

RTTY

JULY-AUG. 1977

JOURNAL

EXCLUSIVELY AMATEUR RADIO TELETYPE

VOLUME 25 No. 7

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MERRILL SWAN
W6AEE

1953 ** 1967

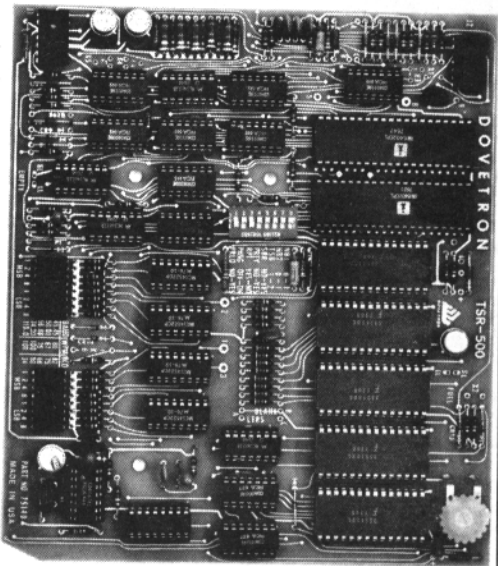


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W8CQ

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Second Class Permit pending
Cardiff by the Sea, CA 92007

Subscription Rates

RTTY JOURNAL

Don Crumpton, W6KCW , Editor & Publisher
P.O. Box RY
Cardiff by the Sea, CA. 92007

U.S. Canada, Mexico, \$3.50
Canada, Mexico, Air Mail 4.00
Surface Mail 4.00
Other Countries - Air Mail 8.00

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 35 cents 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.

The ONLY back issues available are listed below. 35 cents each.

1972. -OCT. -NOV. -DEC. - [3]
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NOV. - [5]
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A duplicate of any back issue may be obtained from R. Wilson, 4011 Clearview Dr., Cedar Falls, IA. 50613. \$1.00 pp. Reprints of all UART articles, \$2.00 pp.

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COMING SOON !

New RTTY BEGINNERS HANDBOOK.

This new edition will include information on the Model 28 machines and the Model 28 machine STUNT BOX.

There will be many new projects for the beginner and " Old Timer " alike. A must for those just getting their feet wet in this fascinating mode.

The target date for the new edition has been set for late August or early September. The Journal will make every effort to keep you " up to date" . on the latest projects as they are sent in from all over the world.

With your help the Journal will continue to grow. Send in your articles and share your ideas with your fellow Hams.



RON W8BBB DUSTY W8CQ JOHN W3KV

Trying to write about three men that have done so much for RTTY over the past decade is a very difficult job.

Dusty was indeed fortunate to get such fine helpers that were not only faithful to him and the Journal but also faithful to RTTY in general.

Everyone has written to me in the past month expressing their gratitude to these three men. Dusty, Ron and John would like to answer each one of you and thank you for the support you have given them over these past 10 years but to write 3000 letters would be a real chore. So on their behalf I will attempt to tell you how they felt about giving up the Journal.

To quote Dusty, It's kinda like giving up the favorite daughter, but if you gain a good son it's a lot easier.. We of course like to feel that Dusty is "gaining a good son" in our taking over the publishing of the Journal. and like John said "sure am going to miss the close contact with all my friends"

Well John won't be missing his close contact cause now he can spend more

time on the air with them. From Ron, "sure will feel funny not having to meet a deadline article every month for the guys"

So you can see their thoughts were with each of you when they "give up the Journal".

For us, we have received good wishes from all over the world, and each letter expressed appreciation for all the things that Dusty, John and Ron have done for them as individuals and for RTTY in general. We all wish to pay tribute to three great people.

DUSTY DUNN W8CQ

JOHN POSSEHL W3KV

RON GUENTZLER W8BBB

.....

HITS & MISSES

From The Editor
and
his Mail



To quote Dusty from the January, 1967 issue 'The first line is the hardest' We all know that when we transplant anything it has a tendency to slow down. Well the Journal is no exception and we hope that everyone will bear with us until we get our 'roots' set.

