

### 3FE71782AA-C

Alcatel-Lucent Nokia® 3FE71782AA Compatible TAA 100GBase-LR4 CFP4 Transceiver (SMF, 1310nm, 10km, LC, DOM)

#### Features:

- CFP MSA 1.1 Compliance
- Duplex LC Connector
- Single-mode Fiber
- Commercial Temperature 0 to 70 Celsius
- Hot Pluggable
- Metal with Lower EMI
- Excellent ESD Protection
- RoHS Compliant and Lead Free



#### Applications:

- 100GBase Ethernet
- ITU-T OTU4
- Access and Enterprise

#### Product Description

This Alcatel-Lucent Nokia® 3FE71782AA compatible CFP4 transceiver provides 100GBase-LR4 throughput up to 10km over single-mode fiber (SMF) using a wavelength of 1310nm via an LC connector. Our transceiver is built to meet or exceed OEM specifications and is guaranteed to be 100% compatible with Alcatel-Lucent Nokia®. It has been programmed, uniquely serialized, and tested for data-traffic and application to ensure that it will initialize and perform identically. All of our transceivers comply with Multi-Source Agreement (MSA) standards to provide seamless network integration. Additional product features include Digital Optical Monitoring (DOM) support which allows access to real-time operating parameters. This transceiver is Trade Agreements Act (TAA) compliant. We stand behind the quality of our products and proudly offer a limited lifetime warranty.

ProLabs' transceivers are RoHS compliant and lead-free.

TAA refers to the Trade Agreements Act (19 U.S.C. & 2501-2581), which is intended to foster fair and open international trade. TAA requires that the U.S. Government may acquire only "U.S.-made or designated country end products.")



## Absolute Maximum Ratings

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Operating Case Temperature	Tc	0		70	°C	
Storage Temperature	Tstg	-40		85	°C	
Power Supply Voltage	Vcc	-0.3		4	V	
Signal Input Voltage		Vcc-0.3		Vcc+0.3	V	
Relative Humidity	RH	5		95	%	
Receive Input Optical Power (Damage Threshold)	Pdmg			5.0	dBm	
Signaling Rate Per Lane			25.78125		Gbps	

## Low-Speed Electrical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Power Supply Voltage	Vcc	3.2	3.3	3.4	V	1
Power Supply Current	Icc			1.8	A	
Power Dissipation	PD			6.0	W	
Power Dissipation (Low-Power Mode)	PDLP			1.0	W	
Low-Speed Control and Sense Signals (3.3V LVCMOS)						
Output Low Voltage	VOL	0.3		0.2	V	IOH = 100µA
Output High Voltage	VOH	Vcc-0.2		Vcc+0.3	V	IOH = -100µA
Input Low Voltage	VIL	-0.3		0.8	V	
Input High Voltage	VIH	2		Vcc3+ 0.3	V	
Input Leakage Current	Iin	-10		10	µA	
Low-Speed Control and Sense Signals (1.2V LVCMOS)						
Output Low Voltage	VOL	-0.3		0.2	V	
Output High Voltage	VOH	1.0		1.5	V	
Output Low Current	Iol	4			mA	
Output High Current	Ioh			-4	mA	
Input Low Voltage	VIL	-0.3		0.36	V	
Input High Voltage	VIH	0.84		1.5	V	
Input Leakage Current	Iin	-100		100	µA	
Input Capacitance	C			10	pF	
MDC Clock Rate		0.1		4	MHz	

### Notes:

1. With respect to the GND.

## High-Speed Electrical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
<b>Transmitter Electrical Input from Host</b>						
Differential Voltage Pk-Pk		100		1200	mV	
Common-Mode Noise (RMS)				17.5	mV	
Differential Termination Mismatch				10	%	
Transition Time		10			ps	20-80%
Common-Mode Voltage		-0.3		2.8	V	
<b>Receiver Electrical Output from Host</b>						
Differential Voltage Pk-Pk		100		1200	mV	
Common-Mode Noise (RMS)				17.5	mV	
Differential Termination Mismatch				10	%	
Transition Time		9.5			ps	20-80%

