ModBox

ModBox-FE-NIR-5Gs

ModBox Pulse shaper sub-ns

The Exail ModBox-FE-NIR-5Gs is a complete front end laser system designed to be used as a seed source in solid state or fiber laser. The system is available at various wavelength to generate 200 ps to 1 µs, custom shapped optical pulses with high stability and high extinction ratio.
The short pulse generation is based on the combination of a high performance continuous laser source combined with a large bandwidth modulation stage based on a high extinction ratio external $LiNbO_3$ modulator. An automatic bias control circuitry (MBC) guarantees the extinction ratio stability over time and the optical pulses are carved out thanks to a high vertical resolution Arbitrary Waveform Generator. A multi year collaboration experience with famous intense laser facilities all over the world allows Exail to propose high performance, reliable and easy to use systems perfectly suited to the various applications related with high energy optical pulse generation.



FEATURES

- Optical waveform flexibility
- Cost effective
- High vertical resolution
- High extinction ratio
- Proven solution
- Long pulse duration
- High repetition rate

APPLICATIONS

- Laser shock peening
- Interaction of intense light with matter
- VISAR

PERFORMANCE HIGHLIGHTS

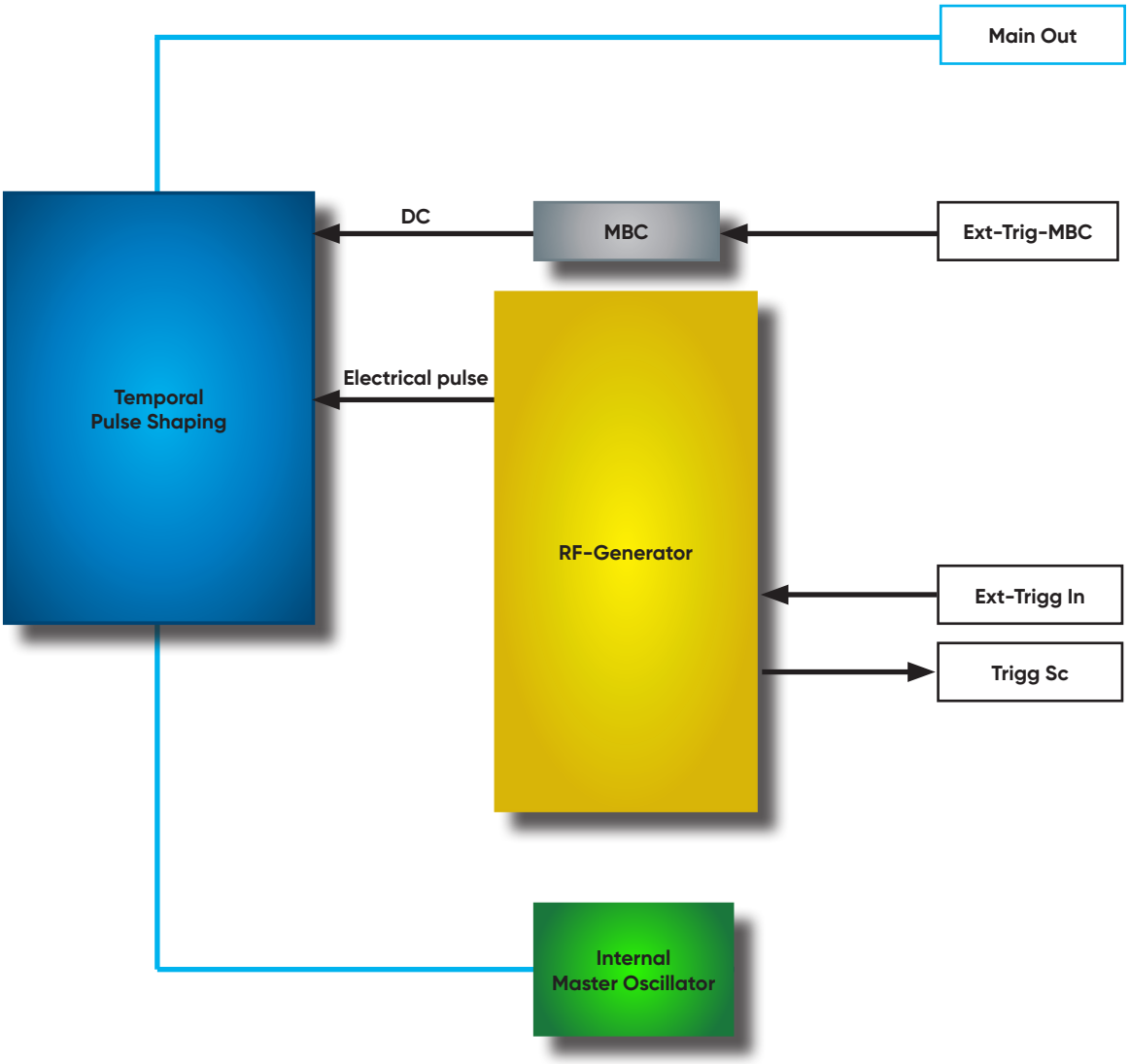
Operating wavelength	1030 nm / 1053 nm / 1064 nm
Pulse contrast	40 dB
Pulse waveform	Arbitrary, user adjustable
Pulse width	From 200 ps
Optical Jitter	80 ps RMS

