1   PRODUCT INFORMATION

Lumentum Part Number: **22090304**
Lumentum Catalog Number: **TWSSX9P22090304**

RoHS: **EU 6/ 6**

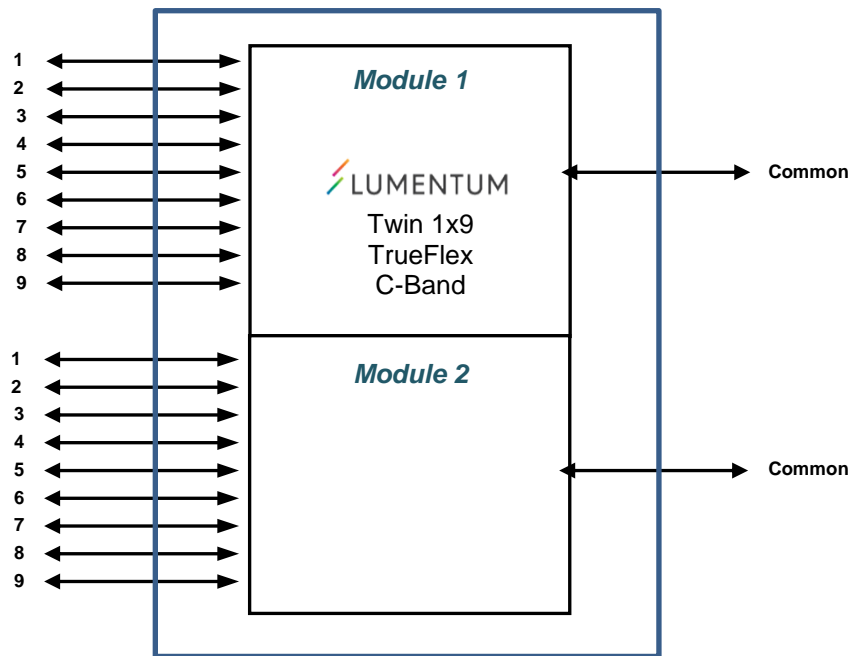**Customer:**   **Multiple**

Description: Gen2 Wavelength Selective Switch C-Band, Twin 9x1, TrueFlex, bidirectional, non-monitored with bottom entry electrical connector.

Application: Single/Multiple Channel Blocking, Wavelength Routing and Channel Equalization with TrueFlex capabilities

2   REVISION SUMMARY

Revision	Date	Changes	Author
000	September 24, 2015	Initial release	Jason Zawalek
001	January 21, 2016	Update FW to latest version Update label content Specify fiber exit and LC connector	Jason Zawalek
002	March 24, 2016	- Update label detail to latest build standard (Lumentum)	Jason Zawalek
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		-	
		-	
		-	
		-	
		-	

3   FUNCTIONAL DIAGRAM

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4 OPTICAL PERFORMANCE SPECIFICATIONS

Parameters are specified per module, over passband, over operating temperature, 15 dB attenuation range, and all polarization states unless stated otherwise. Please refer to "Measurement Details" document for further details on measurement conditions for each parameter. Specifications are subject to change during the development cycle of the product.

Parameter	Condition	Min	Max	Comments	Units	Test Code
Port Configuration		Twin 1x9				
Number of ports		20		2 x 1 Common, 2 x 9 Input/Output Ports		
Operating WL Range	Center of outermost 50GHz channel	191.50 - 196.25		96 x 50GHz channels	THz	
	Continuous usable region across operating band	191.475 – 196.275				
Maximum Input Power	Single in/ out Port (including Common)		24	Performance within specification	dBm	MIP.01
	Single 12.5GHz Window		9	Performance within specification	dBm	MIP.02
Bi-directional		Yes		Each module can be used as add or drop		
Sub channel Width		6.25			GHz	
Total # of Sub Channels		768				
# of sub channel/ user channel (N)		6	80			
User Channel Width		37.5	500		GHz	
Passband/Stopband	BW over which parameters are defined	$\pm (6.25n-12.5)$		Equivalent to 12.5GHz for a 50GHz channel	GHz	
0.5 dB Channel Bandwidth	N=8	$\pm (6.25n-11)$		Equivalent to ±14GHz for a 50GHz channel NOTE: 0.5HBW is measured at 0dB only.	GHz	BW.00
3.0 dB Channel Bandwidth	N=8	$\pm (6.25n-9)$		Equivalent to ±16GHz for a 50GHz channel	GHz	BW.00
Insertion Loss (IL)		2.5	8.0	Including connectors	dB	IL.00
Insertion Loss Uniformity	Channel uniformity		1.5	All channels on one port at constant T	dB	ILU.00
	Port Uniformity		2.5	Port to Port uniformity		ILU.01
Insertion Loss Ripple	Up to 10 dB attn		0.6		dB	ILR.00
	10.1-15 dB attn.		1.0			
PDL	Up to 10 dB attn		1.0		dB	PDL.00
	10.1-15 dB attn.		1.2			