## Optical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
<b>Transmitter</b>						
Center Wavelength	$\lambda_0$	1294.53	1295.56	1296.59	nm	
	$\lambda_1$	1299.02	1300.05	1301.09	nm	
	$\lambda_2$	1303.54	1304.58	1305.63	nm	
	$\lambda_3$	1308.09	1309.14	1310.19	nm	
Rate Tolerance		-100		100	ppm	1
Side-Mode Suppression Ratio	SMSR	30			dB	
Total Output Power	POUT			10.5	dBm	
Average Launch Power Per Lane		-4.3		4.5	dBm	
Extinction Ratio	ER	4			dB	
Optical Modulation Amplitude Per Lane	OMA	-1.3		4.5	dBm	
Difference in Launch Power Between Any Two Lanes	OMA			5	dB	
Transmitter and Dispersion Penalty Per Lane	TDP			2.2	dB	
Average Launch Power Off Per Lane	Poff			-30	dBm	
Relative Intensity Noise	RIN <sub>20</sub> OMA			-130	dB/Hz	
Transmitter Reflectance				-120dB		
Output Eye Mask Definitions: {X1, X2, X3, Y1, Y2, Y3}		{0.25, 0.4, 0.45, 0.25, 0.28, 0.4}				
<b>Receiver</b>						
Center Wavelength	$\lambda_0$	1294.53	1295.56	1296.59	nm	

	$\lambda 1$	1299.02	1300.05	1301.09	nm	
	$\lambda 2$	1303.54	1304.58	1305.63	nm	
	$\lambda 3$	1308.09	1309.14	1310.19	nm	
<b>Rate Tolerance</b>		-100		100	ppm	1
<b>Average Receiver Power Per lane</b>	Pavg	-10.6		4.5	dBm	
<b>Receiver Power (OMA) Per Lane</b>	RXPx			4.5	dBm	
<b>Difference in Launch Power Between Any Two Lanes</b>				5.5	dB	
<b>Receiver Sensitivity (OMA) Per Lane</b>	RxSENS			-8.6	dBm	2
<b>Stressed Receiver Sensitivity (OMA) Per Lane</b>	SRS			-6.8	dBm	
<b>Stressed Receiver Sensitivity Test Conditions</b>						
<b>Vertical Eye Closure Penalty Per Lane</b>	VECP		1.8		dB	
<b>Stressed Eye J2 Jitter Per Lane</b>			0.3		UI	3
<b>Stressed Eye J9 Jitter Per Lane</b>			0.47		UI	3
<b>Receiver Reflectance</b>	RR			-26	dB	
<b>LOS Assert</b>	LOSA	-30			dBm	
<b>LOS De-Assert</b>	LOSD			-12	dBm	
<b>LOS Hysteresis</b>	LOSH	0.5		-26	dB	

**Notes:**

1. From the normal rate.
2. Receiver sensitivity OMA per lane is informative.
3. Vertical Eye Closure Penalty, Stressed Eye J2 Jitter, and Stressed Eye J9 Jitter test conditions for measuring stressed receiver sensitivity. They are not characteristics of the receiver.

