

PRELIMINARY DATA SHEET



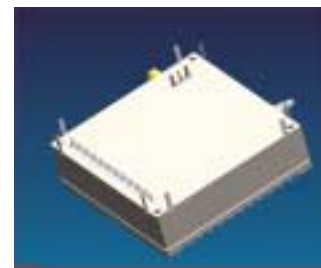
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LT9775 RoHS Compliant G-PON B+ ONU Triplexer

2488 Mb/s Downstream 1244 Mb/s Upstream DFB/APD

The LT9775 is a 2488 Mbps downstream / 1244 Mbps upstream GPON bidirectional ONU triplexer transceiver designed to meet the requirements of the ITU-T G.984.2 Class B+ specification for point to multi point service in advanced “triple play” Optical Network Termination (ONT) or Optical Network Unit (ONU) equipment. It incorporates a 1310 nm DFB burst mode upstream laser transmitter, a 1490 nm continuous mode downstream APD digital receiver and a 1550 nm linear analog receiver for reception of CATV signals in the 47 to 870 MHz band. It is packaged in a 20-Pin Single-In-Line / 3-Pin Single-In-Line 2.00 x 2.00 inch metal housing with fiber pigtail and SC/APC connector and is designed to operate over the industrial temperature range of -40°C to +85°C.



LT9775 Composite Sketch
Shows both RF Options:
Pins and SMB Connector

Optical Features

- Single Fiber Triplexer
- 1244 Mb/s 1310 nm DFB Upstream Burst Mode Transmitter
- 2488 Mb/s 1490 nm APD/TIA Downstream CW Mode Digital Receiver
- 1550 nm Downstream Linear CATV Video Receiver
- SC/APC Fiber Pigtail
- 28 dB Optical Budget
- 20 km Reach

RF / Electrical Features

- 3.3 V Burst Mode Transmitter
- 3.3 V Digital Receiver
- 12.0 V Video Receiver
- 1.2 W Typical Power Consumption
- Rx DATA
 - CML differential data interface
 - Internally AC coupled and terminated
- Tx DATA
 - CML differential data interface
 - Externally DC coupled
- 45 to 870 MHz RF BW
- 17 dBmV / ch with 4dB positive tilt RF Output
- 75-Ohm Single-Ended RF Output

Diagnostic Features

- LVTTTL Rx_SD
- CML Differential Tx_BEN
- LVTTTL I2C Interface
- I²C Transceiver Diagnostics

Mechanical Features

- 20-Pin SIL 2.00 x 2.00 Inch Package
- 3-Pin 75-Ohm RF Output Port
- Optional SMB 75-Ohm RF Output Port
- RoHS Compliant

Environmental Features

- -40°C to +85°C Storage Temperature
- -40°C to +85°C Case Temperature

Applications

- Passive optical network (PON)
- Full Service Access Networks
- Fiber-to-the-Home (FTTH)
- Fiber-to-the-Business (FTTB)

Applied Standards

- ITU-T G.984.2

Ordering Information

Part Number	Package Option (X)		RF Interface (Y)	
	LTT9775 XY	A	Pigtail, no connector	P
B		Pigtail, SC/APC	S	SMB connector
C		Pigtail, SC/PC		

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Absolute Maximum Ratings					
Parameter	Symbol	Min	Max	Units	Notes
Storage Temperature	T _{stg}	-40	+85	°C	
Case Operating Temperature	T _{case}	-40	+85	°C	
Relative Humidity @ +85°C Case Operating Temperature	RH	-	95	%	Non-condensing
Mechanical Shock	-	100	-	G	GR-468 (REV 12/02/1998)
Vibration	-	20	-	G	GR-486 (REV 12/02/1998)
Fiber Pull Strength	-	10	-	N	GR-468 (REV 12/02/1998)
Lead Soldering Temperature	T _{slid}	-	260	°C	
Soldering Duration	t _{slid}	-	10	sec	
Module ESD Immunity	-	-	-	-	GR-468 (REV 2/02/1998)
Module RF Port ESD Immunity (See Note 1)	-	-	-	-	GR-1089 (i4)
RF Termination Surge Protection (See Note 2)	-	-	-	-	GR-1089 ITU K.21 ANSI / SCTE 812003
<p>Note 1 Module RF Port ESD Immunity (with respect to the center connector) 10 discharges each polarity, 4kV and 15kV (air discharge) or, 10 discharges each polarity, 8kV (contact discharge), applied to each test point per IEC 61000-4-2</p>					
<p>Note 2 K.21 test 7.2 for Intra-building ports, enhanced levels. GR1089 Outside Plant Cables without External Protectors.</p>					

