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Offices:

433 Liberty Street
PO Box 555
Little Ferry NJ
07643 USA

Phone:

(201) 641-1770

Facsimile:

(201) 641-1771

Email:

info@setileague.org

Web:

www.setileague.org

President:

Richard Factor

Registered Agent:

Marc Arnold, Esq.

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The Case for Active SETI

**by Adrian W. Kingsley-Hughes (Email awk-h@dolwar.demon.co.uk)
SETI League Regional Coordinator for Wales**

With the Millennium upon us, dozens of organizations are vying for the honor of being "the first to transmit humanity's message into space." While SETI scientists scramble to articulate reasons for *not* transmitting, I think it's easier to ask, "What reasons are there *for* transmitting messages?"

From what I can see from having talked to people who have paid to have messages sent, researched relevant literature and having observed recent trends in society, the problem partly stems from a widespread belief held by many that just beaming any signal out into space will guarantee that it will fall on ears (of some description) - period. Sounds easy, doesn't it?

This is the first step in a race where everyone and anyone with something to say, preach, learn, gain or looking for a new 'pool' to convert/sell to (yes, sell to) etc. wants to be first to make contact with their message (or 'ad'). Obviously, they think, being first would carry huge weight with the aliens. THEY would be the ambassadors for Earth! They would speak for Earth!

At this stage we have quite a few 'groups' which want in on the whole thing. Their potential messages seem to range from a simple 'Hello' to complex mathematical and scientific messages. In between, we have the possibility for calls for (check the 'net - there's plenty of them!) Elvis to come back, Mr. Spock to make an appearance, and quite a few messages with religious content - a new race to convert!

Watch this space - it's just the tip of the iceberg. Moreover, all this is happening because we don't have one strong, fair and impartial voice speaking for the planet.

The second problem we face is that, at the moment, there is much opposition to any one person or body doing the speaking. I suppose that one reason for this is that by having many messages sent by many groups we feel that the overall message content will be more democratic and fairer - although I fail to see why. If the UN (or other organization) proposed a message, I'm sure that as many opinions and views would be sought and listened to as possible. Which do we have most control over - a message sent by the UN or by UFOs'r'us?

Personally, I don't have a problem with one body speaking for Earth, as long as there is a fair opportunity for debate. It is my belief that most of the oppositions to the one voice approach are based on paranoia raised by the idea of government cover-ups, Roswell saucers and X-files.

Finally, the content of the message is a vital point. Many criticisms were made of the Voyager record being a sanitized message composed of half-truths and the cosmic equivalent of brushing our problems under the carpet. Do we send a message that shows us, flaws and all? Do we include information on our wars, crime problems, famine? Is this the best way to introduce ourselves? An area for a lot of debate, I'm sure!

The era of active SETI is now well and truly here. Perhaps another pimple on the face of the technologically adolescent Human race. Like it or not, it's something we'll have to deal with, and sooner rather than later. ❖

Introducing:

Our Legal Services Chairman and South Central US Regional Coordinator

email: sd@arkpatent.com

Stephen D. Carver, The SETI League's Legal Services Committee chairman and South Central US Volunteer Coordinator, was nine years old in October 1957 when he first heard the startling news of a new Russian satellite, Sputnik. While viewing it one evening, he overheard a relative remark pessimistically about the fact that the dreaded "Communists," who had violently invaded Hungary barely a year before, now had the "orbital means" to destroy "us" from above with nuclear weapons. Carver's father, a chemical engineer who had worked on the Manhattan Project, oftentimes made it clear to him that, while a nuclear war would be uncomfortable and difficult for us, it would end the Soviet empire forever. Then in 1948 the Soviets blockaded Berlin. During the Cuban missile crisis of 1962, nuclear war seemed even more inevitable, but luckily President Kennedy and Premier Khrushchev were able to diffuse the madness.