One of the first things we would like to talk about is the Beginners Handbook. We have several orders for this fine little publication pending, there were some additions to be made to the book covering the model 28 machines. This article has not been completed yet but we do expect it soon and your copies will be in the mail as soon as they are out of the printers.

There will also be a separate booklet covering the model 28 stunt box and the many things this mechanical computer can do for you along with ideas and ways to make it work.

There are no other major change expected to take place as far as the Journal is concerned. With the coming postage increase for first class mail we are planning on using a different class for mailing this should not effect delivery time as we are going to make every effort to comply with all postal rules for packaging to ZIP areas. In doing this we hope to maintain the same subscription rate.

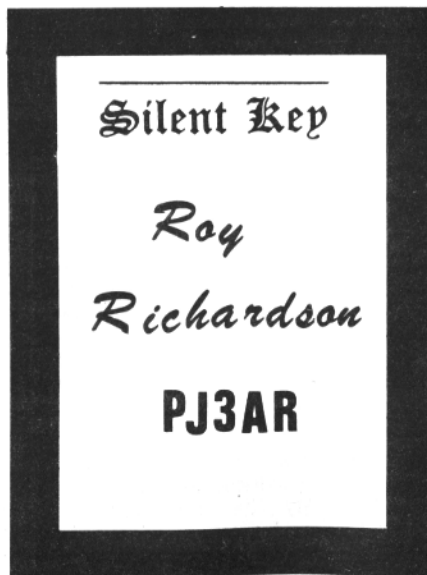
We are indeed fortunate to have Skip Prinsen WB6CYA and Chuck Edwards , W6MNO to assist us with the DX and VHF section. Information of individual or club activities should be sent to Skip or Chuck.

We would also appreciate technical / and informative articles that would be of interest to RTTY'ers.

Now a little run down on myself. I am 55 years old and have just recently retired from the printing business after 25 years, now with the Journal I can say that I am semi-retired. My wife Dee is my full time helper her duties include seeing that everyone gets the Journal, (and taking care of that is one big job).

For my brag tape the equipment in the shack consists of a 28ASR loaded with everything possible the low band rig is the yaesu FT101 E and a DX 40 on VHF we have an EBC 144 Jr. The station is on 24 hr sel-cal on VHF with WRU the sel-cal requires the full call to turn the machine on and the WRU requires the KCW ltrs blank W to activate it. We also have a complete mobile set up using a mite and H.B. T.U. both on VHF and the low bands..

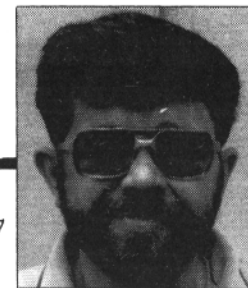
Well as you can see once I get started I am hard to shut up. But I would like to say that I am very proud and happy to serve as your editor and only hope we can continue to bring you the fine publication that Merrill and Dusty have done such a fine job with for these past 25 years.



RTTY-DX

SKIP PRINSEN WB6CYA

3611 Merrimac, San Diego, Calif. 92117



With the beginning of this article I start out having a great deal of apprehension as to whether I would be able to maintain the high standards of the DX articles which, JOHN POSSEHL, has been so skillful in doing these many years. After many moments pondering over this I decided that at least I would try and do my level best.

I think the best way to start is to give you a brief rundown of my background. I call Reading, Vermont home where I was raised. I am now living in San Diego, California while serving in the USN with carrier airborne early warning squadron 113 based at Naval Air Station Miramar. I am an aviation electronics technician with 16-1/2 years of service. I hold a first class radio-telephone license with ship radar endorsement. I was first licensed as an amateur in November 1972 with a technician class license with the call sign of WB4ZDA. In March of this year I upgraded from a conditional class to advanced class with the call of WB6CYA.

I am married to the former Beverly Clyburn of Leeper, MO. and have one step-son Mark May. I have four children by a former marriage living in Lexington Park, MD.

My introduction to RTTY was while stationed at the Naval air station Memphis, Tennessee as an instructor teaching in the advanced first term electronics school. Bill Jacobs, K5WTA, helped me get my old model 15 equipment running.

