

NATIONAL RADIO ASTRONOMY OBSERVATORY
Green Bank, West Virginia

Electronics Division Internal Report No. 5

750 MC AND 1400 MC RECEIVER FRONT ENDS
AT THE 300-FOOT TELESCOPE
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December 1962

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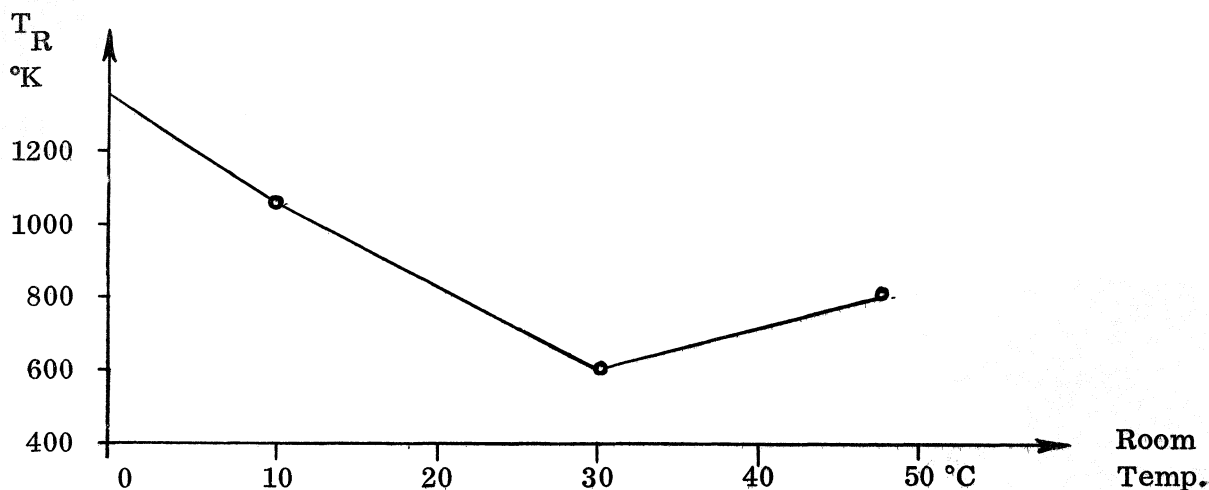
Rerun June 4, 1963: 50

A thermal calibration made October 1, 1962, shows the calibration noise tube to be 12.04° on 750 Mc and 9.75° on 1400 Mc. Another thermal calibration on October 11, 1962, shows the calibration noise tube to be 11.1° on 750 Mc and 8.75° on 1400 Mc.

A tunnel diode amplifier (Micro State Model NC 1402, Serial No. 1) was added to the 1400 Mc system and tested in the lab.

Measurements on Tunnel Diode Amplifier, November 14, 1962

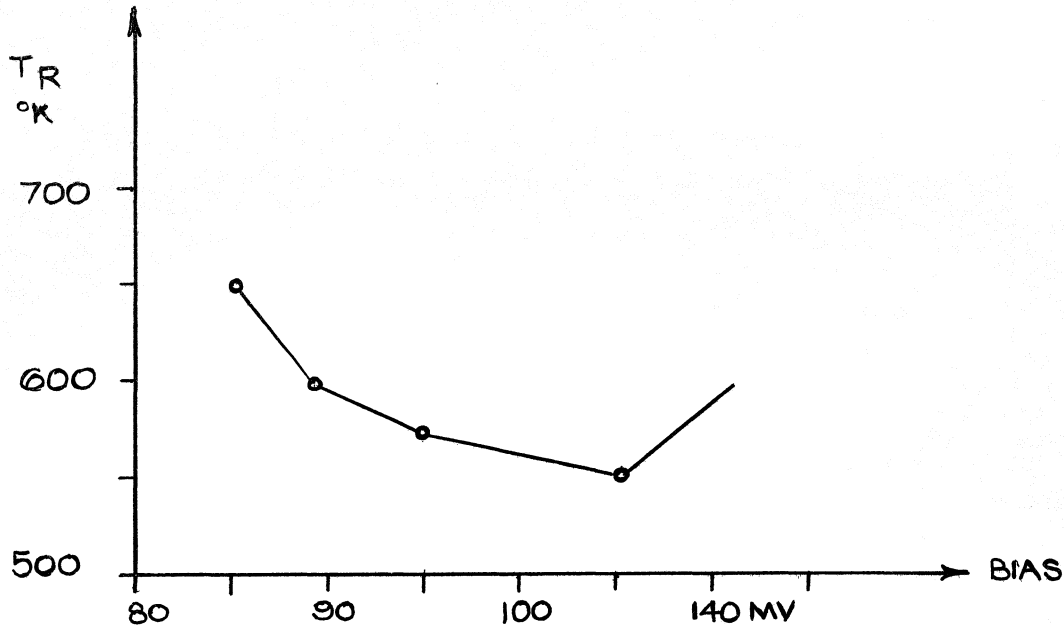
The noise temperature of the tunnel diode amplifier was measured as a function of temperature between 0 °C and 45 °C.



