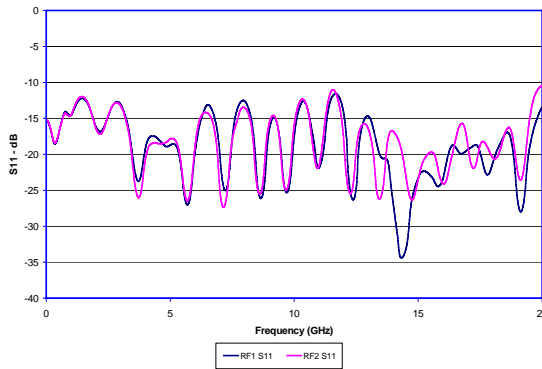
### Thorlabs Quantum Electronics, Inc.

10335 Guilford Road, Jessup, MD 20794, USA

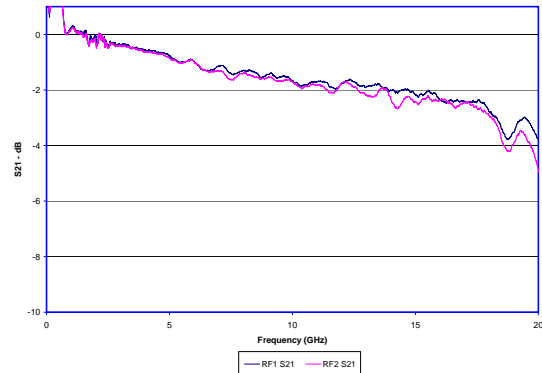
Phone: +1 240-456-7100 Fax: +1 240-456-7200 Email: [sales-TQE@thorlabs.com](mailto:sales-TQE@thorlabs.com) Web: <http://www.covega.com>

Mach-40<sup>®</sup> 086

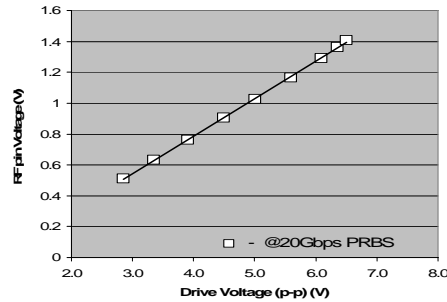
S11 Plot



S21 Plot



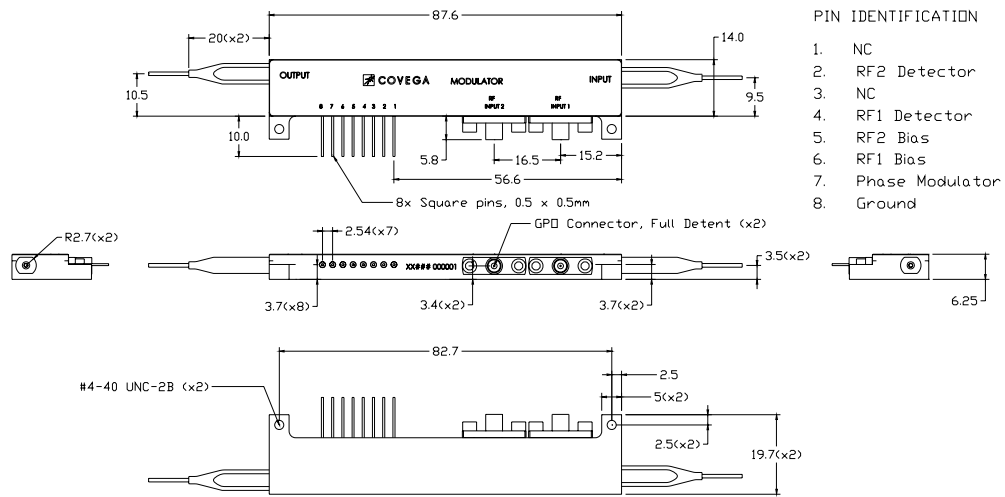
RF Detector Linearity Plot



Specifications

Parameter		Min	Typ	Max	Units
Operating Case Temperature	T <sub>CASE</sub>	0		70	C
Operating Wavelength	λ	1525		1575	nm
Optical Insertion Loss (Connectorized)	I.L.		5.0	6.0	dB
Insertion Loss Variation (EOL)	ΔI.L.	-0.5		0.5	dB
Optical Return Loss		40			dB
Optical Extinction Ratio (@ DC) per MZI	E.R.	20			dB
RF1 & RF2 V <sub>π</sub> @ DC			3.5	4.5	V
RF1 & RF2 V <sub>π</sub> @ 1GHz			4.5	6	V
RF1 & RF2 Bias V <sub>π</sub> @ DC			4.5	5.5	V
RF1 & RF2 S11 (50MHz to 14GHz)			-12	-10	dB
<b>Inner MZI Modulators</b>					
E/O Bandwidth		14			GHz
S21 Amplitude difference (50MHz to 20GHz)		-1.5		1.5	dB
S21 Phase difference (50MHz to 14GHz)		10		10	deg
S21 Phase ripple (50MHz to 10GHz)		10		10	deg
Differential RF delay		-5ps		5ps	
<b>Phase Modulator</b>					
V <sub>π</sub> @ DC				6	V
E/O Bandwidth		1			MHz
<b>RF Detectors</b>					
Threshold				0.5	V
Slope		0.1		0.4	V/Vpk-pk
Linearity		-5		5	%

**Packaging**



Dimensions in mm unless otherwise specified; Tolerances are ± 0.1 (decimals) ± 1 (angles)