Fiber Split Ratio Reference

What is a Split Ratio? A split ratio is the amount of light that is re-directed from the network to the monitor ports. To determine the correct split ratio, a Loss (power) Budget should be calculated.

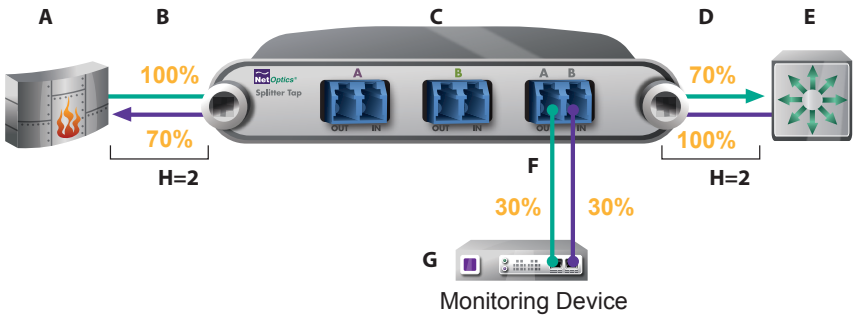
What is a Loss (power) Budget and how do I calculate this? A loss (power) Budget is the amount of attenuation that can be tolerated on the network and monitor links before the end to end data is corrupted. To calculate this, one must know the following network link characteristics: Link Distance, Fiber Type, Launch Power, Receiver Sensitivity, and number of interconnects and splices.

What Split Ratios are available from Net Optics? Net Optics offers Fiber Taps with the following Split Ratios: 50/50, 60/40, 70/30, 80/20 and 90/10.

Loss (power) Budget Calculations to Determine Viable Split Ratios

Item	*Description*	*Value*
A	Router transmit power	-9.5 dBm
B	Distance between Router and Tap	6m (0.006km)
C	Network Tap (70/30 split ratio)	≤ 2.4 dB (Network Port) ≤ 6.3 dB (Monitoring Device)
D	Distance between Tap and Switch	6m (0.006 km)
E	Switch receiver sensitivity	-17 dBm
F	Distance from Tap to Monitoring Device	20m (0.02km)
G	Monitor receiver sensitivity	-21 dBm
H	Connectors (4 in path)	0.5 dB * 4=2 dB

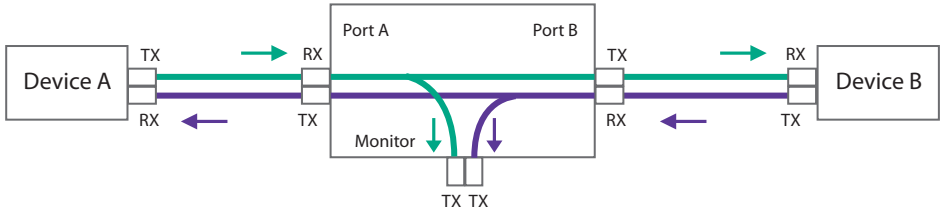
Components of Loss (power) Budget — **Fiber Tap70/30 Split Ratio**



Tap Insertion Loss (Multimode)

Split Ratio	*Network Port Loss (max)*	*Monitor Port Loss (max)*
50/50	4.5 dB	4.5 dB
60/40	3.1 dB	5.1 dB
70/30	2.4 dB	6.3 dB
80/20	1.8 dB	8.1 dB
90/10	1.3 dB	11.5 dB

Light flow



Tap Insertion Loss (Singlemode)

Split Ratio	*Network Port Loss (max)*	*Monitor Port Loss (max)*
50/50	3.7 dB	3.7 dB
60/40	2.8 dB	4.8 dB
70/30	2.0 dB	6.1 dB
80/20	1.3 dB	8.0 dB
90/10	0.8 dB	12.0 dB

Fiber Loss

Fiber Type	**Multimode**		**Singlemode**	
Wavelength (nm)	850	1300	1310	1550
Fiber attenuation (dB/km)	3	1	0.4	0.3

Connector Loss

Multimode	0.2 to 0.5 dB
Singlemode	0.1 to 0.2 dB

Tap into your NETWORK®

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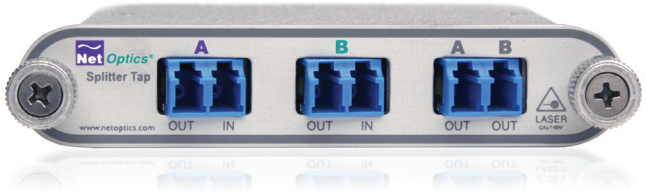
Sample Loss Budget Calculation for Router to Switch Path



1. **Calculate the Power Link Loss Budget**

   Power Link Loss Budget = Router transmit power – Switch receiver sensitivity
   = -9.5 dBm – (-17 dBm)
   = 7.5 dBm

2. **Calculate the Total Cable Attenuation**

   Total Cable Attenuation = (Sum of Connector Losses) + (Sum of Fiber Losses)
   = (Connector Loss) + (Fiber length * Fiber Loss)
   = (Connector Loss) + ((B+D) * Fiber Attenuation, 850nm, Multimode)
   = 2 dB + ((0.006 km + 0.006 km) * 3 dB/km)
   = 2 dB + 0.036 dB
   = 2.036 dB

3. **Calculate the Total Coupler Loss Allowed**

   Total Coupler Loss Allowed = Power Link Loss Budget – Total Cable Attenuation
   = 7.5 dBm – 2.036 dB
   = 5.464 dB

4. Split Ratios with Network Port Loss less than the Total Coupler Loss Allowed are viable. Any of the available Tap split ratios are viable because their Network Port Losses are all less than 5.464 dB. (However, the Router to Monitoring Device Path calculation must also be satisfied.)

Sample Loss Budget Calculation for Router to Monitoring Device Path

1. **Calculate the Power Link Loss Budget**

   Power Link Loss Budget = Router transmit power – Monitoring Device receiver sensitivity
   = -9.5 dBm – (-21 dBm)
   = 11.5 dBm

2. **Calculate the Total Cable Attenuation**

   Total Cable Attenuation = (Sum of Connector Losses) + (Sum of Fiber Losses)
   = (Connector Loss) + (Fiber length * Fiber Loss)
   = (Connector Loss) + (B+F * Fiber Attenuation, 850nm, Multimode)
   = 2 dB + (0.026 km * 3 dB/km)
   = 2 dB + 0.078 dB
   = 2.078 dB

3. **Calculate the Total Coupler Loss Allowed**

   Total Coupler Loss Allowed = Power Link Loss Budget – Total Cable Attenuation
   = 11.5 dBm – 2.078 dB
   = 9.422 dB

4. Split Ratios with Monitoring Device Port Loss less than the Total Coupler Loss Allowed are viable. Any of the available Tap split ratios except the 90/10 will work. The 90/10 split ratio will not work because its Monitoring Device Port Loss, 11.5 dB, is greater than the 9.422 dB available in the budget. (However, the Router to Switch Path calculation must also be satisfied.)