
RF/Digital Modules

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High Power RF Combiner/Splitter



Description

Polaris' High Power RF Combiner/Splitter series provides in-phase high power rating across 10MHz to 250MHz frequency with very low insertion loss. This series provides high isolation and very low amplitude and phase unbalance and can be supplied either SMA or N-type connector depending on your order.



Ordering Information

- ❖ 2-Way Power Combiner/Splitter: PPCS-2-10-250-xxW (xx: Power Rating)
 - Power Rating as Divider: 1W, 5W, 10W, or 20W at SUM port
- ❖ 5-Way Power Combiner/Splitter: PPCS-5-10-250-xxW (xx: Power Rating)
 - Power Rating as Divider: 10W or 20W at SUM port

Features

- ❖ High Power Rating
- ❖ Low Insertion Loss
- ❖ High Isolation
- ❖ Excellent VSWR
- ❖ 50 ohm at all ports
- ❖ SMA or N-type connectors

Applications

- ❖ AM/FM Radio
- ❖ Instrumentation
- ❖ VHF/UHF

Specifications

Parameters		High Power Combiner/Splitter				
		Unit	Min.	Typ.	Max.	
2-Way Combiner /Splitter	Frequency Range	MHz	10		250	
	Insertion Loss Above 3.0dB	dB	-	0.25	0.5	
	Isolation	dB	15	20	-	
	Phase Unbalance	Degree	-	0.5	2	
	Amplitude Unbalance	dB	-	0.05	0.25	
	VSWR at all ports	1	-	1.2	1.5	
	Power Rating as Divider	W	-	-	Note1	
	Operating Temperature	°C	-20	-	+70	
	Storage Temperature		-40	-	+85	
	Connectors		SMA-Jack or N-Jack			
	Housing	Material	Aluminum, ROHS Compliant			
Color		Gray				
Finish		Nickel Coating				
5-Way Combiner /Splitter	Frequency Range	MHz	10		250	
	Insertion Loss Above 9.0dB	dB	-	0.6	1.0	
	Isolation	dB	15	20	-	
	Phase Unbalance	Degree	-	2.5	6	
	Amplitude Unbalance	dB	-	0.3	0.8	
	VSWR at all ports	1	-	1.2	1.5	
	Power Rating as Divider	W			Note2	
	Operating Temperature	°C	-20	-	+70	
	Storage Temperature		-40	-	+85	
	Connectors		SMA-Jack or N-Jack			
	Housing	Material	Aluminum, ROHS Compliant			
Color		Gray				
Finish		Nickel Coating				

Note1:

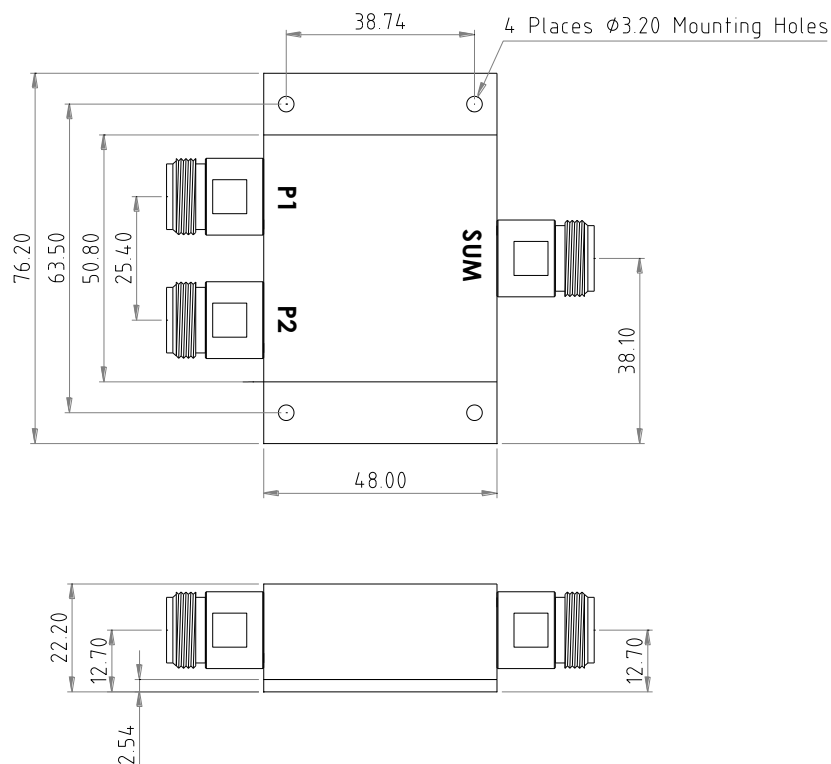
Power Rating as Divider: 1W, 5W, 10W, or 20W at SUM port

Note2:

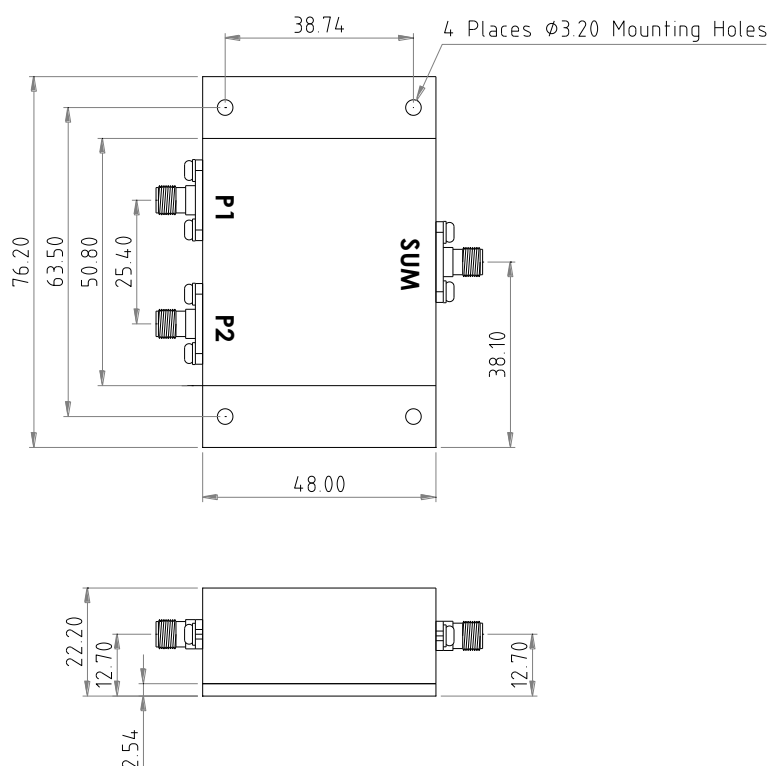
Power Rating as Divider: 10W or 20W at SUM port

Outline Drawing

All dimensions are in millimeters.