Parameter	Condition	Min	Max	Comments	Units	Test Code
Port Isolation	Worst case	30			dB	ISO.18
Extinction Ratio		35			dB	ER.00
Directivity	Isolation between input ports	15			dB	DIR.00
Return loss	Excluding Directivity		30		dB	RL.00
Out of Band Suppression		25		Any channel inside 191.0 to 197.0THz that is not commissioned	dB	OBS.01
Attenuation setting resolution	Smallest step size supported by firmware		0.1		dB	
Attenuation Accuracy	Up to 10 dB attenuation		±1.0		dB	AA.00
	10.1-15 dB attenuation		±1.5			
Attenuation Dynamic Range		0	15		dB	
Dynamic Crosstalk			+/-0.5		dB	DXT.00
Response Time	< 2dB step		1400	All channels	msec	CRT.00
	< 15dB step		2000			
	Port Switching		3000			
PMD	0-15dB attenuation		1.0		ps	PMD.00
Chromatic Dispersion	0-15dB attenuation		±10		ps/nm	CD.00
Group Delay Ripple	0-15dB attenuation	-1.5	1.5		ps	GDR.02

LUMENTUM

5   DIRECTIVITY DETAILS

Note the directivity map below is the same for each module. There is no connectivity between modules.

Directivity map

Selected Port to Common Ports Connects To	P1	P2	P3	P4	P5	P6	P7	P8	P9
P1	C	P1/-	P1/2	P2/3	P3/4	P4/5	P5/6	P6/7	P7/8
P2		C	P1/-	P1/2	P2/3	P3/4	P4/5	P5/6	P6/7
P3			C	P1/-	P1/2	P2/3	P3/4	P4/5	P5/6
P4				C	P1/-	P1/2	P2/3	P3/4	P4/5
P5					C	P1/-	P1/2	P2/3	P3/4
P6						C	P1/-	P1/2	P2/3
P7							C	P1/-	P1/2
P8								C	P1/-
P9									C

[green] Free of directivity	Px/y	Power is between ports x and y but does not directly hit either
[yellow] Desired Configuration	P1/-	Power is directed to port put does not directly hit the port

Example: When Port 4 is connected Common, there will be directivity leakage between:
- **Port 1 and Port 2**
- **Port 1 and Port 3**
- **Port 2 and Port 1**
- **Port 2 and itself (return loss)**
- **Port 3 and Port 1**
- **All other ports (higher than 4) will have no directivity issue**

6   ENVIRONMENTAL & OPERATIONAL SPECIFICATIONS

Parameters	Conditions	Specifications		Units
		Min.	Max.	
Operating Case Temperature		0	65	^{o}C
Operating Humidity[1]		5	85	% RH
Operating Altitude		0	2300	m
Required Airflow		1		m/s
Storage Temperature		-40	70	^{o}C
Storage Humidity		5	95	% RH

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[1] Non-condensing

7   MECHANICAL & FIBER LABELING

Parameters	Conditions	Specifications		Units
Module Dimensions (WxDxH)	Nominal	185 x 110 x 20		mm
Fiber Type	All Ports	Singulated 900um tight buffer		SMF or equivalent
Fiber Length		75 ± 5		cm
Fiber Exit		Long Side of Module		
Optical Connector	All ports	LC/UPC connectors		
Electrical Connector	26 pin Connector, 2 rows of 13 contacts on a 2mm pitch	CLT-113-02-S-D-BE		
Electrical Interface[2]		RS232		
Connector Labeling for LC connector option (Module 1)		Port	Label	
		Common	M1_C	
		1	M1P1	
		2	M1P2	
		3	M1P3	
		4	M1P4	
		5	M1P5	
		6	M1P6	
		7	M1P7	
		8	M1P8	
		9	M1P9	
Connector Labeling for LC connector option (Module 2)		Port	Label	
		Common	M2_C	
		1	M2P1	
		2	M2P2	
		3	M2P3	
		4	M2P4	
		5	M2P5	

