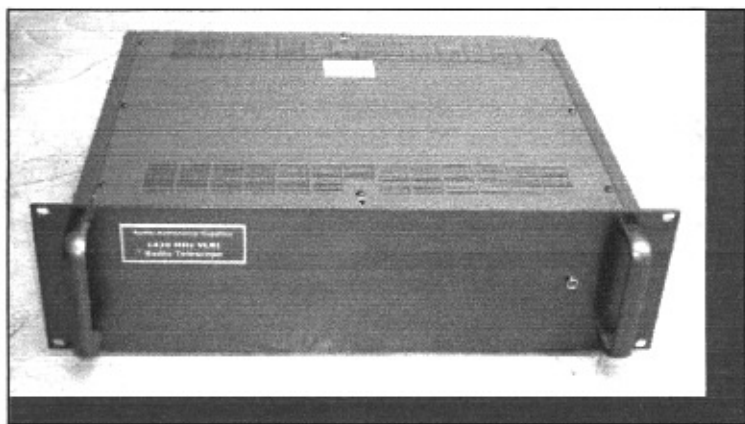


*Radio Astronomy Supplies*

# **1420 MHz VLBI Radio Telescope**

**Description and Operation**

(ICUAA - INDIA)



*Radio Astronomy Supplies*  
**P.O. Box 450546**  
**Sunrise, FL 33345**  
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**Radio Astronomy Supplies**  
**1420 MHz VLBI Radio Telescope**

CAUTION, WARNINGS AND NOTES

CAUTION 1: It would be best not to operate the receiver without a proper reference input for any extended period of time. Possible damage could result with unlocked PLL oscillators. Considerable RF noise may be generated by the PLL'S "Hunting" for lock could result.

CAUTION 2: Do not to operate the receiver without a proper 50 Ohm load on the baseband output. The baseband output MMIC amplifiers are designed to work into 50 Ohm circuitry. An incorrect mismatch might damage the amplifiers.

CAUTION 3: This receiver's worst enemy is lightning induced over voltage transients. It is strongly recommended that you utilize the very best lightning protection on the AC supply.



CAUTION 4: This system uses Electrostatic devices and modules. Observe proper precautions while handling.

WARNING

IT IS STRONGLY SUGGESTED THAT THAT THE UNIT NOT BE OPENED DURING OPERATION. SHOCK OR BODILY INJURY MAY BE INCURRED IF CONTACT WITH THE POWER SUPPLY. IN ADDITION, REMOVE ANY JEWELRY FROM YOUR BODY WHICH MIGHT HANG DOWN OR COME IN CONTACT WITH THE VOLTAGE SUPPLY.

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**1420 MHz VLBI Radio Telescope**

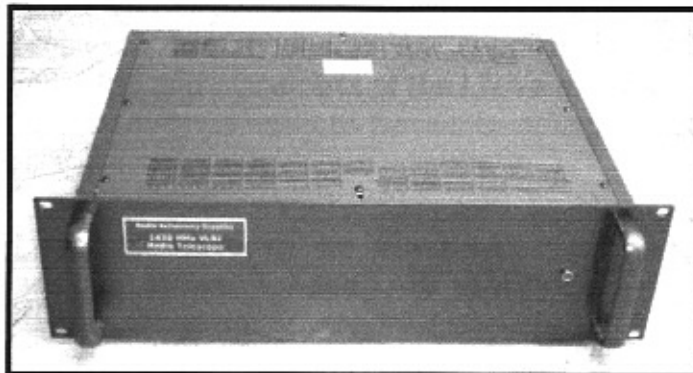
## **Description of the 1420 MHz Receiver:**

**This receiver is a custom made, one of a kind unit (manufactured for the University of Costa Rica)** – The primary receive frequency for this receiver is 1420 MHz. This receiver is a triple conversion receiver with the first LO at 1012.8 MHz, 2<sup>nd</sup> LO at 337.6 MHz and the third LO at 70.005 MHz.

