

# Short Circuit



January 1986  
Vol 10 Nr 4

Address correspondence to:  
Arctic Amateur Radio Club  
Newsletter Editor  
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President - Mike Rice, KL7YV  
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Treasurer - Jim Gilmore, KL7SW  
Secretary - Kurt Torgerson, WL7BGE  
Editor - Lewis Overton, NOSN

Next Meeting: January 10, 1986

The programs for the January and February meetings of the Arctic Amateur Radio Club are linked. On the SECOND Friday of January, there will be a program on the construction of small directional antennas suitable for use in mobile direction finding at 146 Mhz. At least two people -- Jim Gilmore, KL7SW, and Billy Connor, AL7FQ -- will describe different DF techniques and how to construct the needed equipment. Examples will be available for inspection.

Then February 7, on the regular meeting night, there will be a potluck dinner. More DF discussion will lead into the first "bunny hunt" of 1986, which will start at 1:00 pm Saturday, February 8, from Creamer's Field.

For those of you not familiar with bunny hunts, no one shoots little furry long-ears. The idea is to use radio direction finding to locate a hidden transmitter (the bunny). Bunny hunts can be lots of fun. Equipment can vary from highly sophisticated electronics down to just shielding your hand-held with your body and turning until the signal is weakest (at which point the bunny is behind you -- sneaky little devil). For good techniques in between the two extremes come to the meeting on January 10. Coffee and donuts are available at 7:30, the program starts at 8:00 at the Geophysical Institute auditorium on UAF West Ridge.

## Calendar of Upcoming Club Activities

|               |                     |          |                        |
|---------------|---------------------|----------|------------------------|
| Ham for lunch | Wednesdays          | noon-ish | Bakery on College Road |
| Westlink News | Sunday's            | 9:00 pm  | 146.88 Mhz             |
| Meeting       | Friday January 10   | 7:30 pm  | Geophysical Institute  |
| Ham Exam      | Saturday February 1 | 1:00 pm  | Geophysical Institute  |
| Pot Luck      | Friday February 7   | 6:30 pm  | To be announced        |
| Bunny Hunt    | Saturday February 8 | 1:00 pm  | Creamer's Field 146.52 |

« Oooopppsss! »

OK, folks. I know 7.027 isn't available to novices. I hope the novices know as well. It is ABSOLUTELY CERTAIN that everyone else knows, cuz they ALL told me. Look for novice activity around 7.125 MHz. And yes, Jim Gilmore is a ham. He even has a call: KL7SW. And the new word processor arrived, complete with spelling checker. That won't find right words in left places, but maybe it will help me spell correspondence correctly. Keep those slings and arrows comin'.

Operating Activities -- DX

by Dianne Marshall, AL7FG

YL International SSB'ERS, Inc.

The YL International SSB'ers Communication System meets every day at 1600 GMT on 14.332 MHz. The system is not a traffic net. There is no routine traffic handled here, but they will help you find a net that will take routine traffic. The primary purpose of the system is to be available on the air to handle emergency traffic. When there is no active emergency, members and non-member make contacts for a long list of awards. The awards number somewhere around 50, many with endorsements. There are trophies and plaques for some of the harder-to-get awards. Awards have names like the Amateur Radio Teams Award, Corona Borealis, SSB'ers Kangaroo Award, Sweet Fifteen Award, and The Square Shooter Award.

If you listen for a while you will hear people exchanging numbers as part of the contact. To get a number you have to join. Annual dues are \$6.00 per family which gets each member a number and a copy of the SSB'ers Voice. The Voice is a 150+ page book with information about the system, awards, pictures of members, contests information, stories, and a membership list. Send a SASE to KC4LF for membership information.

The majority of check-ins are from the U.S., with lots in the east. This is a good place to pick up the last few states for W.A.S. (Delaware, for example). There are often a few South American and European stations checking in. Often check-ins come from people driving cross country, just looking for company. Check-ins are accepted by call area, not in numeric order. Net control calls for DX every 5 call areas. I have checked in both as in the 7th call area and as DX; both seem to be acceptable.

