13-Feb-92

GBT RECEIVER PLAN

RX NR.	BAND	FEED GHz LOW	FEED GHz HIGH	TYPE	BW RATIO	WG DIA Inches	Flo/Fco	Fco GHz	Fhom GHz	RECEIVER GHz LOW	RECEIVER GHz HIGH	BW RATIO	POLARIZATION	Tr Proj. Kelvin	VLBA	Prio.
1	L	1.15	1.73	Profile	1.50	6.628	1.10	1.04	1.73	1.15	1.73	1.50	Dual Linear	5	*	1
2		1.73	2.60	Profile	1.50	4.406	1.10	1.57	2.61	1.73	2.60	1.50	Dual Linear	5	*	10
3	S	2.60	3.95	Profile	1.52	2.900 32	1.09	2.39	3.96	2.60	3.95	1.52	Dual Linear	6		9
4		3.95	5.85	Lin.Taper	1.48	1.930	1.10	3.58	5.95	3.95	5.85	1.48	Dual Linear	7	*	5
5	C	5.85	8.20		1.40	1.303	1.10	5.31	8.81	5.85	8.20	1.40	Dual Linear	8		8
6	X	8.00	12.40	Lin.Taper	1.55	0.961	1.11	7.20	11.95	8.00	10.00	1.25	Dual Circular	10	*	6
7						0.769	1.11	9.00	14.93	10.00	12.40	1.24	Dual Circular	11		6
8	Ku	12.00	18.00	Lin.Taper	1.50	0.620	1.08	11.16	18.52	12.00	15.40	1.28	Dual Circular	12	*	3
9						0.499	1.11	13.86	23.00	15.40	18.00	1.17	Dual Circular	13		3
10	K	18.00	26.50	Lin.Taper	1.47	0.427	1.11	16.20	26.88	18.00	22.00	1.22	Dual Circular	15		2
11						0.349	1.11	19.80	32.86	22.00	26.50	1.20	Dual Circular	20	*	2
12	Ka	26.50	40.00	Lin.Taper	1.51	0.290	1.11	23.84	39.58	26.50	33.00	1.25	Dual Circular	25		7
13						0.233	1.11	29.69	49.28	33.00	40.00	1.21	Dual Circular	27		7
14	Q	40.00	52.00	Lin.Taper	1.30	0.192	1.11	35.99	59.74	40.00	45.50	1.14	Dual Circular	30	*	4
15						0.169	1.11	40.94	67.95	45.50	52.00	1.14	Dual Circular	35		4