Each LO is phase locked to a master 10 MHz reference that is .5 to 1.0 volts peak to peak. Sine wave output is from 0 – 5 MHz which represents the RF input at the antenna of between 1425.4 to 1420.4 MHz. The output level is +15 Dbm maximum at 50 Ohms. +12 volts DC is provided at the red (positive) and black (ground) leads, on the rear panel for an external LNA.

*NOTE: The user must supply their own 10 MHz Reference Source and their own custom software.*

The entire receiver is contained in a standard 19" rack mount chassis and is powered by an external desk top power supply that will operate from 110VAC or 220VAC without adjustment. A standard international power cord connector is supplied on this supply. The total DC power consumption of the complete receiver is about 4 Watts.



**1420 MHz Radio Telescope**

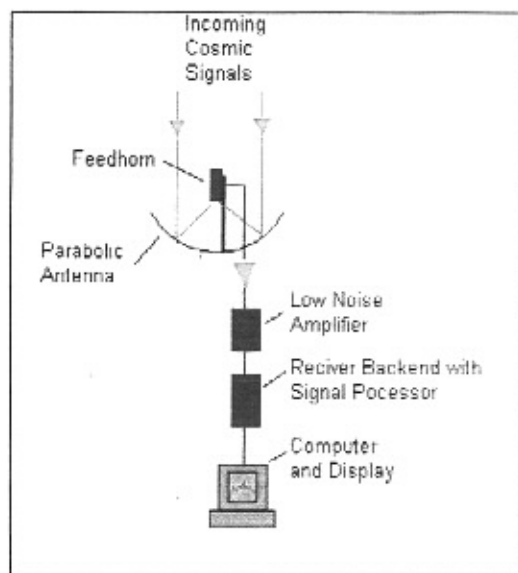
### **Hookup (Single Antenna)-**

The feedhorn should be mounted at the focus of the dish in whatever manner you choose (The focal point of your antenna should be at the mouth of the horn, not inside at the monopole). The LNA should be connected to the feed horn. *A weather proof box should be used to house the front end module (LNA).*

## Radio Astronomy Supplies 1420 MHz VLBI Radio Telescope

### NOTE

Power for the LNA will have to be supplied by a separate customer supplied power supply. Power for the LNA should be a regulated +12 Vdc at 100 ma.



### ***Interferometer Hookup (Two Antennas) -***

For two antenna systems, two feedhorns are supplied as well as two LNA's. Mounting of the feedhorns and placement of the LNA's are the same as above.

A weather proof box should be used to house the front end module (LNAs).

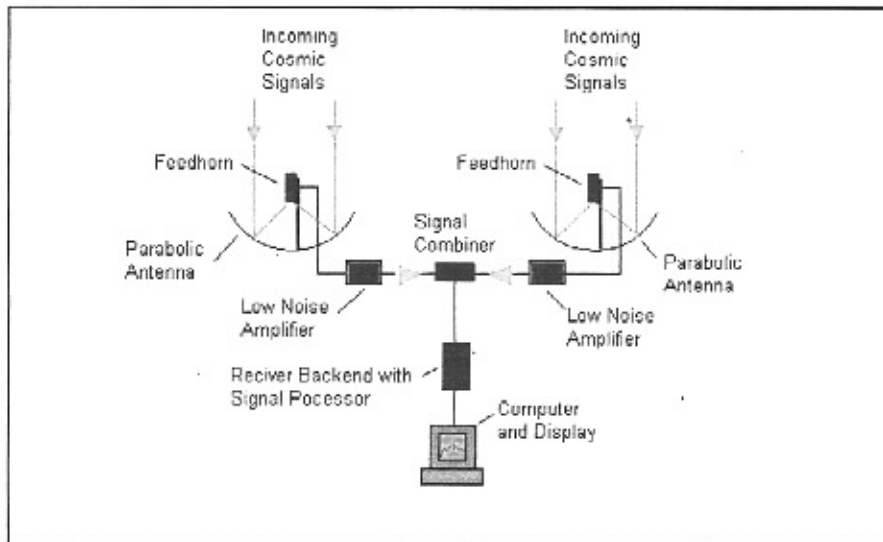
### NOTE

Power for the LNA will have to be supplied by a separate customer supplied power supply. Power for the LNA should be a regulated +12 Vdc at 100 ma.