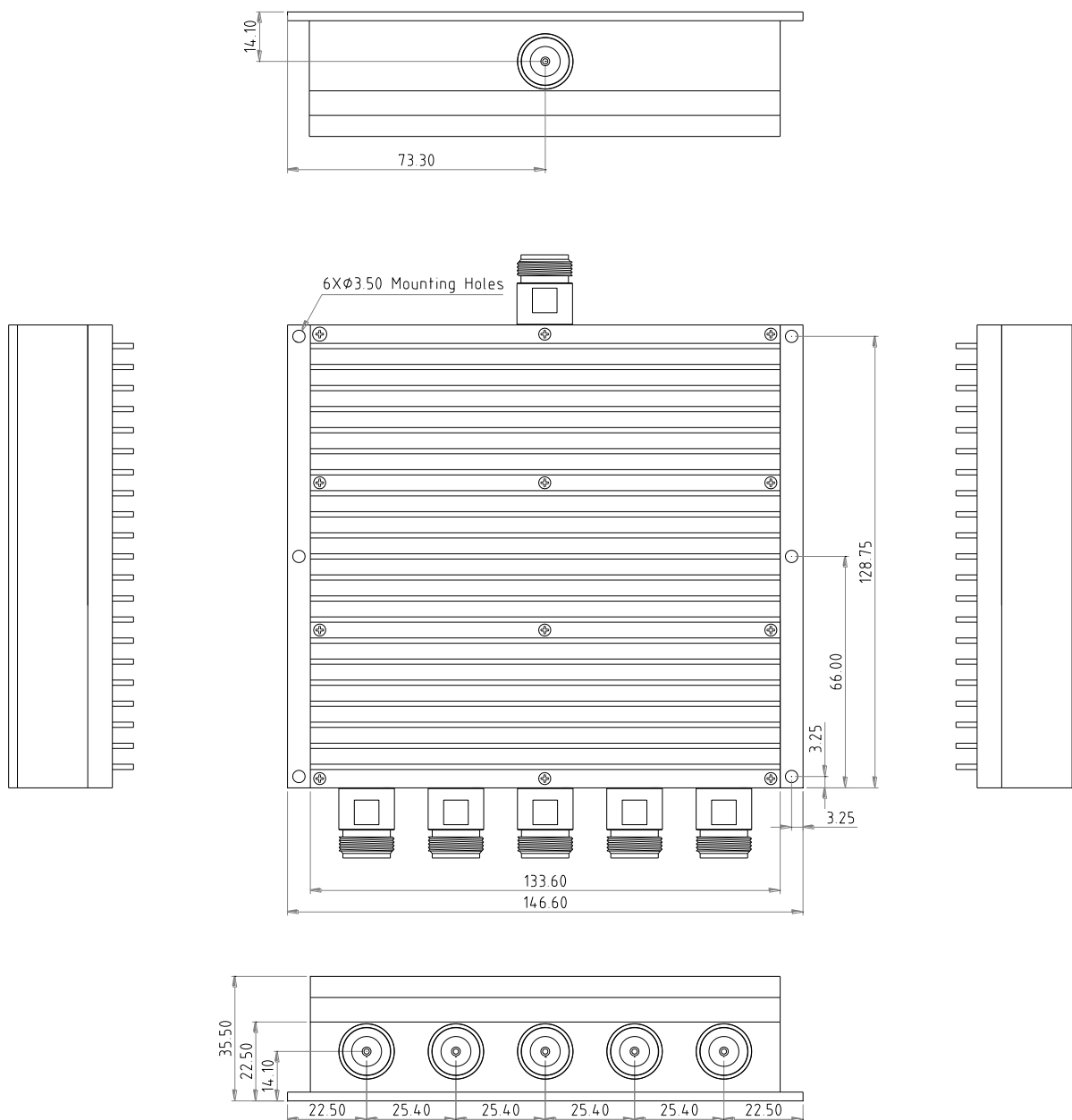
2-Way Power Combiner/Splitter – N Connectors



2-Way Power Combiner/Splitter – SMA Connectors

Outline Drawing

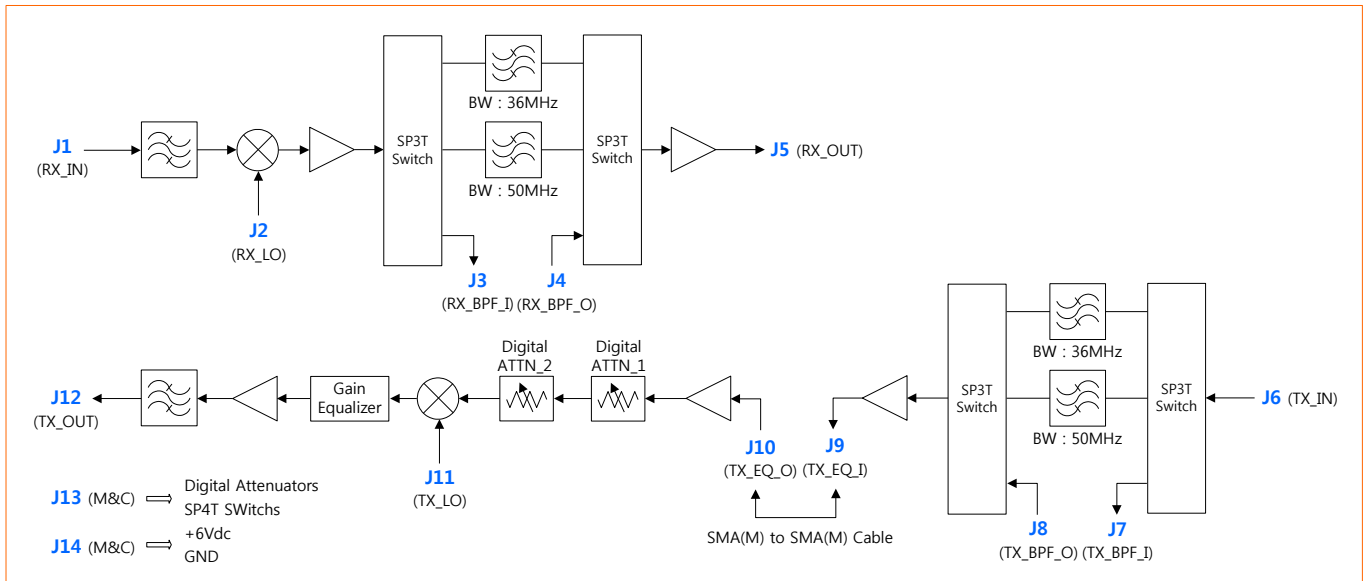
All dimensions are in millimeters.



