DX - Cont. -

CONTINUED FROM PAGE 12

couple of years Larry has been in Italy but unfortunately "grounded" as far as amateur radio activity is concerned as there is no reciprocal agreement between Italy and other countries for hams. Larry entered the recent Volta Contest in the SWL category and sent us a copy of his log. Well, we were really amazed at the number of countries logged on 80 and 40 meters over there that we cannot even hear over here. In contrast we noticed that only one station from either North or South America was logged over there, and that was KZ5LF. What this tells us, I don't know, but apparently the boys in Europe have just as much difficulty hearing us as we do them on these two bands. Possibly the moral of the story is that the boys on this side of the pond should concentrate on racking up the W/VE sections as multipliers on 40 and 80 to counter the many countries the European boys have on those bands over there.

Henri, LU2ESB has been active with his old call of FO8BS from Tahiti while on vacation for a few weeks. Claude, F9LC, met with the New York RTTY gang on a trip to the States in early December. Ike, PJ2CR, picked up a new Drake Line while here in the States recently and will be QRV again very soon.

It is with extreme pleasure that we now introduce the latest recipients of the 100 DXCC-RTTY Plaque Award.

Nr. 10 Reg Wigg G6JF
Nr. 11 Bud Smith W2LFL
Nr. 12 Lamberto Rossi I5ROL

With 101 confirmed countries on RTTY Reg is the first from the British Empire to claim the Award. When Reg isn't busy with the farming chores there in Devon he can be heard on the band with a fb signal in spite of some 800 feet of feed line separating the rig from the antenna high on the hill.

A glance at the last posting of the Honor Roll and you will see that it was a neck to neck race and a photo finish between Reg and Bud. However, from back in the middle of the pack Lamberto, I5ROL, put on a burst of speed and came up with 104 confirmations to win Plaque Nr. 12. Lamberto did not fill us in with a rundown of past and present activities but modestly says, "it was finally achieved after 8 years without any operating difficulties, but with hard trouble to get all the confirmations". How true!

73 de John

*****

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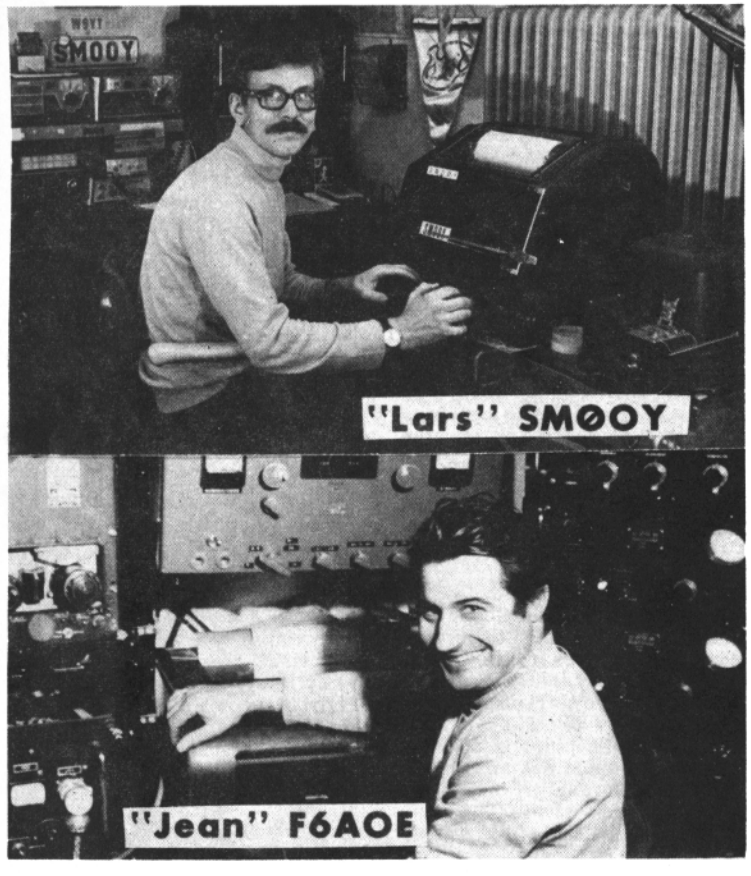


CONTENTS-

LOOKING BACK - - -

It has been just ten years since your editor first got on RTTY. In that time many active stations have disappeared and many are still active. Like all modes of amateur radio interest comes and goes but some of the pioneers are still active and long with interested newcomers the state of RTTY continues to advance.

In this issue we are printing letters from two of the pioneers. One is from Bob Weibrecht, W6NRM, (who is also deaf) and the other is a reprint of a letter from Merrill Swan, W6AEE published in the CARTG News. Both of these amateurs were among the first to adapt and use "what was available" on amateur RTTY and we are sure our readers will enjoy hearing about some of the crude (by today's standards) but workable equipment as well as a little history of Amateur RTTY.

*****

Merril Swan-W6AEE

MERRILL SWAN, W6AEE.
372 Warren Way
ARCADIA, CA.

My introduction to Teletype and it's potential for Amateur Radio operations occurred in late 1948 when my employer arranged to purchase several Model 12 Teletypes from a local electrical company, who had decided to lease rather than own and maintain their own system. There were twelve complete Model 12's in the lot along with parts enough to build up another complete Model 12.

To those who have never seen a Model 12, it is similar to a normal typewriter with added electrical equipment to operate the printing and sending functions. For example: There was an electrical distributor to select and operate the five magnets of the Baudot Teletype Code. Also a motor generator was supplied to provide DC to operate the magnets and polar relay used on the land line. Now, the big question how to operate these machines from a radio receiver and into a transmitter?

I was at that time supervising the research laboratories of United Geophysical Corporation, in Pasadena, California, hence had available necessary equipment to design electronic equipment used in Scismic exploration. To start on this project, a search of the Lab's Library was made to see what was prior anti (circuits) and what we could design for replacing wire line with receiver output and input to a transmitter.

After some time, suitable filters were designed to provide a separation of two tones to give an equivalent open and closed circuit. A primitive TU was written up and published in "CQ" Magazine in December 1952. Research work for providing AM, FM and carrier on and

CONTINUED ON PAGE 10

Robert Weitbrect-W6NRM

Robert "BOB" WEITBRECT, W6NRM
1966 Woodside Rd.
REDWOOD CITY, CA. 94061

Dear Dusty:

I thought I would drop you a line to let you know how much I enjoyed reading that letter of Mack Santer's - W2-ZPW, Brooklyn, N.Y. - which appeared in the just-come November 1973 issue of **RTTY JOURNAL**. It was in your Hits and Misses column.