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[2] Electrical interface is specified in SW Interface Document - xxxxxx

Parameters	Conditions	Specifications	Units
		6	M2P6
		7	M2P7
		8	M2P8
		9	M2P9

Ribbon Fiber Map

Fanout #1					
12-fiber fanout fiber colors	Pigtail #	Ribbon #	6-fiber ribbon color	Module-Port	Module
Blue	1	1	Blue	C_M2	M2
Orange	3		Orange	P2M2	
Green	5		Green	P4M2	
Brown	7		Brown	P6M2	
Slate	9		Slate	P8M2	
White	11		White	Dummy	
Red	13	3	White	C_M1	M1
Black	15		Slate	P2M1	
Yellow	17		Brown	P4M1	
Violet	19		Green	P6M1	
Pink	21		Orange	P8M1	
Aqua	23		Blue	Dummy	

Fanout #2					
12-fiber fanout fiber colors	Pigtail #	Ribbon #	6-fiber ribbon color	Module-Port	Module
Aqua	2	2	White	P1M2	M2
Pink	4		Slate	P3M2	
Violet	6		Brown	P5M2	
Yellow	8		Green	P7M2	
Black	10		Orange	P9M2	

Red	12		Blue	Dummy	
White	14		Blue	P1M1	
Slate	16		Orange	P3M1	
Brown	18	4	Green	P5M1	M1
Green	20		Brown	P7M1	
Orange	22		Slate	P9M1	
Blue	24		White	Dummy	