Studying for his ham ticket in that year, Carver was an avid shortwave listener and broadcast band DX-er. After taping some of the early 1960's "ConElRad" test broadcasts formerly transmitted on 640 and 1240 kilocycles in the AM broadcast band, he found that few adults, if any, wanted to hear the tapes, explore the possible consequences of World War III, or discuss the subject. Several things became clear, though, from the evidence Carver was provided: life in the country was less likely to result in vaporization; school desks were for hiding under, not for writing; Geiger counters were more important than flashlights or radios; and the "big war" was not only winnable, but inevitable. Not surprisingly for someone of such a background, Carver has always sought a low key, rural lifestyle, presently residing in the hills near a small town in Arkansas.

Carver pursued radio interests throughout the numerous states and Canadian provinces his family moved between, prior to upgrading to Extra Class Amateur radio operator (now K5PT) in 1968. That same year, Carver obtained a First Class Commercial radio license, and the Soviets invaded Czechoslovakia. Graduating in Electrical Engineering from the University of Minnesota in 1970, Carver worked in electronics and spent two years with the Federal Communications Commission as a field engineer.

Disillusioned with big cities (read "targets!"), Carver switched careers to law, and graduated with distinction from the University of Missouri Law School in 1974. Carver established a small, independent patent law firm in Arkansas in 1976, surviving financially at first by working in commercial radio. His present job duties include the preparation and filing of patent, trademark, and copyright applications; intellectual property law litigation; patent, trademark, copyright, and miscellaneous database searching; and related licensing, negotiation and contract matters.

Carver is listed in *Best Lawyers in America* from 1992-1999. He is a member of the American Intellectual Property Law Association, the American Bar Association, the American Radio Relay League, the Society of Broadcast Engineers, the National Rifle Association (Life Member), the Quarter Century Wireless Association (QCWA), and The SETI League (Volunteer Regional Coordinator for South Central US, as well as Chairman of its Legal Services Committee). Carver is attorney of record on over 120 patents issued in various technical categories over the last several years, and is the inventor of record of U.S. Patent No. 4,024,666.

Despite his enthusiastic discovery of John Kraus's famous book *Big Ear* in 1977, and his commercial and amateur radio background, Carver was not motivated to pursue any SETI-related activities until 1997, when he read a stunning and shocking article by Dr. Paul Shuch, The SETI League's Executive Director, published in *Communications Quarterly*. After joining The SETI League, Carver established his *Project Argus* station, EM34rv, in 1998, and continues to experiment with both microwave hardware and software. He is an active HF and VHF ham, and often can be heard on The SETI League 20-meter net frequency of 14.204 MHz (just one percent of the Hydrogen Line).

Steve is pleased to admit that, for most of his life, he was probably wrong about the Drake equation L factor – relating to the expected life span of evolving technological civilizations. He is willing to stipulate, after watching the Cold War fade away, that there is a reasonable chance that scientifically inclined, communicative creatures, despite their intoxicating adoration of carnage and superstition, and their humble beginnings through random chemical evolution, can take a long enough break between wars and disasters to give ET communications a shot. ❖

Guest Editorial:

The Unseen Hand of Evolution

by Bruce Cornet, Ph.D. (email
bcornet@monmouth.com)

When considering the origin of life on Earth, one cannot help but reflect on what is theory and what is fact. Humans, especially scientists, seem to require a conceptual (theoretical) premise before they will venture into a new or controversial area of thinking in physics and science. A certain amount of speculation is necessary for creating an atmosphere of acceptance and opportunity for advancement. But the bottom line is this: What actual experimental data are available which will give credence to one's ideas on (and implications of), for example, the origin of life?

I am a biologist and evolutionist. I have studied the fossil history of life on Earth with great enthusiasm and interest for 35 years. What is missing from our database are data which elaborate on the primordial soup, as it is conceived, which gave rise to life on Earth. My suspicions are such that if we were to have more data on the process of evolution of living cells, we would be in awe at the natural processes that take place on an evolving planet such as primordial Earth was two to three billion years ago. The fact that it took more than a billion years for multicellular life to evolve indicates to me that there is so much missing from our understanding that it is easier to assume some "intelligent" process was involved in creating life than it is to figure out the multitude of biochemical steps that were required in the path to cellular evolution. Ignorance and magic are related states of unknowing and deception.

