

IIP Radiometer Front End - Version 1
 S.W. Ellingson, ElectroScience Laboratory, The Ohio State University
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Stage	Function	G (dB)	F (dB)	IIP3 (dBm)	Model	Vendor	Cost
1	Antenna	0.0	0.5	100.0			
2	Cal. Switch	-0.5	0.5	200.0			
3	Bandpass Filter	-0.5	0.5	13.0	4B120-150(K&L		0.00
4	Isolator	-0.5	0.5	13.0	9A83	Alcatel Fer	225.00
5	LNA	34.0	0.8	-14.0	AFS3-0100	Miteq	1,150.00
	Cable	-1.0	1.0	200.0			
6	Pad (improve match)	-3.0	3.0	100.0	BW-S3W2	Mini-Circuit	29.95
7	Image Reject Filter	-1.0	1.0	13.0	307-1522.5	TTE	417.00
8	RF Amp	19.0	3.8	3.0	ZJL-3G	Mini-Circuit	114.95
9	Pad (improve match)	-6.0	6.0	100.0	BW-S6W2	Mini-Circuit	29.95
10	Mixer	-7.0	7.0	11.0	ZFM-11	Mini-Circuit	89.95
11	Pad (improve match)	-6.0	6.0	100.0	SAT-6	Mini-Circuit	20.95
12	LO Reject Filter	-1.0	1.0	13.0	SLP-450	Mini-Circuit	34.95
13	GaAs SPST Switch	-1.3	1.3	29.0	ZFSWHA-1	Mini-Circuit	74.95
14	Digital Step Attenuator	-4.0	4.0	10.0	ZFAT-4816	Mini-Circuit	89.95
15	IF Amp	19.0	3.8	11.0	ZFL-500HL	Mini-Circuit	99.95
16	Antialiasing Filter	-1.0	1.0	13.0			
17	IF Amp	19.0	3.8	11.0	ZFL-500HL	Mini-Circuit	99.95
	Matched load (ambient)						
	Temp sensor (ambient)						
	Matched load (heated)						
	Temp sensor (heated)						
	Heater						
	LO Synthesizer				NS2-	Nova Engir	699.00
	LO Filter						
TOTAL							3,176.50

GNI Analysis for Minimum Attenuation Setting

Stage	Function	Stage			Cascade		
		G (dB)	F (dB)	IIP3 (dBm)	G (dB)	F (dB)	IIP3 (dBm)
1	Antenna	0.0	0.5	100.0	0.0	0.5	100.0
2	Cal. Switch	-0.5	0.5	200.0	-0.5	0.9	100.0
3	Bandpass Filter	-0.5	0.5	13.0	-1.0	1.4	13.5
4	Isolator	-0.5	0.5	13.0	-1.5	1.9	10.7
5	LNA	34.0	0.8	-14.0	32.5	2.6	-12.5
	Cable	-1.0	1.0	200.0	31.5	2.6	-12.5
6	Pad (improve match)	-3.0	3.0	100.0	28.5	2.6	-12.5
7	Image Reject Filter	-1.0	1.0	13.0	27.5	2.6	-17.3
8	RF Amp	19.0	3.8	3.0	46.5	2.6	-25.3
9	Pad (improve match)	-6.0	6.0	100.0	40.5	2.6	-25.3
10	Mixer	-7.0	7.0	11.0	33.5	2.6	-30.9
11	Pad (improve match)	-6.0	6.0	100.0	27.5	2.6	-30.9
12	LO Reject Filter	-1.0	1.0	13.0	26.5	2.6	-31.0
13	GaAs SPST Switch	-1.3	1.3	29.0	25.2	2.6	-31.0
14	Digital Step Attenuator	-4.0	4.0	10.0	21.2	2.6	-31.1
15	IF Amp	19.0	3.8	11.0	40.2	2.7	-31.1
16	Antialiasing Filter	-1.0	1.0	13.0	39.2	2.7	-32.6

17 IF Amp	19.0	3.8	11.0	58.2	2.7	-34.0
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Est. Receiver Temp. 244.3 degK assuming min. atten.
 Est. 1dB Comp. (input) -49.0 dBm assuming 15 dB down from IIP3, min atten.
 Output at 1dB Comp.: 9.2 dBm assuming min. atten.
 kTB at input yields: -38.8 dBm at output, assuming B=50 MHz, min. atten.

GNI Analysis for "Optimum" Attenuation Setting

Stage	Function	Stage			Cascade		
		G (dB)	F(dB)	IIP3 (dBm)	G (dB)	F (dB)	IIP3 (dBm)
1	Antenna	0.0	0.5	100.0	0.0	0.5	100.0
2	Cal. Switch	-0.5	0.5	200.0	-0.5	0.9	100.0
3	Bandpass Filter	-0.5	0.5	13.0	-1.0	1.4	13.5
4	Isolator	-0.5	0.5	13.0	-1.5	1.9	10.7
5	LNA	34.0	0.8	-14.0	32.5	2.6	-12.5
	Cable	-1.0	1.0	200.0	31.5	2.6	-12.5
6	Pad (improve match)	-3.0	3.0	100.0	28.5	2.6	-12.5
7	Image Reject Filter	-1.0	1.0	13.0	27.5	2.6	-17.3
8	RF Amp	19.0	3.8	3.0	46.5	2.6	-25.3
9	Pad (improve match)	-6.0	6.0	100.0	40.5	2.6	-25.3
10	Mixer	-7.0	7.0	11.0	33.5	2.6	-30.9
11	Pad (improve match)	-6.0	6.0	100.0	27.5	2.6	-30.9
12	LO Reject Filter	-1.0	1.0	13.0	26.5	2.6	-31.0
13	GaAs SPST Switch	-1.3	1.3	29.0	25.2	2.6	-31.0
14	Digital Step Attenuator	-16.0	16.0	10.0	9.2	2.9	-31.1
15	IF Amp	19.0	3.8	11.0	28.2	3.2	-31.1
16	Antialiasing Filter	-1.0	1.0	13.0	27.2	3.2	-31.2
17	IF Amp	19.0	3.8	11.0	46.2	3.3	-31.3

Est. Receiver Temp. 323.5 degK assuming opt. atten.
 Est. 1dB Comp. (input) -46.3 dBm assuming 15 dB down from IIP3, opt. atten.
 Output at 1dB Comp.: -0.1 dBm assuming opt. atten.
 kTB at input yields: -50.8 dBm at output, assuming B=50 MHz, opt. atten.