The curve shows a relatively strong temperature dependence of the noise temperature with a minimum around 30 °C. Since the gain as a function of temperature was not measured, it is uncertain whether part of the change in system noise temperature is a change in second stage noise contribution.

The noise temperature shown in the figure is the system noise temperature. A noise temperature of 500 °K was measured with an isolator between the first and second stage. The noise contribution from the second stage was calculated to 50 °K and consequently the noise temperature of the tunnel diode amplifier was 450 °K .

The noise temperature as a function of bias voltage was also measured. A minimum occurred at 105 mv (measured at the test point), the voltage recommended by the manufacturer. Even in this case part of the change in measured noise temperature could be caused by change in second stage noise contribution because of variations in tunnel diode gain.



The battery voltage as a function of temperature was also measured. The voltage was extremely stable over a temperature range of 0 - 50 °C.

In general, the optimum noise temperature of the amplifier was found to be about 50 °K higher than when first installed.

Front-End Removal

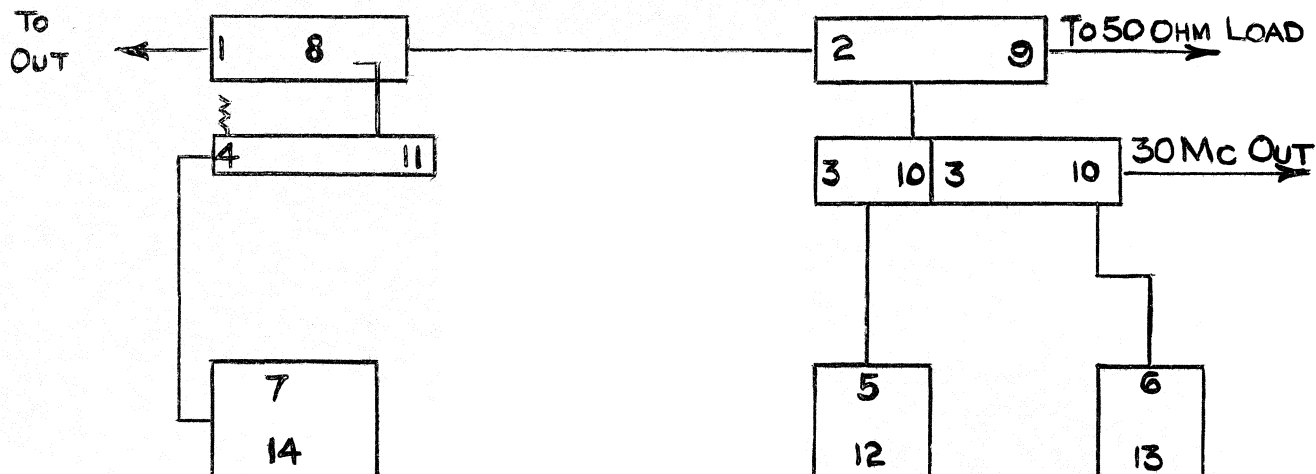
The following steps must be followed when removing either the 750 Mc or 1400 Mc front ends.