The system runs about 8 hours and ends at the new day GMT. For those who haven't had enough there is a continuing session called the MOONBEAM. The MOONBEAM session seems more informal. Most days there are still people on frequency for a few more hours. If you are ever in trouble, the YL International SSB'ers will be there. Most of the daily gang have good stations to nail the DX and pick up the weak stations. Check in for fun; they treat Alaska as something special.

QSL Cards, IRC's and DX

One of the big attractions for me, when I was a kid and wanted to get into ham radio, was all the neat cards on the wall. It wasn't until I graduated from college that I got my license. Although the license only took two weeks to come, what I wanted more was my own QSL cards and to start getting others in return. I had an order form all filled out waiting for my call to arrive. When my call appeared, my order was in the mail within ten minutes. My cards back in a week. I only ordered a small quantity of inexpensive cards since I would be upgrading soon. I couldn't imagine how I could possibly use 400 cards in two months. My first contact was with Japan. No quick card there; it took 15 months for that card to arrive. My first card was from St. Mary's, Alaska; a homemade card with a dog team picture from WB4BSJ. All you DX'ers recognize the call from the Priblof's.

Well, things have changed and now I have QSL cards piled up everywhere waiting to be answered. I can use 400 cards in a night or two. I QSL 100%. How do I send all those cards without going bankrupt? How do I get a rare DX station to send me a card? I send everyone I make a contact with a card through the QSL bureau. The QSL bureau is a network of incoming and outgoing collection points for cards. In the United States there are incoming bureaus for each call district, Puerto Rico, Virgin

Islands, Hawaiian Islands, and Alaska. The American Radio Relay League (ARRL) handles the outgoing bureau. The incoming bureau receives cards for you; the outgoing bureau is where you send your cards.

John Bierman, KL7GNP, and his wife Dot are the Alaska bureau, handling all the cards in your best interests. To get cards from the bureau, send \$5.00 to John to cover the costs of postage and envelopes needed to get your cards to you. The bureau is slow. It may take years to get cards from places like Russia, but some other countries do come through in a few months. The address for the Alaska QSL bureau is 4304 Garfield St., Anchorage, Alaska 99503.

In your cards there will often be cards from short wave listeners (SWL's). These are people who have heard you make a contact with someone and would like you to confirm the contact. I strongly urge you to answer SWL's from Russia. They need confirmations to get the transmitting part of their license.

Outgoing cards may go through the ARRL bureau, through foreign bureaus (similar to our Alaska Bureau), or directly to the individual ham. To use the ARRL bureau you must be a member of ARRL. For the ARRL bureau, sort your cards by country (if you don't they will send you a nasty note). Include a mailing label from a current QST, and a dollar per pound or part of a pound. Send the package to ARRL QSL bureau, 225 Main St., Newington, CT 06111. If you are a family member put a note in the package letting them know. The system works fairly quickly. I have heard back over the air in a few months that people have received my cards in Europe. The QSL bureau is really the only reason I belong to ARRL.

If you are not a member of ARRL, or you just want to, you can send cards directly to the radio operators, or to their bureaus. The addresses of the bureaus are in the front of most callbooks. Direct QSLing is quicker than the bureaus, but expensive. International postage adds up quickly, even using slow boat.

I mentioned callbooks. These are directories of the addresses of amateurs around the world. Several different companies put them out yearly with updates during the year. If you make contact with someone and want to send them a card direct you can look their call up and get the address. Some of the books also come with cross references to name and location.

Rare DX means making a contact with a station that is in a place that is hard to get, often because there are few operators in that country. Once you have made a rare DX contact, listen to the pile up. The operator will often give his QSL information. For many rarer stations that work lots of contacts the operator will have a QSL manager who will handle all the cards for the rare station. If the station has a state-side QSL manager, send your card to the manager along with a self addressed stamped envelope (SASE) large enough to hold the DX station's card. If don't send a SASE you might get a card through the bureau, but don't count on it.