At any rate, noting that Mr. Santer is deaf, I might as well relate a bit of my own experiences during the early days of amateur RTTY. I am also deaf, from birth, at least. I cannot even use a telephone in the normal manner, so what hearing I may have (and I do have some slight hearing, about 80 dB loss), I know Morse Code. Back in 1936 I practiced hard at Morse Code, building up my code speed to the required 13 words per minute. At the L.A. FCC office I was allowed to attach a code practice oscillator to the keyer terminals of their tape sending device. Wearing my Baldwin headphones (am sure you old timers know the "Baldies"), I was quite nervous and straining for the first Morse Code dit-dahs. . .finally they came, and I found I could copy them down on paper. So much for that, and my W6NRM call arrived in due course of time.

Around 1948 there appeared an article in **QST**, relating to Amateur Radioteletype, written by John Williams, W2-BFD. It was mostly a description of certain a.f.s.k. teletypewriter operations on the two-meter amateur band. The Model 12 Teletype machine, actually manufactured by Morkrum-Kleinschmidt back in the twenties, was an important piece of apparatus in the first

CONTINUED ON PAGE 10

THE OA-5 DEMODULATOR

KENNETH SIMPSON, WA8ETX
3700 Mountview Ave.
ALLIANCE, OH. 44601

By this time, most RTTY enthusiasts are familiar with the ST-5 and ST-6 terminal units described and designed by Irv Hoff. The OA-5 is basically an extension of these terminal units into a much smaller, neater package, with several extras added. An AK-1 AFSK generator is also included.

Anyone who has ever built an ST-6 knows that wiring the printed circuit boards is only about half of the job. The really big job comes in putting the edge connectors together (assuming that edge connectors are used) and the necessary interconnecting wiring to go to the various switches. I built my first ST-6 shortly after I had finished wiring a Heath SB-102 transceiver, and can truly say that the ST-6 took as much effort as the SB-102. If edge connectors are used, the job is simplified slightly, but there is the added cost of the connectors, which, if one has a fat junk box, may approach the cost of component parts.

Because of these reasons, the OA-5 was born. The OA-5 really includes all of the good parts of the ST-5 and ST-6 terminal units with the addition of an AK-1 AFSK oscillator, and some other options, all on a circuit board measuring 8 inches by 6 1/2 inches. The only interconnections needed are for the externally mounted switches, jacks, and transformers. This makes wiring an easy job. Typical time for the complete job should be on the order of eight hours, including tune-up time. In addition to the ease in construction, the possibility of error is also reduced, since there are very few wires to get in the wrong place. Appearance in greatly enhanced, and the cost is reduced considerably.

Basic Functions

A review of the original ST-5, ST-6, and AK-1 articles by Irv Hoff will show the advantages of this type of terminal unit. A few of these advantages will be mentioned here.

Input Filter:

This is an optional part of the OA-5. For good copy of RTTY, especially on the HF bands, an input filter of proper band-width is very important. In addition to the input filter, provisions are made on the circuit board for a 8 ohm to 600 ohm transformer to match the input impedence of the OA-5. We have found that many hams eliminate this small item, and sacrifice some of the exceptional copying ability of the TU, so a place was provided on the circuit board.

Discriminator:

The discriminator used on the OA-5 follows that of the ST-5 and ST-6. This design has proven to be very superior, Limiterless operation, such as provided in the ST-6 is so seldom used that it was eliminated from the OA-5. In two years of RTTY operation, I found that I had used it only once, so it is hardly worthwhile to include in a simple TU.

Slicer/Keyer:

The slicer/keyer stages also follow the ST-5 and ST-6 example. The active low pass filter and automatic threshold corrector was eliminated since this has its primary advantage in limiterless operation.

Power Supply:

The OA-5 uses a high voltage "floating loop" design that has become fairly standard. Other changes were made in the low voltage section of the power supply. Provisions are made on the circuit board for either a transistor regulated plus and minus 12 volt supply such as used in the ST-6, or for a zener regulated supply as used in the ST-5. Either type of regulation is adequate, but the transistor regulator is recommended. The added cost of the transistors is almost entirely offset by the different value of filter capacitance needed.

Added AK-1 power supply:

Many hams have used the plus 12 V DC directly from the ST-6 power supply for an AK-1 if it is included in the same case. This results in poorer regulation, and a different value of plus and minus voltages to the op amps, an undesirable condition. Research revealed that the transformer was capable of the extra load, but the regulator circuit was not (with out many changes). Because of this, an extra power supply (plus 12 V DC) was added for the AK-1. This power supply is also fused, and provides a handy place to turn the AK-1 on and off if this were ever desirable, thereby eliminating another switch. The AK-1 power supply is zener regulated, which has proved to be quite sufficient. Actually additional zener regulation is provided on the AK-1 oscillators

themself, so that there is almost no frequency variation with a change of voltage.

AK-1 AFSK oscillator:

The AK-1 is superior to every design of AFSK oscillator I have ever come in contact. A look at the output on a scope shows this very quickly. Transients, when going from mark to space, are non-existant, and the output is a beautiful sine wave, thanks to the low pass filter.

