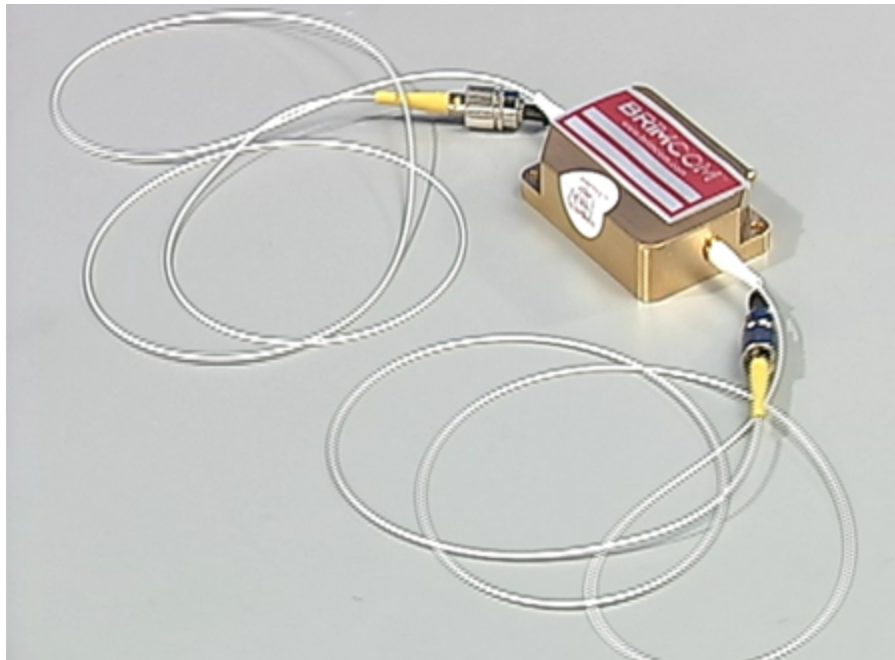




AO Modulators System for Recirculating Loop System

For application of simulating and testing of long distance fiber-optic communication lines Brimrose has developed a fiber-pigtailed AO modulator system. The recirculating loop system consists of 2 fiber-pigtailed AO modulators and a corresponding RF driver. One of the modulators is placed outside the loop to defined the transmitted pulse width and the second devices is placed inside the loop to defined the distance of the pulse transmission which corresponds directly to the length of the long distance fiber-optic line.

Since conventional AO devices will frequency shift the transmitted light by the acoustic carrier frequency, the Brimrose approach utilizes a no-shift AO devices inside the loop which does not complicate testing nor degrade system performance.





Specification

<i>3 Port Fiber Pigtailed AO Modulator</i> <i>(transmitter switch for outside the loop)</i>	
The supporting driver electronics has two complementing RF outputs , one for each device. Pulse width and length adjustment are standard.	
<i>Specification</i>	Model # AMM-100-8-70-1550-3FP Amplitude Modulator
Wavelength of Operation	1550 nm
Optical Power Density	3 W/mm ²
Carrier Frequencies	100 MHz
Active Aperture	0.3 mm
Beam Diameter Inside the Crystal	0.2 mm
Rise Time	70 ns
Digital Modulation Bandwidth	8 MHz
Bragg Angle	31 mrad
Separation Angle	62 mrad
Acoustic Velocity (m/sec)	2.52E+3
Maximum RF Power (Watt)	~1.0 W
Optical Transmission	95%
Diffraction Efficiency	65%
Extinction Ratio*	>50 dB
Input Impedance	50 ohms
V.S.W.R.	2.1:1
Optical Polarization	Linear
Case Type	3 Port Fiber Optically Pigtailed
Type of Fiber, Port 1,2 & 3	9 μm core, 125 μm cladding Single Mode
Fiber Connector Type	FC
Polishing of the Fiber End	APC
Fiber Length	1 m
Fiber Jacket Type	3 mm OD loose tube kevlar
Back Reflection**	40 dB
Total Insertion Loss*** at 1550 nm	
First Order	3.6 dB
Zero Order	2.3 dB
Case Type	FP003
* - The RF driver must match this extinction ratio	
** - Back reflection at FC connector are not included.	
*** - This spec includes: coupling losses, optical transmission through the crystal and diffraction efficiency losses. Losses at FC connectors are not included.	



2 Port Fiber Pigtailed AO Modulator

(no frequency shift switch for inside the loop)

<i>Specification</i>	Model#: AMM-100-8-70-1550-2FP/X
	Amplitude Modulator
Wavelength of Operation	1550 nm
Optical Power Density	3 W/mm ²
Carrier Frequencies	100 MHz
Active Aperture	0.3 mm
Beam Diameter Inside the Crystal	0.2 mm
Rise Time	70 ns
Digital Modulation Bandwidth	8 MHz
Bragg Angle	31 mrad
Separation Angle	62 mrad
Acoustic Velocity (m/sec)	2.52E+3
Maximum RF Power (Watt)	~1.0W
Optical Transmission	95%
Diffraction Efficiency	65-70%
Extinction Ratio*	>50 dB
Input Impedance	50 ohms
V.S.W.R.	2.1:1
Optical Polarization	Linear
Case Type	2 Port Fiber Optically Pigtailed
Type of Fiber, Port 1&2	9 μm core, 125 μm cladding Single Mode
Fiber Connector Type	FC
Polishing of the Fiber End	APC
Fiber Length	1 m
Fiber Jacket Type	3 mm OD loose tube kevlar
Back Reflection**	40 dB
Total Insertion Loss***	First Order - ~5.6 dB
Option X	"no frequency shift"

* - The RF driver must match this extinction ratio

** - Back reflection at FC connector are not included.

*** - This spec includes: coupling losses, optical transmission through the crystal and diffraction efficiency losses. Losses at FC connectors are not included.



Drivers

<i>RF Driver Specifications</i>	
	Model #: FFD-100-B3-F1-X-Y/3ch
Frequency	100 MHz
Frequency Control	Quartz crystal referenced phase locked loop.
Frequency Accuracy	0.015%
Harmonic Content	≤ -40 dBc
Stability	0.0015% minimum after 15 minute warm-up.
Output Power	1 Watt in each channel. Power is optimized for A-O device performance
Operating Power	117 VAC +/-10% 50-60Hz, 55W max.
Enclosure	The unit will be packaged in a 7.5 inch wide by 3.5 inch high by 8.75 inch deep instrument case. The rear panel heat sink increases depth to 10.5 inch max. Size is exclusive of connectors.
Environmental	Nominal Laboratory conditions: Max ambient temperature 0 +35 deg C; the unit is not sealed against moisture or condensing humidity. A detachable AC line cord is provided.
Option X	Internal pulse generator with adjustable pulse repetition rate and adjustable pulse width. Pulse rep rate 70-150 ms. Pulse width 300-500 us. Stability of pulse pattern is ~5% (0.5% short term).
Option Y	Three pulse RF outputs; one for standard AOM and the other two for the "no frequency shift" modulator. RF outputs are complementary to each other.