1. Remove the AC cable and the crystal current cable from the terminal strips nearest the power supply and fasten them to the terminal strip mounted above the power supply on the inner box frame.
2. Disconnect the following cables and secure them to the inner box frame.
 - a. Input (to be disconnected at the directional coupler)
 - b. Load (to be disconnected at the coaxial switch)

- c. Local oscillator (to be disconnected at the attenuator -- 7 db for 750 Mc and 12 db for 1400 Mc -- which is attached to the mixer)*
 - d. IF (to be disconnected at the mixer)*
 - e. Noise tube power (to be disconnected at the relay chassis and a cable clamp mounted behind the chassis must be removed also)
 - f. Switch drive (to be disconnected at the switch and removable clamp).
3. Separate the steel cables attached to the top of each plate.
 4. Remove the plate mounting bolts (6 on the 750 Mc plate and 5 on the 1400 Mc plate).
 5. Attach the winch to the steel cable located at the top of the plate and lower assembly to the ground.

* The LO and IF cables for each receiver are clamped to the opposite plate and the clamps have to be removed.

Front End Block Diagram and Component Listing

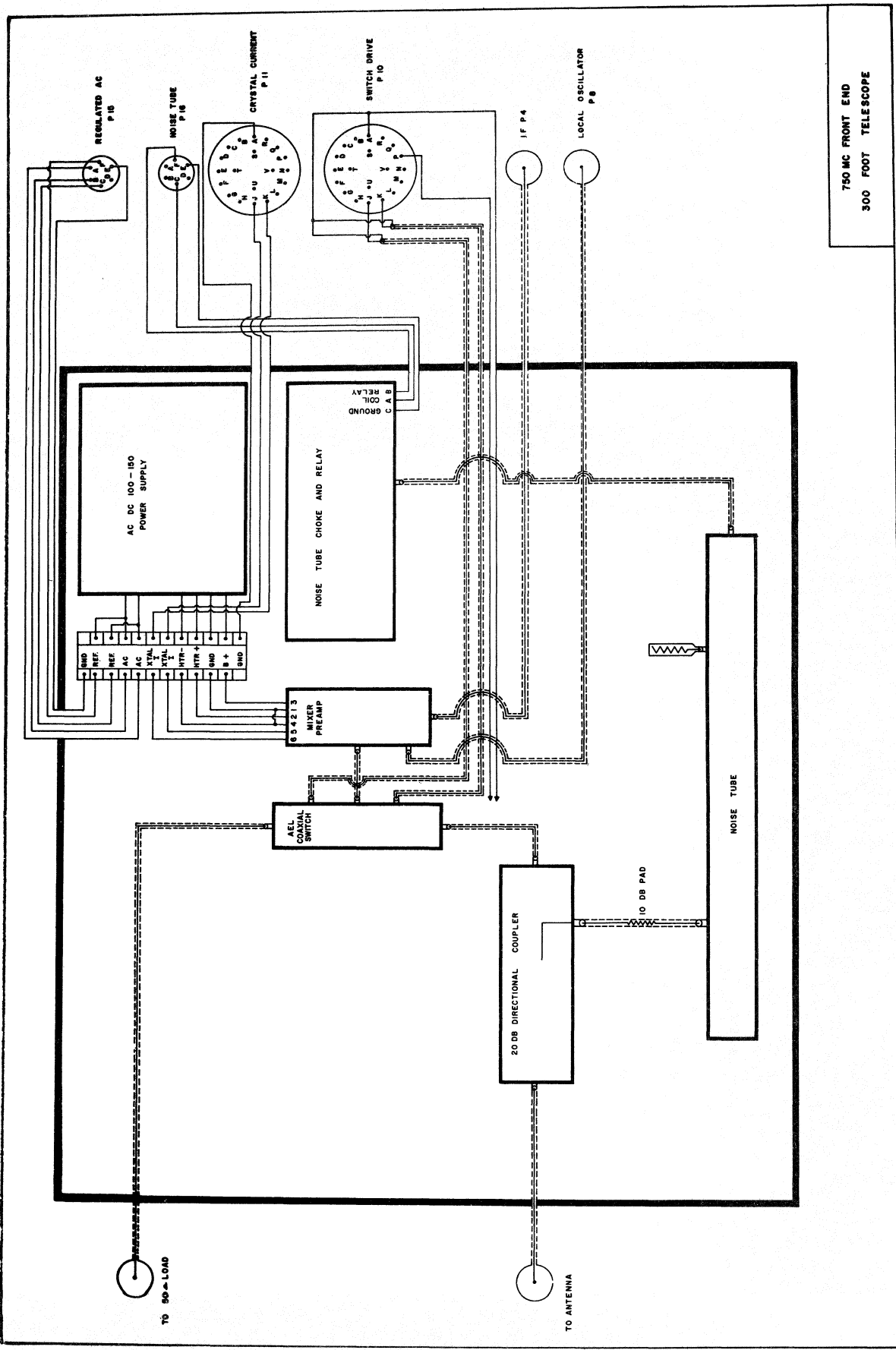


750 Mc

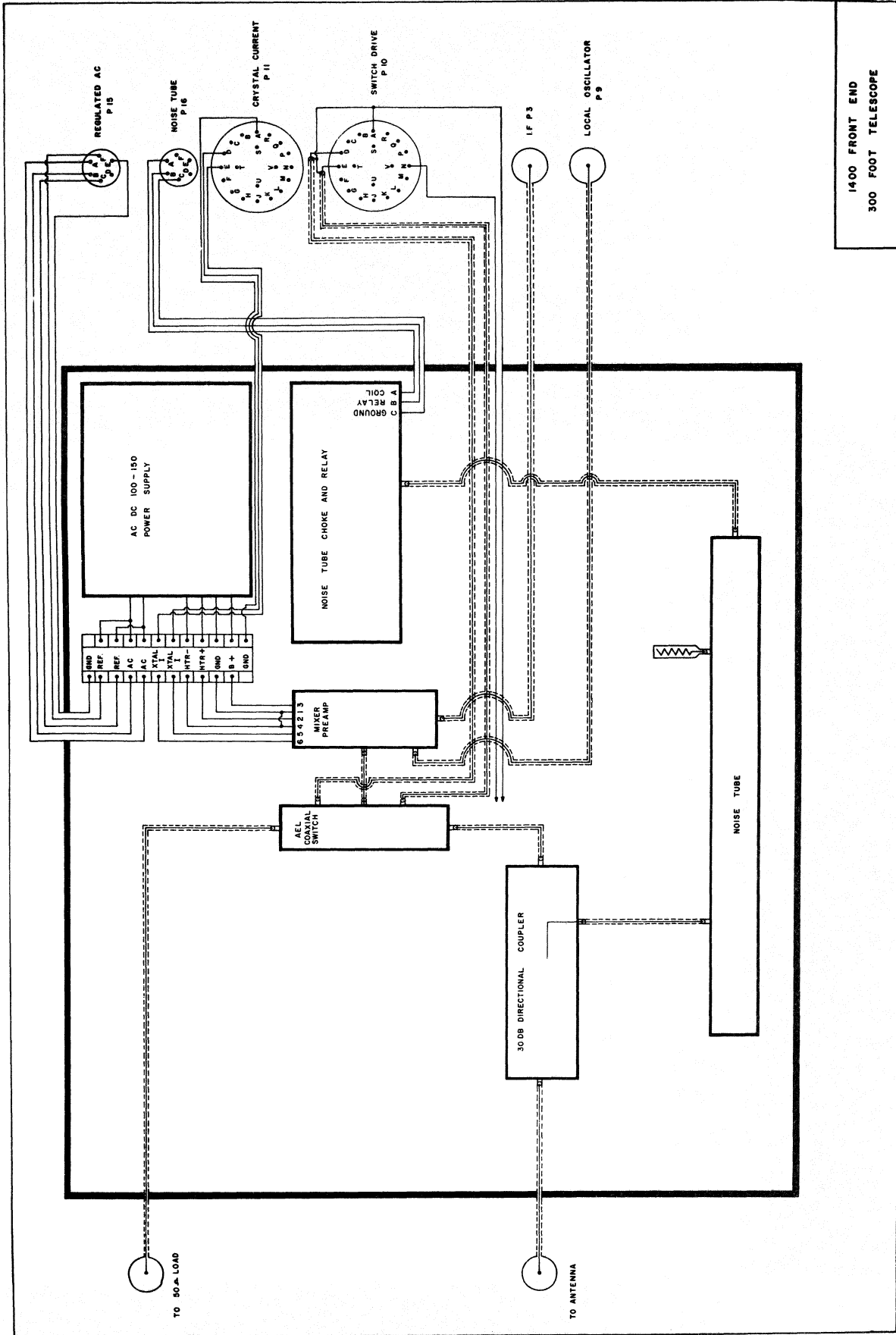
<u>Component</u>	<u>Manufacturer</u>	<u>Model No.</u>	<u>AUI Blue Tag No.</u>
1. Directional coupler	Narda	3001-20	1543
2. Coaxial Switch	AEL	SNB508B	2016
3. Mixer-Preamp	LEL	UCC-3	1373
4. Noise tube	AIL	7010	133
5. Local oscillator	GR	1361-A	1684
6. Power supply	AC-DC	150-100	1883
7. Noise tube relay	NRAO		None