5-Way Power Combiner/Splitter

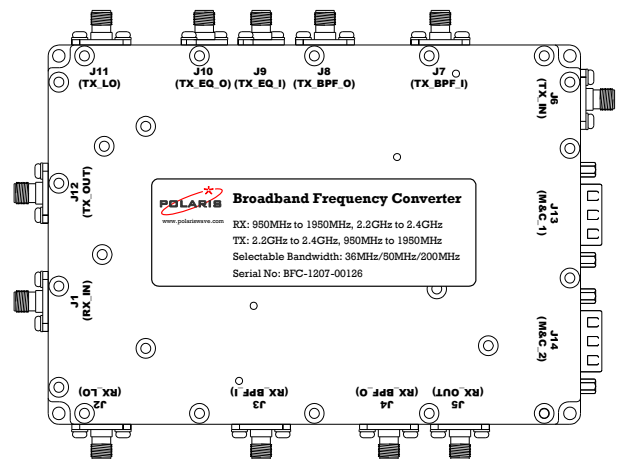
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Broadband Frequency Converter



Features

- ❖ Broad operating bandwidth
 - up to 200MHz
- ❖ User selectable bandwidth
 - 36MHz, 50MHz, or 200MHz
- ❖ Receive path
 - Input frequency : 950MHz to 1,950MHz
 - Output frequency : 2.2GHz to 2.4GHz
- ❖ Transmit path
 - Input frequency : 2.2GHz to 2.4GHz
 - Output frequency : 950MHz to 1,950MHz
- ❖ Spurious suppression
 - $\leq -50\text{dBc}$ @in-band



Applications

- ❖ Satellite communication system
- ❖ Broadband wireless access system
- ❖ Satellite link test equipment

Specifications

Parameters			Specifications	Remarks
Common	Gain flatness		$\leq 2\text{dBpp}$	at any 200MHz bandwidth in 950 to 1,950MHz
	Spurious	In band	$\leq -50\text{dBc}$	in 950MHz to 1,950MHz
		Out of band	$\leq -60\text{dBc}$	
	LO	Frequency	3.25GHz to 4.25GHz	
		Input power	+15dBm	
Selectable bandwidth		36MHz, 50MHz, or 200MHz		
Receive path	Input frequency		950MHz to 1,950MHz	
	Output frequency		2.2GHz to 2.4GHz	
	Gain		-5dB	
Transmit path	Input frequency		2.2GHz to 2.4GHz	
	Output frequency		950MHz to 1,950MHz	
	Gain		+15dB	
	Attenuation	Range	0 to -40dB	
Resolution		0.5dB		
Supply voltage			+6Vdc	
Current consumption			+1.5A max.	
Connectors	RX_IN	J1	SMA (F), ST, 50 Ω	Input, L-Band_RF
	RX_LO	J2	SMA (F), ST, 50 Ω	Input, RX_LO
	RX_BPF_I*	J3	SMA (F), ST, 50 Ω	Input, External Cavity Filter
	RX_BPF_O*	J4	SMA (F), ST, 50 Ω	Output, External Cavity Filter
	RX_OUT	J5	SMA (F), ST, 50 Ω	Output, RX_RF
	TX_IN	J6	SMA (F), ST, 50 Ω	Input, TX_RF
	TX_BPF_I**	J7	SMA (F), ST, 50 Ω	Input, External Cavity Filter
	TX_BPF_O**	J8	SMA (F), ST, 50 Ω	Output, External Cavity Filter
	TX_EQ_I	J9	SMA (F), ST, 50 Ω	Option
	TX_EQ_O	J10	SMA (F), ST, 50 Ω	Option

