

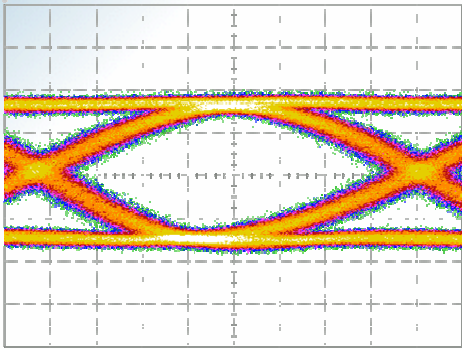


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# Datasheet

## SHF 46212A

### Duobinary Transmitter



## Description

The SHF 46212 A is an optical duobinary transmitter unit, in the style of a half-width plug-in for the SHF 10000 A mainframe. Field installation or upgrade by the end-user is possible for this equipment.

The SHF 46212 A Optical Transmitter converts an NRZ electrical signal into an optical duobinary signal at a data rate of 40 - 44 Gbps.

The main elements of the SHF 46212 A is a chirp-free Lithium Niobate Mach-Zehnder modulator driven by an optimised duobinary driver amplifier.

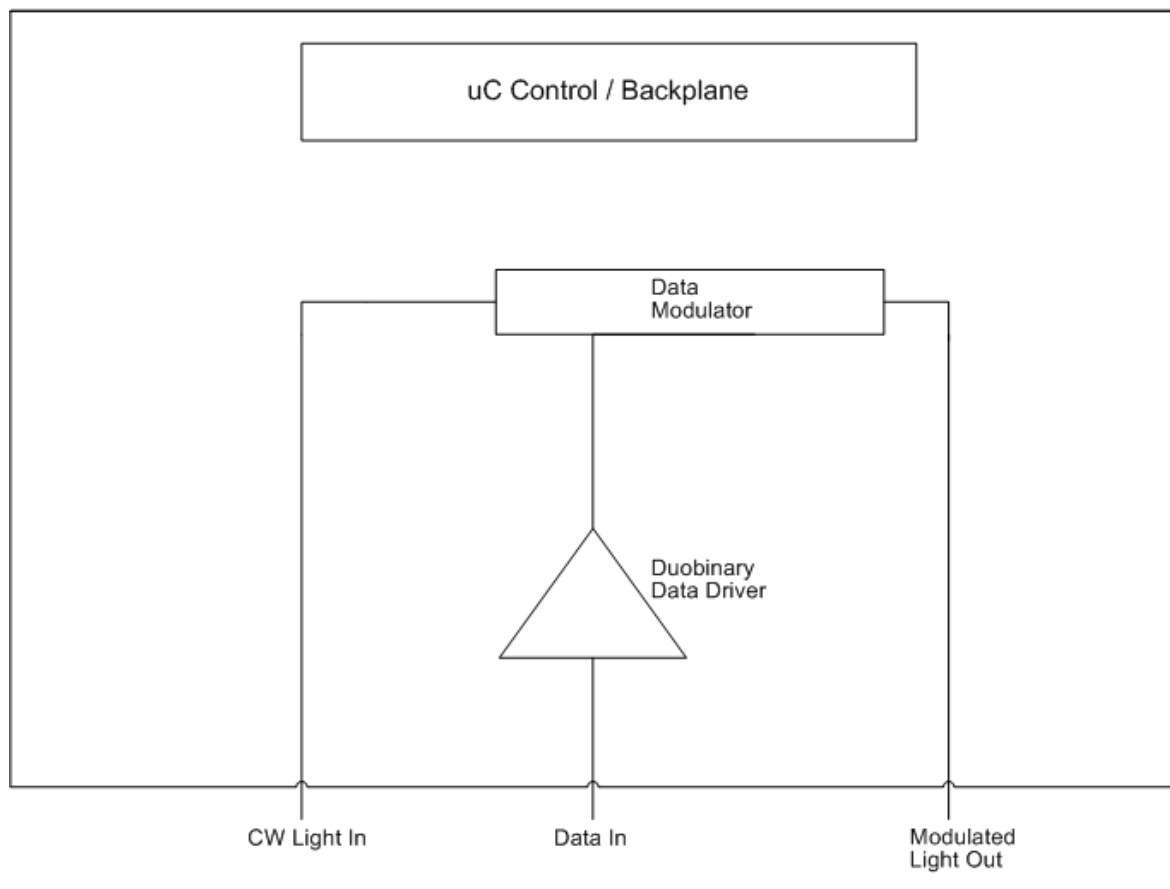
The duobinary amplifier generates an electrical 3-level signal, driving the LiNbO<sub>3</sub>-modulator at  $2 \times V\pi$ .

An automatic modulator DC bias control loop ensures high stability of the optical output signal.