When the station has a foreign QSL manager you will have to include a self addressed envelope (SAE) and international reply coupons (IRC's) for postage. IRC's allow the foreign operator to buy postage in his country. IRC's may be purchased at the post office for 65 cents each, but first ask around. IRC's can be purchased on the open market for 40 to 50 cents each. The club has some for sale right now. One IRC is suppose to be good for surface postage anywhere in the world. Air mail postage varies from 2 to 5 IRC's. The callbook contains a table showing the number of IRC's required for air mail for each country. Alaska is somewhat a rare DX country. You may get IRC's which you can use to send QSL's to other DX stations.

Some rare DX stations don't give out QSL information on the air. Even if they do and you missed it, there is still hope. Try the callbook for an address. If it is not listed, there are other sources. The magazines all have DX listings and QSL information. The W6GO/K6HHD list identifies stations and their QSL managers. "QRZ DX," the weekly DX news, often has QSL listings. The International DX Association net meets at 0000 UTC on 14.236 MHz just for passing QSL and DX information. KL7XO and AL7FG have the W6GO/K6HHD List, "QRZ DX," and the current callbooks with supplements. Just ask.

Repeaters and FM News

New Repeater in Seward

For visitors to the Seward area, there is a new repeater going in at an excellent location. The new KL7WM/R will operate on 145.2 (-600) from the end of Resurrection Pass. Two four-element yagis, one pointed up the road, one out over the water, will be located at 700 feet above sea level. The repeater will run 30 watts on four US Coast Guard 5-year batteries. A link on 220 through Soldotna and 440 from there to the KL7GG 145.45 repeater in Eagle River will extend the coverage far to the north. In addition, the Coast Guard will be asked to monitor the repeater for emergency calls from boats in the area. This is not a club project. It is going in through the efforts of Mike Hurlbut, KL7HNU. Mike expects the repeater to be up soon, and the links to be in place by summer.

... information from Mike Hurlbut, KL7HNU

What are YOU going to do about the Intermods

by Steve Estes, KL7XO

« What is Intermod ? »

"Beep beep grind", "ET Please phone home". Sounds almost familiar to the hams in the Tanana Valley who monitor the 146.28/88 repeater. If you listen carefully, you will notice that these transmissions usually consist of two and sometimes more voices. The cause of this phenomenon, intermodulation or intermod for short, is a nonlinear device. Often a third transmitter, which is also working correctly, a receiver, even a barbed wire fence can act as a nonlinear device and create intermod from the mixing of signals from the correctly operating transmitters. There are numerous other (commercial) transmitters located near our 28/88 machine. The originating transmitters are usually working correctly, with no distortion or harmonics. To point a finger of blame at them would not be justified.

Intermodulation products are expressed mathematically as sums and differences of two frequencies or their harmonics. If two signals with frequencies  $F_1$  and  $F_2$  are passed through a nonlinear device or medium, intermodulation products result which are spurious frequencies (not harmonically related). A few of the possibilities are listed below;

- o Second order products  $F_1 \pm F_2$
- o Third order products  $F_1 \pm 2F_2$  ;  $2F_1 \pm F_2$
- o Fourth order products  $2F_1 \pm 2F_2$  ;  $3F_1 \pm F_2$

These just represent some of the possibilities with two transmitters. Just imagine the situation we have on Ester Dome where there are a hundred or so transmitters, several which are high power wide band models. The mathematical possibilities approach infinity.

« What can be done? »

First, you can turn your radio off or use a different repeater and ignore the mess. Second, we could move the repeater to another location thus limiting its coverage. Third, we can change the repeater frequency and hope to get away from the IMD products. However, given the situation on Ester Dome with the wide band TV and FM stereo stations it is unlikely that a better frequency can be found. Fourth, you can find the nonlinear device on Ester Dome that is generating the intermod and convince the owner that even though his radio or barbed wire fence is working fine, he will have to move it from Ester Dome so that the amateur radio

repeater will work right.