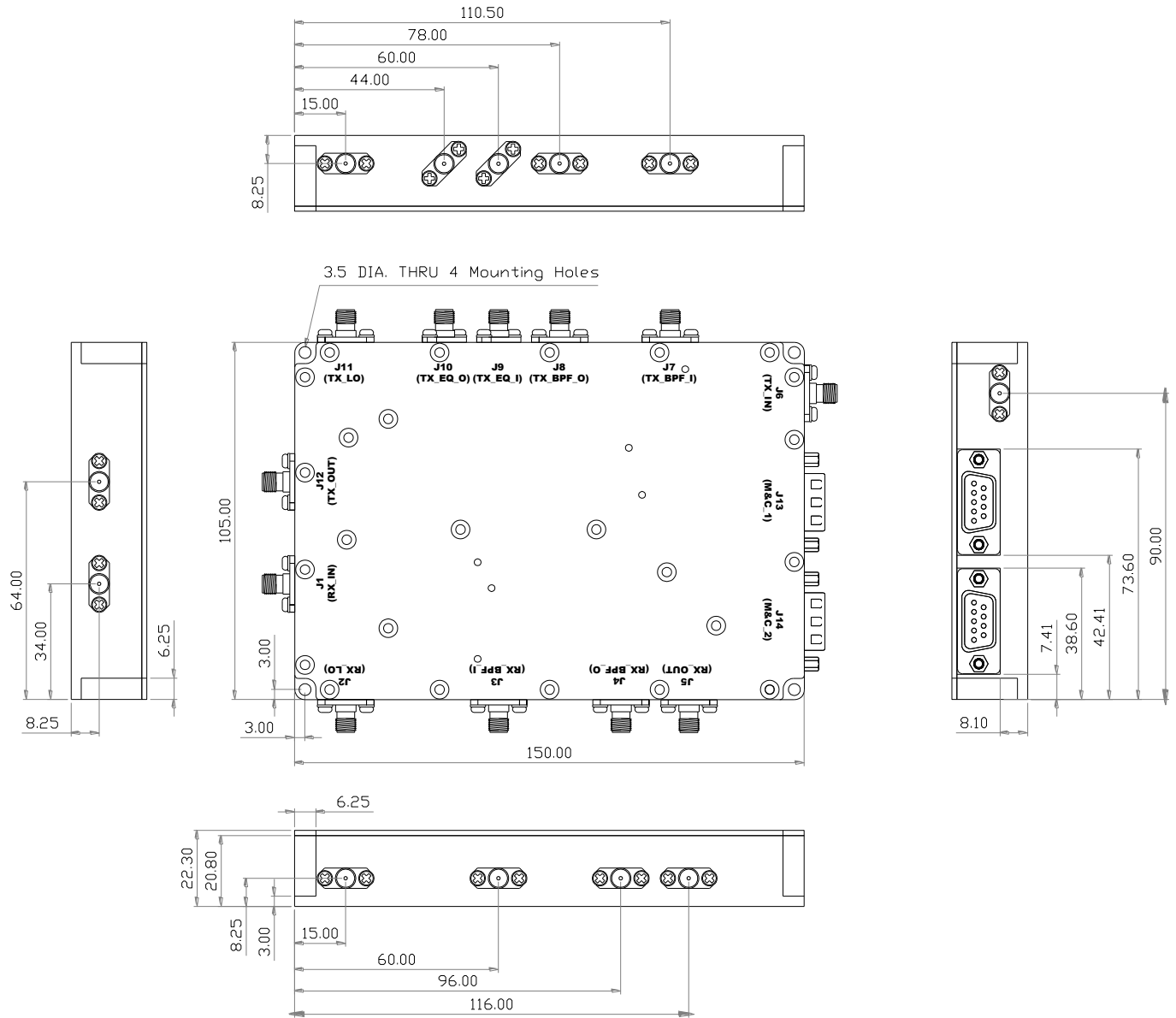
Parameters		Specifications		Remarks	
	TX_LO	J11	SMA (F), ST, 50Ω	Input, TX_LO	
	TX_OUT	J12	SMA (F), ST, 50Ω	Output, TX_RF	
	M&C_1	J13	D_SUB_9pin (Mail)		Digital Attenuators & SP3T Switches Control
			P1: SP3T_CTL4 P3: ATT_EN2 P5: N/C P7: SP3T_CTL1 P9: ATT_CLK	P2: SP3T_CTL2 P4: ATT_DATA P6: SP3T_CTL3 P8: ATT_EN1	
	M&C_2	J14	D_SUB_9pin (Mail)		DC Power Supply
			P1: GND P5, P9: +6Vdc P3, P7: N/C	P2, P4, P6, P8: N/C	
Dimension (mm)			150(L) x 105(W) x 22.3(H)		

*: RX Cavity Filter (200MHz Bandwidth)

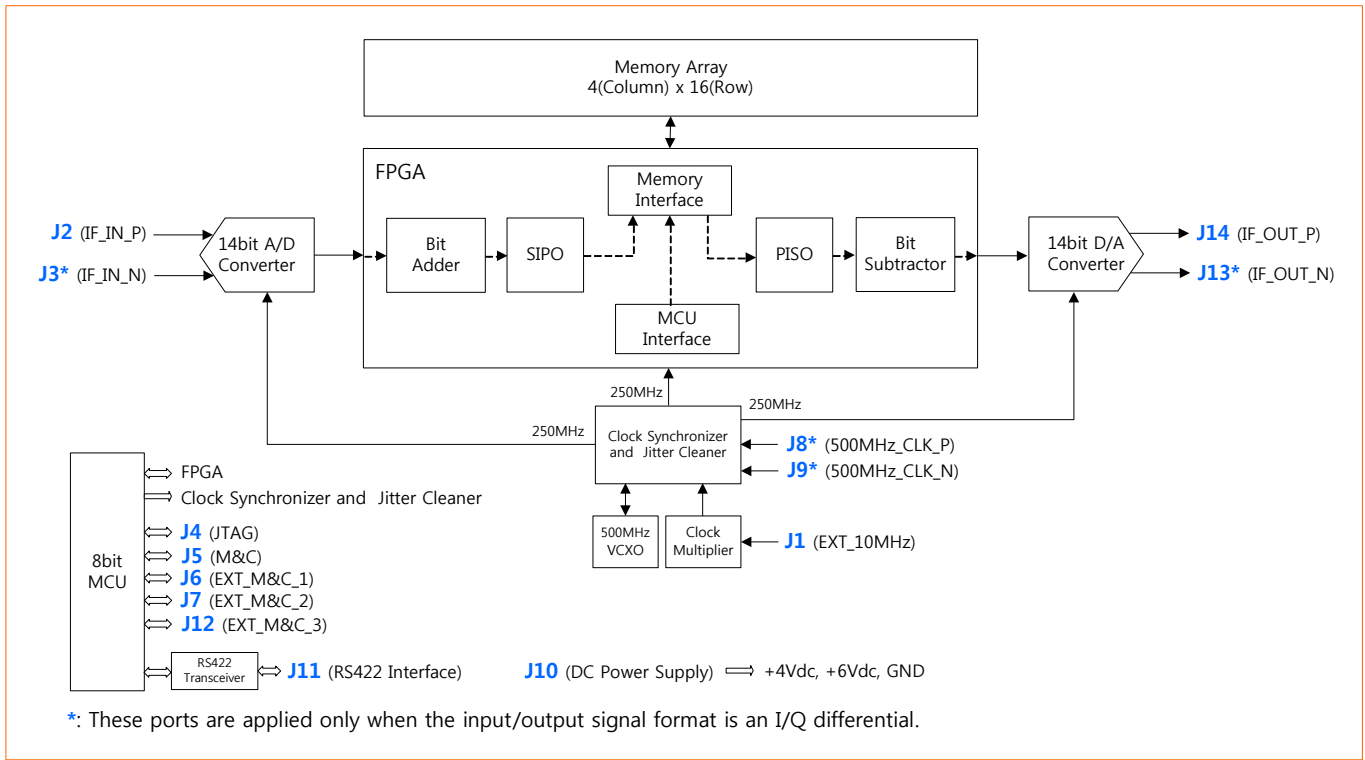
** : TX Cavity Filter (200MHz Bandwidth)

Outline Drawing

All dimensions are in millimeters.