I am not saying that life could not have evolved on this or another planet through natural processes. Far from it. What I am saying is that we are probably the result of a natural process of planetary evolution, the details of which have not yet been discovered. This may sound like "faith" in science, but it is based on 35 years of experience studying the evolution of microfossils on Earth. It is so much easier to turn to "magic" and "black box" thinking, which imply some kind of "divine intelligence," than it is to piece together the actual history of biochemical evolution on this planet.

I strongly suspect that human macro-evolution, especially our intelligence quotient, has been guided by an invisible "hand" through artificial genetic selection. By that I mean, I suspect, based on verifiable evidence, that something or someone is attempting to force the evolution of our brains toward some unknown goal or objective through selective match-making (i.e., breeding, as in certain royal bloodlines). This notion or concept is quite different from the "God" hypothesis for Genesis, as propounded by the Bible. Once sentience and "free will" evolve, a species enters the realm in which it can violate most rules for natural selection. When such a condition evolves, that species may require the intervention of an invisible agent of selection, which will artificially offset those tendencies leading to loss of genetic polarity or heterogeneity, such as global gene transfer between isolated populations and the dilution or mixing of characteristics which might otherwise lead to improved adaptation or intelligence in sub-populations.

In effect, humans have destroyed or limited those processes which can lead to rapid evolution by creating global tribal warfare (wanton and random gene depletion), interracial marriages (gene dilution - although this may have a secondary benefit), and the preservation of recessive (maladapted) genes through moral issues and medicine. Global opposition to forced eugenics is a prime example of resistance to any kind of artificial selection in humans. Reduced numbers of offspring amongst the well-educated is another. I am certainly not advocating selective forced breeding policies. Far from it. I am only pointing out how intelligence can lead to a stagnation in genetic evolution through moral and legal issues, requiring an offsetting influence which must by necessity remain anonymous and invisible in order to exist. ❖

Event Horizon

SETI League members are invited to check the website at <<http://www.setileague.org/general/confrnce.htm>> or send an email to <info@setileague.org>, for further details about these events, at which SETI-related presentations are scheduled.

*** - SETI League participation confirmed**

January 1, 2000: *The End Of The World As We Know It.*

*** March 3-5, 2000:** *Contact 2000*, Santa Clara CA.

*** March 11, 2000:** *SETI League Canadian Regional Meeting*, Toronto, Ontario Canada.

*** March 26, 2000:** *SETI League Annual Meeting*, Little Ferry NJ.

*** April 21, 2000:** *Second annual SETI League Ham Radio QSO Party*, 14.204 MHz.

*** April 21 - 23, 2000:** *Balticon 34*, Baltimore MD.

*** May 6 - 7, 2000:** *Trenton Computer Fest*, Trenton NJ.

May 12 - 14, 2000: *ARRL National Convention and Dayton Hamvention*, Dayton OH.

June 2 - 4, 2000: *ARRL Atlantic Division Convention and Rochester Hamfest*, Rochester NY.

*** July 9 - 12, 2000:** *Society of Amateur Radio Astronomers*, NRAO Green Bank WV.

*** July 20 - 23, 2000:** *Central States VHF Conference*, Winnipeg Manitoba.

August 7 - 19, 2000: *XXIVth International Astronomical Union General Assembly*, Manchester University, UK.

August 31 - September 4, 2000: *Chicon 2000 World Science Fiction Convention*, Chicago IL.

*** September 9 - 10, 2000:** *Second Convention of the European Radio Astronomy Club*, Heppenheim Germany.

September 16 - 17, 2000: *Weinheim VHF Convention*, Mannheim Germany.

*** February 12 - 14, 2001:** *OSETI III*, Third International Conference on Optical SETI, San Jose CA.

*** August 30 - September 3, 2001:** *Millennium Philcon World Science Fiction Convention*, Philadelphia PA.

*** August, 2002 (proposed):** *BioAstronomy '02*, Hamilton Island (Great Barrier Reef), Australia. ❖

Director's Corner: Marriage Made in Heaven

The SETI League's *Project Argus* is an effort of tech-savvy experimenters to build up a global network of small radio telescopes and monitor the entire sky. It's ambitious and, quite frankly, beyond most everybody's reach. If you aren't quite ready to build your own radio telescope, but still want to support SETI, one alternative is to put your money where your math is, join somebody's Team, and help professional astronomers to finance 'real SETI.'

