

**MASSACHUSETTS INSTITUTE OF TECHNOLOGY****HAYSTACK OBSERVATORY**

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To: UVLBI Group

From: Shep Doleman

Subject: UVLBI Equipment needs

Prior to the UVLBI telecon of 20 Oct 2004, information on VLBI equipment needs, and front end capabilities was sent to all participants. After clarifications made during the telecon, the information was revised and is contained in this memo.

**IF Bandwidth Requirements for 1, 2, 4 Gb/s Recording**

	BW (MHz) 1 Gb/s	BW (MHz) 2 Gb/s	BW (MHz) 4 Gb/s
Single Pol	256	512	1024
Dual Pol	128	256	512

Note: Assumes Nyquist sampling, 2-bits per sample.

**Station Frequency Ranges and Bandwidths**

Station	L-Band GHz	L-BW MHz	C-Band GHz	C-BW MHz	X-Band GHz	X-BW MHz
Arecibo	1.15-1.73 dual lin.	500	3.85-6.0 dual lin.	1000	7.8-10.2 dual circ.	1000
Effelsberg	1.2-1.8 dual circ.	?-RFI	4.6-5.1 dual circ.	500	8.0-9.2 dual circ.	1000
GBT	1.1-1.8 dual circ. dual lin.	700	3.9-6.1 dual circ. dual lin.	>700	7.9-10.1 dual circ. dual lin.	>500
Lovell	1.37-1.73	500	4.4-8.4	1000	---	---
Westerbork	1.16-1.8 dual lin.	160	4.76-5.02 dual lin.	160	8.15-8.65 dual lin.	160

## VLBI Equipment needs for High Bandwidth Observations

**Notes:**

1. MK4 Formatter Upgrade allows 2Gb/s output from formatter.
2. MK5B+ is assumed to have 2Gb/s capability.
3. DBE is next generation VLBI Digital Back End which accepts 512MHz IF and outputs up to 4Gb/s in VSI format.
4. With 14 Mark4 BBCs, each with 16MHz USB and LSB, we get only 1792Mb/s.

Station	Current VLBI Backend	1 Gb/s	Needs for 2 Gb/s (see note 4)	4 Gb/s
Arecibo	VLBA4 DAR 8 VLBA BBC MK5A PC FS	None	MK4 DAR 14 MK4 BBC MK4 Frm Upgrade 2 MK5B <b>or</b> 1 DBE (2)MK5B/(1)MK5B+	1 DBE 2 MK5B+
Effelsberg	MK4 DAR 14 MK4 BBC MK5A PC FS	None	MK4 Form Upgrade 2 MK5B <b>or</b> 1 DBE (2)MK5B/(1)MK5B+	1 DBE 2 MK5B+
GBT	VLBA DAR MK5A	Mark4 DAR 8 Mark4 BBC PC FS <b>or</b> MK5B Sampler Adapter	MK4 DAR 14 MK4 BBC MK4 Form Upgrade 2 MK5B PC FS <b>or</b> 1 DBE (2)MK5B/(1)MK5B+PC FS	1 DBE 2 MK5B+
Lovell	MK4 DAR 14 MK4 BBC MK5A PC FS	None	MK4 Form Upgrade 2 MK5B <b>or</b> 1 DBE (2)MK5B/(1)MK5B+	1 DBE 2 MK5B+
Westerbork	MK4 DAR 14 MK4 BBC MK5A PC FS	None	MK4 Form Upgrade 2 MK5B <b>or</b> 1 DBE (2)MK5B/(1)MK5B+	1 DBE 2 MK5B+