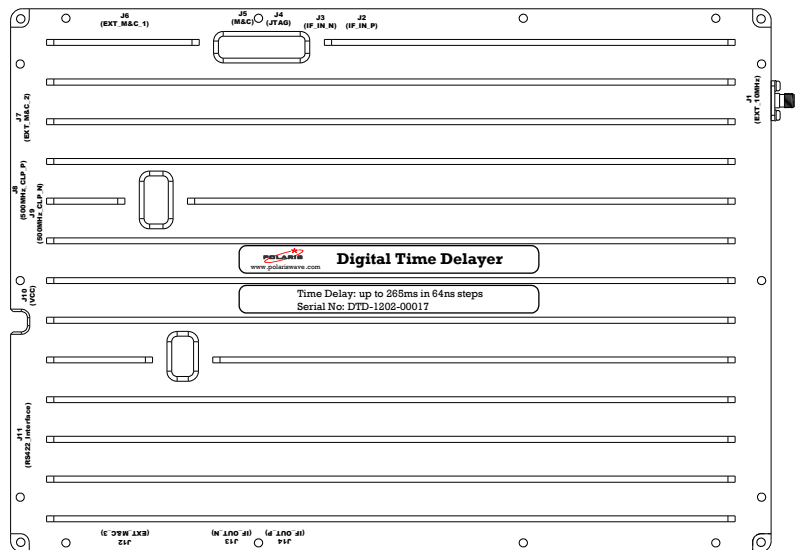


Digital Time Delayer



Features

- ❖ Ultra-wide bandwidth
 - up to 100MHz
- ❖ Operating frequency range
 - 13MHz to 113MHz
- ❖ Time delay range
 - up to 265ms
- ❖ Time delay resolution
 - 64ns
- ❖ Spurious @in-band
 - $\leq -45\text{dBc}$ ($\leq -50\text{dBc}$ typical)



Applications

- ❖ Radar simulator
- ❖ VSAT
- ❖ Earth terminal testing equipment
- ❖ Satellite link emulator

Specifications

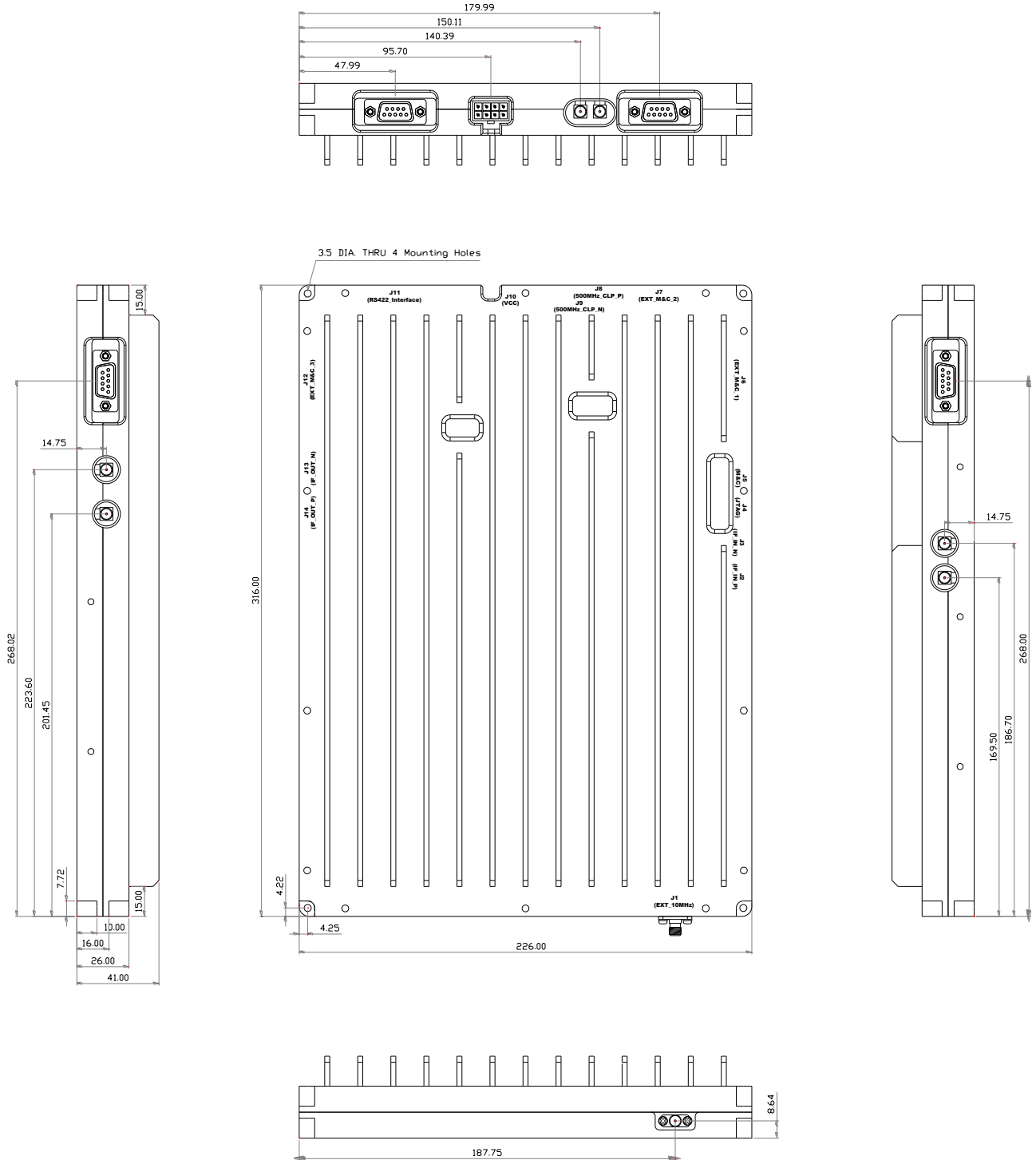
Parameters		Specifications		Remarks
Reference Signal	Frequency	10MHz		
	Input power	+3dBm		
Input frequency range		13MHz to 113MHz		Center frequency: 63MHz
Output frequency range		13MHz to 113MHz		
Operating bandwidth		100MHz		
Gain		-4.0dB @center frequency		
Bit resolution		14bit		
In-band spurious		≤ -45dBc		≤ -50dBc typical
Time delay	Range	up to 265ms		
	Resolution	64ns		
Supply voltage		+6Vdc, +4Vdc		
Current consumption	+6Vdc	+1.0A max.		
	+4Vdc	+4.0A max.		
Connectors	EXT_10MHz	J1	SMA (F), ST, 50Ω	Input, External 10MHz reference signal
	IF_IN_P	J2	SMA (F), R/A, 50Ω, PCB Mount	Input, IF, Positive
	IF_IN_N*	J3	SMA (F), R/A, 50Ω, PCB Mount	Option
	JTAG	J4	Male Header, 2x5-pin (10-pin), 2.54 mm	Program Download