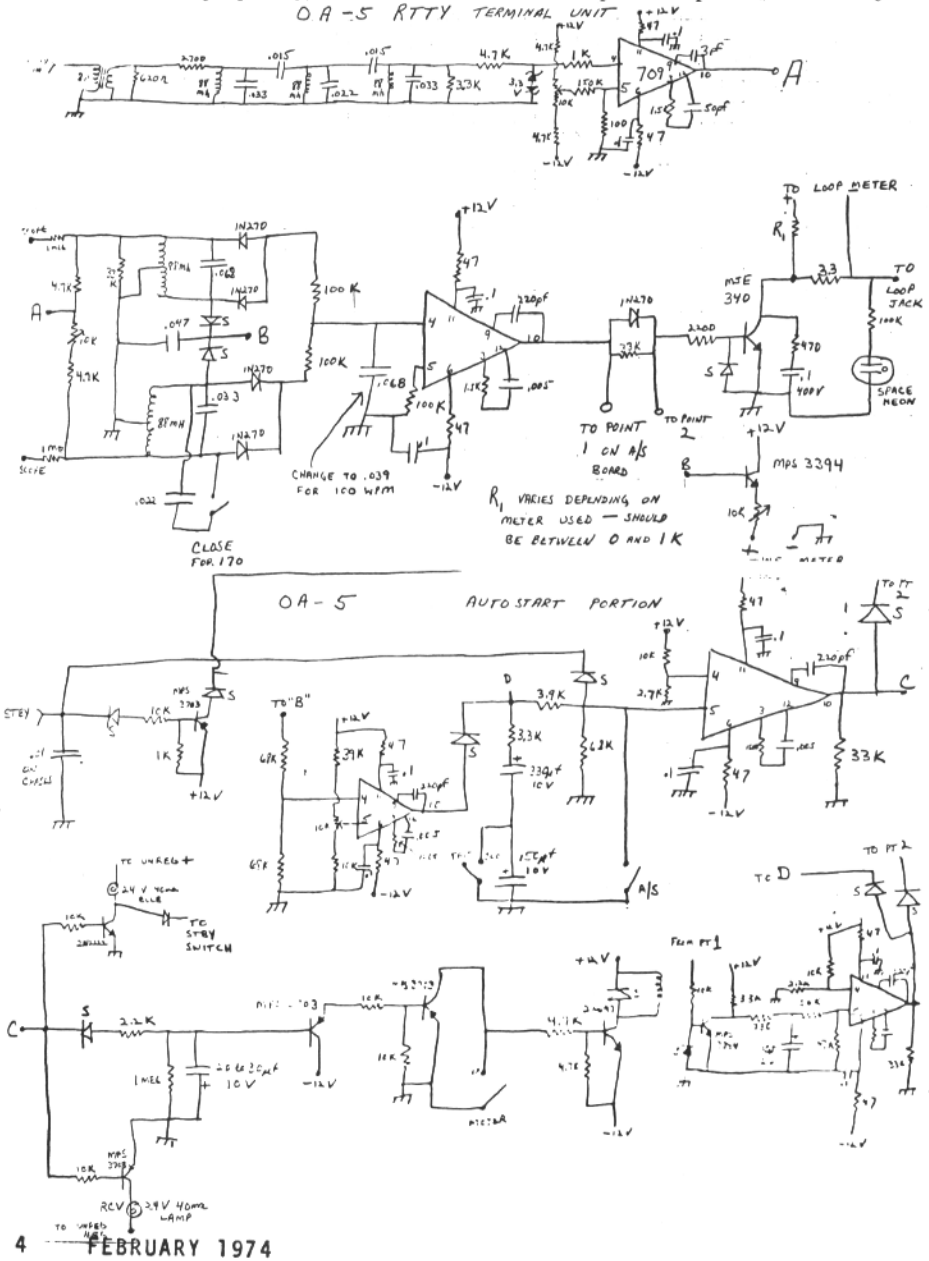
The AK-1 has outputs for low Z, high level inputs such as a carbon mike on a VHF rig, and for high Z, low level output compatible with crystal mike inputs. On VHF, AFSK is a standard practice. On the HF bands, AFSK can be used with a SSB rig to produce FSK, if, and only if, adequate precautions are taken. More on this later.

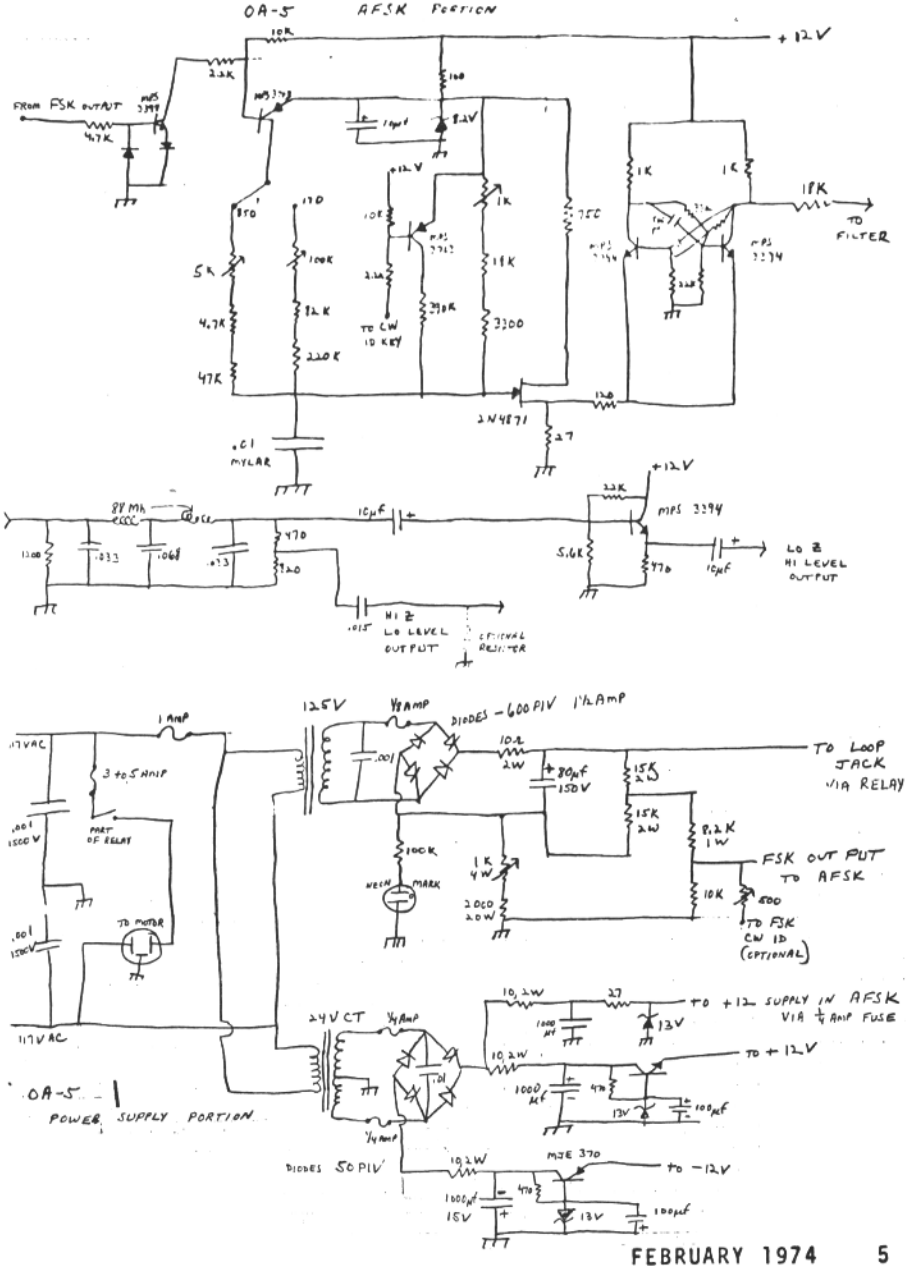
CW ID:

Provisions are included on the AK-1 for CW ID. If FSK is used instead, CW ID can be provided by the addition of a single trimpot.

