

MASSACHUSETTS INSTITUTE OF TECHNOLOGY
HAYSTACK OBSERVATORY
Off Route 40
Westford, MA 01886-1299

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Phone: (978) 692-4764
Fax: (781) 981-0590

To: Recorder Group

From: Hans F. Hinteregger, Dave Fields, Arthur Niell

Subject: Haystack Dry Air Kit

The Haystack Dry Air Kit (HDAK) is recommended for use in all MK3A, VLBA, MK4 acquisition and processor tape drives in order to ensure that the relative humidity (RH) in the tape path is under 30%. The purpose of this low relative humidity is to minimize head wear rate.

Currently the stepped VLBI heads have an initial depth of gap of 25 μ m-35 μ m. In order to obtain more than 5000 hours of use from the head the wear rate must be less than about 5 nm/hour. In VLBA Acquisition Memo #369 this wear rate appears to be safely achievable for relative humidity at the head of less than 35%. Above this value the wear rate increases dramatically. Since relative humidity sensors typically have an uncertainty of about 5%, we would like to keep the relative humidity in the tape path as close to, or below, 30% as possible.

There is a relationship between air temperature and relative humidity according to which, if room air at 68°F (20°C) and 60% RH is raised to 104°F (40°C), the relative humidity of that air is reduced to about 20%. The HDAK lowers tape-path relative humidity by raising the temperature of the air blown into the tape path.

The HDAK consists of a motor to provide the heat and air supply, and tubing to get the air to the heads. The blower motor is identical to the vacuum motor. It is surrounded by porous foam sheet stock and encased in a two-piece sheet-metal housing. This packaging greatly reduces audible noise and allows the blower to be used up to full power without creating an annoyance. Rack mounting-ears, an air hose identical to the vacuum hose, a feed-through plate, and a sheet-metal air guide with a hole for thermometer probe are included. A mini DC supply and potentiometer for motor speed control are attached to one of the mounting ears.

The thermometer included in the kit measures the temperature of the blown-in air, and the relative humidity is calculated from the ambient conditions.

The speed of the blower motor should be adjusted until the blown-in air temperature is stable at 104°F +/- 1°F. The potentiometer is provided for this purpose.

Although the kit is normally mounted inside the VLBA or MK3A/MK4 tape drive, it is electrically independent of the drive. The HDAK can be used when the recorder is powered off if it is plugged into a separate AC source.

Room humidity must be kept below 60% RH for the HDAK to maintain the low relative humidity in the tape path. The room humidity should be monitored and reported in the pre-experiment checkout. If this condition cannot be maintained, Haystack can offer suggestions to alleviate the problem.

Complete documentation for the HDAK is available from Haystack (see parts list and drawing numbers below). The cost for all parts is less than \$1000.

Though not part of the kit, an inexpensive temperature and relative humidity meter for the room (not the tape-path) can be supplied on request. This humidity meter is accurate to 5% RH in mid-range, degrades to 7% accuracy at 20% RH, and does not read below 20% RH.

Better humidity meters (quoted accuracy 2% down to 0% RH) are also available for about \$300. In operational use it is unnecessary to include one of these for direct measurement of tape-path humidity. However, a slightly modified feed-through plate allows the use of such a meter for accurate experimental work.

Haystack Dry-Air Kit Parts List

Qty	DESCRIPTION	PART NO.	REF. DWG.
1	Housing Receptacle	6400M001A	6400M001A
1	Housing Cover	6400M002	6400M002
1	Mounting Ears Short/Long	6400M003A	6400M003A
1	Ametek Motor	6400M004	6400M004
1	Hose Mounting Plate	6400M005	6400M005
1	Air Flow Deflector	6400M006	6400M006
1	Metrum Hose Assembly	16817935-001	6400A001
1	PVC Pipe 1" dia/1.5"long	NA	6400A001
1	Motor Hose Collar	A54313M002	6400A002
1	Metrum Hose Adaptor	16738263-001	6400A002
1	Filter Screen	NA	6400A002
2	Porous Foam Filters	NA	6400A001/002
1	Foam Pieces/McMaster-Carr	8723K14	6400M007/A002
1	Terminal Strip	NA	6400S001
1	Terminal Strip Cover	NA	6400S001
1	Acopian Power Module	10E12	6400S001
1	Acopian Accessory Socket	ES-1	6400S001
2	H.H.Smith 1/4" Standoff	2330	6400S001
4	H.H. Smith 1/2" Standoff	2332	6400S001
1	C&K On/Off Switch	7201	6400S001
1	Clarostat 10K Pot.	RV6NAYSD103A	6400S001
1	3M Plug Connector 34-Pin	4634-6300	6400S001
1	3M Socket Connector 34-Pin	3414-6034	6400S001
1	AMP Socket Connector 6-Pin	6410250-6	6400S001
4	Amp Female Pins	640706-1	6400S001