Parameters		Specifications		Remarks	
Connectors	M&C	J5	Rectangular, ST, Header, 2x6-pin, 2.54 mm P1: +3.3Vdc P2: +5Vdc P3: KEY_ADC1 P4: KEY_ADC2 P5: KEY_ADC3 P6: KEY_ADC4 P7: LCD_OUT P8: Reserved P9: Reserved P10: Reserved P11: GND P12: GND	Monitoring & Control via Key-Pad/VFD	
	EXT_M&C_1	J6	D_SUB_9pin (Mail)	Reserved Port	
	EXT_M&C_2	J7	D_SUB_9pin (Mail)	Reserved Port	
	500MHz_CLK_P*	J8	SMA (F), R/A, 50Ω, PCB Mount	Option	
	500MHz_CLK_N*	J9	SMA (F), R/A, 50Ω, PCB Mount	Option	
	DC Power supply	J10	Rectangular, R/A, Header, 2x4-pin, 4.2 mm P1: +6Vdc P2: GND P3: +4Vdc P4: GND P5: +6Vdc P6: GND P7: +4Vdc P8: GND	+4Vdc, +6Vdc, GND	
	RS422 Interface	J11	D_SUB_9pin (Mail) P1: TXP P2: TXN P3: RXP P4: RXN P5: GND P6: N/C P7: N/C P8: N/C P9: N/C	Remote Control	
	EXT_M&C_3	J12	D_SUB_9pin (Mail)	Reserved Port	
	IF_OUT_N*	J13	SMA (F), R/A, 50Ω, PCB Mount	Option	
	IF_OUT_P	J14	SMA (F), R/A, 50Ω, PCB Mount	Output, IF, Positive	
	Dimension (mm)		316(L) x 226(W) x 41(H)		

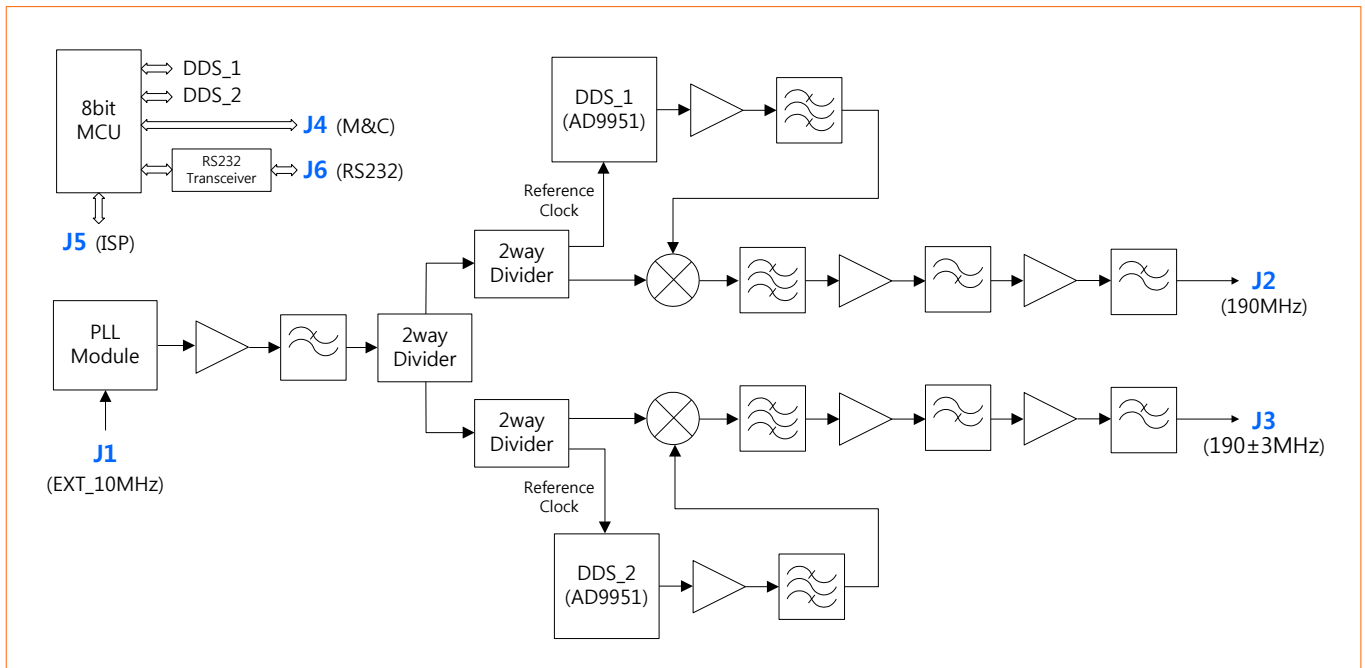
*: These ports are applied only when the input/output signal format is an I/Q differential.