Now along comes SETI@home, a most appealing middle ground. Those not ready to build a mini-Arecibo in the back garden, but who feel that SETI is too important to be left to the professionals, have in SETI@home a low-cost opportunity to make a difference. And working together is certainly working! Today, perhaps a million home computers are devouring data from the world's largest radio telescope, TeraBytes at a time.

Still, while the screen saver churns away in the background, the appetite for involvement is not sated. "I'm no rocket scientist," I hear you saying, "but I want to do more than wait for my Pentium to claim the prize. Where can I go from here?"

Fortunately, it doesn't take a rocket scientist. But before we can propose a promising path, we need to take a close look at SETI@home's strengths, as well as its weaknesses. The public involvement benefits are obvious, and have already resulted in the creation of the world's most powerful supercomputer. The software is fully capable of discovering that elusive needle. Only, where do we find the haystack?

The SETI@home packet your PC is processing came from Arecibo, the world's largest radio dish. So did everybody else's. Which means that about a million PCs are being serviced by a single data source. A powerful source to be sure. But with lotteries all over the world, why buy all our tickets for a single drawing?

Arecibo achieves its sensitivity by scanning a slim slice of the celestial sphere -- perhaps only a millionth of the sky at a time. That means if it's turned on, and tuned to exactly the right frequency, at exactly the instant The Call comes in, there's still a 99.9999 percent chance it will be pointed the wrong way. No software in the world is going to find photons that didn't hit the fan. No matter how many computers are running it.

Perhaps that's where the eyes of Argus can really shine. Imagine a global network of thousands of amateur radio telescopes scanning the entire sky in real time. Now imagine something akin to SETI@home, software which will let you scan that data via the Internet. Only instead of archival data recorded weeks ago, we're talking live data which your computer can capture in real time. So, you need not wait for the evening news to hear the winning numbers.

ARGUS@home won't happen overnight, any more than SETI@home did. Project Argus went online almost four years ago with only five telescopes. Today we're approaching a hundred. It's going to take us a few more years before the Argus network grows to truly global proportions. Until then, there's always Arecibo.

The distributed computing concept pioneered by SETI@home is very adept at finding needles. The global network of Argus telescopes will be ideal for finding haystacks. Seems to me, it's a marriage made in heaven. ♦

A Student's Perspective:

ET, Call Enrico Fermi

by Mike Shupp (email ms44278@huey.csun.edu)

Graduate Student, Dept. of Anthropology
California State University, Northridge

In April 1999, the news media reported that Upsilon Andromedae, a star about 47 light years distant, has at least three planets the size of Jupiter or larger, and that one is in the hypothetical "life zone" corresponding to the Venus-Earth-Mars region of our solar system. This is roughly the 20th star in our stellar neighborhood to have been credited with planets. It is the first to which observers give more than one, with the exception of Barnard's Star, which is apparently still regarded as an unproven case. Ironically, Barnard's Star was the first star other than our own to be described as having planets.

A few decades ago, extra-solar planets were the property of science fiction writers. Astronomers deemed them unlikely around large red and blue giants (O and B class suns) on the grounds that these stars destroyed themselves in supernovas at a young age, before sensible planets would have had time to condense; unlikely around M-class dwarf stars, which were thought too small to have material for building solar systems; and improbable for dynamical reasons among the 40 percent of the remaining A, F, G, and K-class suns which formed binary (or higher) systems. These days the notion seems to be surfacing that if you have enough material to form any sort of star in the first place, you have enough material to build planets as well-- perhaps several sets of planets from the primordial debris over the lifetime of a typical star.

