

NATIONAL RADIO ASTRONOMY OBSERVATORY
GREEN BANK, WEST VIRGINIA

CMR AC-DC COUPLED
AMPLIFIER WITH BACK-OFF
FOR NRAO ULTRA LOW
FREQUENCY SPECTRUM
ANALYZER UNIT

AUGUST 13, 1975

JEFFREY S. WALDHUTER

CMR AC-DC COUPLED AMPLIFIER WITH BACK-OFF
FOR NRAO ULTRA LOW FREQUENCY ANALYZER UNIT

Jeffrey S. Waldhuter

INTRODUCTION

The purpose of this device (CMR AC-DC Coupled Amplifier with Back-Off) is to interface waveforms which contain a D.C. bias (example output of NRAO Standard Receiver 1V D.C.) with the NRAO Ultra Low Frequency Spectrum Analyzer Unit. One has two modes of operation (refer to Fig. 1). First, AC coupling with a RC time constant of 100 seconds. This mode is used when one wants to remove a D.C. component of a low frequency pulse waveform. Example is the switched waveform (between source and load from the NRAO Standard Receiver. The second mode of operation is D.C. Coupling with Back-Off. This allows one to offset a positive D.C. bias (0 to +1.5 volts) with a negative voltage. This was designed solely for monitoring total power signals from NRAO Standard Receiver.

CALIBRATION OF UNIT

I. OFFSET. Note, no Op-Amp is ideal, hence one must offset these units. Now this can be done with the controls provided on the front panel. The procedure is as follows (refer Fig. 1).

- 1) POWER - On
- 2) TRIM CONTROL - Put the three trim control switches in the "On" position (each one corresponding to the individual Op-Amps).
- 3) GAIN SELECTOR - X100
- 4) BACK OFF - Off

- 5) COUPLING - D. C.
- 6) OUTPUT - Connect digital voltmeter (D. C. mode).
- 7) TRIM (VARIABLE GAIN AMPLIFIER) - Adjust till you get a reading of 0.00 D.C. volts on DVM.
- 8) TRIM CONTROL (VARIABLE GAIN AMPLIFIER) - Off
- 9) TRIM (UNITY GAIN AMPLIFIER) - Adjust till you get a reading of 0.00 D.C. volts on DVM.
- 10) TRIM CONTROL (UNITY GAIN AMPLIFIER) - Off
- 11) TRIM (INSTRUMENTAL AMPLIFIER) - Adjust till you get a reading or close to it of 0.00 D.C. volts on DVM.
- 12) TRIM CONTROL (INSTRUMENTAL AMPLIFIER) - Off
- 13) Offset calibration complete.

II. GAIN. One has three choices of gain through the system: X1, X10, X100.

- 1) GAIN SELECTOR - Course adjustment.
- 2) GAIN CONTROL (UNITY) - Fine adjustment.
- 3) To calibrate gain, apply signal at input and monitor output (Example: apply and measure AC rms value of sine wave to INPUT. Then measure AC rms value of signal at OUTPUT and divide the two for gain.

CMR AC-DC COUPLED AMPLIFIER WITH BACK OFF