Optical Interface		
Optical Connector	SC/APC (8 degree angle)	GR-326 Compliant
Fiber Pigtail (Type)	Tight Buffer 0.9 mm	9/125/250 micron non-dispersion shifted single mode fiber.
Fiber Pigtail (Length)	23.5 +/- 1.5 inches	

RoHS-5 Compliance		
Component Lead Finish (Option 1)	Sn/Pb	Compliant with iNEMI guidelines for Tin Whisker mitigation
Component Lead Finish (Option 2)	Sn	Compliant with iNEMI guidelines for Tin Whisker mitigation

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Upstream Burst Mode Transmitter Optical and Electrical Characteristics (Tamb = -40° to +85°C unless noted otherwise, VCC = 3.3 V)

Parameter	Symbol	Min	Typ	Max	Units	Notes
Transmitter DC Supply Voltage	Vcc	3.14	3.3	3.46	VDC	
Transmitter DC Supply Current	Icc	-	-	125	mA DC	
Upstream Signaling Speed	Stx	-	1244.16	-	Mb/s	
Transmitter Type		1310 nm DFB Burst Mode				
Transmitter Control		Differential Burst Mode ON / OFF				CML compatible input
Average Output Power (9/125 μ SMF)	Pout	0.5	-	5.0	dBm	The tracking error is included in the TX output power range
Extinction Ratio	ER	10	-	-	dB	PRBS 2 ²³ -1, NRZ, 50% Duty Cycle. G.984.2 Tx eye mask compliant
Tolerance to the transmitter incident optical power	-	-15	-	-	dB	
Center Wavelength	λ	1260	-	1360	nm	
Spectral Line Width @ -20 dB	Δλ	0.1	-	1.0	nm	
Side Mode Suppression Ratio	SMSR	-30	-	-	dB	Reflectance = -15 dB at laser output (Table 2f / G.984.2)
Optical Output with Tx OFF	Pout	-	-	-39	dBm	
Optical Rise / Fall Time	t _r / t _f	-	150	260	ps	20% to 80%
Tx Data Input	V _{IH} - V _{IL}	200	-	1600	mV p-p	CML Interface, DC Coupled
Tx Burst Mode Enable Input	V _{IH} - V _{IL}	200	-	1600	mV p-p	CML Interface, DC Coupled
Tx Data Common Mode Input		1.8	2.0	2.4	VDC	CML Interface, DC Coupled
Tx Burst Mode Common Mode Input		1.8	2.0	2.4	VDC	CML Interface, DC Coupled
Relative Intensity Noise	RIN	-	-	-125	dB/Hz	1244 Mb/s Signaling Rate
Additive Jitter Generation	J _A	-	-	0.2	UI	

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Downstream CW Mode Receiver Optical and Electrical Characteristics (Tamb = -40°C to +85°C unless noted otherwise, VCC = 3.3 V)

Parameter	Symbol	Min	Typ	Max	Units	Notes
Receiver DC Supply Voltage	Vcc	3.14	3.3	3.46	VDC	
Receiver DC Supply Current	Icc	-	-	125	mA DC	
DC Supply - Immunity to Ripple		30	-	-	mV pk-pk	Up to 10 MHz
Receiver Type		1490 nm APD / TIA CW Mode				
Rx Signaling Speed	SRx	-			Mb/s	
Operating Wavelength	λ	1480	-	1500	nm	
Rx Sensitivity (Note 1)	Pin	-29	-	-	dBm	BER=1E-10, ER=10 dB, PRBS 2 ²³ -1, 2488 Mb/s, 1480 – 1500 nm
Rx Optical Input Overload	Pin			-8	dBm	Average Optical Power
Rx Optical Input Damage Level	Pin	-	-	+5	dBm	Average Optical Power
Rx Data Differential Output Voltage	-	300	-	1200	mV p-p	CML Compatible, AC-Coupled
Continuous Identical Digit Immunity	CID	-	72	-	bits	
Jitter Tolerance	J _{TL}	G.984.2 Mask			UI	
Jitter Transfer	J _{TR}	G.984.2 Mask			dB	
Receiver Reflectance	RFL	-	-	-30	dB	
Polarization Dependent Loss	PDL	-	-	0.5	dB	1490 nm to 1500 nm
Receiver RSSI Accuracy	RSSI	-3	-	+3	dB	

