

LO Multipliers

~~2001~~ ~~42 mos~~ ~~42 mos~~ ~~42 mos~~ ~~42 mos~~

	<u>engr</u>	<u>mach+tech</u>	<u>M&amp;S</u>
2001	42 mos.	78 mos.	\$844K
2	42	114	785
3	42	198	667
4	42	186	556
5	42	198	522
6	42	48	40

75-115 X LO 30-70

⊙ 30 : 45-85

⊙ 70 : 5-45

# LO MULTIPLIERS FOR EVALUATION RECEIVER

7-22-99

RJB

MMA BAND : 223-263 GHz

CENTER 243 GHz

BW  $\pm 20$  GHz FOR 16.5%

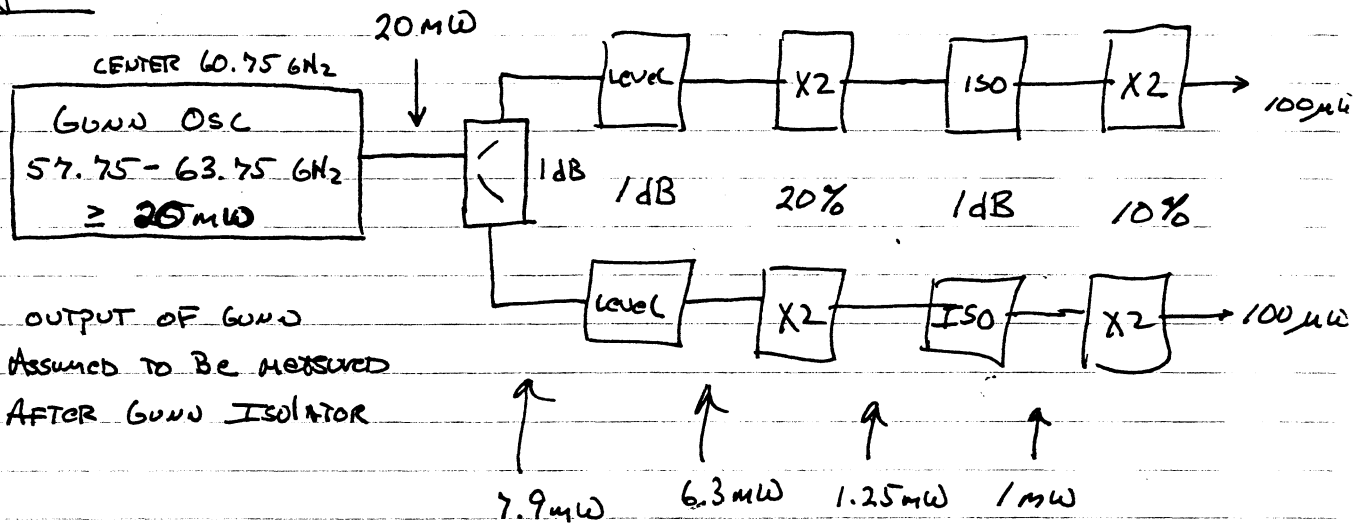
Mixer: 100  $\mu$ W ASSUMING 20 dB COUPLER

Approach #1: X2 X2

- + EXISTING DESIGNS REQUIRING MINOR MODIFICATIONS
- 10% BW

FOUR MULTIPLIERS PER RECEIVER (DUAL POLARIZATION)