## Pin Descriptions

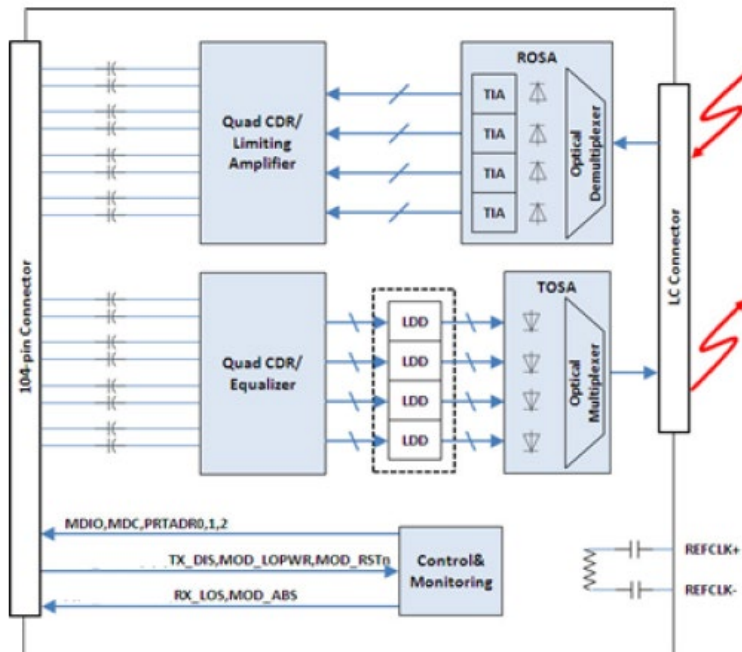
Pin	Symbol	Name/Description
1	3.3V_GND	3.3V Module Supply Voltage Return Ground. Can be separate or tied together with the Signal Ground.
2	3.3V_GND	3.3V Module Supply Voltage Return Ground. Can be separate or tied together with the Signal Ground.
3	3.3V	3.3V Module Supply Voltage.
4	3.3V	3.3V Module Supply Voltage.
5	3.3V	3.3V Module Supply Voltage.
6	3.3V	3.3V Module Supply Voltage.
7	3.3V_GND	3.3V Module Supply Voltage Return Ground. Can be separate or tied together with the Signal Ground.
8	3.3V_GND	3.3V Module Supply Voltage Return Ground. Can be separate or tied together with the Signal Ground.
9	NUC	Module Vendor I/O. Must not connect at the host board.
10	NUC	Module Vendor I/O. Must not connect at the host board.
11	Tx_DIS	Transmitter Disable for All Lanes. "1" or NC = transmitter disabled. "0" = transmitter enabled.
12	Rx_LOS	Receiver Loss of Optical Signal. "1" = low optical signal. "0" = normal condition.
13	GLB_ALRMn	Global Alarm. "0" = alarm condition in any MDIO alarm register. "1" = no alarm condition. Open drain. Pull-up resistor on the host.
14	MOD_LOPWR	Module Low-Power Mode. "1" or NC = module in low-power (safe) mode. "0" = power-on enabled.
15	MOD_ABS	Module Absent. "1" or NC = module absent. "0" = module present. Pull-up resistor on the host.
16	MOD_RSTn	Module Reset. "0" resets the module. "1" or NC = module enabled. Pull-down resistor in the module.
17	MDC	Management Data Clock. Electrical specs as per 802.3ae and 802.3ba.
18	MDIO	Management Data I/O Bi-Directional Data. Electrical specs as per 802.3ae and 802.3ba).
19	PRTADR0	MDIO Physical Port Address Bit 0.
20	PRTADR1	MDIO Physical Port Address Bit 1.
21	PRTADR2	MDIO Physical Port Address Bit 2.
22	NUC	Module Vendor I/O. Must not connect at the host board.
23	NUC	Module Vendor I/O. Must not connect at the host board.
24	NUC	Module Vendor I/O. Must not connect at the host board.
25	GND	
26	Tx_MCLKn	Tx Monitor Clock Output (Positive).
27	Tx_MCLKp	Tx Monitor Clock Output (Negative).
28	GND	
29	GND	
30	Rx0+	Lane 0 Receiver Output (Positive).
31	Rx0-	Lane 0 Receiver Output (Negative).
32	GND	
33	Rx1+	Lane 1 Receiver Output (Positive).
34	Rx1-	Lane 1 Receiver Output (Negative).
35	GND	

36	Rx2+	Lane 2 Receiver Output (Positive).
37	Rx2-	Lane 2 Receiver Output (Negative).
38	GND	
39	Rx3+	Lane 3 Receiver Output (Positive).
40	Rx3-	Lane 3 Receiver Output (Negative).
41	GND	
42	REFCLKp(NUC)	Reference Clock Input (Positive) (Optional).
43	REFCLKn(NUC)	Reference Clock Input (Negative) (Optional).
44	GND	
45	Tx0+	Lane 0 Transmitter Input (Positive).
46	Tx0-	Lane 0 Transmitter Input (Negative).
47	GND	
48	Tx1+	Lane 1 Transmitter Input (Positive).
49	Tx1-	Lane 1 Transmitter Input (Negative).
50	GND	
51	Tx2+	Lane 2 Transmitter Input (Positive).
52	Tx2-	Lane 2 Transmitter Input (Negative).
53	GND	
54	Tx3+	Lane 3 Transmitter Input (Positive).
55	Tx3-	Lane 3 Transmitter Input (Negative).
56	GND	