Fifth, we can provide subaudible tone access to the repeater (many commercial operators do this). To do this you must have a two meter rig which provides this tone. Many newer rigs such as the ICOM O2AT, Kenwood TR2500 and TS-711A have this feature built in. Older rigs and some new rigs including the Kenwood 21AT, TR2600 have subaudible tones as an option which can be added for about \$35. The repeater's receiver listens for this special tone and keys the transmitter only when this special tone is present.

Sixth, we could provide touch tone access. For example you might need to dial "\*" on your touch tone pad to bring up the repeater and a "#" to turn it off when your done. Again, not every amateur has the required equipment or the desire to get it.

As I look at it, none of the six solutions are preferable to the existing operation. We already have other repeaters for those who can't stand intermod. Looking for better frequencies or nonlinear devices can require a lot of effort. Any volunteers? Tone signaling is restrictive and may cause problems to "DX" users if they are not full quieting.

Incidentally, Gene Colson, KL7YM, built tone access capability into the 28/88 machine. This could be activated by the flip of a switch. Gene also included a terminated circulator on the transmitting antenna output. This device acts as a one way valve and does not allow RF energy coming down the line to enter our transmitter, mix with our transmissions and create intermod on some other repeater. If every user of Ester Dome would use terminated circulators, and use linear amplifiers instead of class C in the final power amplifier, seventy percent of the intermod problems we have would go away. Further if all the barbed wire, guy wires, and any metal to metal contacts were well made (soldered) and grounded this would cure much of the rest.

Considering the hostile environment that the 28/88 machine is living in, it is doing extremely well. KL7YM and KL7AH deserve a big thank you for their contribution to amateur radio in the Tanana Valley.

Packet Radio News

The TAPR group recently sent a Christmas Present to purchasers of TNC-2 boards with serial numbers below 500. The "present" consists of parts and instructions to correct some problems found in the earlier TNC-2 kits, a new ROM containing versions 1.1.2 software, and a new memory chip to increase the RAM in the TNC. Kits with serial numbers above 500 should have the mods already in them, except for the software. TAPR will upgrade your ROM to version 1.1.2 for \$10.00 if you send the ROM back to them. Mike Rice, KL7YV, has the new software and a ROM burner, however, and he has offered to reburn your ROM locally at no charge. That's a bargain if you have the 1.1.1 software and would like to upgrade.

Dianne Marshall, AL7FG, has developed a method for switching the TNC-2 between HF and VHF without having to open the box. She removes the pots for setting tones and the components on the headers which must be changed to switch to HF. These components, along with alternate values for the other bands, are removed to a piece of perfboard. A simple toggle switch then selects either HF or VHF values. A complete write-up is available from Dianne or on request from Short Circuit.

Experiments with a digipeater at Byers Lake have proved successful. A permanent digipeater there should open the Anchorage to Fairbanks path along the highway should be open with reasonable antennas at the ends. Watch the BBS for announcements.

Education and Exams

Upgrades and New Licenses

Upgrades from the December 4th exam ...

Don Churchill from Novice to General  
Tom Hassler WL7BIF from Novice to Tech  
Jim Dixon WL7BIP from Novice to Tech  
David Hagstrom from Novice to Tech

New calls received

Roger Ross WL7BIS  
Eddie Curry WL7BIT

Congratulations to all and to our Volunteer Examiners for helping Ham Radio grow!

Club News and Commentary

Telling the Players without a Program

One of the commonly heard complaints from newcomers and some old members as well is that it is hard to identify who's on first, what's on second, and ... old joke. The complaint is well founded, however. Many of us have heard complaints that newcomers, in particular, have trouble identifying hams at meetings, operating events, and social activities. There have also been complaints that people have been told "Go find Joe for an answer to your questions. Joe is the Fraplap manager for the club." But the person asking doesn't know Joe, has no last name to go by, and can't tell by looking who might be interested in Fraplaps! So the question goes unanswered, even though Joe is standing not ten feet from the questioner. The club loses the participation of someone valuable, the person asking goes away frustrated, perhaps never to return. All lose.