Tuning Analysis for 125-175 MHz IF

	LO (MHz)	RF (MHz)	IF (MHz)	Image (MHz)	
		1438.0	175.0	1088.0	
1263		1413.0	150.0	1113.0	
		1388.0	125.0	1138.0	Image Rej. Filter is -40 dB @ 1145
		1427.0	175.0	1077.0	Top end of ITU-protected band
1252		1402.0	150.0	1102.0	
		1377.0	125.0	1127.0	
		1377.0	175.0	1027.0	
1202		1352.0	150.0	1052.0	
		1327.0	125.0	1077.0	
		1327.0	175.0	977.0	Image getting close to 900 MHz LM
1152		1302.0	150.0	1002.0	
		1277.0	125.0	1027.0	RF getting close to BPF edge

<i>Fl (MHz)</i>	<i>Fh (MHz)</i>	<i>V (V)</i>	<i>I (mA)</i>	<i>Comments</i>
1200	1800			On-hand
1350	1850			18dB rev. iso., 1.3:1 VSWR
1000	2000	15	125	Connects antenna unit and downconverter
0	18000			VSWR 1.2:1
1345	1700			-40dB@1145, -30dB@1850
20	3000	12	45	
0	18000			VSWR 1.2:1
1	2000			Level 7, IF=(5,600)MHz
0	1500			VSWR 1.3:1
0	400			-40dB@(750,1800)MHz
0	2500			-8V ctrl., 10 ns to switch
10	1000	5	12	(4,28)dB via 3b-TTL
10	500	15	110	
110	190			
10	500	15	110	On-hand
				On-hand
1000	1500			
1100	1300			

<i>Stage</i>	<i>Cascade</i>					
<i>G</i>	<i>F</i>	<i>IIP3 (mW)</i>	<i>G</i>	<i>F</i>	<i>IIP3 (mW)</i>	
1	1.122018	1E+10	1	1.122018	10000000000	
0.891251	1.122018	1E+20	0.891251	1.244037	9999999999	
0.891251	1.122018	19.95262	0.794328	1.380944	22.38721134	
0.891251	1.122018	19.95262	0.707946	1.534556	11.83725063	
2511.886	1.202264	0.039811	1778.279	1.820262	0.055968249	
0.794328	1.258925	1E+20	1412.538	1.820408	0.055968249	
0.501187	1.995262	1E+10	707.9458	1.821112	0.055968249	
0.794328	1.258925	19.95262	562.3413	1.821478	0.01874463	
79.43282	2.398833	1.995262	44668.36	1.823966	0.00298341	
0.251189	3.981072	1E+10	11220.18	1.824032	0.00298341	
0.199526	5.011872	12.58925	2238.721	1.82439	0.000815369	
0.251189	3.981072	1E+10	562.3413	1.825721	0.000815369	
0.794328	1.258925	19.95262	446.6836	1.826182	0.000797053	
0.74131	1.348963	794.3282	331.1311	1.826963	0.000796696	
0.398107	2.511886	10	131.8257	1.831529	0.000776218	
79.43282	2.398833	12.58925	10471.29	1.84214	0.00076996	
0.794328	1.258925	19.95262	8317.638	1.842165	0.000548373	

79.43282 2.398833 12.58925 660693.4 1.842333 0.000402533

Stage			Cascade		
G	F	IIP3 (mW)	G	F	IIP3 (mW)
1	1.122018	1E+10	1	1.122018	10000000000
0.891251	1.122018	1E+20	0.891251	1.244037	9999999999
0.891251	1.122018	19.95262	0.794328	1.380944	22.38721134
0.891251	1.122018	19.95262	0.707946	1.534556	11.83725063
2511.886	1.202264	0.039811	1778.279	1.820262	0.055968249
0.794328	1.258925	1E+20	1412.538	1.820408	0.055968249
0.501187	1.995262	1E+10	707.9458	1.821112	0.055968249
0.794328	1.258925	19.95262	562.3413	1.821478	0.01874463
79.43282	2.398833	1.995262	44668.36	1.823966	0.00298341
0.251189	3.981072	1E+10	11220.18	1.824032	0.00298341
0.199526	5.011872	12.58925	2238.721	1.82439	0.000815369
0.251189	3.981072	1E+10	562.3413	1.825721	0.000815369
0.794328	1.258925	19.95262	446.6836	1.826182	0.000797053
0.74131	1.348963	794.3282	331.1311	1.826963	0.000796696
0.025119	39.81072	10	8.317638	1.94417	0.000776218
79.43282	2.398833	12.58925	660.6934	2.112346	0.000775821
0.794328	1.258925	19.95262	524.8075	2.112738	0.000756389
79.43282	2.398833	12.58925	41686.94	2.115404	0.000733268

<-- Not recommended

i MHz

Recommended H-I band coverage

Recommended for continuous coverage

MR band

Extended tuning range possible