Outline Drawing

All dimensions are in millimeters.

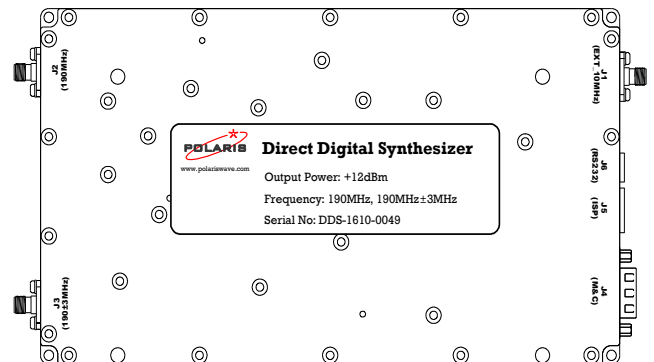


Direct Digital Synthesizer



Features

- ❖ Two frequency generators consisting of AD9951 DDS chips and mixers
- ❖ User-controllable frequency offset
- ❖ Built-in PLL module for AD9951 reference clock and mixer LO signal
- ❖ Built-in 8bit MCU for AD9951 control and external master MCU interface
- ❖ Frequency control with simple ASCII characters via RS232 interface
- ❖ Two output ports
 - J2: 190MHz
 - J3: 190±3MHz (1Hz frequency resolution)
- ❖ Output power
 - +12dBm
- ❖ Spurious suppression
 - ≤ -50 dBc



Applications

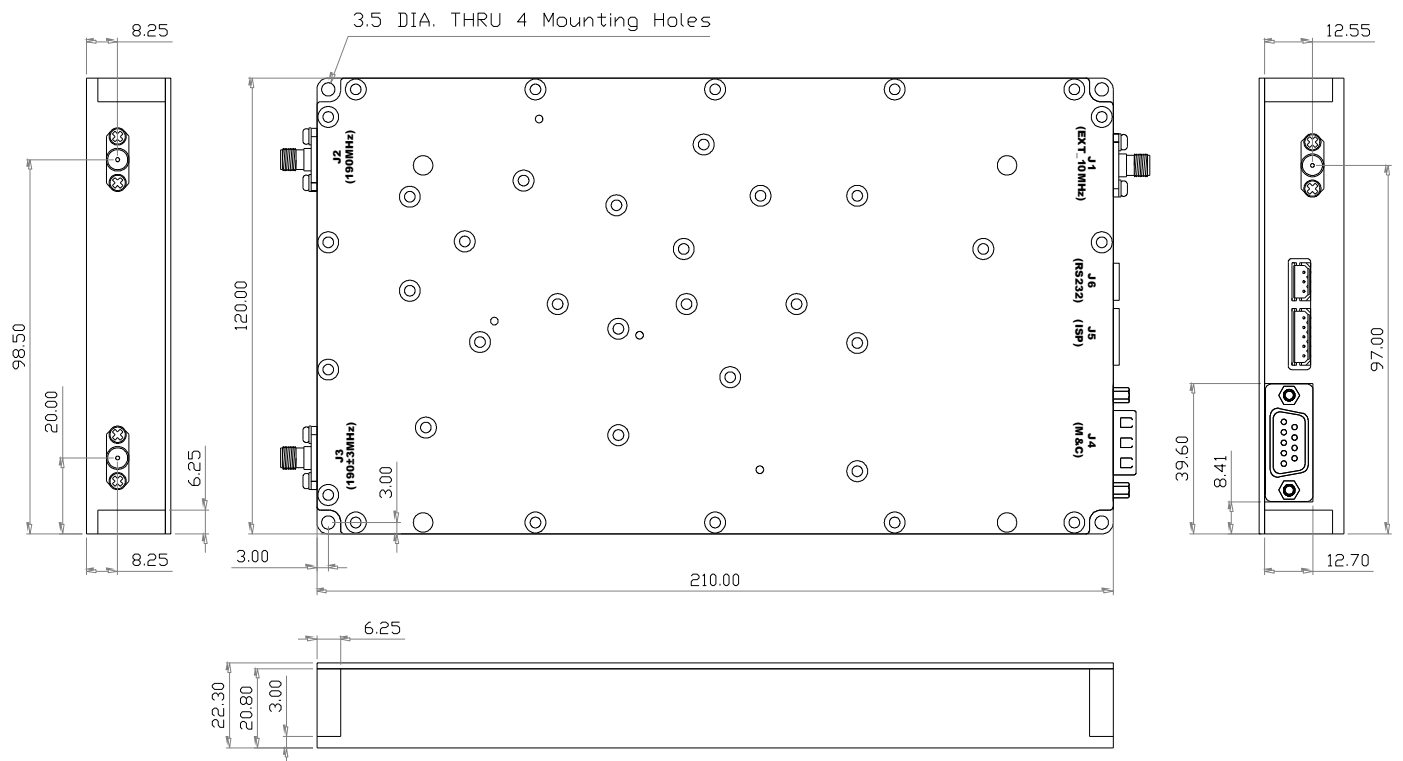
- ❖ Agile LO frequency synthesizer
- ❖ Programmable clock generator
- ❖ Test and measurement equipment
- ❖ Acousto-optic device drivers