3/26/92

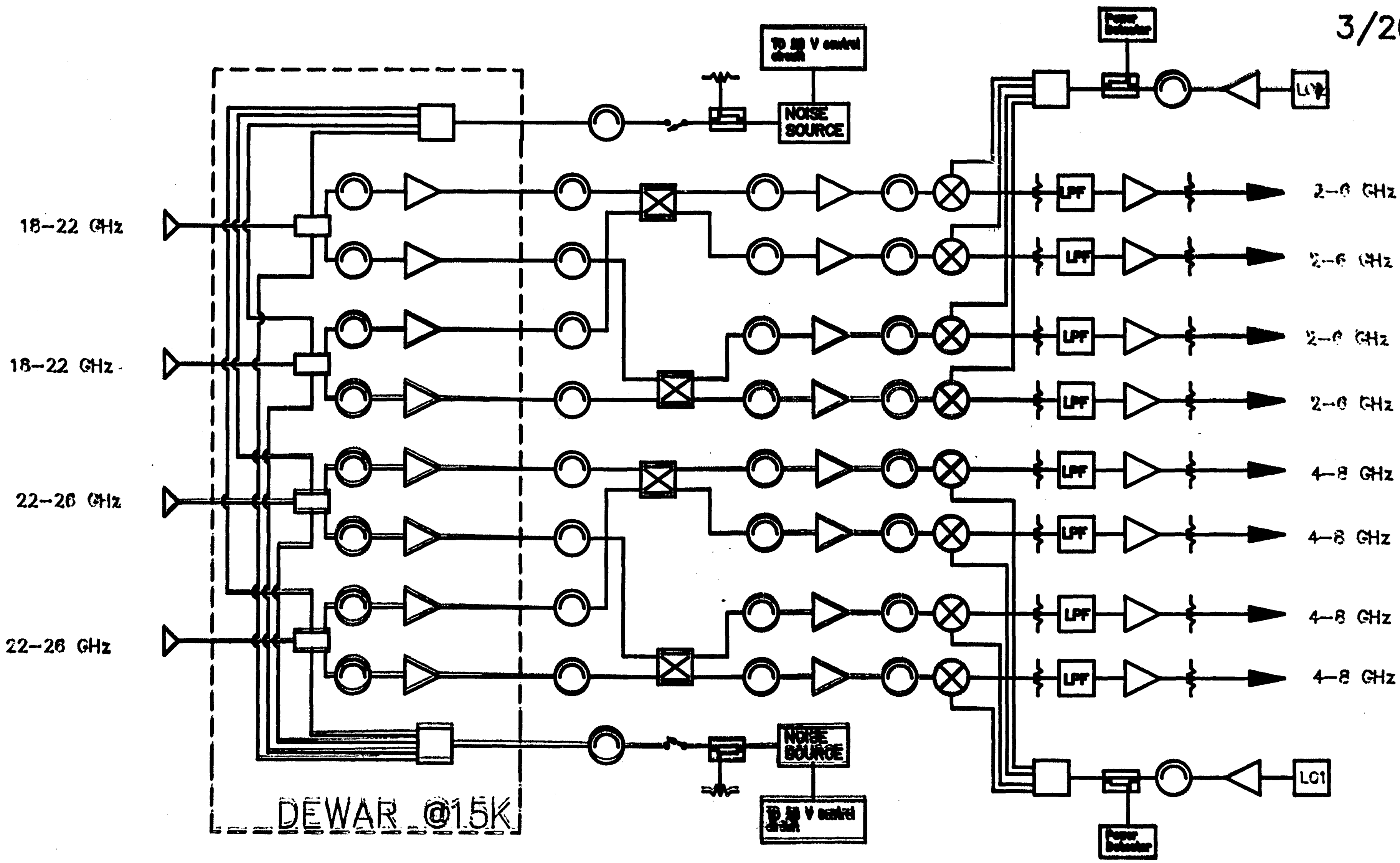

18–22 GHz
18–22 GHz
22–26 GHz
22–26 GHz
DEWAR @15K
NOISE SOURCE
NOISE SOURCE
LPF
LO1
2–6 GHz
2–6 GHz
2–6 GHz
2–6 GHz
4–8 GHz
4–8 GHz
4–8 GHz
4–8 GHz

Table 3.2-2

GBT PRIME FOCUS RECEIVER
PLAN A

Rx No.	Freq. Range (MHz)	B.W. Ratio	Feed Type	Polarization	Polarizer
PF-1	290- 395	1.36	Coaxial Fed Cavity-Backed Dipoles or Backfire Antenna	Dual Linear	Crossed Dipoles
PF-2	385- 520	1.35	Coaxial Fed Cavity-Backed Dipoles or Backfire Antenna	Dual Linear	Crossed Dipoles
PF-3	510- 690	1.35	Waveguide Fed Corrugated Horn	Dual Linear	Crossed Tunable W/G Probe
PF-4	680- 920	1.35	Waveguide Fed Corrugated Horn	Dual Linear	Crossed Tunable W/G Probe
PF-5	910-1230	1.35	Waveguide Fed Corrugated Horn	Dual Linear	Crossed Tunable W/G Probe