Note 1 Input optical power measured at SC/APC interface
 Includes effects of temperature dependency, filter wavelength response and PDL.
 Sensitivity shall be met with a reflectance of -15 dB at laser output (Table 2f-1/G.984.2)
 Sensitivity shall include the tolerance to reflected power at the receiver of -10 dB (Table 2f-1/G.984.2, and G.957).

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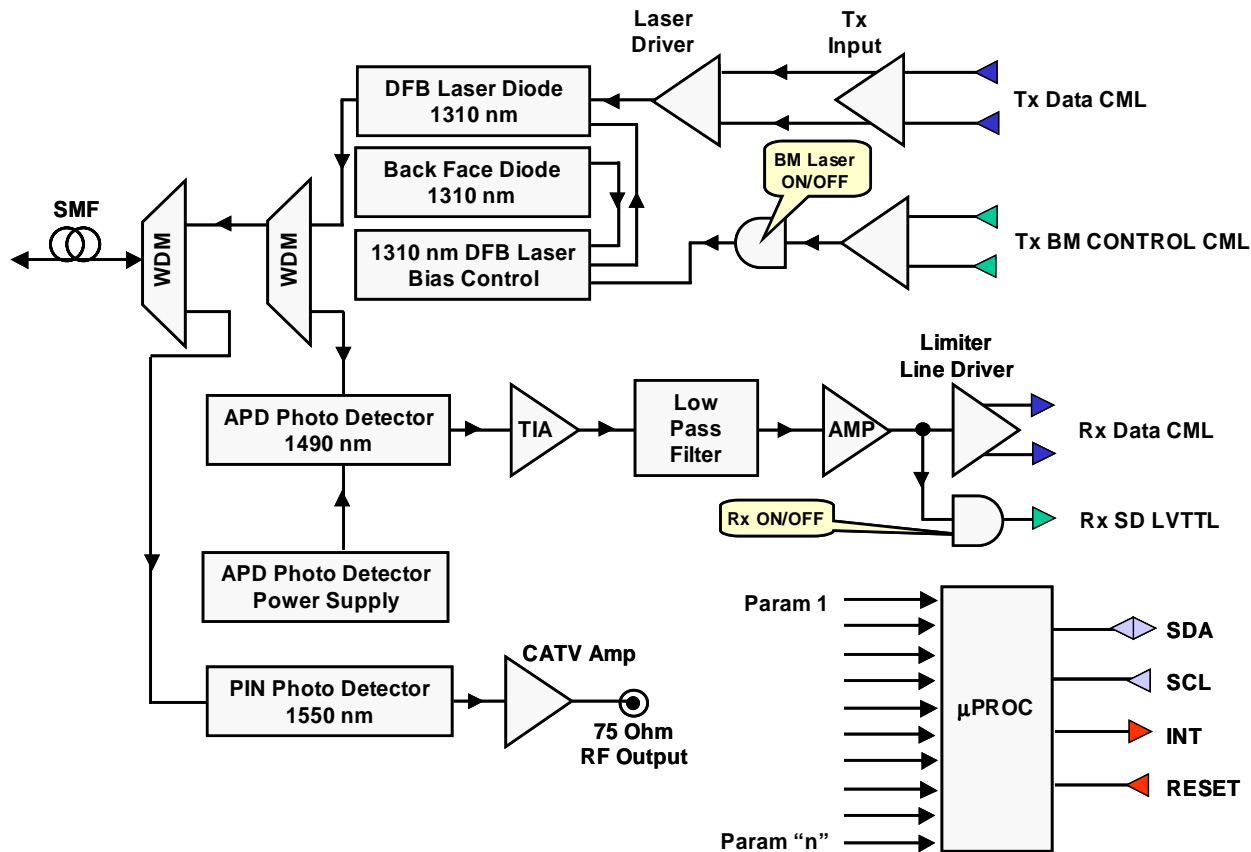
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LTY9775 BLOCK DIAGRAM - TENTATIVE