Autostart:

The autostart is similar to the ST-6. Two speeds of autostart are provided, making "fast break" and net operation





much easier. Although it can be argued that a digital autostart is superior, even with the low cost of TTL logic, it is still much more economical to use the 709s since their cost has also been lower considerably.

Design changes:

Various design changes were made from the original ST-5, ST-6 and AK-1 articles. These changes will be discussed in parts. Options will also be discussed.

170/850 shift

Both 170 and 850 shift are still used today, even though the trend is toward 170 shift. In talking with most RTTY hams, it was found that they tend to use one shift predominately, and the other very seldom. Performance of the ST-5 and ST-6 when using an extra 0.022 capacitor, properly trimmed for the correct frequency, is really not as bad as one would be led to believe. If this is done, and the discriminator balance pot aligned for the shift most often used, almost no difference in performance could be detected compared to an ST-6 using separate boards designed for both shifts. For this reason, a capacitor is switched into the circuit for 170 operation, and the builder can balance the discriminator for whatever shift he desires. Another pole of this same switch is used to switch the AK-1 from 170 to 850 shift, so that the transmit and receive shift will be the same.

Upside-down switch.

This switch was eliminated from design on the board because it is used so infrequently. On VHF, I have never encountered a station upside down, and on the HF bands, it is so seldom, that one can simply switch to USB and invert the signal if needed. The added complexity and necessity for very short switch leads, precluded the use of this switch on the board.

Metering circuits

A meter, such as used on the ST-5 and ST-6 is included. In addition a switch is provided so that loop current can be metered. This has proven much easier than using a scope for tuning, once one becomes accustomed to the proper tuning method. For those desiring a scope, pads are provided on the board for the connection of an external scope.

If one were intending to use the TU on VHF only, the metering circuit could be eliminated entirely, since all stations would have the proper shift, and, hopefully, be on frequency. Two blinking neon bulbs are provided to indicate mark and space conditions. These would be useful as tuning indicators if the meter were not used and is quite impressive to visitors in the shack even if the meter is used.

Autostart lamps

The original ST-6 made provisions for lamps to indicate the condition of the autostart. These are very good operator aids, and almost a "must" as far as this operator is concerned. They serve as a very good reminder of the autostart condition, and are also useful as an aid in aligning the autostart portion of the TU.

Autostart relay

The circuit to turn the motor and loop on, has been changed slightly primarily to permit the use of a DPST (normally open) relay if desired.

AFSK

A word of caution should be expressed regarding use of the AFSK generator. On VHF, there is no problem, since audio is simply fed into the mic jack of an AM or FM rig.

When AFSK is used to simulate FSK, by use of a SSB rig, on HF, the results can be very good, or they can be disasterous, depending on the procautions taken.

If you plan to use AFSK to simulate FSK, and it is really the easiest way to go RTTY transmit on HF, make certain that you change the BFO xtal in your rig to pass the higher frequencies, even if you intend to use 170 shift. The BFO shift results in more carrier and unwanted sideband suppression. I have had opportunity to use both an SB-102 and a Drake TR-4 this way. The modification is simple, and well worth the time.

Make sure that you do not overdrive the SSB rig. Most SSB rigs will not take RTTY as full power at all. This may be due to the use of sweep tubes in the final, or to a low duty cycle power supply, or both. A good rule to follow is not to run more DC power input than twice the place dissipation of the final tubes. This usually requires turning down the audio gain control, which in turn means that you are far from overdriving the rig. A small muffin fan will also produce big dividends, when placed on top of the finals, and/or the power supply.

Taking all of these precautions into account, several tests were run on the air. Two stations were utilized about 4 miles apart, with tests conducted on a quiet afternoon on 80 meters. Results with both the TR-4 and SB-102 indicated that the desired signal produced readings which almost pinned the S meter. The carrier was just barely discernable, and the unwanted sideband was completely absent. A conservative estimate would be that both carrier and unwanted sideband were down at least 80 db, and certainly should not be objectionable to anyone.

Again, let me caution you that the BFO crystal should be changed, and a minimum amount of audio drive should be used. If grid current can be metered, there should never be any grid current flow.

Generations of TUs

The OA-5 is the culmination of many solid state terminal units built by the author and members of the Marlington High School Amateur Radio Club (WB8BLH) where I teach.

To start, I built an ST-5 directly from the original plans, with no extra frills added. It worked very well, but more was still desired, so an ST-5 with input filter was constructed. About this time the ST-6 appeared, and I built in complete with all of the extras (and added more on my own). It performed very well indeed, but was really much more than was needed, and more than most hams could afford, especially if interested in VHF only.

Next an ST-6 was built for the club station, WB8BLH, but an AK-1 and autostart board were added, along with input filter, for use with VHF rigs, and the Heath SB-301/401. Results were very good, but an immense tangle of wires resulted.

The OA-5 was then born in an effort to reduce the complexity of the terminal unit and make wiring much simpler. The OA-5 should be superior to any VHF terminal unit now in use (excluding the ST-6 or TTL-2 which are rarely used on VHF), and should cost much less than any available. The OA-5 may not be quite as good as the ST-6 on the HF bands, but is better than a simple ST-5. Construction time is greatly reduced, and the board is layed out so that any of the various options can be added at any time.

I would like to express my thanks to members of the local radio clubs that have helped with the OA-5, and especially to the WA8VYQ who helped with the layout.

****

MORE ON POWER-FREQUENCIES

The little article by JA1ACB. in the January RTTY Journal did a nice job of discussing the options of gears for operation of 60 Hz machines on 50Hz. I had some pleasant correspondence earlier this fall with K1LPS who is currently with the U.S. Navy in Naples. Larry had the same problem with Mite and Kleinschmidt machines.

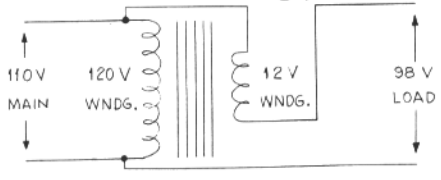
The problem of motor overheating is due to the lower frequency - not to any idiosyncrasies in the motors. Motors designed for 60 Hz must be run at reduced voltage on 50 Hz to avoid iron saturation, and the resultant high exciting current. The voltage must be proportional to frequency. A motor designed for 115 volts 60 Hz must be run on 5/6 of 115 volts or 96 volts at 50 Hz. There is some margin in design, of course (typically +/-10%), so some motors will behave ok on 110 volts 50 Hz. as long as the line voltage is not too high above nominal. The safer course is to use an autotransformer to reduce the line voltage. With the proper line voltage, the motor will develop normal torque at 50 Hz although the actual horsepower capability is reduced to 5/6 of the nameplate value.