Identifying people visually won't solve all these problems, but it will indeed solve some. We have found a source for reasonably priced name tags here in Fairbanks, and orders are being placed through Lewis Overton, NOSN. Some of us have already received tags, and everyone is being encouraged to order a tag. Even though the price to "buy Alaskan" is a little more than mail order, we have elected to order through a local supplier. Tags are \$5.00 COD, and show the buyers name, call, city and state.

To help people identify club members, officers, committee chairs, event sponsors, and others of that ilk, each of these jobs comes with its own distinctively colored tag, again at no additional charge. Your fearless editor (ahem) has a name tag, a white on black Arctic ARC tag, a gold on blue tag that says Board, and a white on green tag identifying me as a Newsletter. That makes me quite a colorful character, which you may have guessed anyway.

If you would like to help your fellow hams get to know you, we encourage you to order a tag for yourself and one for each ham in your family (or non-ham for that matter). Order through the newsletter or any board member or officer.

Letters

Dear Editor,

I am new to amateur radio and new to the Arctic Amateur Radio Club. I am enjoying my new hobby very much, and enjoying the Club and its activities also. It appears that there are two kinds of "events" the Club participates in. There are the monthly meetings at the Geophysical Institute, the weekly luncheon ragchews at the Bakery, an annual giving of awards in recognition of service and some others to roast

more, shall we say, "colorful" activities by members.

I have also heard discussions about "special events" such as the Yukon 800 boat race, the Yukon Quest dog mushing race. I wonder if it might be helpful if we more formally distinguished between these two types of events, something like, "A regular event is a club activity which has been sanctioned, sponsored, and scheduled by the Club board. A special event is a formal Club involvement in an activity not sponsored by the Club, and in which Club members participate under the coordination of a club member sponsor." These definitions obviously require some wordsmithing, but they may give us something to shoot at and chew on. If I have heard and understood correctly, Board members or their designees run regular events, whereas formal club involvement in a special event requires a club member to step forward as Club involvement "sponsor" and muster club members for the event and to be liaison with the event organization. I think that this means "no Club sponsor -- no formal Club involvement." All of this seems fair enough to me, but I would like to see it further clarified. Have you heard anymore word on when we will get the latest copies of the Club bylaws?

73's in the New Year!  
Tom Hassler, WL7BIF/KT

Activities, Radio Clubs, and Hams: a Strange Mixture  
An Editorial of Sorts

Putting the name tags together to take to the board meeting brought to mind one of the odd characteristics of radio clubs. As I assembled tags for people doing two, three or four different jobs, I thought about how clubs tend to have a core of a few people who do much of the organizing, another group of people who participate in activities but do not organize them, and a lot of people who join, attend some meetings and social events, but do not become involved in things. Often those in one group spend a fair amount of time grumbling about those in the other groups. "Why must we few do all the work?" "Why do those guys have to always try to run things?" "Why will no one volunteer to lead an event?" "Why do we have to have events instead of just meeting for fun?"

Well, I thought about that for a while (it took forever to put the name tags together). I won't try to explain human psychology to you, except to comment that without the differences alluded to above, we wouldn't have politics, horse races, or summit conferences. But it seems to me that one of the consequences of having all the little groups is that people may not know how to move from one group to another when the urge overcomes them. The Pres says, "We need a sponsor for the boatrace." During the ensuing silence there are likely to be at least three people thinking, "That might be interesting if I had some idea about what to do, how to do it, what has been done before, and how much work is involved. Gee. I'll bet there is a lot of work involved just in figuring out how much work is involved!" About that time the Pres starts to growl, and one of the core folk says, "Oh, FRAPLAP! All right, I'll do it again." SHAZAM! Another event gets laid on an already overcommitted member, while others who might enjoy trying something new feel left out.

So what do we do about that? (Sam, are you gonna tell us what to do again? Sure, Martha, wouldn't be any fun if I didn't get to tell y'all what to do.) It seems to me that we should identify potential events and activities that people might like to try. We can get an "old hand" to join up with a "new kid" and put the pair to work together. We can explain what is meant by a club sponsor, what club sponsored events are, how they differ from events which are not club sponsored, and what resources are available to event sponsors.