Microprocessor Monitor Functions		
Parameter	Section	Description
1	Digital Transceiver	Tx Optical Output Power
2	Digital Transceiver	Rx RSSI
3	Digital Transceiver	Vcc
4	Digital Transceiver	Icc
5	Digital Transceiver	Transceiver Case Temperature
6	Video Receiver	Video AGC Output
7	Video Receiver	RF Output (RSSI)
8	Video Receiver	Video Optical Input
9	Video Receiver	Vcc
10	Video Receiver	Icc
11	Video Receiver	Video Section Case Temperature

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Video (RF) Receiver Characteristics (Tamb = -40°C to +85°C unless noted otherwise, VDD1 = 12 V)

Parameter	Symbol	Min	Typ	Max	Units	Notes
DC Supply Voltage	Vcc	10.8	12.0	13.2	VDC	
DC Supply Current	Icc	-	-	100	mA	
DC Supply - Immunity to Ripple		30	-	-	mV pk-pk	Up to 10 MHz
Operating Wavelength	λ	1550	1550	1560	nm	
RF Bandwidth	BW	45	-	870	MHz	
Optical Input Power	Pin	-8	-	+2	dBm	Linear Operating Range
Optical Input Power Damage Level	Pin	+5	-	-	dBm	$\lambda = 1555$ nm
Video Detector Sensitivity	Svd	0.85	-	-	A/W	
Video Equivalent Thermal Noise	Npd	-	-	4.5	pA / SQRT Hz	
Video Detector Monitor Accuracy	-	-1	-	1	dB	1555 nm
RF Ripple	-	0	-	3	dB	Any 6 MHz RF Channel
Compound Second Order	CSO	-	-	-58	dB	
Compound Triple Beat	CTB	-	-	-58	dB	
Carrier to Noise Ratio	CNR	46	-	-	dB	
Linear Slope Correction	-	0	2	5	dB	45 vs. 870 MHz
RF Output Impedance	Z _{out}	-	75	-	Ohms	Unbalanced
RF Output Return Loss	RL	18	-	-	dB	45 to 870 MHz
RF Output	Vout					See Graph

WDM Characteristics

Parameter	Conditions	Min	Max	Units
Tx Channel	Operating Band	1260	1360	nm
Digital Rx Channel	Operating Band	1480	1500	nm
Video Rx Channel	Operating Band	1550	1560	nm
Optical Isolation From External Source to Digital Rx	1260 nm to 1360 nm into 1490 nm	-	-29	dB
Optical Isolation: From External Source to Video Rx	1260 nm to 1360 nm into 1555 nm	-	-40	dB
Optical Cross Talk from Internal Laser to Digital Rx	1260 nm to 1360 nm into 1490 nm	-	-47	dB
Optical Cross Talk from Internal Laser into Video Rx	1260 nm to 1360 nm into 1555 nm	-	-50	
Optical Isolation from Internal Video into Digital Rx	1555 nm into 1480 nm to 1500 nm	-	-35	dB
Optical Isolation from External Source to Video Rx	1480 nm to 1500 nm into 1555 nm	-	-35	dB
PDL	1555 nm Band	-	0.5	dB
PDL	1490 nm Band	-	0.5	dB
Optical Return Loss	1480 nm to 1500 nm	-	-30	dB
Optical Return Loss	1550 nm to 1560 nm	-	-30	dB
Digital Diagnostic Monitor	I ² C Interface			

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LTY9775 Triplexer Pin Out Table