1400 Mc

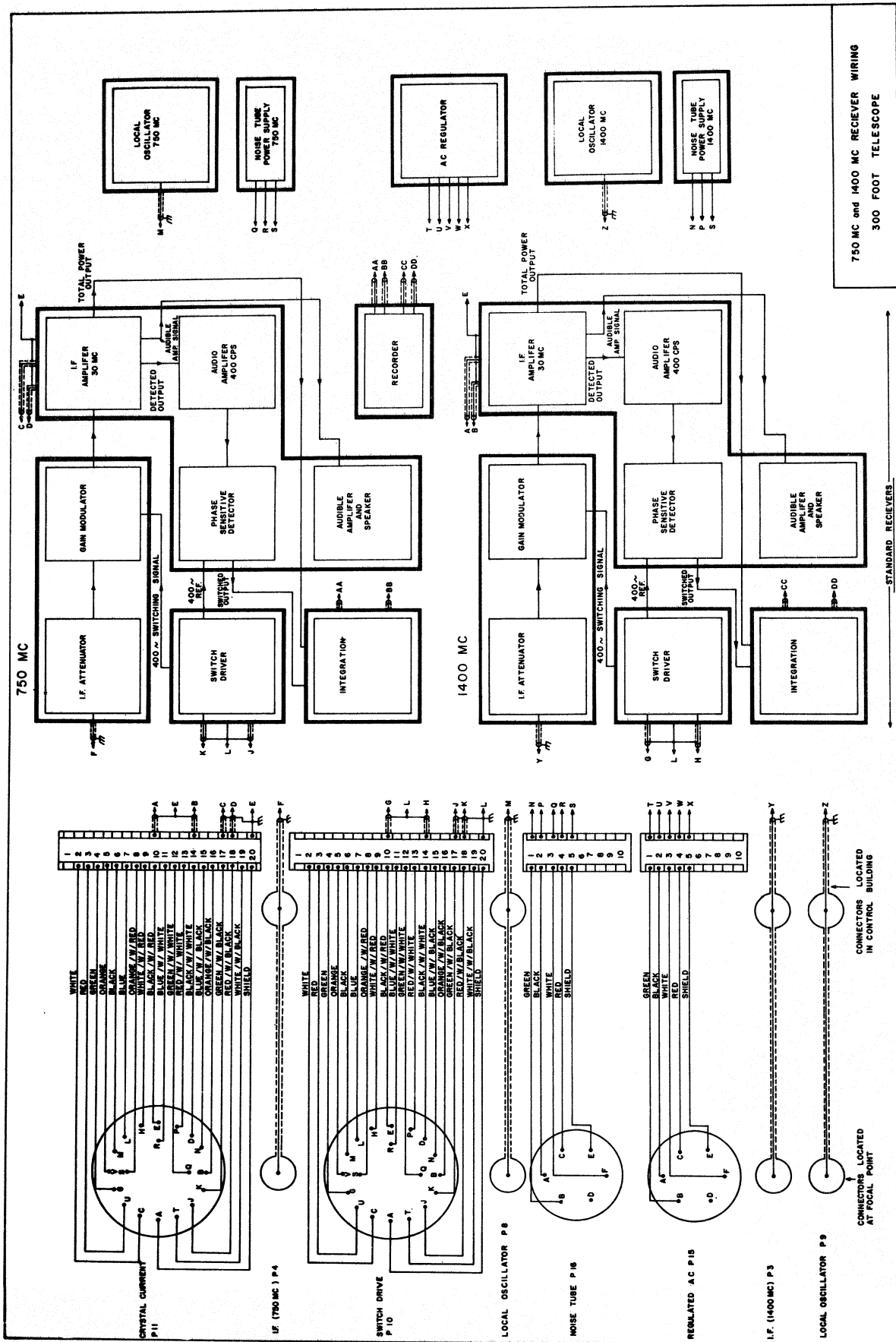
8. Directional coupler	Narda	3002-30	1422
9. Coaxial switch	AEL	SNB508B	2015
10. Mixer-Preamp	LEL	LAC-3	1525
11. Noise tube	AIL	7010	941
12. Local oscillator	GR	1218-A	55
13. Power supply	AC-DC	150-100	1834
14. Noise tube relay	NRAO		None