NOTE: Suggested antenna placement should not be more than 50 - 100 feet apart. If more distance is required, a pair of in-line booster amplifiers may be required.

The separate antenna cables are connected via a power combiner which also routes the combined signal to the receiver backend.

## Radio Astronomy Supplies 1420 MHz VLBI Radio Telescope



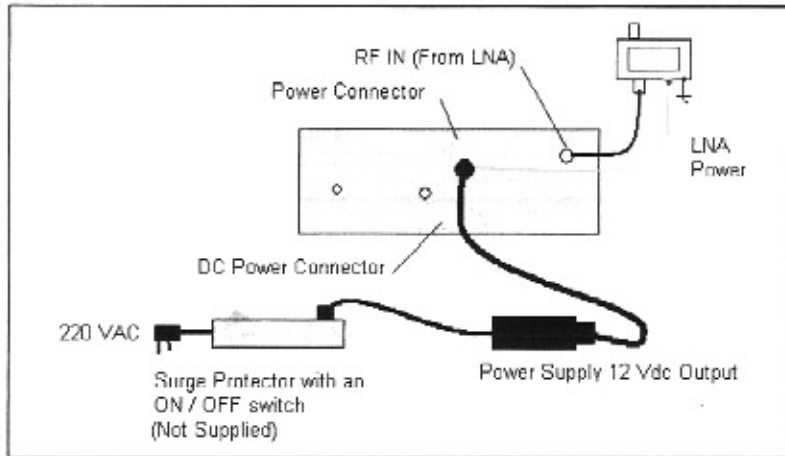
It can not be stressed enough that any outside modules (LNA), which comprises part of the radio telescope front end, **are not fully weather proof!!!** The low noise amplifier/s must be housed in an additional weather proof box, (such as rubbermaid container) simply painting will not keep the elements out. Damaged electronics may result if these instructions are not followed!

Power for the LNA is obtained from the backend via the power cable. The RF output of the LNA is connected to the coax cable and run into the observation area, to the backend unit. The backend unit is meant to be kept in a shirt sleeve environment such as, a habitable room. This unit is not resistant to the elements and must be kept free of temperature extremes and high humidity. Keep in mind that this unit will be connected to a computer (user supplied), which is also very sensitive to environmental conditions.

## Radio Astronomy Supplies 1420 MHz VLBI Radio Telescope

### ***Power Connection:***

Referring to the figure, power for the receiver is supplied via a block type power supply.



### ***Power Supply Hookup***

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1420 MHz VLBI Radio Telescope**

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**Engineering Support**

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**ENGINEERING SUPPORT**

*(United States)*

**RADIO ASTRONOMY SUPPLIES ENGINEERING**

*Carl Lyster (865) 588-7120 between 7 PM - 9:00 PM EST.*

CTLYSTER@COMCAST.NET

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*J-Peter Riese +49 (0) 6103 83 38 95*

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This system has been developed by Radio Astronomy Supplies as well as the accompanying software. The system has been engineered and designed to operate as promised. Any modification to this system or software should be communicated by mail, or Email, to Radio Astronomy Supplies ie; Jeffrey M. Lichtman or Carl Lyster.

*Any problems/bugs etc. should be sent to Radio Astronomy Supplies for immediate attention.*

We hope that you have many rewarding hours of research.

**Best Regards,  
Jeffrey M. Lichtman  
Radio Astronomy Supplies  
Sunrise, FL**