The attached sketch shows how a 12 volt filament transformer can be connected as an autotransformer to reduce a nominal 110 volt line to about 98 volts. I say "about" since most transformers are nameplate rated on voltage with a 120 volt primary. Be sure the transformer is rated for 50/60 Hz or at least 50 Hz!

Starting and running capacitors will not be the correct values on 50 Hz but are not as critical as the voltage. For best results, any capacitors should be increased in capacitance by 20% to compensate for the lower frequency. As a final suggestion, make sure the motor has an ample supply of cooling air.

These suggestions should insure cool, dependable operation of nearly any 60 Hz synchronous motor on a 50 Hz main. I hope this information will be of some use to our friends overseas, and I will be glad to answer questions by mail with SASE.

Best 73's,
Keith Sueker W3VF
110 Garlow Drive
Pittsburgh, Pa. 15235



REVERSE SECONDARY CONNECTIONS IF LOAD VOLTAGE IS 122 VOLTS. SECONDARY CURRENT RATING SHOULD BE AS MARKED ON MOTOR PLATE.

***

RTTY theory & applications-

RON 'RG' GUENTZLER, W8BBB
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ADA OHIO, 45810

RTTY for Beginners- Part 10

The original beginner's series ended at this point with a summary. Because of various questions asked by readers, we have decided to add about five more installments.

We would like to discuss FSK generation and FSK keyers, but before we can do that, it is necessary to give the basic station operating details and the method of interconnection of the various pieces of station gear.

OPERATING ARRANGEMENTS

There are two basic ways to interconnect the equipment and to operate a station: 1) Connect the output of the receiver to a terminal unit (TU) and connect the output of the TU to the printer. Connect the keyboard to a keyer and connect the output of the keyer to the transmitter. 2) Connect the output of the receiver to the input of the TU and connect the output of the TU to the printer and the keyboard. Connect the keyer input into the loop containing the keyboard, the TU, and the printer and connect the keyer output to the transmitter.

In arrangement #1, the message being sent is printed locally by leaving the receiver on and tuning it to the transmitter. This arrangement is ideal when running AFSK on VHF FM because FM receivers are normally not muted while transmitting and the receiver doesn't overload. The "local" copy is obtained "off the air", and thus serves as a good check that something is really being sent. The arrangement might create problems with VHF AM because the receiver might get unhappy with the strong signal. Also, if the transmitter and receiver are on two different frequencies, it requires retuning the receiver.

In arrangement #2, the receiver is muted while transmitting. Local copy is obtained directly from the keyboard because the keyboard and printer are in the same loop. The receiver does nothing but receive the other station, so it can be left tuned to the frequency. The major objection to this arrangement is that since copy is from the transmitting loop and not from "off the air", you have no really good check that the transmitted signal is really being transmitted. (We have many times copied ten minutes of steady Mark because someone was making local loop copy, but never connected the local loop into the transmitter!)

RECEIVING EQUIPMENT INTERCONNECTION

Next, let's look at the actual interconnection of the station equipment. For either arrangement #1 or #2, the audio output of the receiver is connected to the input of the TU; this interconnection merely feeds the audio tones coming out of the receiver into the TU. The receiver output can be obtained from the loudspeaker terminals or from a headphone jack. It is nice to have the loudspeaker operating because listening to the tones can signal (to the operator) when something has gone wrong (like QRM). However, the constant audio tones can sometimes make one ready for the "funny farm" after an hour or so of listening (XYLs are especially annoyed by the tones). Also, the loudspeaker tends to act as (like) a microphone and it can pick up enough noise from the printer to "junk" copy.

For either arrangement #1 or #2, the output of the TU is connected into a series loop composed of a 130-volt (or higher) dc power supply, a variable resistor, and the selector magnets. The TU opens and closes the loop. Some TUs come with the power supply and resistor built in (TT/L-2, ST-5, ST-6)and others require a separate loop supply (CV-89). Obviously, if the dc loop supply is built into the TU, you merely connect the selector magnets to the TU. For most teleprinters, the selector magnets require 60 mA during a steady Mark. The current can be adjusted by means of a series rheostat (2 to 4K, 25W) or by varying the screen voltage on the output tubes. If arrangement #2 is used, the keyboard contacts are also included in the loop (in series with the printer, TU, and power supply), and the keyer must somehow be connected into the loop. (Units like the TT/L-2, ST-5, and ST-6 have a jack for extracting a voltage for operating the keyer.)

With the arrangements described, it should be possible to copy signals regardless of whether you can or want to transmit. Also, the arrangements are independent of whether you want to receive AFSK or FSK. In either case, the receiver must provide at its output an AFSK signal having the frequencies required by the TU.

TRANSMITTING EQUIPMENT INTERCONNECTION

For transmitting the options become numerous depending upon whether you want to transmit AFSK, indirect FSK (AFSK into an SSB transmitter), or direct FSK and depending upon whether the keyer is to be operated directly from a keyboard (arrangement #1) or indirectly from a TU (arrangement #2).

Take the latter pair of options first. With arrangement #1, the keyer is operated directly from a keyboard; that is, the keyboard is connected directly to the keyer input and nowhere else. Arrangement #2 requires that the keyer get its input signal from the TU (a terminal or jack must be available within the TU to provide the necessary keying voltage). The input circuit of the keyer (be it AFSK or FSK) is different depending upon whether it was designed for direct operation from a keyboard or indirect operation from a TU.

Assume that you want to transmit AFSK. Connect the output of the keyer to the audio input (microphone input) of the FM or DSB AM transmitter. When something is "typed" on the keyboard, the keyer output will contain an audio signal with a warbling (tweedling) characteristic. When nothing is being "typed", a steady audio tone should appear at the keyer output.

If indirect FSK is to be transmitted, connect the audio output of an AFSK keyer to the microphone input of a single sideband transmitter. You must be careful to make sure that the SSB transmitter has adequate carrier and unwanted sideband suppression. The keyer must not overdrive the SSB transmitter. The keyer must have an audio output free harmonics. Don't burn up the transmitter (or its power supply); you are running constant audio into the transmitter.

If indirect FSK is to be obtained by applying AFSK to an SSB transceiver, the comments applying to an SSB transmitter also apply. Only arrangement #2 can be used. In addition, a frequency offset might give troubles. A recent article (Ken Ridout, WB5FHF, RTTY Journal, 1973 DEC, p. 17) describes the problem and gives a solution.

