6-9-99

CDL SIS Group — Job List

ARK – 9 June 99

SIS mixer development

LO & sideband sources

First IF

Test equipment

Vacuum Windows

Fourier Transform Spectrometer

SIS mixer testing

Microfabrication

Miscellaneous

DEADLINES:

- **MMA test receiver support**
- **12-m telescope support**
- **SIS mixer sales**

* = under way	+ = completed	# = another group responsible

SIS mixer development:

211-275 GHz

* BM371 balanced mixer development (UVA): -- ARK/SKP

* SIS374 building block mixer (SUNY): -- ARK

BSSM371 balanced sideband-separating mixer: -- ARK

602-720 GHz

* SIS141 building block mixer: -- SKP

BM141 balanced mixer: -- SKP

BSSM141(???) balanced sideband-separating mixer: -- SKP

Mixer design software:

Evaluate SuperMix; compare with our present software -- SKP

Nb test circuits:

* New I/R Labs Dewar instrumentation -- SKP/KC/NT1
* 75-110 GHz -- ARK
* 211-275 GHz -- SUNY

602-720 GHz -- SKP

*Design of w/g quad hybrid for use in balanced & s/b separating mixers: -- ARK

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LO & sideband sources:

+ 211-275 GHz LO
211-275 GHz Sideband source (harmonic generator + lookup tables)
Alternative -- clone LO source plates

602-720 GHz LO -- GE
602-720 GHz Sideband source -- GE

LO optics as needed -- GE
Horn
Lens
IR filter

Vacuum windows -- see below

Signal path optics:

211-275 GHz
? Feed horn
? Lens
+ IR filter

602-720 GHz
Feed horn – GE/SS
Lens -- GE/SS
IR filter -- GE

Vacuum windows -- see below

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First IF:

4-12 GHz IF schemes for SIS mixers:
- Discrete component preamps -- GL/MP
- MMIC preamps -- GL/SW
- * Investigate current-amplifiers (GG input stage) -- ARK/SW/GL

Alternate IF bands:
- Verify that 4-12 GHz is near optimum -- GL

IF preamp measurements: -- GL/NT2

*SIS bias circuit design for MMA: -- ARK

Mixer/preamp integration: -- GL/NT2
- Bias circuit -- ARK
- Thermal design
- Mixer block modifications

Choice of cryogenic connectors: -- GE/DK

+Cryogenic IF switch development/evaluation: -- ARK/NH/JE

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Test equipment

Second 4K mixer test station: -- KC/NT1

Instrumentation for automated mixer measurements:

All bands:

* Computer control, interface, & data collection -- JE/KC/NT1/SM

Motorize all tuners -- Gunns, (multipliers), LO attenuators -- JE/KC/NT1

4-12 GHz IF -- SKP/GL

4K plate -- SKP/GL

\+ Switch (Radiall) -- prototype tests complete

\+ Order 3 more switches

* Heatsink magnet plates -- KC

Balanced amplifier (from parts) -- GL

Evaluate Miteq amp. at 4K -- GL

Coupler -- GL

Pads -- GL

* Room temp. plate -- SKP/JE/KC/SM

Control box & sq-law detector -- SKP/JE/KC/SM

RF Hot/Cold loads & switch/chopper -- SKP/JE/KC/SM

* = under way + = completed # = another group responsible

Vacuum windows

12-m telescope support:

Vacuum windows -- DK

80-115 GHz	4 by 8/1/99 for new 4-beam Rx.
68-90 GHz	2 by 7/1/99
90-116 GHz	2 by 7/1/99
130-180 GHz	2 by 7/1/99
200-265 GHz	4 by 10/1/99
260-300 GHz	4 by 11/1/99

Xtal quartz vacuum windows:

* 5-layer design -- ARK/DK

Assembly techniques-- DK

Window & material measurements:

Measurements of windows, IR filters, and absorbers -- GE/DK

W/G vacuum window improvements: -- ??

*Install RA7957 plugs in all outgoing mixers: -- NH

Fourier transform spectrometer -- GE

Determine lowest frequency needed (110 GHz?, 90 GHz?, 68 GHz?)

* Study commercial FTS' s

Decide whether to buy or build

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SIS mixer testing -- SKP/KC/DK/JE

211-275 GHz

* BM371 balanced mixer development (UVA)
SIS374 building block mixer (SUNY)
BSSM371 balanced sideband-separating mixer

602-720 GHz

* SIS141 600-720 GHz building block mixer
BM141 600-720 GHz balanced mixer
BSSM141(???) 600-720 GHz balanced sideband-separating mixer

Non-MMA

SIS1221 68-90 GHz
Type-D 90-116 GHz
SIS581 130-170 GHz
SIS373 200-270 GHz

Microfabrication -- NH/FJ

Mixer fabrication techniques:

? Wafer thinning by surface grinder
* Wafer thinning by etching -- AWL(UVA)
* Machining by shaping with form tools -- ARK/AM
* Explore re-entrant dicing of quartz wafers
* Dicing saw acquisition
Used μ-Automation dicing saws (& repairs)

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DEADLINES

MMA test receiver support: (ref. discussion with GGM, 7 June 99)

+	90-115 GHz Type-D SIS mixers	2 by 6-99 -- SKP/DK
#	B/S drives	2 by 6-99 -- Tuc
+	Backshorts	2 by 6-99 -- OK -- have plenty
#	210-270 GHz SIS373 or -4 mixers	3 by 9-99 -- HIA: CDL design
#	90-115 GHz LO couplers	2 by 6-99 -- Tuc: CDL design, to be made in Socorro.
	210-270 GHz LO couplers	2 by 9-99 -- ARK
	90-115 GHz Windows	4 by 9-99 -- DK hemts 80-110
	210-270 GHz Windows	3 by 11-99 -- DK
+	4-6 GHz HFET Amplifiers	6 by 6-99
#	Bias Tees, 4-6 GHz (6 wire)	6 by 6-99 -- Tuc: CDL design
#	36-40 GHz HFET Amplifiers	5 by 7-99 -- in discussion with JW
#	80-115 GHz HFET Amplifiers	3 by 8-99 -- MP

12-m telescope support

Vacuum windows -- DK

80-115 GHz	4 by 8/1/99 for new 4-beam Rx.
68-90 GHz	2 by 7/1/99
90-116 GHz	2 by 7/1/99
130-180 GHz	2 by 7/1/99
200-265 GHz	4 by 10/1/99
260-300 GHz	4 by 11/1/99

SIS mixer sales

SIS-581, LO coupler, 5-GHz bias-T for SMT -- Order expected 5/99 -- all in stock.

Peter Timbie may want two 150 GHz two-tuner mixers (for SSB operation), IF amps (??) and bias-T's (??). He could do the testing.