## Features

- 40 – 44 Gbps optical data streams
- Quick optimization of optical eye diagram performance by user adjustable gain and modulator bias control
- Modulators' bias condition controlled automatically
- Selectable automatic or manual bias control (ABC circuit)
- SONET/SDH compatible
- All features controlled using custom software (BCC) via Standard Ethernet

## Functional block diagram





# Specifications – SHF 46210 B

Parameter	Unit	Min.	Typ.	Max.	Comment
<b>Optical parameters</b>					
Wavelength range		C- and L-band			
Insertion loss	dB		6	8	connector to connector, maximum transmission without modulation
DC Extinction ratio	dB		20		
Return loss	dB		30		without optical connector
Chirp (Alpha parameter)					small signal measurement method <sup>1</sup>
Positive slope				0.2	
Negative slope				-0.2	
<b>Electrical and electro-optical parameters</b>					
Electro-optical bandwidth of modulator	GHz	25			-3dB electrical
Electrical bandwidth of drive amplifier	GHz		15		
Drive amplifier electrical return loss	dB			-10	
Drive amplifier input level	Vpp (dBm)	0.32 (-6)		0.45 (-3)	
Dynamic extinction ratio @ 40 Gbps	dB	10	11		measured between data '1' and long sequence of '0'
Dynamic signal to noise ratio @ 40 Gbps		10	11		
Output timing jitter <RMS> @ 40 Gbps	ps		1	1.3	Measured with SHF Pattern Generator with low jitter output option, precision timebase DCA. De-embedded from 40 Gb/s NRZ electrical data source
<b>Auto-bias control (ABC)</b>					
Dither signal frequency	kHz		10		

<sup>1</sup> (F. Devaux, Y. Sorel and J.F. Kerdiles, "Simple Measurement of Fiber Dispersion and of Chirp Parameter of Intensity Modulated Light Emitter", J. Lightwave Technol., vol. 11, no. 12, December 1993)



## Absolute maximum ratings

Parameter	Unit	Min.	Typ.	Max.	Conditions
Optical input power	dBm			17	
Data amplifier input power	dBm			10	NRZ data

## General specifications

Parameter	Unit	Min.	Typ.	Max.	Conditions
Weight	kg		3.3		
Dimensions	mm		59x213x450		w/o Frontpanel - Connectors
Power consumption	W		20		
Operating temperature	°C	10		35	
Electrical data input connector			V (1.85mm)		
Optical connectors			FC/PC		



## Test Measurements

The following equipment was used in obtaining these results:

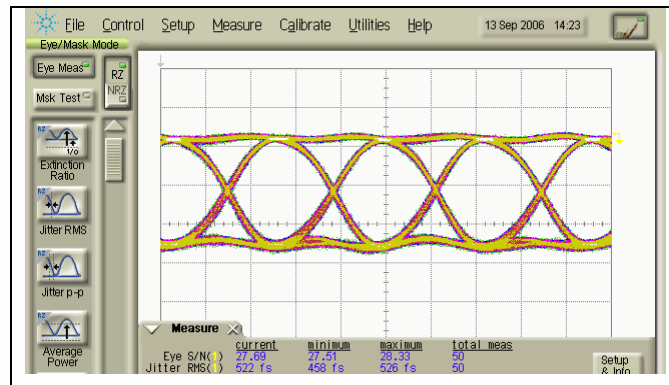
SHF12100 B S/N 6022 Pattern Generator

SHF 1550DFB Laser source set to 15mW output power @ 1550 nm.

AMPAQ EDFA + 1nm bandpass filter

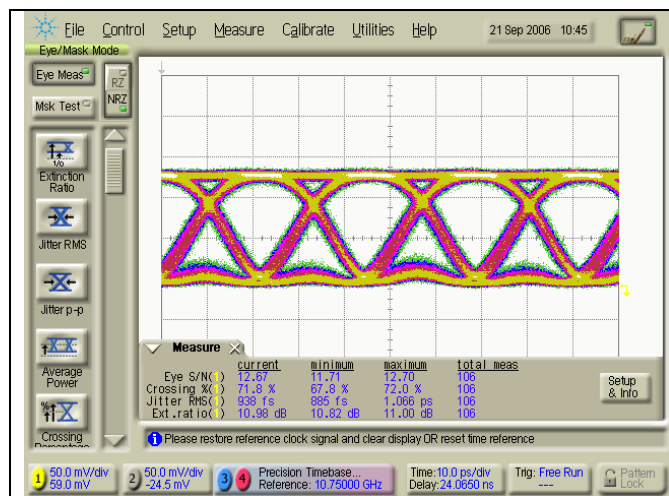
Agilent 86100A DCA with 70GHz plugin and precision timebase module

### Typical transmitter data input signal



43 Gbps electrical signal. S/N: 15.9; RMS Jitter: 522 fs

### Transmitter data output signal



43 Gbps optical output signal. S/N: 13; RMS Jitter: 940 fs





Change note:  
new