What can YOU do about that? (Here comes the pitch, right Sam?) When the Pres says, "We need a sponsor for the boat race," you can climb to your feet in the meet-

ing, or speak forcefully into the phone, and say, "Sure, I'll be the "new kid" half of the sponsor team. Who will be the "old hand" who will help me get started?" Of course, the Pres will be well prepared for you and will say, "Abigail did it last year, and will help you get started. Call her at 555-1234 after 6:00 pm any night this week."

Now for the hard part (mine, that's what makes it hard!). I will try, in future issues, to bring to these pages a discussion of what makes up a club sponsored event, what it means to be an event sponsor, and what it means to have an event backed by the club. Clearly a club event should NOT be an event where one person does all the organizing and most of the work. That would be an individually sponsored event, for which you don't need the organization of a club.

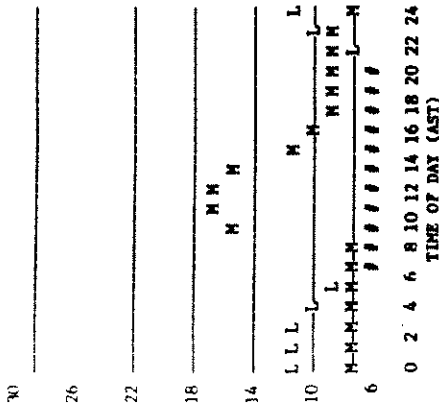
The club has undertaken activities and events like those listed below. At the present time, we are looking for people in these areas. Are you interested?

- o teaching ham radio classes, both to prospective novices and to license holders for upgrades. Ham education has been conducted through TVCC, but is not restricted to that method. In fact, we need to examine the effectiveness of our education program. We need to expand it beyond the confines of Fairbanks, as is being done with the classes at Fort Yukon. And most of all, we need to qualify more instructors, to relieve the burden on those who have been teaching. It's easy to burn out teaching ham classes, but it isn't necessary to do so. And it can be lots of fun. There are some new opportunities for teaching today. Ask!
- o developing programs for meetings. We have moved the program slot to the beginning of the meeting, to attract more people to the program. We need more varied programs, more non-technical programs, and programs with wider interest. Billy Connor, AL7FQ, is our program chairman (the job goes to the VP). He would be delighted to hear your ideas for program topics, and to help you develop those ideas into a program, or to help find presenters. Call him!
- o publicity and public relations. Would you be willing to contact news media from a call list to place announcements for club events? How about putting up posters announcing meetings once a month? There are lots of things to be done, many of them easy, but when only one person does them they become a burden. How about sharing the load?
- o liaison with state, borough and city government. We have one liaison with the Civil Defense activity in the borough (Dave Williams, KL7JIZ). We could certainly use additional help in this area, both participation and ideas for what we should be doing. Call!
- o working on repeaters, both digital and voice. You need not be a technical whiz kid. Jobs include assembling boards for repeaters from kits, installing or transporting gear to remote sites, holding guy lines, or reviewing potential sites. What would you like to do?
- o writing articles for ham publications. There is editorial help available. There are suggestions available for topics and for publications which might be interested in what you write. Several hams in the area contribute to World Radio. How about you?
- o making our fair booth (more) interesting to the public

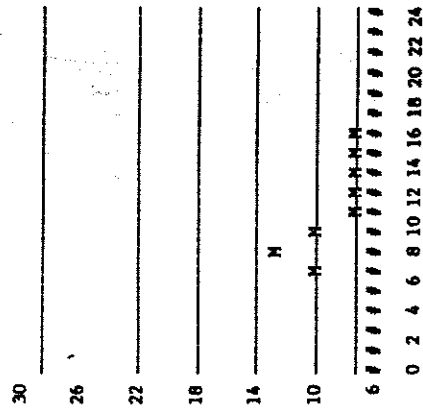
You don't have to do any of these things. It's a club, remember, not a job. While the club must have the support of hams for the club to function, hams can be hams without a club. Still, some of the activities in need of people just might be fun. No one (I hope) will condemn you if you don't participate. No one (I hope) will condemn you if you try and aren't the pro they might think themselves to be. Clubs should be for the enjoyment of the members and of the people in the community where the club operates. Write or call me if you want to play. I'm Lewy, N0SN, Editor of this rag.