Pin Number	Symbol	Description	Notes
1	GND	Case Ground	
2	V _{EER}	Receiver Ground	
3	V _{CCR}	Receiver 3.3 Volt DC Supply	
4	Rx_SD	Receiver Signal Detect Monitor Function	LVTTTL
5	Rx_DATA(+)	Digital Receiver Rx DATA Non Inverted Output	CML Compatible
6	Rx_DATA(-)	Digital Receiver Rx DATA Inverted Output	CML Compatible
7	Tx_BEN(+)	Transmitter Burst Mode Enable Non Inverted Input	CML Compatible
8	Tx_BEN(-)	Transmitter Burst Mode Enable Inverted Input	CML Compatible
9	V _{EET}	Transmitter Ground	
10	Tx_DATA(+)	Transmitter Tx DATA Non-Inverted Input	CML Compatible, DC Coupled
11	V _{EET}	Transmitter Ground	
12	Tx_DATA(-)	Transmitter Tx DATA Inverted Input	CML Compatible, DC Coupled
13	V _{CCT}	Transmitter 3.3 Volt DC Supply	
14	SDA	I ² C Serial Data I/O	LVTTTL (External Pull-Up Required)
15	SCL	I ² C Serial Clock	LVTTTL (External Pull-Up Required)
16	INT	Microcontroller INTERRUPT Output	LVTTTL (Internal Pull-Up)
17	V _{DD}	Video 12.0 VDC Supply	
18	V _{CCM}	3.3 Volt DC Power Supply for Microcontroller	
19	RESET	Microcontroller RESET Input	LVTTTL (Internal Pull-Up)
20	GND	Case Ground	
21	RF GND	RF Ground	
22	RF Out	RF Output	75 Ohms
23	RF GND	RF Ground	

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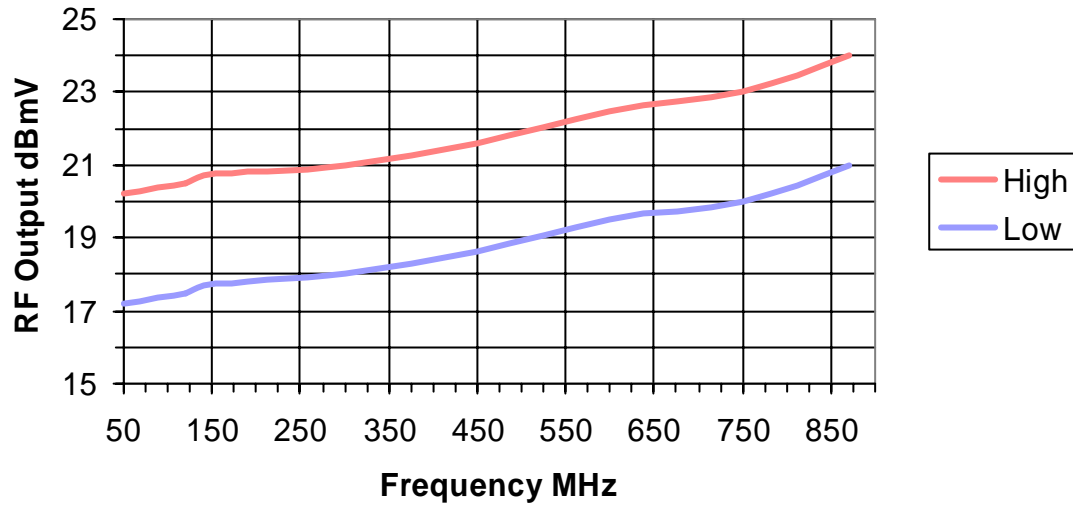
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RF Output Range in dBmV (75 Ohms) vs Frequency



