MASSACHUSETTS INSTITUTE OF TECHNOLOGY

HAYSTACK OBSERVATORY

WESTFORD, MASSACHUSETTS 01886

13 March 1987

Area Code 617
692-4765

To: VLBA Data Acquisition Group

From: Alan E.E. Rogers

Subject: Changes to MCB Protocol for the Baseband Converter and I.F. Distributor

The memo describes changes to the MCB protocol described in Acquisition Memos #65, #72 and #74. The changes are in the method used to handle the radiometric averages. In the original implementation the request for an average resulted in the average from the time of last request while the revised implementation provides selectable fixed period averages. The new implementation also increases the address space so that both total and switched power can be obtained with only monitor requests. These changes allow multiple users to communicate with the modules without interference.

Changes as follows:

Function: Mode Control   Address 2.8 - 2.F

Bit 0 - (address 2.8) - Manual Gain/AGC
    0 Apply fixed values to gain control.
    1 Adjust attenuator values to "auto-level" (or AGC) the output.

Bit 1 - USB gain
    When this bit is toggled from 0 to 1 the USB gain is changed
    in manual gain mode.

Bit 2 - LSB gain

Bit 3 - decrement/increment
    0 Decrement gain when bit 1 or 2 are toggled.
    1 Increment gain when bit 1 or 2 are toggled.

Bits 4-6 - Averaging period

Bit 6	Bit 5	Bit 4	Period
0	0	0	1/80 sec
0	0	1	1 sec
0	1	0	2 sec
0	1	1	4 sec
1	0	0	10 sec
1	0	1	20 sec
1	1	0	40 sec
1	1	1	60 sec

Bit 7 - Not assigned

Read: USB (LSB) switched power

Address   E.0 - E.F (F.0 - F.F for LSB)

Read: 8751 Status

Bit 0 - System Timing Check
        0 1 second tick is absent or incomensurate with 80 Hz.
        1 1 second tick is O.K.

Bit 1 - Not assigned

Rules for averages and AGC:

1] There is no dead time - current average always immediately follows the previous average.

2] The only possible ambiguity in reading an average is whether the average is the current or previous average. Both bytes come from the same average since MCB communication acknowledge is delayed (by up to ~50 microsec) until both bytes are in place.

3] The next average starts at the first 80 Hz interrupt tick following any mode change and continues for the specific period and then repeats.

4] Any mode change will result in an average being calculated and remaining accessible to the MCB for the new averaging period - at which time a new average is calculated.

5] AGC changes are only made at the boundary between averages thereby maintaining accountability between the gain (as read by MCB) and total power.