Meanwhile, on the one planet in the one solar system known to harbor life, we've evidence that alga-like organisms existed on earth at roughly 3.8 billion years ago. This is not far removed from the "Age of Bombardment" from roughly 4.2 to 4.0 billion years ago, which saw most of the remaining planetesimals in the inner solar system swept up like dust on a carpet by the gravitational pull of Mercury, Venus, Earth, Mars, the Moon, etc. With an estimated age of 4.6 billion years, it is conceivable that life existed on earth before the bombardment but that the evidence has been hidden simply because no rocks from that earlier age have survived to the present day. It is also conceivable some earlier form of life, maybe not based on DNA, existed and was eradicated by the bombardment, and that modern day organisms are the products of a second "origin of life."

Even without these speculative cases, it seems clear that life got established on earth with considerable haste.

We have indications as well that life may have arisen on Mars some 3+ billion years ago, in the form of minute inclusions which might be fossilized spores in rocks blasted into space by long-ago meteorite strikes. Scientists also speculate that an "ocean" of liquid water below the frozen surface of Europa, kept warm by tidal strains imparted by Jupiter, might be warm enough for life to evolve even in the chilly "outside the life zone" regions of the solar system. All the 20+ planets now thought to orbit other suns are on the order of Jupiter's size or larger, so the implications are profound.

It would appear that we have before us a galaxy of some 400 billion stars-- one galaxy in a universe of perhaps 10 billion galaxies-- in which planets are commonplace and life is easily generated. The odds on the existence of extra-solar life-forms with technological civilizations, parameterized by the famous Drake equation some thirty years ago, should seem much higher today than in the early days of enthusiasm for SETI/CETI.

Against this, we've no astronomical evidence as yet of either Kardashev II or III civilizations (K-I civilizations use energy equivalent to what might be obtained from solar radiation on a planet's surface-- our condition; K-II's utilize energy equivalent to full solar output, for example, with a "Dyson sphere" of habitats arranged to absorb virtually all a star's visible radiation; K-II's would use the energy of entire galaxies). This suggests that technological progress beyond some point may be bounded for undetermined reasons-- a bit of a stumper because methods of mining the outer planets for ores and valuable industrial gases and building materials and even for stripping the outer layers of a sun away to extend its life-- K-II style achievements-- are already being discussed in engineering journals in our comparatively low-tech culture. It's a reasonable assumption that our technological capability expands at the rate of say one percent a year over historically long periods of time -- it isn't lack of ability but lack of interest that prevents us from duplicating the Pyramids-- and there's no good reason to think this is going to stop in the immediate future. Why should this be different for alien species?

Note next, we have a conspicuous shortage of visiting aliens. I am deliberately excluding from consideration aliens of the "Flying Saucer-X Files-abduction for medical examination/impregnation-Chariot of the Gods-Area 51" variety, however firmly they may be believed in by 20-30 percent of the American public. We can find the same sort of numbers who also firmly believe in the literal existence of angels, after all, and they're also outside the bounds

of discussion within The SETI League. I've read more than my share of this literature in the past 52 years and have come to regard it not as worthy contributions to human knowledge but as the late 20th century counterpart of Millerism, Mormonism, mesmerism, Atlantis, Bacon-as-the-author-of-Shakespeare, table rapping, and countless other Victorian enthusiasms. There's always a great deal of nonsense about, which someone can be persuaded to believe.

Back to space-faring aliens: "Where are they?" Enrico Fermi once asked his dinner guests, and fifty years on we still have no answer. Compared to exchanging radio messages, interstellar travel would be (a) dull, (b) expensive, (c) inefficient, and (d) tediously time-consuming. SETI pioneers argued in the 1960's, but space-farers might have other goals than exchange of scientific knowledge. (Species survival, perhaps? That some of the SETI set could envision no other motive for interstellar travelers than military conquest of other species says something indeed about the aliens among us, but I am not sure what.)

About 1970, Michael Hart proposed that the absence of aliens on earth demonstrated the absence of aliens off earth. Any species with the ability to travel from star to star at the rate of 0.1 C could traverse the length of a galaxy in a million years, he argued. A species which chose to build colonies which built other colonies would in time reach every sun of the Milky Way. That individual technological civilizations might not be interested in such activity, as suggested by SETI enthusiasts, might well be true, but it hardly seemed possible that not one alien species would be interested in or capable of interstellar flight.