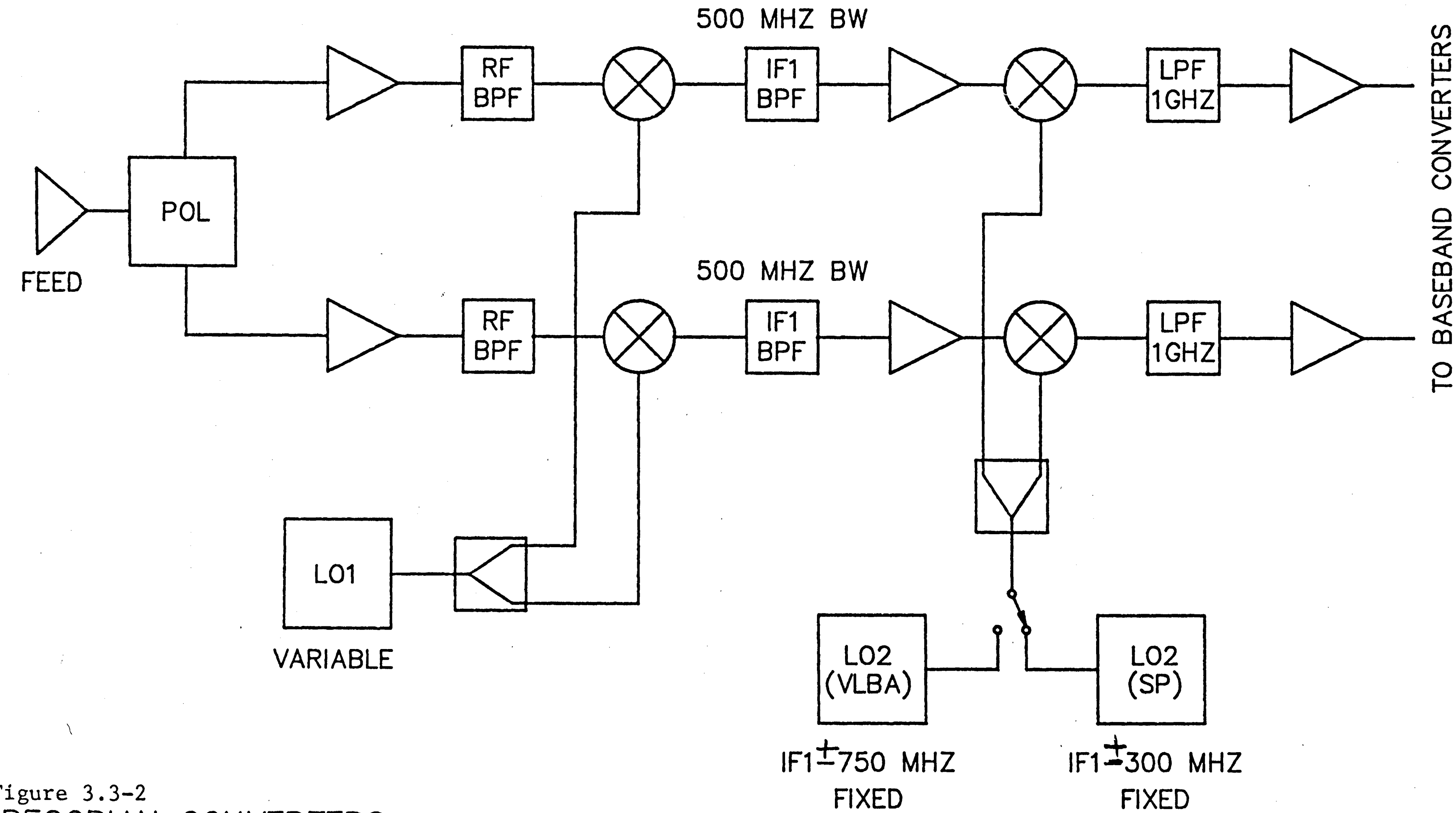
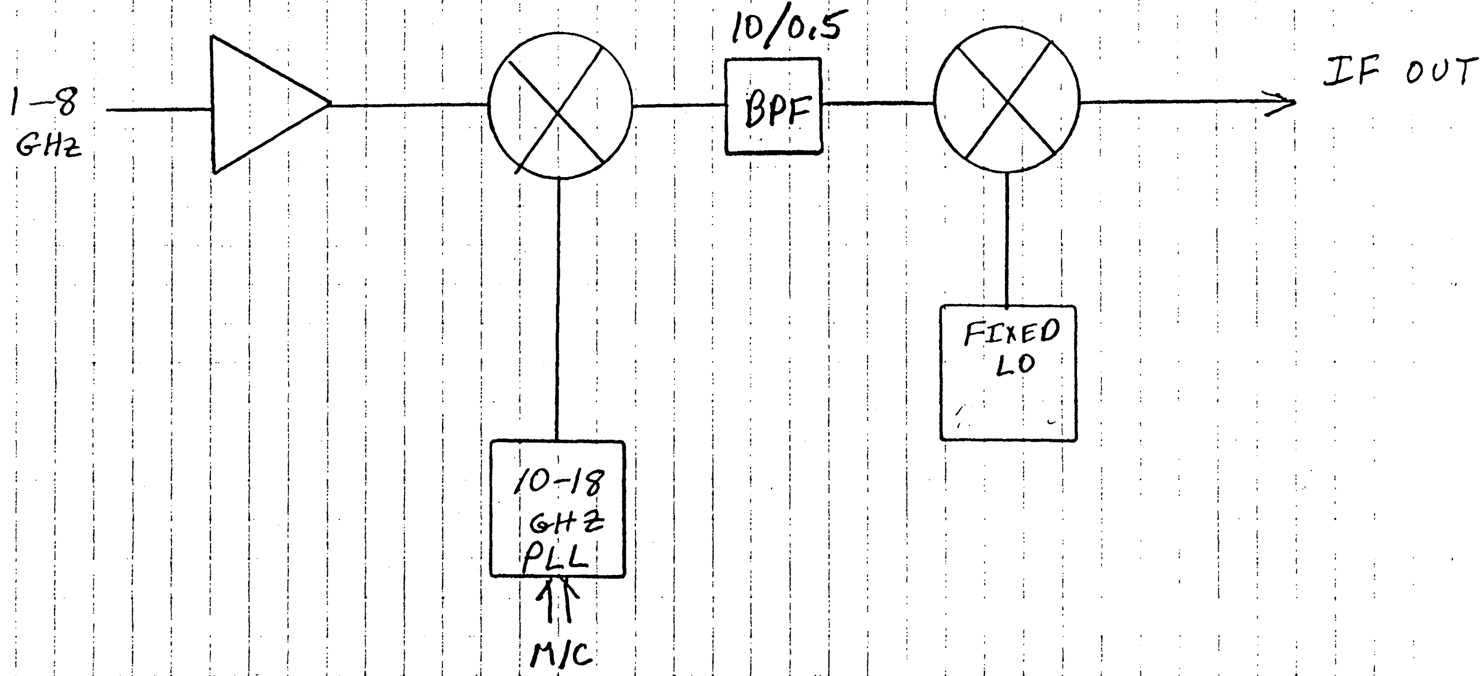