If direct FSK is to be employed, an FSK keyer must be **built into** the transmitter. (Some come with the keyer built in.) The FSK keyer is connected to the oscillator circuit in the transmitter or VFO. Two different (although similar) circuits are used depending upon whether the keyer is to be operated directly by the keyboard (arrangement #1) or indirectly from the keyboard via the TU (arrangement #2).

Next month we will give the theory of indirect FSK and the circuits for direct FSK.

SUMMARY

There are two basic ways to operate a RTTY station. Arrangement #1 makes local copy by actually copying the signal transmitted. The receiver is **not** muted while transmitting. The receiver is connected to the TU which is connected to the printer. The teleprinter is "split". The keyboard is connected to the keyer which is connected to the transmitter. Arrangement #2 makes local copy by copying directly from the keyboard. The receiver is muted during transmission. The receiver is connected to the TU. The keyboard, printer, and keyer are connected to the TU output. The keyer is connected to the transmitter. The input circuit of the keyer (and to some extent, the keyer itself) is different depending upon whether arrangement #1 or #2 is to be used. For AFSK, an external AFSK keyer is used with an FM or DSB AM transmitter. For indirect FSK an external AFSK keyer is used with an SSB transmitter. For direct FSK, an FSK keyer is built into the transmitter.

73 ES CUL next month, RG

***

DATA ON MARS-

Last month we stated that we understood Mars operation might be on 75 WMP and narrow shift. A letter from K2RTQ, operating on Army Mars states that only 60 WPM is allowed and he believes this is standard for all Mars operation. 170 shift however is being tested and it is quite likely that it will become standard in the future.

And another letter from W2GRU says Navy MARS is using 60 and 100 WPM as well as wide and narrow shift. So just like hams, MARS seems to use, what is available, convenient and gets the job done efficiently. END . . .

***

MERRIL SWAN-W6AEE

CONTINUED FROM PAGE 2

off for use in Geophysical work had been under way for some time in the Lab. so the diode keyer (which has become widely used) was used to key an FSK audio oscillator. Make and Break (M A B) also was tried but did not prove to be reliable.

The 12 model 12's were placed with a group of two meter amateurs who lived thru the general area surrounding Pasadena. So it was a normal result that a small RTTY Club was formed. Herb Hoover W6ZH had arranged the original purchase and was most active in getting the Model 12's in operation on amateur two metre band. So in order to get what information we were able to develop, a small magazine was started in January 1953. It is now known as the "RTTY JOURNAL" and is now in its 22nd year of continuous publication. Through W6zh's contacts our Club was allowed to purchase and re-sell to amateurs licensed by F.C.C. Model 26 teletypes from the Telephone Company on a waiver. At first most of the 26's were placed in the Los Angeles area, but as time went by and interest grew, Model 26's were shipped all over the United States.

At first we only published 250 copies of "THE RTTY" but as word got around we increased the number of copies until the number had grown to approximately 3,000 copies. Some 400 to 500 going overseas. My work assignment was changed in middle 1966 to System's Analyst for Business Computer, and time became hard to find. Dusty Dunn, W8CQ, took over the publication of "RTTY" in January 1967.

On December 23, 1952 the FCC authorized FSK for Amateur RTTY operations, and we were off and running. My first cross-country RTTY QSO was with Brownie W2PAU (Technical Editor of "CQ" at that time) on 7088 Kcs. FSK. Many stations were copied with fair QSO's on the 20th, but many things showed up, which did not cause problems on two metres. In September 1953 "RTTY" we announced the first annual RTTY Sweepstakes Contest (which is now the "C.A.R.T.G." SS) and interest was at a high level. Most of the readers will be aware of the present level of amateur activity, over 100 countries operational on various amateur frequencies.

As for equipment at W6AEE, my old Model 12 was given to an amateur in Idaho many years ago. Believe he is still using it on Army MARS circuits. My Model 26 went to Bruce ZL1WB. I had built up a Model 15 from parts purchased from "HAM" W6EV our local surplus TTY dealer. Ham is now dead and his call is assigned to the RTTY Society of Southern California. Later, W6ZNU on a visit to my QTH asked to buy my 15 so I bought two burnt Model 28's from a friend in the Chicago area, and after some five years of swapping purchases and trades etc., completed the present 28ASR which I use on all amateur frequencies.

My TU is an odd-ball unit using digital logic after the detectors and has features which were used at United Geophysical in our Scismic recording amplifiers. The transmitter is an HT-32-A and a HT-33-A using direct FSK using diode keyers. On two and 220 etc. use diode keyed AFSK.

Many readers have seen my articles before so will go no further, but would like to publicly thank W6CL and W6DEO "RTTY's" earlier printers. W6CG who did the "RTTY-DX Column" as did Ed K3GIF and now W3KV. W6SCQ, our Club Secretary (now Silent Key) and especially Dusty W8CQ, present "RTTY JOURNAL" Editor. In over fifty-two years as a licensed amateur, nothing has given more pleasure than RTTY, through the friends made on this mode.

de Merrill Swan, W6AEE

*** U.S.A.

ROBERT WEITBRECT-W6NRM

CONTINUED FROM PAGE 2

VHF RTTY network up and down the East Coast. So I became interested --- a year elapsed until I picked up a Model 12 receive only machine at the Los Angeles Daily News plant. I remember those days well --

Anyhow, I needed a keyboard real bad . . .what use is a TTY machine if it cannot send as well as receive? I pestered John with many pleading and cajoling letters. . .finally something happened, resulting in the arrival of a Model 26 keyboard base from somebody in the East. Hmmmm. . .Model 26 keyboard, Model 12 typing unit? During some experiments, I took a washing machine motor and a bit of string -- wrapped it around the top gear of the 26 keyboard and onto the motor shaft. First try had the keyboard running much too fast, perhaps 200 WPM? I peeled off the friction tape from the motor shaft, reducing its diameter, until finally I was able to make the Model 12 follow the keyboard. Well, anyhow, I finally wedded the 26 to the 12 using a pair of Boston gears to reduce from the 420 RPM output from the receiving distributor to the required 368 RPM for the transmitting distributor shaft. So. . .I had that combined Model 12-26 machine for quite a few years, and it went to Wisconsin in the early fifties. I was quite active on the first days of low-frequency amateur RTTY, using that machine, from W9TCJ. I had never seen the Model 26 at that time, when I received the keyboard portion. I well remember a ham from Santa Monica coming up to visit me and to try to separate that 26 keyboard from me. . .but it was too late for him, I had already modified and installed the 26 keyboard, so it then fitted neatly into the 12 installation.

