



## **1.0 Introduction**

This application note explains how to program the ZL30165 to generate common Telecom/Datacom frequencies.

## **2.0 Generating Common Frequencies**

The ZL30165 can generate any frequency in the 1 kHz to 750 MHz range. The high performance synthesizers embedded in the ZL30165 can generate frequencies in the range from 1 GHz to 1.5 GHz. This frequency is divided down to generate the required frequency using one of four output post dividers connected to corresponding synthesizer.

To derive the synthesizer frequency, the required output frequency is multiplied with an integer such that resulting value is in the 1 GHz to 1.5 GHz range. This integer is the value that needs to be programmed to post divider.

The required synthesizer frequency needs to be presented as:

$$\text{SynthFreq} = \text{Bs} * \text{Ks} * 16 * \text{Ms}/\text{Ns}$$

where Bs, Ks, Ms and Ns are 16 bit unsigned values mapped to corresponding 16 bit registers.

This application note provides Bs, Ks, Ms, Ns and post divider values for the most commonly used frequencies in Telecom/Datacom applications. This is presented in the table below.

Note that the GUI supplied by Microsemi can also be used to determine the correct values for Bs, Ks, Ms, Ns, and post dividers.

Interface	Data Rate Mbps	Bs	Ks	M	N	Post divider	Output Frequency MHz
<b>Ethernet</b>							
10GBASE-T	10000.00	25000	3125	1	1	2	625.00
10GBASE-T	10000.00	25000	3125	1	1	8	156.25
10GBASE-T	10000.00	25000	3125	1	1	10	125.00
10GBASE-R	10000.00*66/64	25000	3125	66	64	2	644.53125
10GBASE-R	10000.00*66/64	25000	3125	66	64	8	161.1328125
10GBASE-W	9953.28	40000	1944	1	1	2	622.08
10GBASE-W	9953.28	40000	1944	1	1	8	155.52
<b>OTN</b>							
OTU1=OC48*15/14	2488.32*15/14	40000	1944	15	14	2	666.51428...
OTU1=OC48*15/14	2488.32*15/14	40000	1944	15	14	8	166.62857...
OTU2=OC192*255/237	9953.28*255/237	40000	1944	255	237	2	669.32658...
OTU2=OC192*255/237	9953.28*255/237	40000	1944	255	237	8	167.33164...
OTU3=OC769*255/236	39813.12*255/236	40000	1944	255	236	2	672.16271...
OTU3=OC769*255/236	39813.12*255/236	40000	1944	255	236	8	168.04067...
OTU1e=10GBASE-R*255/238	10000*66/64*255/238	25000	3125	8415	7616	2	690.56919...
OTU1e=10GBASE-R*255/238	10000*66/64*255/238	25000	3125	8415	7616	8	172.642299...
OTU1f=10GFC with Line Coding *255/238	10200*66/64*255/238	12500	6375	8415	7616	2	704.38058...
OTU1f=10GFC with Line Coding *255/238	10200*66/64*255/238	12500	6375	8415	7616	8	176.09514...
OTU2e=10GBASE-R*255/237	10000*66/64*255/237	25000	3125	2805	2528	2	693.482990...
OTU2e=10GBASE-R*255/237	10000*66/64*255/237	25000	3125	2805	2528	8	173.37074...
OTU2f=10GFC with Line Coding * 255/237	10200*66/64*255/237	12500	6375	2805	2528	2	707.35265...
OTU2f=10GFC with Line Coding * 255/237	10200*66/64*255/237	12500	6375	2805	2528	8	176.83816...
OTU3e1=10GBASE-R*4*255/236*66/64	40000*255/236*66/64	25000	3125	8415	7552	2	696.42147...
OTU3e1=10GBASE-R*4*255/236	40000*255/236*66/64	25000	3125	8415	7552	8	174.10536...

Interface	Data Rate Mbps	Bs	Ks	M	N	Post divider	Output Frequency MHz
<b>OTN</b>							
OTU3e2=OC769 *243/217	39813.12*243/217	40000	1944	243	217	2	696.61493...
OTU3e2=OC769 *243/217	39813.12*243/217	40000	1944	243	217	8	174.15373...
<b>Infiniband</b>							
2.5G Infiniband	2500.00	25000	3125	1	1	10	125.00
5G Infiniband	5000.00	25000	3125	1	1	2	625.00
10G Infiniband	10000.00	25000	3125	1	1	2	625.00
<b>Fiber Channel</b>							
1GFC	850	25000	2550	1	1	24	42.50
1GFC with Line Coding=1GFC*10/8	1062.50	25000	2550	10	8	24	53.125
2GFC	1700.00	25000	2550	1	1	12	85.00
2GFC with Line Coding=2GFC*10/8	2125.00	25000	2550	10	8	12	106.250
4GFC	3400.00	25000	2550	1	1	6	170.00
4GFC with Line Coding=4GFC*10/8	4250.00	25000	2550	10	8	6	212.50
8GFC	6800.00	40000	2125	1	1	4	340.00
8GFC with Line Coding=8GFC*10/8	8500.00	25000	2550	10	8	3	425.00
10GFC	10200.00	12500	6375	1	1	2	637.50
10GFC	10200.00	12500	6375	1	1	8	159.375
10GFC with Line Coding=10GFC*66/64	10200.00*66/64	12500	6375	66	64	2	657.421875
10GFC with Line Coding=10GFC*66/64	10200.00*66/64	12500	6375	66	64	8	164.35546875
10GFC with Line Coding and FEC=10GFC*66/64*255/237	10200.00*66/64*255/237	12500	6375	2805	2528	2	707.35265...
10GFC with Line Coding and FEC=10GFC*66/64*255/237	10200.00*66/64*255/237	12500	6375	2805	2528	8	176.83816...



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