Figure 3.3-2
GREGORIAN CONVERTERS
SIMPLIFIED BLOCK DIAGRAM

FILE: CONV2.DWG

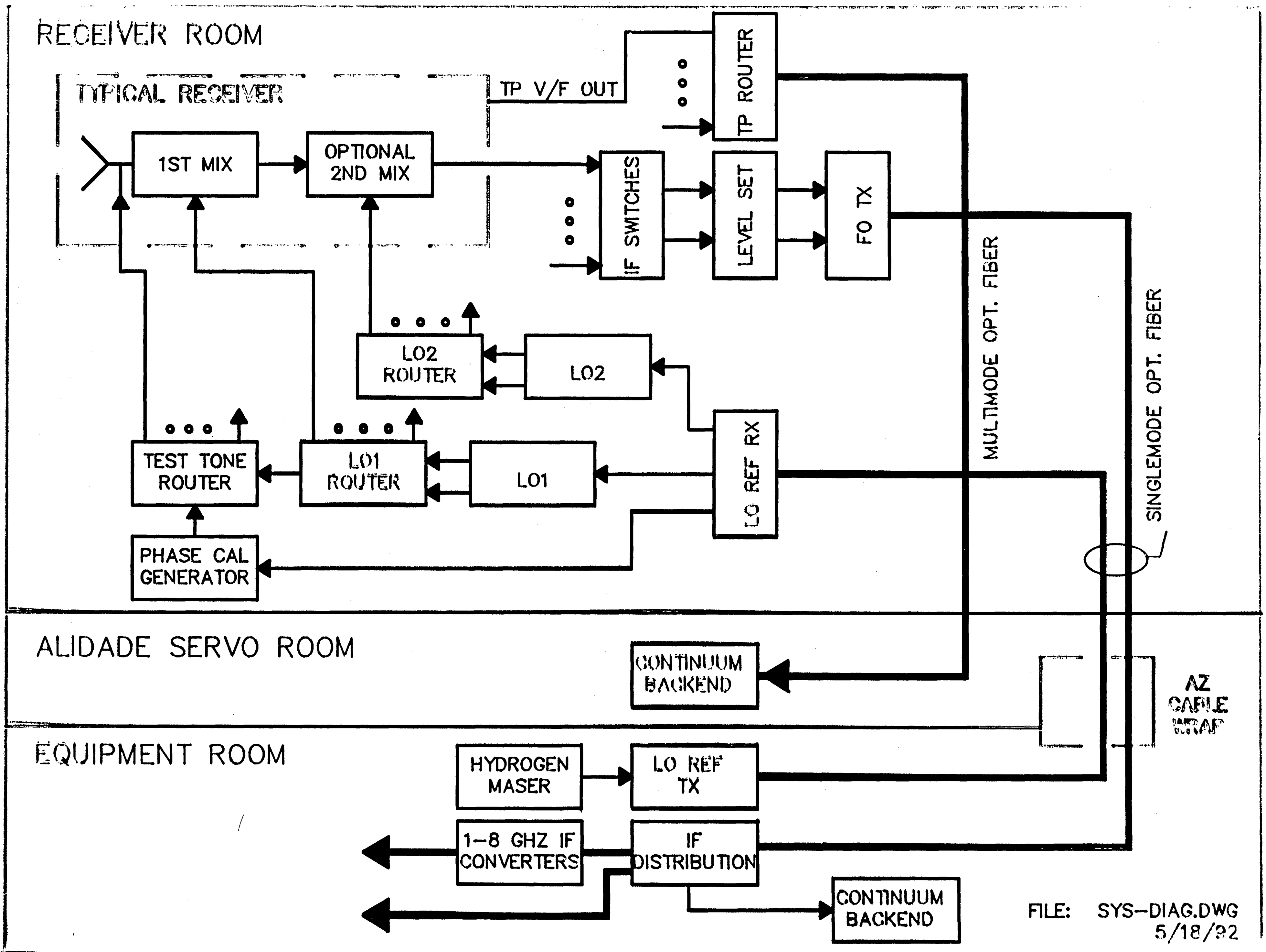

1-8
GHz
10/0.5
BPF
IF OUT
FIXED
LO
10-18
GHZ
PLL
M/C

May 4, 1992
F.J. Lockman

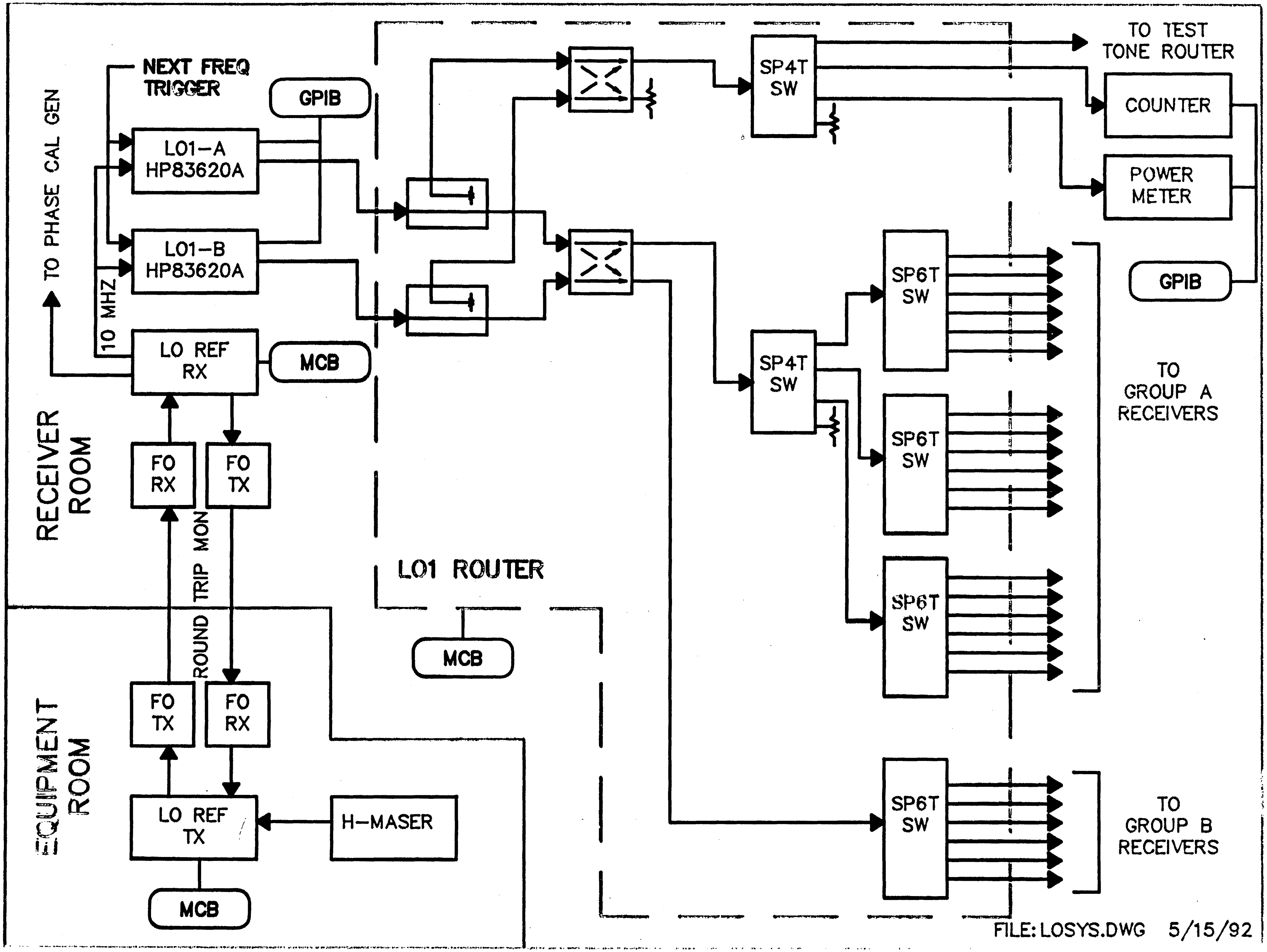
GBT GREGORIAN RECEIVERS

Receiver	Freq.	BW	Wide IF	Tertiary	Dual Feed	Rank		Notes
1	1.15-1.73	0.58	No	No	No	1	/	HI, OH, VLBA