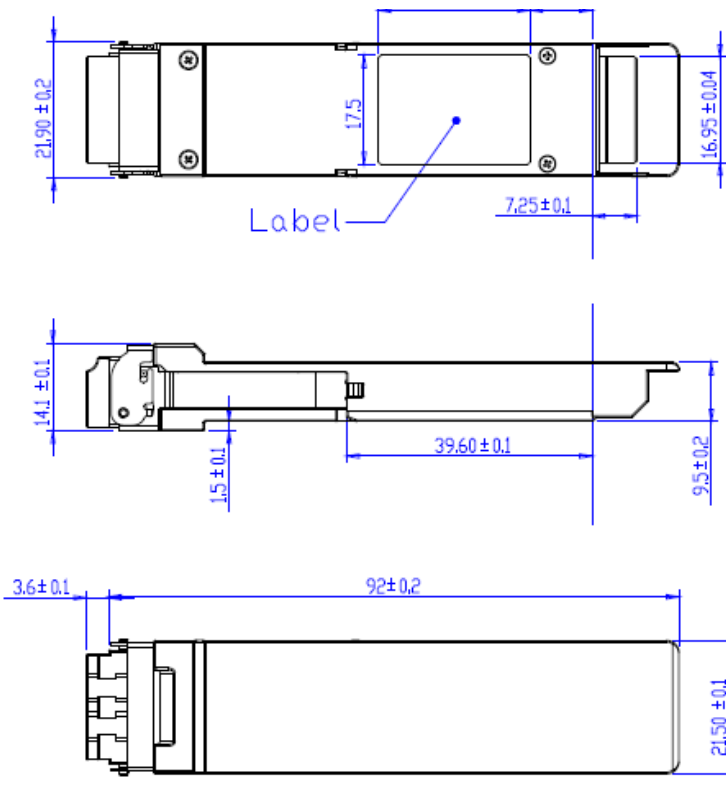
## Pin Definitions

Top Row		Bottom Row	
PIN#	Name	PIN#	Name
56	GND	1	3.3V_GND
55	TX3n	2	3.3V_GND
54	TX3p	3	3.3V
53	GND	4	3.3V
52	TX2n	5	3.3V
51	TX2p	6	3.3V
50	GND	7	3.3V_GND
49	TX1n	8	3.3V_GND
48	TX1p	9	NUC
47	GND	10	NUC
46	TX0n	11	TX_DIS
45	TX0p	12	RX_LOS
44	GND	13	GLB_ALRMn
43	(REFCLKn)	14	MOD_LOPWR
42	(REFCLKp)	15	MOD_ABS
41	GND	16	MOD_RSTn
40	RX3n	17	MDC
39	RX3p	18	MDIO
38	GND	19	PRTADR0
37	RX2n	20	PRTADR1
36	RX2p	21	PRTADR2
35	GND	22	NUC
34	RX1n	23	NUC
33	RX1p	24	NUC
32	GND	25	GND
31	RX0n	26	TX_MCLKn
30	RX0p	27	TX_MCLKp
29	GND	28	GND

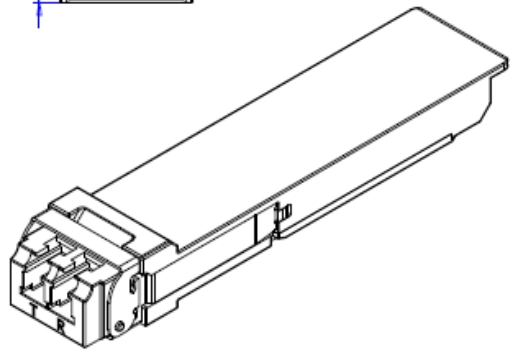
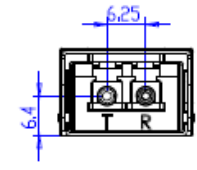
## Block Diagram



# Mechanical Specifications



Units in mm



## About ProLabs

Our extensive experience comes as standard. For over 20 years ProLabs has delivered optical connectivity solutions that give our customers freedom and choice through our ability to provide seamless interoperability. At the heart of our company is the ability to provide state-of-the-art optical transport and connectivity solutions that are compatible with more than 100 optical switching and transport platforms.

## A Complete Portfolio of Network Solutions

ProLabs is focused on innovations in optical transport and connectivity. The combination of our knowledge of optics and networking equipment enables ProLabs to be your single source for optical transport and connectivity solutions from 100Mb to 1.6T while providing innovative solutions that increase network efficiency. We provide the optical connectivity expertise that is compatible with and enhances your switching and transport equipment.

## The Trusted Partner

Customer service is our number one value. ProLabs has invested in people, labs and manufacturing capacity to ensure compatible products, and immediate answers to your questions. With Engineering and Manufacturing offices in the U.K. and U.S. augmented by field offices throughout the U.S., U.K. and Asia, ProLabs is able to be our customers best advocate 24 hours a day.



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