GRAPHICAL USER INTERFACE



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FUNCTIONAL BLOCK DIAGRAM



The ModBox Front-End integrates:

- a temporal pulse shaping block based on a modulator set to ensure a very high optical pulse extinction ratio and flexible pulse shaping,
- an advanced calibration feature to increase pulse shaping linearity,
- an automatic Modulator Bias Control circuitry (MBC) to garantee high extinction ratio stability over time,
- a RF-Generator with an arbitrary waveform capability,
- a master oscillator.

The ModBox offers several electrical output and input:

- a "Trigg-Sc" : for scope synchronization,
- an "Ext-Trigg In" : external trigger input,
- an "Ext-Trigg-MBC": external trigger for MBC.

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ELECTRICAL INPUT SPECIFICATIONS

Parameter	Symbol	Condition	Min	Typ	Max	Unit
External trigg input	-	+5 V on 50 Ω with positive slop	single shot	-	1	MHz
External trigg MBC	-	+5 V on 50 Ω with positive slop ΔT = 500 µs	single shot	-	1	kHz

ELECTRICAL OUTPUT SPECIFICATIONS

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Trigg Sc amplitude	-	fixed	-	3.3	-	V
Trigger Sc frequency	-	adjustable	-	-	1	MHz

OPTICAL OUTPUT SPECIFICATIONS

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Operating wavelength	λ	Select wavelength		1030 / 1053 / 1064		nm
Wavelength tunability	dλ	By temperature	-	1	-	nm
Linewidth [1]	Δλ	-	-	1	10	MHz
Ouptut pulse shapes	-	-	Arbitrary, user adjustable			
Sample rate	-	-	-	5	-	Gsample/s
Vertical resolution	-	-	-	16	-	bit
Pulse width	PW	Remotely adjustable	0.200	-	1000	ns
		Optimized value	-	10	-	ns
Frequency repetition rate	FRR	Adustable by the trigger frequency	Single shot	-	1 M	Hz
		Optimized value	-	100	-	Hz
Rise time / Fall time	t_r/t_f	20 % - 80 % / 10 % - 90 %	-	80 / 100	-	ps
Extinction ratio	ER	EOM output	35	40	-	dB
Extinction ratio stability	ΔSER	Over 8 hours	-	0.5	1	dB
Polarization extension ratio	PER	-	20	-	-	dB
RMS Jitter (ext. trigger)	J_{RMS}	-	-	80	-	ps
Pulse energy	E	1 ns, rectangular pulse	750	900	-	pJ
Pulse enery stability	ΔE	100 Hz over 1 min	-	0.3	0.5	%rms
Pulse power stability	ΔP	8 hours 10 kHz	-	0.5	0.8	%rms