2	1.73-2.60	0.87	No	No	No	4	10	VLBA
3	2.60-3.95	1.35	No	No	No	3	9	CH
4	3.95-5.85	1.9	No	No	No	2	5	VLBA, H2CO
5	5.85-8.20	2.35	No	No	No	3	8	Methanol maser
6	8.00-10.0	2.0	No	No	No	2	6	VLBA, 3He
7	10.0-12.4	2.4	No	No	No	3	6	Methanol maser
8	12.0-15.4	3.4	?	?	Yes	1	3	Evaluate tel., VLBA, SO, Methanol maser
9	15.4-18.0	4.6	No	?	No	4	3	
10	18.0-22.0	4.0	Yes	Yes	Yes	2	2	Lots of molecules.
11	22.0-26.5	4.5	Yes	Yes	Yes	1	2	H2O, VLBA, NH3
12	26.5-33.0	6.5	Yes	Yes	Yes	3	7	H2CO
13	33.0-40.0	7.0	Yes	Yes	Yes	3	7	Molecules
14	40.0-45.5	5.5	Yes	Yes	Yes	1	4	SiO maser for pointing, VLBA.
15	45.5-52.0	6.5	Yes	Yes	Yes	2	4	C3H2 at 52 GHz is important.

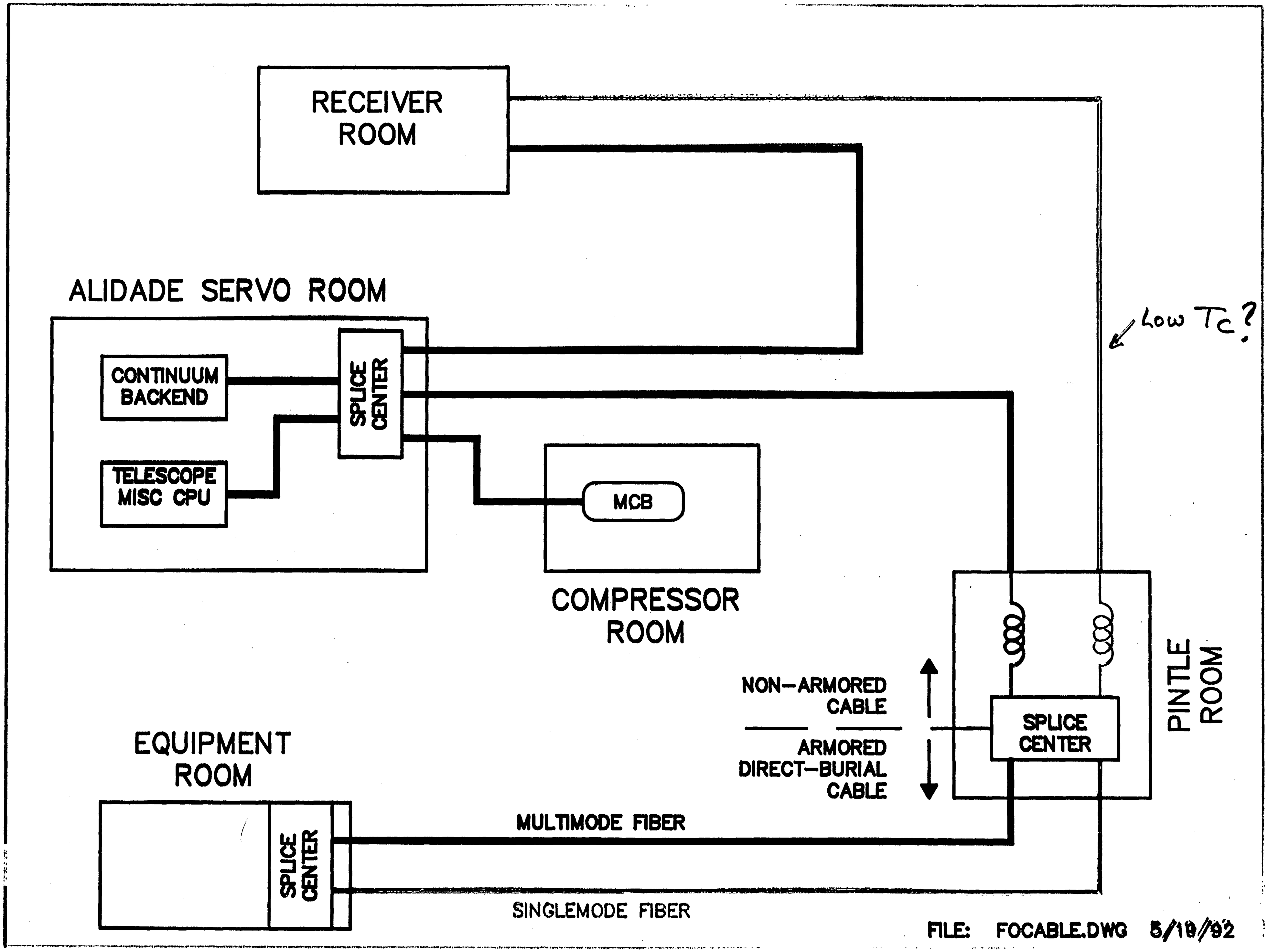
Note: Dual feed capability is used primarily for mapping extended line sources.