During the fifties I was quite active, promoting the idea of amateur RTTY on the DC bands. This resulted in FCC Docket 10073, and then a hassle from various amateur groups. . .finally resulting in a set of regulations governing the operation of teleprinters on the amateur bands. The first months of 1953 saw a large number of eager RTTY operators on 80-40-20 meter bands, making many calls and having fine QSOs with each other. Remember the calls such as WØBP, W3PYW, W2JAV, W6AEE. . .and many others. A glorious time was had.

During the early years I acquired a practically brand-new Model 26, shipped to the Midwest from Los Angeles. The truck freight charge was just $14! That machine saw many years of excellent service, and it is still rendering satisfactory service in my laboratory. I feel that the Model 26 has been one of the best feeling keyboards ever designed. During the time I acquired a Model 14 typing reperforator and a Model 14 TD. . .I still have both. Just for the fun of it, I designed and operated an electronic TD, using a neon-bulb matrix, and it used a Western Untion 1-A tape reader. Nowadays, if I built it again, I would use TTL and diode matrix chips. . .maybe I will come around to doing that!

Literature relating to TTY and RTTY matters was scarce. Thus, through the inspired guidance of Merrill Swan, **RTTY** began on January 1953. Many articles have appeared in the succeeding issues. Much useful information was exchanged, relating to design of TUs, FSK oscillators, and the like, not to mention teleprinter adjustments. Well, years and years passed by, and finally, **RTTY** became **RTTY JOURNAL**. Now we have a number of excellent books relating to RTTY techniques, and these days show the proliferation of new ideas and designs, this time using solid state technology . . .all to the good.

Well, one thing led to another, resulting in my meeting a number of prominent deaf adults during the ensuing year. One of them, Dr. James C. Marsters, an orthodontist from Pasadena, Calif., was quite interested in my amateur RTTY installation. Dr. Marsters is deaf, just like myself. He was quite interested in amateur RTTY and wanted to get on the air. Well, during the time, we had numerous discussions as to how we could communicate with each other, me in Redwood City and he in Pasadena. Experiments, using the telephone line, were undertaken -- ultimately resulting in a design, called Phonetype, which is now in wide use by deaf people all around USA and in several foreign countries. More than 7,000 installations exist, and additions are being made quite rapidly, these days, as supplies of Model 15 and 19 machines, not to mention the Kleinschmidts and the Mites, continue to be available. So, as you can imagine, there is a large Teletypewriters for the Deaf network, using 5-level Baudot, 60-wpm equipment. Any deaf owner of a Phonetype installation can dial a number of another such installation, whether across the town or across the country, and then teletypewrite to each other. Some of the installations are automatic answer, a few even including nametape loops. There exist a sizeable number of Dial-A-News installations (DANs) -- whereby the deaf operator can dial thereto and thus obtain news of particular interest to the deaf, such as club meetings, sports events, legislation relating to the deaf, activities of prominent deaf people here and there, etc. There are Phonetype installations in the various police and sheriff offices, thus lending security to the area deaf teletypers. A number of lives have already been saved, just by making emergency calls to such offices, obtaining ambulance and doctor assistance.

Quite a growth of TTY installations -- in a different category -- as a result of my own personal interest in TTY and RTTY techniques. The deaf people have indeed welcomed Teletype to their own hearts. It is the first and only practical method of telephonic communications for such people. Phonetype communications have proved quite reliable. A number of installations are now almost ten years old, and they are still rendering satisfactory service.

Needless to say, I am still quite busy in business, supplying the acoustic couplers, widely used in the deaf telephone-teletypewriter network. We have avail-

able various accessories such as Automatic Control Units, Message Control Units, Telephone-Ring Signalers.

The deaf people have proved themselves very resourceful. Many of them have become quite competent in matters of procurement, installations and adjustments on Teletype machines as obtained from Bell System and Western Union sources. Thus, the people concerned are learning the latest in technology, thus helping themselves to better careers. Many people have learned how to communicate well, via the printed route, thus improving their language, thus gaining the respect of their peers.

At any rate, I feel quite proud and gratified that I was able to lend my TTY-RTTY knowledge towards the communication needs of my deaf friends and compatriots. Now, any deaf person can avail himself of telephone service, via the Teletypewriters for the Deaf network! Equipment cost is quite reasonable, for all the service obtained. A complete Phonetype installation costs about $200; this includes the (typical) Model 15 Teletype, cleaned, adjusted, and installed by a Teletypewriters for the Deaf agent or other interested person. New Teletypes, of course, cost more. There is a trend towards Television Teletype, using a variety of electronic readouts. Such things are still quite expensive, but it is anticipated that costs will tumble as MSI-LSI-CMOS technologies become more and more widely spread in such forthcoming designs. Already, there is a controversy as to whether "hard copy" should be retained. . .some people seem to feel that soft copy (evanescent) output from TV TTYs do not provide enough stored memory to enable them to understand just what is being said to them. Time will tell.

Best regards,
R. H. Weitbrecht - W6NRM

*****

RTTY-DX

JOHN POSSEHL - W3KV
Box 73 Blue Bell, Pa., 19422

Slow Christmas mails, flu and our early deadline this month delayed John's DX column past the deadline but we had a little space left when it arrived and have included most important items in a cut down version. John will have full swing next month and bring everything up to date. Send your totals for the DX Honor Roll.

***

Hello there. . .

As "predicted" last month, Sid was QRV from Montserrat on the 4th December for a whirlwind one day stay. Word of his trip was spread around during the Volta and the DX'ers were on tap waiting for his signal. The station was set up right at the airport with the vertical antenna leaning against one of the buildings. Only 17 contacts were made which was quite a disappointment and due primarily to the short notice over which Sid had no control. The trip was to assess the situation for an airport project and Sid is hopeful of a six month stay on Montserrat later in the year if the project goes through.

The first W A C Award for 1974 goes to. . .

Nr. 220 Sid May VP2KH

As most everyone knows, Sid was the first RTTY activity from any of the many VP2 Islands in the Caribbean area.

For the past several weeks band conditions and activity seemed to be at a low ebb with nothing much new to report. Part of it may be due to the year end holidays and part of it due to the increasingly poorer band conditions as we get closer to the bottom of the sun spot cycle curve. Anymore, on the East coast USA 14 mhz is closed down after about 2300z with practically no signals to be heard on any mode. Things may change a bit for the better as more areas of the world go on Summer time as a fuel conservation measure. The States will have been on Summer time for a few weeks by the time this is read. Even a one hour change in time has an influence on operating habits in different areas of the world.