750 MC FRONT END
300 FOOT TELESCOPE



1400 FRONT END
300 FOOT TELESCOPE

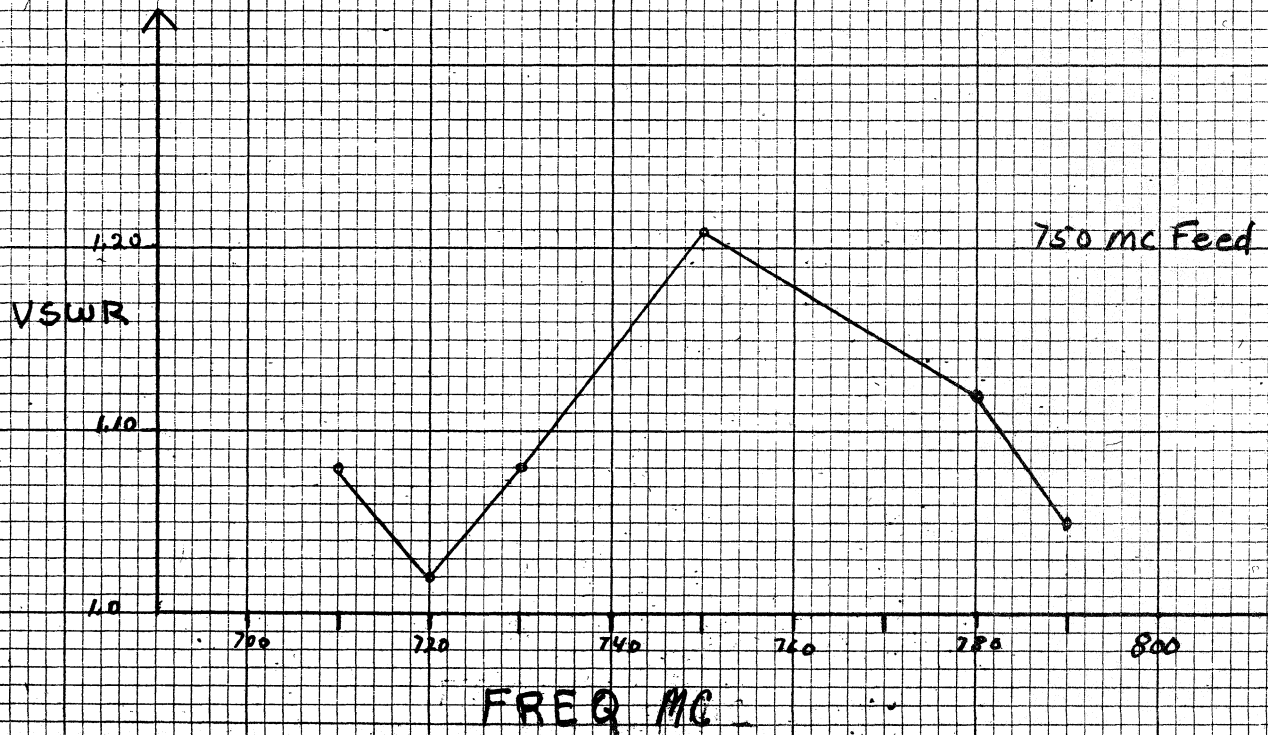


750 MC and 1400 MC RECEIVER WIRING
300 FOOT TELESCOPE

STANDARD RECEIVERS

JASIK FEED

Type 275
Serial # 3



SANBORN Recording Paper