[1] kHz linewidth seed available as an option

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ModBox-FE-NIR-5Gs

PANELS

Parameter		Condition
Local supervisory control	Human-machine interface	Touch-screen user interface / Embedded windows PC
	Remote	Ethernet port
	LEDs indicator	LED reports On/Off operations, Alarms
	USB port	Keyboard, mouse, memory stick (to download waveforms)
		Rear panel
Optical ports	«Main Out»	Isolated, gland and armed cable, 5 m fiber length [2], connector FC/APC
	«Main In», «Internal laser Out»	FC/APC connector
Optical fiber	-	Polarization maintaining fiber, Corning PM98-U25A
Trigg output	«Trigg-SC»	BNC connector
Trigger & clock input	«Trigg In», «Trigg-MBC»	BNC connector
Main power socket	-	IEC 60320, C14 inlet

[2] 10m or 15m fiber length available as an option

ENVIRONMENT

Parameter	Condition	Min	Typ	Max	Unit
Operating / storage Temp	-	+20 / -10	-	+25 / +30	°C
Operating / storage humidity	-		30 to 60 / 30 to 80		%

COMPLIANCE AND SAFETY

Parameter	Condition	Min	Typ	Max	Unit
Compliance	-	BS EN 60825 - CE certified			
Interlock response time	From laser system	-	-	1	ms
Remote interlock	-	LEMO controlled			
Laser safety	-	Class 3B			



DIMENSIONS

Parameter	
Size	19 inches 6U
Weight	18 kg
Power supply	100 - 120 V / 220 - 240 V automatic switch, 50 - 60 Hz





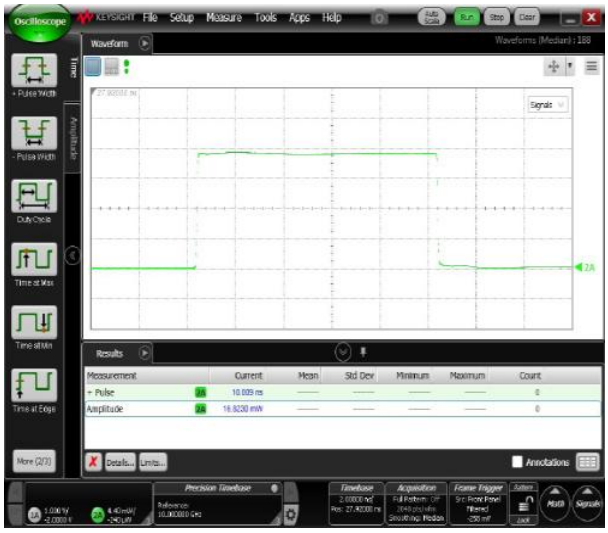
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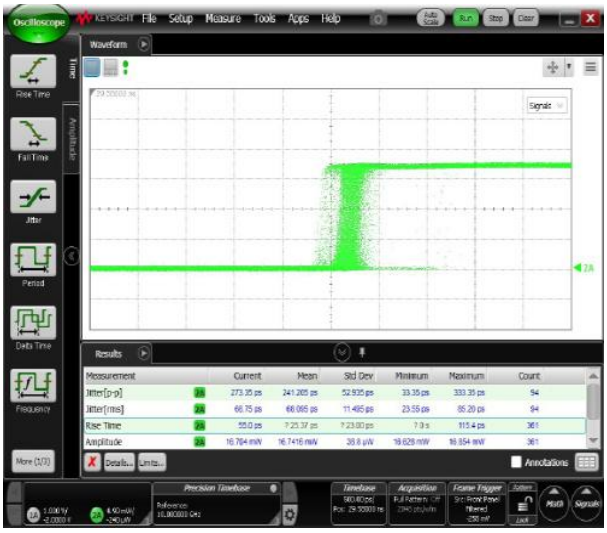
MODBOX ELECTRICAL AND OPTICAL OUTPUTS

The following equipment was used to obtain below results:

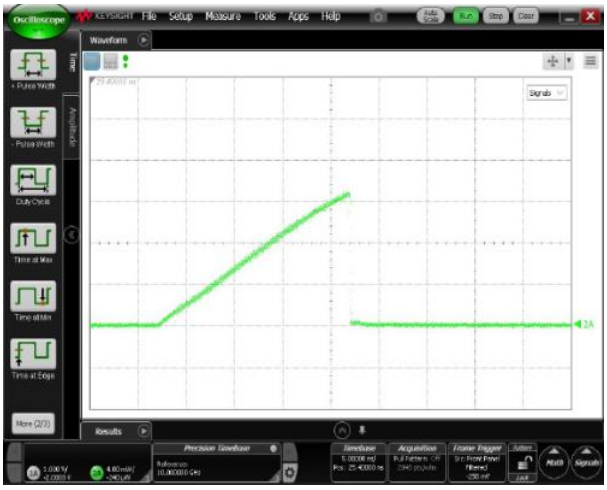
- Oscilloscope Agilent 86100B
- Tektronix CSA 8000 oscilloscope



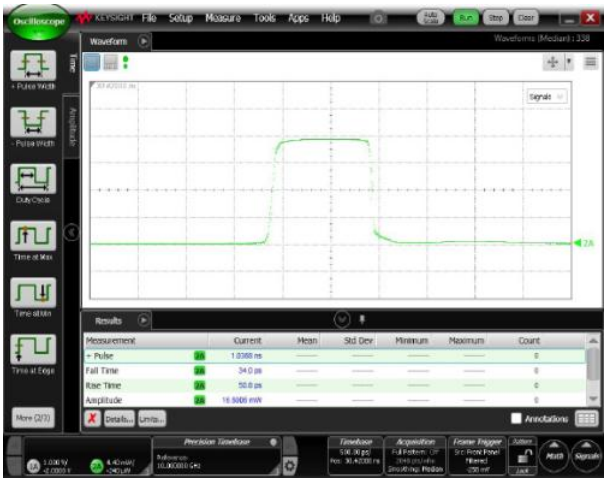
Square pulse generation



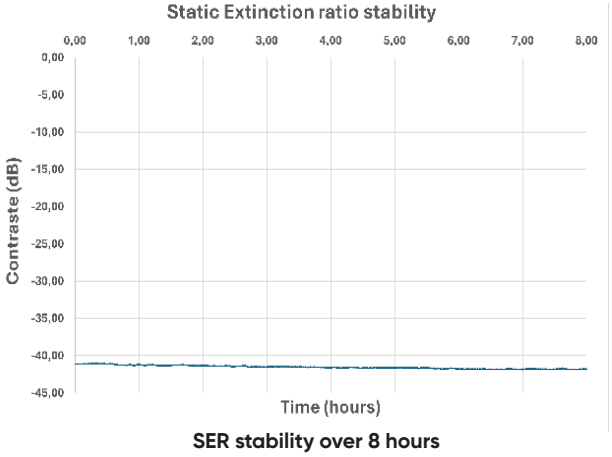
Jitter for external trigger mode



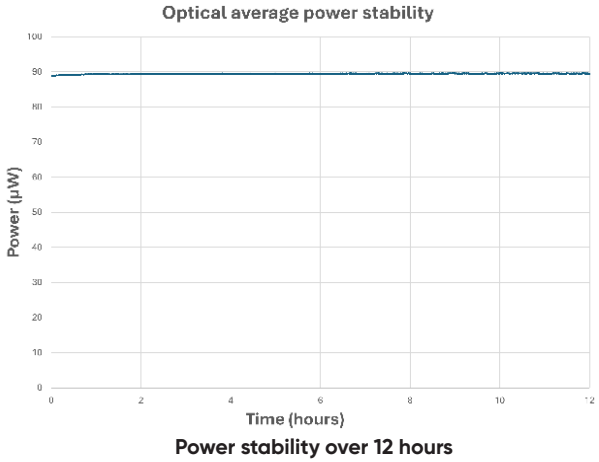
slope generation



Pulse rise time 20 %/80 %



SER stability over 8 hours



Power stability over 12 hours

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