And about this time, Ron Bracewell began to argue that within a century progress in computer science would make possible robotic explorers ("von Neumann replicators") which would explore alien solar systems and exploit local resources to make duplicates of themselves which could be sent to explore other suns. Interstellar exploration could be made cheap and easy, it would seem...

So, where indeed are they? Hart has the right of it, I suspect. There aren't other advanced technological civilizations out there, or at least not anywhere close to us. Getting life started is easy, but there are countless obstacles to reaching much else. Either multi-cellular life is rare, or intelligent life is rare, or technology is rare.

Thus, my questions: Which? Why? ❖

Hardware Page

Helix Antennas, Theory and Practice

by Edward R. Cole, AL7EB (al7eb@ptialaska.net)
SETI League volunteer Regional Coordinator for Alaska

This article documents research done by Dr. Darrel Emerson, AA7FV, Kitt Peak Observatory: demerson@nrao.edu

Several studies of the axial-mode Helix, created by Dr. John Kraus, W8JK, at Ohio State University, indicate that an antenna of 7 wavelengths and approximately 1.05 wavelength circumference will produce a gain of ~15 dBi (Kraus's early formulae appear to overestimate the gain of a helix). Several studies have been done: King and Wong, Lee and Wong...Darrel has a web page which investigates the Helix and shows several graphs. NEC analysis is also included.

Mike Cook, AF9Y created a 437 MHz tapered Helix design based on these studies (which could be scaled to 1420 MHz) and can be seen on his web page. This is essentially the antenna I built for 437 MHz with one difference: I used a 15 inch aluminum pizza pan for a reflector. The AF9Y Helix is fool-proof, if scaled. The tapered design improves circularity, as the standard Kraus Helix exhibits a little asymmetry. I would use a reflector screen, however, to ensure good G/T. I've toyed with the idea of building one of these to compare with a dish.

The spacing between helices is similar to spacing of Yagi antennas. The goal is to have their effective apertures just touch to maximize gain. A small overlap of aperture is usually done to minimize sidelobes at a small sacrifice of gain. Aperture of an ideal dish is equal to its physical size, whereas antennas such as Yagis and helices the aperture is usually greater than the physical dimension. A good antenna book will give the relationship between gain and aperture. I suppose NEC can do the same.

The rule of thumb for long (>2 wavelength) Yagis is to space antennas of an array at half the boom length. Therefore, for a 7 wave, helix spacing would be $3.5 \times 21\text{cm} = 73.5\text{cm}$. This is about 2.4 feet. An array of 16 of these helices would be 7.2 feet by 7.2 feet square and the ground plane would be 5 inches larger (or 7.65 feet square). From Kraus, the number of turns = boom length/S, where $S = C \tan(a)$. S is the turn spacing, C is the turn circumference, and a is the turn pitch angle. For $C = 1.05$ and $a = 12.5$ deg, $S = .23$ wavelengths. $7/.23 = 30$ turns. AF9Y claimed 15.9 dBi gain from a 23 turn helix, so maybe a 30 turn helix would do a bit better. Kraus's book *Antennas*, gives a good example of how to feed four helices from a common 50 ohm coax feed.

In summary, Darrel Emerson reports: "The modeling studies, and recent papers in the literature, all agree that the simple formula for gain of the helix vs. length derived by Kraus is too optimistic. King and Wong, and Lee and Wong, are the classic references." ❖

L-Band Gain At Sixty Percent Off!

By H. Paul Shuch, Ph.D.

The typical amateur hydrogen-line radio telescope or SETI system uses an antenna-mounted low-noise amplifier, or LNA, which is often located some distance away from the station's microwave receiver. To get power to the LNA, and add enough gain to overcome feedline losses, most of us use three rather costly components. This article shows how one inexpensive UHF TV accessory, found at Radio Shack®, can do the job of those three specialized parts, at about forty percent of their price.

My radio telescope uses a Skyvision #02-3000018 satellite TV line amplifier just behind the LNA. This \$24.95 unit exhibits flat gain from 950 to 2250 MHz, and is a natural for 1420 MHz radio astronomy. Both the line amp and my LNA require 12 to 24 volts of DC fed through the center conductor of the coax, which I apply via a Down East Microwave Bias Tee, inside the SETI station. The required operating voltage comes from a Radio Shack "wall-wart" style DC power supply. Total cost for these three items was around \$73 US.