PROPAGATION FORECAST FOR JANUARY 1966  
Prepared by Rod Combellick, IL7JJA

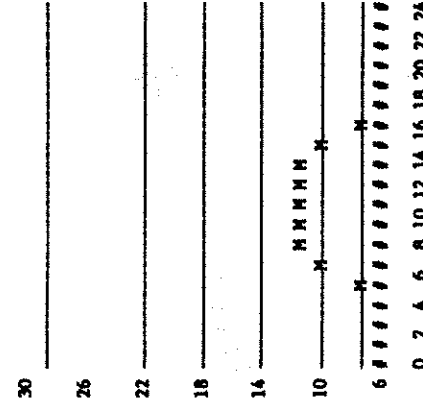
FAIRBANKS TO CENTRAL AFRICA  
TO: 9Q  
10 DEGREES & 8273 MILES  
DATE: 1-19 TIME: AST  
FLUX: 74 PLOT: MUF



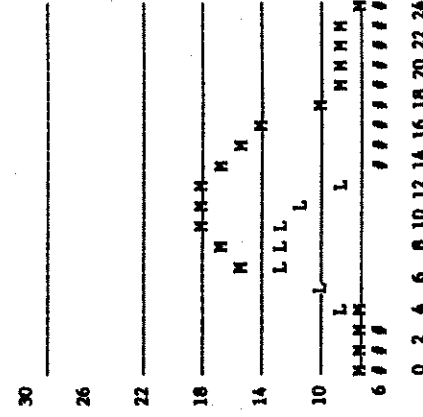
FAIRBANKS TO EUROPE  
TO: EA  
28 DEGREES & 4932 MILES  
DATE: 1-19 TIME: AST  
FLUX: 74 PLOT: MUF



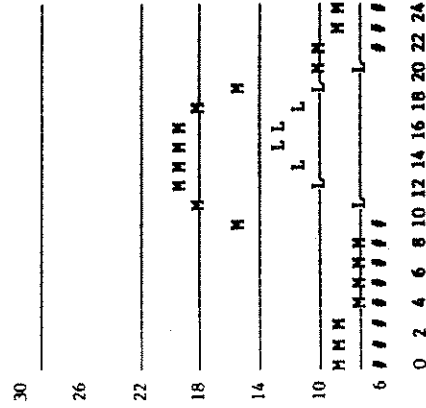
FAIRBANKS TO EASTERN E.A.  
TO: W3  
87 DEGREES & 3271 MILES  
DATE: 1-19 TIME: AST  
FLUX: 74 PLOT: MUF



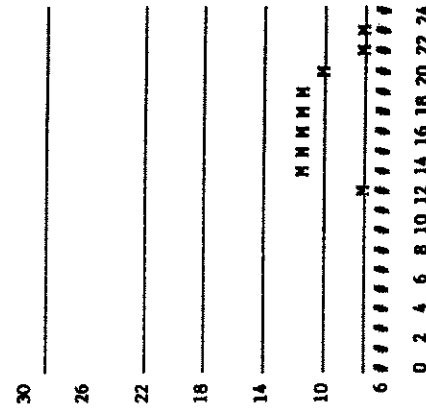
FAIRBANKS TO SOUTH AMERICA  
TO: CP  
106 DEGREES & 6988 MILES  
DATE: 1-19 TIME: AST  
FLUX: 74 PLOT: MUF



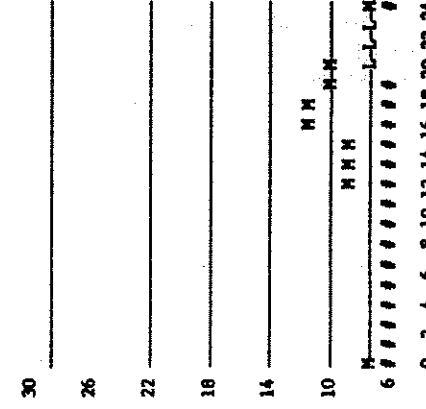
FAIRBANKS TO SOUTH PACIFIC  
TO: 3D2  
212 DEGREES & 5930 MILES  
DATE: 1-19 TIME: AST  
FLUX: 74 PLOT: MUF