## SYSTEM:



~~FIRST DOUBLER WILL BE USED FOR MMA BANDS~~

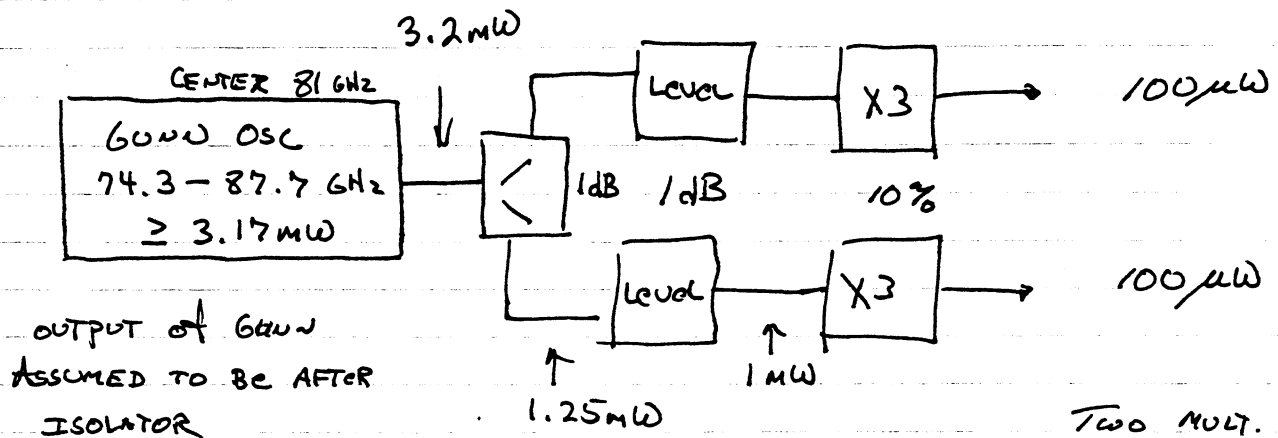
BOTH DOUBLERS ARE NOT USED BY MMA RECEIVERS  
 ISOLATOR WILL NOT BE USED BY MMA RECEIVERS

# LO MULTIPLIERS FOR EVALUATION RECEIVER (CONTINUED)

9-22-99

*[Signature]*

APPROACH #2: X3 FULL 16.5% BW



OUTPUT OF 60mW ASSUMED TO BE AFTER ISOLATOR

TWO MULT. REQUIRED PER RECEIVER (DUAL POLARIZATION)

THIS TRIPLER WILL BE USED AS PART OF MWA

- | Sep - RF design & sim complete
- | Jan 2000 - diodes ready - pricing item
- | Feb 2000 - initial test data
- | Apr 2000 - deliver to Tucson

--- p r e l i m i n a r y ---

MMA FREQUENCY CONVERSION PLAN  
1999-06-01 LRD

#	T	RF	1stLO	Driver	N	MidLO	LastLO	
1	U	31.3-45	28-33	A28-33	1	NA	8-14	*
	L	31.3-45	53.3-59	A26-30	2	26	8-14	alt LO scheme a
	L	36.0-44	32.0	A32	1	NA	8-14	alt LO scheme b
2	L	67-90	90-104	D90-104	1	26	8-14	
	DL	67-90	79-94	C79-94	1	NA	8-14	alt LO scheme a
3	U	89-116	75-94	C75-94	1	26	8-14	* HFET version f
3	2	89-116	101-104	D101-104	1	NA	8-14	* SIS version s
4	2	125-163	137-151	B68-76	2	NA	8-14	
5	2	163-211	175-191	D87-96	2	NA	8-14	
6	2	211-275	223-263	C74-87	3	NA	8-14	*
7	2	275-370	297-358	E99-120	3	NA	8-14	
8	2	385-500	397-488	E99-122	4	NA	8-14	
9	D	602-720	614-708	E102-118	6	NA	8-14	
A	D	797-950	799-938	E100-117	8	NA	8-14	

T: U=USB, L=LSB, 2=separated, D=DSB.

\*: incl in eval rcvr

IFs at 14-22 (for a few cases) and 4-12 GHz (all cases).  
Final output at 2-4 GHz. "Last LO" is really 8-10 or 12-14, depending on channel.

Drivers

	UsedOn	Range	Ratio	Source	Bradley plan 2/99
A	1	28-33	1.179	28.0-33.0 x1	not included
B	4	68-76	1.118	17.0-19.0 x4	65-85 1.308
C	2a,3f,6	74-94	1.270	18.5-23.5 x4	72-95 1.319
D	2,3s,5	87-104	1.195	21.7-26.0 x4	87-108 1.241
E	7,8,9,A	99-122	1.232	24.7-30.5 x4	100-120 1.200

↓  
LP

17.0-33.0 total  
17.0-30.0 with 1a  
17.0-32.0 with 1b

GET TO 115 GHz wide  
BAND

Since driver B is used only for band 4, we should include the final doubler in the driver and lock at the final frequency, 137-151 GHz.

If 2a and 3f are chosen, then driver D is needed only for band 5, so its doubler should also be made part of the driver and we should lock at the final frequency, 175-191. Then bands 1-5 will all be locked to the reference at their final LO frequencies.

10304.491  
76