7.1 Mechanical details
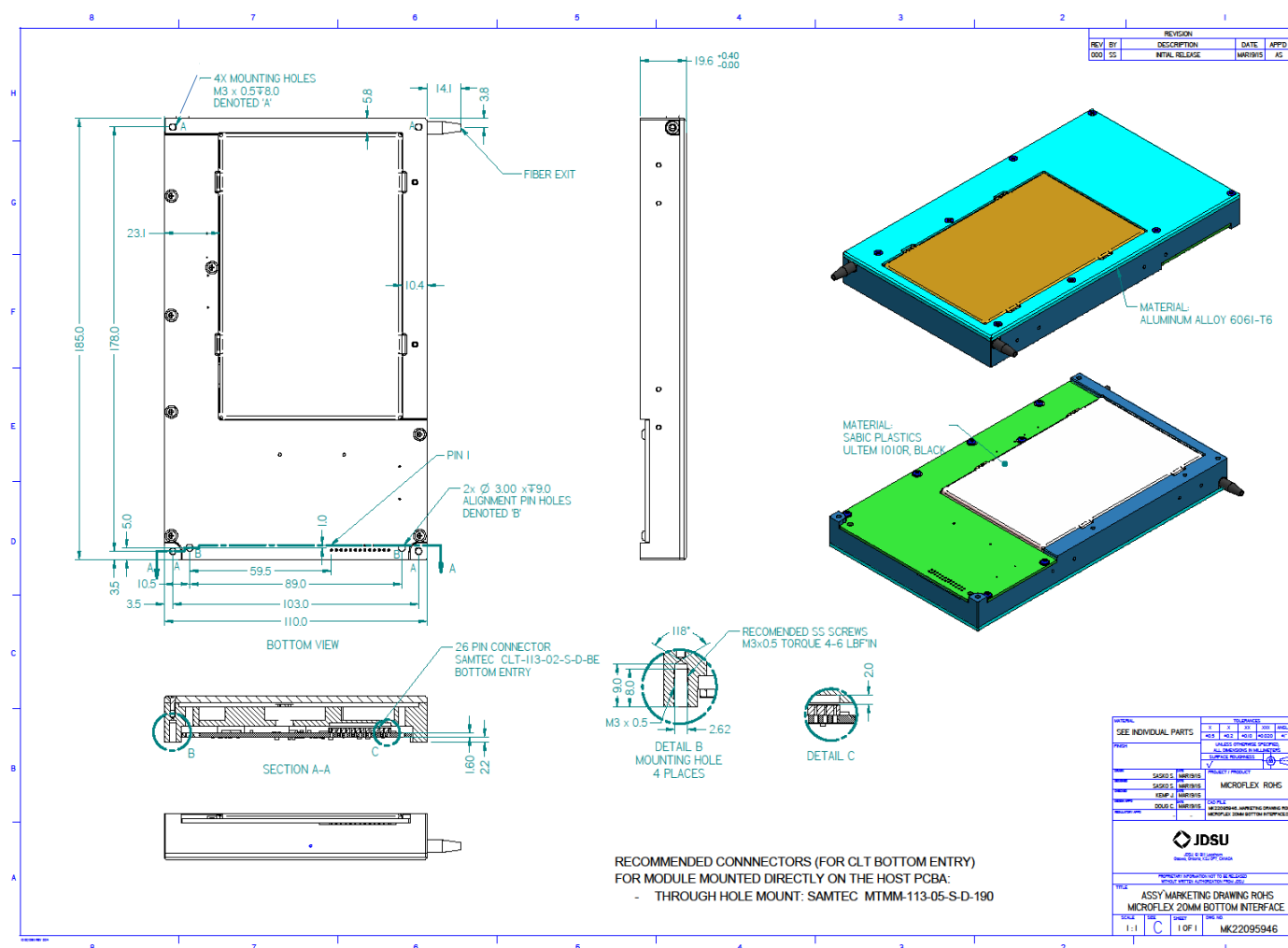
8 ELECTRICAL

8.1 Input

Parameters	Specification	Typical Current consumption	Max Current
Supply Voltage C[3]	5 V $\pm$ 5%	~5A	8A

8.2 Startup time

Parameters	Condition	Specification	Units
Warm-up Time	From 0C	14	Min
	From 25C	8	Min

8.3 Consumption

Parameters	Condition	Specification	Units
Power	Startup/ During Warm-up	< 40	W
	Steady State (after Warm-up)	~23	W
Note steady state power consumption will decrease with temperature (higher ambient temperature = lower steady state current). At 55C the power is ~11W.			

8.4 Electrical Pin out

Function (LCOS 20mm module)	Pin	Pin	Function (LCOS 20mm module)	
+5 V	1	2	+5 V	
+5 V	3	4	+5 V	
+5 V	5	6	+5 V	
GND	7	8	GND	
GND	9	10	GND	
GND	11	12	GND	**BOTTOM ENTRY 26 pin CLT**
RESERVED	13	14	RESERVED	
RESERVED	15	16	RESERVED	
Serial Port CTS	17	18	Serial Port RTS	
Serial Port TXD (output)	19	20	Serial Port RXD (input)	
MASTER RESET (input, active low)	21	22	HARD RST (input, active low)	
NC	23	24	NC	
ERROR (output, active high)	25	26	RESERVED	

Parameters	Value
Firmware Version	FW 6.11.11

9 LABEL & TEST REPORT SPECIFICATIONS

9.1 Unit Labeling

Minimum label contents:
- Lumentum Logo
- Vendor Name: Lumentum
- Product name: MicroTwin 1x9 Gen2 TrueFlex® WSS - base
- Model Number: **TWSSX9P22090304**
- Lumentum Part Number: **22090304** in text format
- Unit Serial Number: in text format
- Unit Serial Number: in barcode type 39 or 128 format
- Country of Origin

For illustration purposes only – content may vary

Note: Serial Number format will be #12345678-X prior to GA and serial number will be #12345678 (with no suffix) after GA.

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9.2   Shipping Labels

Minimum label Contents:
- Lumentum Logo
- Vendor Name: **Lumentum**
- Product name: MicroTwin 1x9 Gen2 TrueFlex® WSS - base
- Lumentum Model Number : **TWSSX9P22090304**
- Lumentum Part Number: **22090304** in text format
- Unit Serial Number: in text format
- Unit Serial Number: in barcode type 39 or 128 format
- Date of Manufacture
- Lumentum Address: **Lumentum Corporation**
                      61 Bill Leathem Drive
                      Ottawa, Ontario
                      K2J 0P7
- Lumentum Phone : **613-843-3000**
- Lumentum Fax : **613-843-3333**
- Lumentum URL : **www.lumentum.com**
- Country of Origin

For illustration purposes only – content may vary

Additional Labels
- Fragile Label
- ESD Label

Label placement as per example:

9.3 Test Record

For each device shipped, the following information must be available:

- Lumentum Oracle Part Number
- Date of Manufacture/Test
- Serial Number
- Firmware Version
- Pass/Fail Result