Specifications

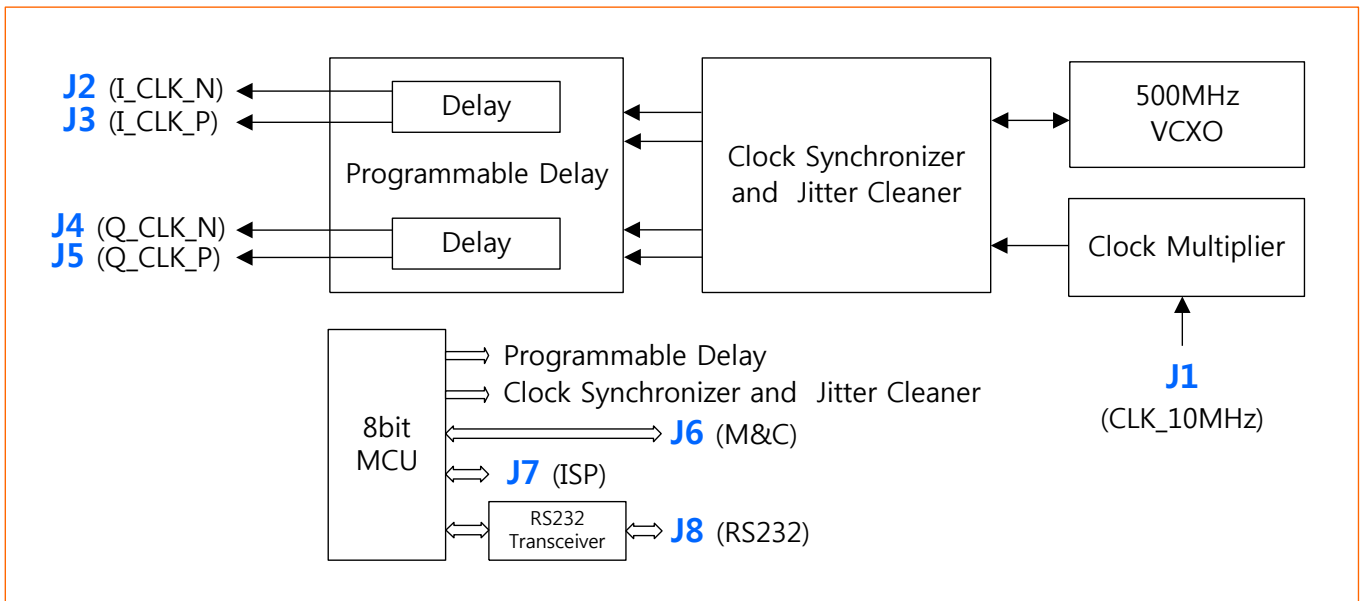
Parameters			Specifications		Remarks
External reference signal input	Frequency		10MHz		
	Power		+7dBm		
Output	Frequency	J2	190MHz		
		J3	190±3MHz (1Hz Resolution)		
	Power		+12dBm		
Spurious suppression			≤ -50dBc		
Supply voltage			+6Vdc		
Current consumption			+2.0A max.		
Connectors	EXT_10MHz	J1	SMA (F), ST, 50Ω		Input, External 10MHz reference signal
	190MHz	J2	SMA (F), ST, 50Ω		Output, 190MHz
	190±3MHz	J3	SMA (F), ST, 50Ω		Output, 190±3MHz (1Hz frequency resolution)
	M&C	J4	D_SUB_9pin (Mail)		External master MCU interface and Power supply
			P1: GND P3: MCU_EN P5: +6Vdc P7: MCU_CLK P9: +6Vdc	P2: MCU_SDO P4: N/C P6: MCU_SDIO P8: PLL_LD	
	ISP	J5	Molex_2.54mm_6pin (Header)		Program Download
RS232	J6	Molex_Header_2.54mm_3pin		Remote Control	
		P1: MCU_TX P3: GND	P2: MCU_RX		
Dimension (mm)			210(L) x 120(W) x 22.3(H)		

Outline Drawing

All dimensions are in millimeters.

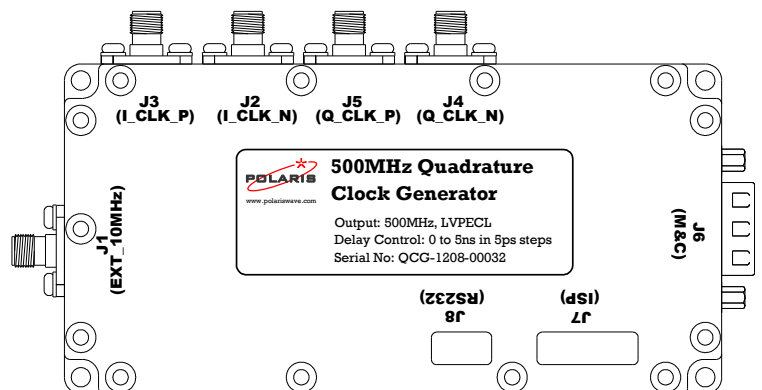


500MHz Quadrature Clock Generator



Features

- ❖ User-controllable phase delay
- ❖ High performance LVPECL and LVCMOS PLL clock synthesizer
- ❖ Built-in 8bit MCU for chips control and external master MCU interface
- ❖ Phase delay control with simple ASCII characters via RS232 interface
- ❖ Output frequency
 - 500MHz
- ❖ Output level
 - LVPECL (I/Q differential signal)
- ❖ Delay control range
 - 0 to 5ns
- ❖ Delay control resolution
 - 5ps



Applications

- ❖ Programmable clock generator
- ❖ Phase compensator
- ❖ Quadrature LVPECL clock generator

Specifications

Parameters		Specifications		Remarks	
External reference signal input	Frequency	10MHz			
	Power	+3dBm			
Output	Frequency	500MHz			
	Level	LVPECL		I/Q differential signal	
Delay control	Range	0 to 5ns			
	Resolution	5ps			
Supply voltage		+6Vdc			
Current consumption		+0.5A max.			
Connectors	CLK_10MHz	J1	SMA (F), ST, 50Ω		Input, External 10MHz reference signal
	I_CLK_N	J2	SMA (F), ST, 50Ω		Output, I-CH clock, Negative
	I_CLK_P	J3	SMA (F), ST, 50Ω		Output, I-CH clock, Positive
	Q_CLK_N	J4	SMA (F), ST, 50Ω		Output, Q-CH clock, Negative
	Q_CLK_P	J5	SMA (F), ST, 50Ω		Output, Q-CH clock, Positive
	M&C	J6	D_SUB_9pin (Mail) P1: GND P2: MCU_SDO P3: MCU_EN P4: N/C P5: +6Vdc P6: MCU_SDIO P7: MCU_CLK P8: N/C P9: +6Vdc		External master MCU interface and Power supply
	ISP	J7	Molex_2.54mm_6pin (Header)		Program Download
	RS232	J8	Molex_Header_2.54mm_3pin P1: MCU_TX P2: MCU_RX P3: GND		Remote Control
Dimension (mm)		120(L) x 60(W) x 22.3(H)			

Outline Drawing

All dimensions are in millimeters.