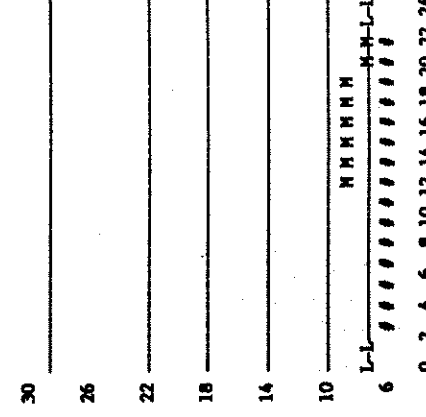
FAIRBANKS TO EASTERN ASIA  
TO: BM  
264 DEGREES & 3736 MILES  
DATE: 1-19 TIME: AST  
FLUX: 74 PLOT: MUF



FAIRBANKS TO CENTRAL ASIA  
TO: 9H  
316 DEGREES & 5422 MILES  
DATE: 1-19 TIME: AST  
FLUX: 74 PLOT: MUF



FAIRBANKS TO RUSSIA EAST  
TO: EZ  
348 DEGREES & 6255 MILES  
DATE: 1-19 TIME: AST  
FLUX: 74 PLOT: MUF



27-day solar-flux forecast of Dec. 31, NOAA Space Environment Laboratory:  
Maximum S.F. = 81, January 12 Minimum S.F. = 67, January 27  
Average forecast S.F. = 74, Jan. 19 (basis for plots)

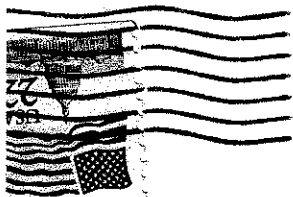
M - Maximum Usable Frequency (MUF)—frequency at which a signal will propagate at least 50 percent of the time under 'normal' conditions.  
L - Lowest Usable Frequency (LUF)—lowest frequency that will support propagation along the path. Path is closed if L is higher than M.  
# - MUF or LUF off scale.

| Geomagnetic Activity Range | Geomagnetic Level | AP <sup>00</sup> | Expected Propagation |
|----------------------------|-------------------|------------------|----------------------|
| Quiet                      | 0-2               | 0-7              | Above normal         |
| Unsettled                  | 2-3               | 7-15             | Normal to high       |
| Active                     | 3-4               | 15-30            | Normal to low        |
| Minor storm                | 4-5               | 30-50            | Below normal         |
| Major storm                | 5+                | 50+              | Poor                 |

\*Obtain actual daily readings of flux, A and K indices from WY at 18 past the hour. If actual flux is higher than 74, then MUF is higher than forecast.  
\*\*Obtain actual daily readings of AK index from 552-2398 in Anchorage (recording) or the UAF ACAD3 computer (at & prompt enter @DISSEM1[FLUX]MUF).

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## Short Circuit

is published monthly  
by the  
Arctic Amateur Radio Club  
PO Box 81389  
Fairbanks, AK 99708

Lewis Overton, NOSN editor

Short Circuit is an open dialog among people interested in Amateur Radio, not all of whom need be hams. Permission is granted to reprint from this publication with appropriate source credit. If you find something useful in these pages, we want to share it.

Our goal is to be a valuable resource of ideas and experiences beneficial to the Amateur Radio Community. We publicize and support the efforts of those who help keep ham radio alive and active, with emphasis on the activities and interests of hams in interior Alaska.

You readers are participants in the dialog. As Worldradio expresses it, "... an alliance of active radio amateurs concerned with reality, using radio as a communications tool to develop the skill, quality and full potential of Amateur Radio." We want to hear what you are doing, what you need and want in order to keep amateur radio fun, and what amateur radio is doing for your community.