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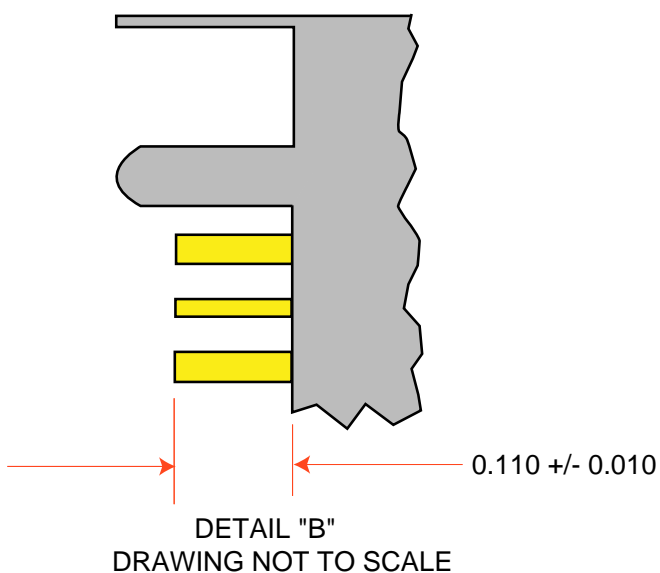
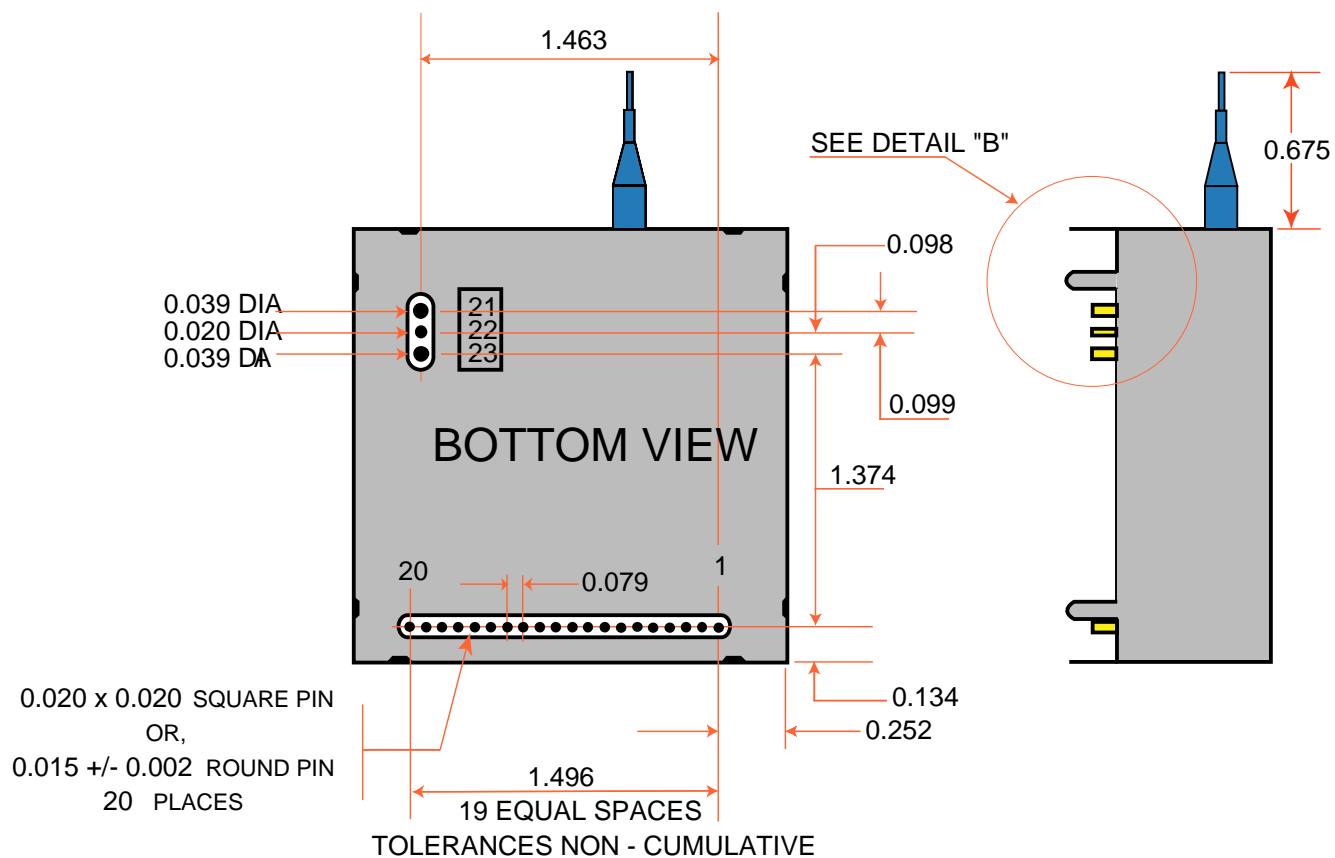