FILE: SYS-DIAG.DWG
5/18/92



TO TEST TONE ROUTER
NEXT FREQ TRIGGER
GPIB
SP4T SW
COUNTER
TO PHASE CAL GEN
L01-A HP83620A
POWER METER
L01-B HP83620A
SP6T SW
GPIB
10 MHZ
LO REF RX
MCB
SP4T SW
TO GROUP A RECEIVERS
RECEIVER ROOM
FO RX
FO TX
SP6T SW
ROUND TRIP MON
L01 ROUTER
SP6T SW
MCB
EQUIPMENT ROOM
FO TX
FO RX
SP6T SW
LO REF TX
H-MASER
TO GROUP B RECEIVERS
MCB
FILE: LOSYS.DWG 5/15/92



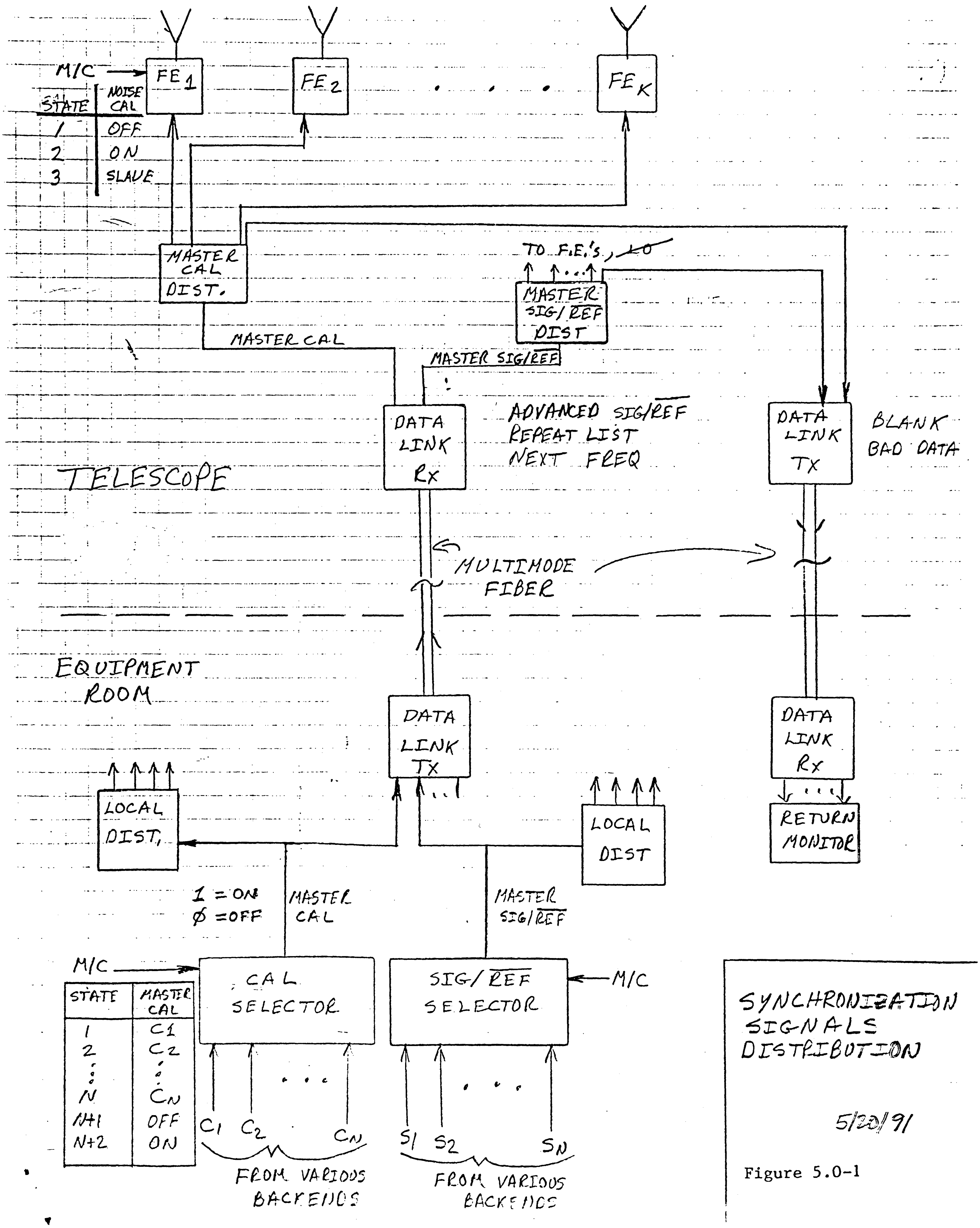
FILE: FOCABLE.DWG 5/19/92

SYNCHRONIZATION SIGNALS

Those logical signals used to synchronize events, and which must be distributed faster than can be done via ethernet.

MASTER CAL	One bit used to control noise source in front-end. Produced by one (master) backend or by master timing generator. Also distributed to other (slave) backends that are also observing. Delay in distribution < 10 usec; known to < 10 nsec.
MASTER SIG/REF	One bit used to control beam, load, or polarization switching in front-end and/or optics mechanisms. Produced by one (master) backend or by master timing generator. Also distributed to other (slave) backends that are also observing. Delay in distribution ??
NEXT FREQ	Pulse used to trigger LO1 to step to next frequency in predefined list. Produced by one (master) backend, by master timing generator, or derived locally from MASTER SIG/REF. [Implementation TBD]