Since the lineup described above works well, and doesn't exactly break the bank, I had no strong incentive to make system changes. However, while browsing the local Radio Shack store for a UHF TV antenna project, I came across a perfectly acceptable replacement for the line amp, wall wart and DC block. The item is their Catalog Number 15-1115B UHF Coaxial In-line Amplifier, and consists of a line amp, DC power inserter, and wall-wart power supply, all for just \$29.95 US. The line amp is rated at 430 to 1430 MHz, exhibiting 20 dB gain and a 5 dB noise figure at the 1420 MHz hydrogen line. The DC block (the spec sheet calls it a Power Injector) has 2 dB maximum insertion loss, and the attached power supply puts out 18 VDC at 50 mA.

Using the standard rule of thumb for required preamp gain (downstream noise figure plus ten dB), this line amp is ideal behind any LNA with at least 15 dB of gain. Since my LNA has 20 dB of gain, its noise temperature dominates system performance, and line amp noise contribution is negligible. Similarly, the gain in the line amp is adequate to override the insertion loss of the DC block, plus the additional loss from a 100 foot run of RG-8 coax. And since the line amp's current draw is only 20 mA, the power supply marginally but adequately provides the additional 25 mA required by my LNA, with a few electrons to spare.

As it comes out of the package, the line amplifier has a DC block screwed onto its input connector. This is to keep the UHF TV antenna (if using the amp in its advertised application) from shorting out the DC power supply. If you want to pass DC through the coax to your LNA, don't forget to remove this clearly marked subassembly. The line amp itself does pass DC from its output to its input connector.

I haven't changed over my L-band radio telescope yet, but the numbers work, and this hardware checks out on the bench. I've used this combination on my Ku-band radio telescope (behind a standard Direct Broadcast Satellite low-noise block downconverter) with good results, and find the power supply adequate to run both the LNB and the line amp (with not quite so many electrons to spare). ❖

Announcing:



The SETI SuperStar Web Award

The SETI League, Inc. is pleased to announce the establishment of a periodic award honoring excellence in SETI website design. The award is known as the SETI SuperStar Award. Noncommercial websites devoted to the scientific Search for Extra-Terrestrial Intelligence (SETI) are eligible for consideration for this award.

SETI League members in good standing are encouraged to nominate worthy websites for this award, and webmasters are invited to self-nominate their sites, whether or not they are SETI League members. All nominations should be made by filling out the appropriate form on our website. Be sure to include the complete URL of the site to be evaluated.

Sites so nominated will be evaluated by our Awards Committee for information content, scientific accuracy, positive portrayal of SETI subjects, service to the SETI community, ease of navigation, and overall presentation. Nominees need not be members of The SETI League, Inc. Membership status will not be a criterion in selection for this Award (although SETI League membership is of course encouraged). The Awards Committee may select not more than one website per month for receipt of the SETI SuperStar Award.

The SETI SuperStar Award carries with it no cash honorarium or any other consideration. Appropriate recognition is the sole prize. Recipients are notified by email of their selection, are listed on (and their websites linked from) the website of The SETI League, Inc. Recipients are encouraged to display the graphic depicted above prominently on their winning websites.

Websites honored with the SETI SuperStar award to date include:

May 1999: SETI Endeavour

<www.duhnet.com/SETI/>

June 1999: Columbus Optical SETI Observatory

<www.coseti.org>

July 1999: ET Presence

<www.et-presence.ndirect.co.uk/>

August 1999: Jenny Bailey's SETI Receiving Equipment

<www.jsuared.co.uk/seti/>

September 1999: Search for ExtraTerrestrial Intelligence Network

<www.seti.net>

October 1999: Amateur SETI Home Page

<php.ucs.indiana.edu/~foxd/home-seti.html>

November 1999: Radio Astronomy at the University of Indianapolis

<radio.uindy.edu/radio/>

December 1999: The Tvind SETI Observatory

<inet.uni-c.dk/~tvikraft/tso/setie.htm>

As always, decisions of the Awards Committee can be expected to be arbitrary, capricious, and final. ❖

Bruno Nominations Now Due

Nominations for the 2000 Giordano Bruno Memorial Award, The SETI League's highest honor, are due by January 1, 2000. Named in memory of the Italian monk burned at the stake in 1600 for postulating a multiplicity of inhabited worlds, the Brunos are awarded for significant contributions to the art and science of SETI. Neither nominator nor nominee need be SETI League members, although a written nomination, citing the contributions of the nominee, is required.