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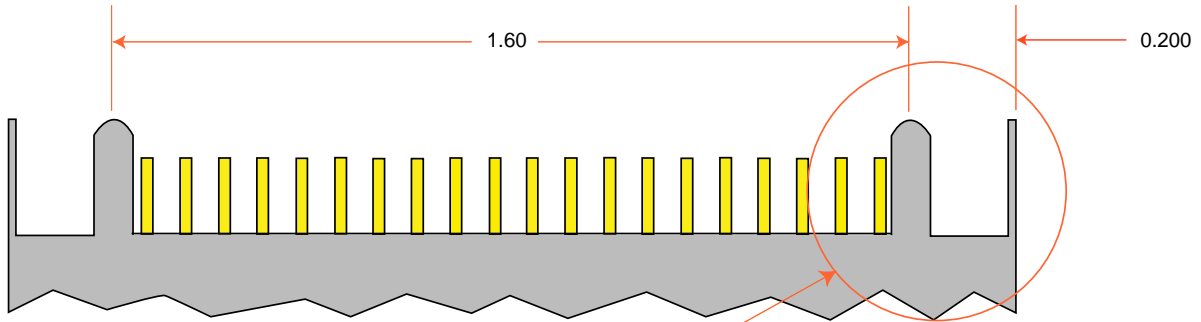


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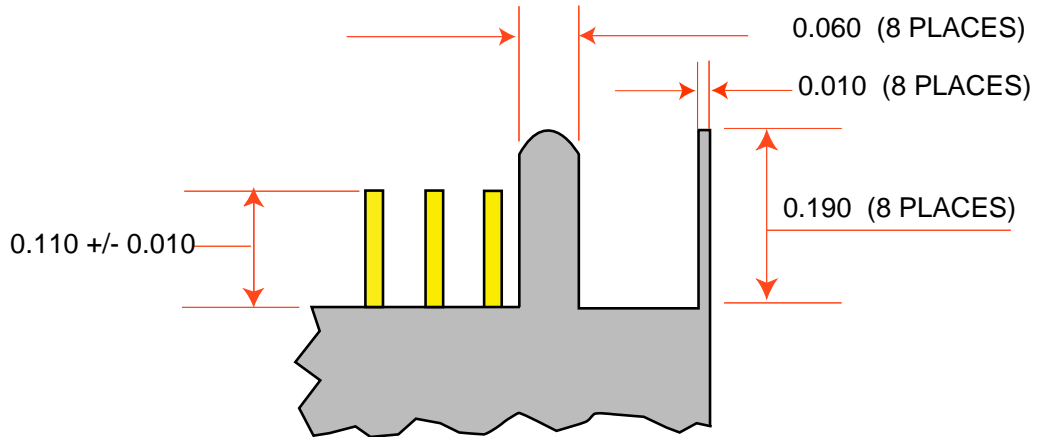
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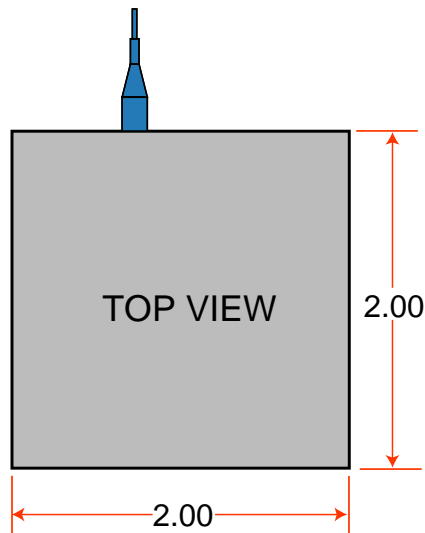
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SEE DETAIL "A"
DRAWING NOT TO SCALE



DETAIL "A"
DRAWING NOT TO SCALE



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