REPEAT LIST	Pulse signaling that LO1 should be at first item in list. Produced by master backend. Sent to Telescope Miscellaneous CPU which uses it to check that LO1 is properly synchronized with backend switching.
ADVANCED SIG/REF	One bit, advanced in time relative to MASTER SIG/REF, used to control switching in optics mechanisms with large inertia. Produced by one (master) backend or by master timing generator. [Used on 140-ft nutating subreflector; may or may not be useful on GBT.]

BLANK	Signal produced by telescope equipment signaling backends incoming data should be blanked. Associated with transitions due to some switching action. Sources TBD; number of bits TBD.
BAD DATA	Signal produced by telescope equipment indicating incoming data is corrupted. Sources TBD; possibilities are servo or pointing systems, or interference detectors.



M/C
FE 1
FE 2
FE K
STATE
NOISE CAL
1 OFF
2 ON
3 SLAVE
MASTER CAL DIST.
TO F.E.'s, LO
MASTER SIG/REF DIST
MASTER CAL
MASTER SIG/REF
DATA LINK Rx
ADVANCED SIG/REF
REPEAT LIST
NEXT FREQ
DATA LINK TX
BLANK BAD DATA
TELESCOPE
MULTIMODE FIBER
EQUIPMENT ROOM
DATA LINK TX
DATA LINK Rx
LOCAL DIST,
LOCAL DIST
RETURN MONITOR
1 = ON
ϕ = OFF
MASTER CAL
MASTER SIG/REF
M/C
CAL SELECTOR
SIG/REF SELECTOR
M/C
STATE
MASTER CAL
1 C1
2 C2
N CN
N+1 OFF
N+2 ON
C1 C2 CN
FROM VARIOUS BACKENDS
S1 S2 SN
FROM VARIOUS BACKENDS
SYNCHRONIZATION SIGNALS DISTRIBUTION
5/20/91

Figure 5.0-1