The 2000 Bruno Award winner will be announced at our Sixth Annual Meeting on Sunday afternoon, 26 March 2000. Past Bruno recipients include:

1996 - Dr. D. Kent Cullers, WA6TWX

1997 - Daniel Boyd Fox, KF9ET

1998 - Ken Chattenton, G4KIR; Trevor Unsworth, G0ECP

1999 - Noel Cedric Welstead, VK4AYW

Please email your 2000 Bruno award nominations now to bruno@setileague.org, fax them to 1 (201) 641-1771, or mail them to SETI League headquarters. ❖

Annual Membership Meeting Scheduled

In accordance with Article IV, Section 1 of our duly approved Bylaws, the Trustees of The SETI League, Inc. hereby schedule our Sixth Annual Membership Meeting for 1 PM Eastern time on Sunday, March 26, 2000, at SETI League Headquarters, 433 Liberty Street, Little Ferry NJ 07643. This office is located just two blocks north of Route 46 and one mile east of the Teterboro Airport, on the northwest corner of Liberty and Kinzley Streets. See our website for a map, courtesy of MapBlast.com.

We recommend that out-of-town members and guests flying in commercially use the Newark International Airport (EWR), which is about twenty minutes South of our office. There is a wide variety of hotels available at the Newark Airport. A rental car is recommended. From Newark, drive North on the New Jersey Turnpike to US Route 46 Westbound, cross over the Hackensack River, and two long blocks after the traffic circle, turn right onto Liberty Street.

Our members and guests using General Aviation are invited to use the Teterboro Airport (there is a landing fee). Of the half-dozen Fixed Base Operators with transient parking, we recommend Signature Aviation. They will provide van transportation to the meeting. Please coordinate your schedules and needs in advance through our executive director.

As attendance by one percent of the League's membership constitutes a quorum, all members in good standing are encouraged to attend. Per Article IV, Section 3 of our Bylaws, written notice of this Meeting will be mailed to all members in good standing, not less than ten days nor more than sixty days prior to the meeting date. Members are encouraged to submit additional Old Business and New Business items for inclusion in the Agenda. Please email your agenda items to n6tx@setileague.org, not later than March 1, 2000.

The annual Board of Trustees Meeting required per Bylaws Article V, Section 3 will immediately follow the Membership Meeting. All SETI League members in good standing are welcome to attend. ❖

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The SETI League, Inc.

433 Liberty Street, PO Box 555, Little Ferry NJ 07643

Tel: (201) 641-1770; fax: (201) 641-1771

memberships: 1(800) TAU-SETI

email: info@setileague.org

Web -- <http://www.setileague.org/>

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The SETI League invites you to pay your membership dues and additional contributions via Visa or MasterCard. Please fill out the form below and return it with any order. We thank you for your ongoing support.

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The SETI League, Inc.

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Except for Household Members and Household Life Members, all memberships include subscription to *SearchLites*, our quarterly newsletter.

Payments may be by US Dollars check payable through a US bank, or by Credit Card (see form at upper right).

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	(u)	(o)
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<i>SETI League Technical Manual</i>	\$10	\$13
<i>Project Cyclops 2nd Printing</i>	\$20	\$25
<i>Sing a Song of SETI (Songbook)</i>	\$10	\$13
SETI Nerd Gift Set (one each Mouse Pad, Pocket Protector, <i>Project Cyclops</i> and <i>Tech Manual</i>) at 20% Savings to <u>Members Only</u> :	\$30	\$40

The above recommended contributions include surface postage to (u) United States, or (o) other addresses.