Of course, many of you remember Larry, K1LPS, from Vermont and as KG6NAA on Guam. Well, for the past

CONTINUED ON PAGE 16

About the time you receive this issue Crys and I will hopefully be in Ft. Lauderdale, Florida. We say hopefully because who knows what may happen tomorrow. We have plane reservations, motel reservations, a rent a car reservation and a promise of friends for good weather. But as we say - who knows these days. Anyway if we can't make it we can always go into the greenhouse and turn on some lights and make believe.

***

We want to thank everyone for the cards and messages of good cheer received. The Journal also had a good Christmas as we received a number of nice articles. The barrel is filling up thanks to our nice subscribers. But keep up with the donations and pictures. The barrel empties in a hurry.

***

It is with a lot of regrets that we have to announce a "Silent Purr". "Patches", our twenty two year old calico cat ended the last of her nine long lives on December 1st. If a year for a cat is equal to seven for a human she was about 150 years old. She never got a ham license but all visiting hams had to pass her examination and many will remember her. Needless to say in that time she became one of the family and it is still hard to realize that we no longer have to arrange for "kitty sitters" or search the markets for some food she might eat. This has nothing to do with teletype but as an editors prerogative we want to offer her a small eulogy for being a pleasant part of our lives for so long.

***

Dayton Hamfest, April 26-28 is getting closer. It is not too early to make reservations. Write PO Box 44, Dayton, OH. 45401 for details. Don't forget our hospitality room at the Imperial North Motel. Have a Kool Ade and meet John, Ron and the editor.

***

We received a list of the top scorers in the BARTG Sweepstakes but will run a complete list of scores in next months issue. LU2ESB was top scorer with over 3 million points. WA2YVK was first among US stations.

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BACK ISSUES

New subscriptions and classified ads are cash in advance as we have no method for billing. New subscriptions will be started with the current issue and one back issue, if requested. Please do not ask us to start any further back than this. Back issues - if available - may be ordered at 30¢ each at time of subscription. The JOURNAL is mailed about the 20th of the month preceding the dated month. May and June are a combined issue and July-August is a combined issue.

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RTTY JOURNAL
Box 837
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Editor & Publisher - 'Dusty' Dunn, W8CQ

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TELETYPE, KLEINSCHMIDT, MITE, gears, ribbons, supplies, parts, manuals, tuning forks, motors; tape $9.00 per case. Mite 66 wpm printer set, ditto. SASE for list Typetronics, Box 8873, Ft Lauderdale, Fl. 33310. W4NYF. Wanted- Northern Radio 107 teleprinter parts.

BACK ISSUES OF RTTY JOURNAL - I have a complete file of all issues from Vol. 1 No. 1 to date. Will reproduce any issue for $1.10 pp. Add 25¢ for air mail delivery. John Isaacs, 3175 Val Verde Ave., Long Beace, CA. 90808.

NEWS-NEWS-NEWS - Amateur Radio's Newspaper, "Worldradio", Trial subscription - Two issues for one dollar. "Worldradio". 2509-F Donner Way, Sacramento, Calif. 95818.

OA-5 SOLID-STATE TERMINAL UNITS for sale. All of the function of ST-6 but on one circuit board. Board with parts list and layout, $15.00. Kit of parts, less cabinet, but including circuit board, $100.00. Circuit board aligned and tested, ready for your cabinet, $160.00. Complete unit, ready to put on air, $210.00. Ken Simpson, WA8ETX, 3700 Mountview, Alliance, Ohio 44601.

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WANTED: Model 33 & 35 equipment. Complete or partial units, any quantity. Will pay shipping. Terminal Systems, Inc., 11300 Hartland St., North Hollywood, CA 91605 (213) 769-6772.

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COLLECTOR wants back issues of RTTY Journal before 1969. W6ISQ, 82 Belbrook Way, Atherton, Cal. 94025

QSL'S MADE FROM YOUR LAYOUT (camera ready) One color, $22.50 per 1000 - Sample catalog 20¢. N & S Print. PO Box 11184, Phoenix, Ariz. 85061

WANTED - 33ASR, B. A. THUNMAN, W8ISG, 71 McCollum Street, Galesburg, Michigan 49053. Phone 616 665-7071 or 731-5164.

DAYTON HAMVENTION Expands to three days April 26, 27, 28, 1974 at HARA ARENA and Exhibition Center. Brochures mailed March 15th. Write for information if you have not attended the last two years. P. O. Box 44, Dayton, Ohio 45401.

CHICAGO AREA RTTY OPERATORS; Expert repair work performed at reasonable prices. Cleaning and lubrication; printers $10.00, keyboards $5.00, reperfs $7.00. Repair work $15.00 plus parts, any Teletype apparatus. Rebuilding by estimate. Phone 312-392-2358, ask for Neil.

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FOR SALE: TT/L2, excellent condx, 19" rack mount, 170 bandpass; 170, 425, 850 disc., auto-start. $130 firm. Shipping extra. Frank Fallon, WA2YVK, 118-43 228th Street, Cambria Heights, N.Y. 11411 (212) 525-4493.

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CV89/URA-8A RTTY CONVERTER wanted. Price must be reasonable. George Marts, WQTDH, 4201 Colvin Dr. St. Louis MO. 63123

WANTED: JOHNSON VIKING KILOWATT linear in mint condition. Drake 4B linear. For Sale; Mini-Products hybrid qual L/N. WB2CHW, Larry, 138 16th Ave. Sea Cliff, N.Y. 11579. (516) 671-0090

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RTTY in AUSTRALIA

N. Roberts, VK3NR

A group of RTTY amateurs has been formed in Australia - it is called the "Australian Amateur Radio Telepronters Group", and is a division of the Wireless Institute of Australia. A magazine is produced called "Keybaud" and it is published and printed in West Australia. The editor of "Keybaud" is Alan Gibbs, VK6PG, who is quite active on 14mhz RTTY.

Conditions have been rotten on 14mhz for the past few months, and it has been rare to hear US stations coming through on any mode. Did have a brief contact with Irv W6FFC during a short opening of the band one day at about 0900GMT. The intrusion of commercial stations into the RTTY section of 20 metres has been a continuing problem this past year, and QRM from commercials is also driving the SSB fellows down below 14100 and they in turn get in our hair!

Our two metre FM RTTY net continues to prosper with new stations appearing regularly. Some teletype Corp equipment has been showing up in some of the surplus stores, and Bill, VK2EG has been buying equipment direct from Government surplus and distributing it at cost - he has done a great service to many of us in the supply of machinery.

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