At the present time my equipment consists of Heathkit gear SB303, SB401, SB200 using the Hal ST6 and XTK 100 with a UT4 digital processor. Teletype gear is the Model 28 ASR and 28 RO. for most of you, you have never heard my call although that will change shortly. By the time you read this I will have a hy-gain quad up 15 meters greatly improving from the coaxial di-

poles that I have been using on the low bands.

I have the honor of personally knowing and being on an autostart net on VHF with Don, W6KCW and Chuck, W6MNO, so anyone wanting to have anything put in the next RTTY Journal I would be happy to take it on the air for you and relay it to either of these gentlemen.

We plan to publish the RTTY DX HONOR ROLL in the December issue. Please try to have your totals of worked/ confirmed in to me by the end of October. No list is required just the usual two numbers.

The RTTY JOURNAL will continue to offer the plaque and endorsements for DXCC as in the past. We will continue to offer the merit awards for WAC and WAS. The awards are in the form of a certificate and are issued free upon presenting proff of contact to the DX Editor at the address listed at the head of this article..

WAC on 40 meters»

WIMX the M.I.T. Radio Society recently obtained WAC on 40 meters for certificate number 2 on this band. They need only a QSL from 4X4MR to make it on 15 meters. The Society is very close to a 5 band WAC.....

Bob, ON4CK now has 160 confirmed for 160 worked, an amazing return of QSL;s in any mode. ON4BX is still ahead by one with 161 confirmed.....

The RTTY community was shocked to learn of the death of Roy Richardson, PJ3AR in an auto accident while returning to New York from the Dayton Hamvention. He was accompanied by his friend and QSL manager, Steve, WA2DHF. Steve was injured but we are happy to report that he has fully recovered from his terrible experience.

VHF RTTY NEWS

CHUCK EDWARDS W6MNO

4726 Barbarossa Drive - San Diego, CA 92115



The backlog of QSL's from Bo, 9K2EP have all been sent out by his manager SM00JZ. Problems at the printer was the cause of the long delay.....

John, K4VDM, received certificate Nr 42 for 14MHZ WAC. Art, K4YZV, now has 100 confirmed which makes him Nr 26 for DXCC-RTTY.....

Check your QSL bureau, cards for Alf, JX6XF have been showing up via that route.....

Cards from Alex, 5Z4TV, have been received by those that have had a QSO. If you still have not received yours try direct to Alex T. Quarmyne, P.O. Box 30592, Nairobi, Kenya.....

LZIKDP is now active with an excellent signal and Stan as the chief operator. They are using the LO15 machine supplied by Uli, DK3CU, QSL info is: City Students Radio Club, P.O. Box 812, Sofia 1000 Bulgaria.....

Gordan, 8P6AY is now back on the band after getting his machine back in working condition. He now has a QSL manager and cards can go to K4ZS, Fred Kienyle, Box 1271, Titusville, Fla. 32780.....

If you had a contact with DJ4KW/4X in last years DARC you can QSL direct to Gerd R. Sapper, Hiltenspergerstr 3, 8 Munchen 40 Federal German Republic.

VK2APG has been printed testing with VK2SG.....

Ross ZL1WN puts in a terrific signal to the east coast of the U.S.A. AT about 1200Z.....

Now active from Muscat, Oman is Robert, A4XFW, and Hans A4XGP. Sid, A4XGB is now home in England signing his home call G4CTQ and promises to put all active hams in the Sultanate of Oman on RTTY.....

Ros, I8AA, Gin, JALACB, and Uli, DK3CU, have all heard signals from ZK1DY, Cook Island, but so far no contact has been made and the boys are starting to wonder how valid the station is.....

Very strong signals have been printed from CT1XZ but with bad distortion on the keyboard. CT4CK also is reported to have a good signal.....

KZ5ZK is a fairly new station in the Canal Zone.....

FM7WB again is on the band with good signals. After a long QRT with

machine troubles Fred, HK3SO is again active on the bands.

A new station from the Canary Islands is Jose EA8NI..

Get things tuned up for the SARTG contest. Three test periods over August 20 and 21. See you on contest. Futher details in this issue.

VE2QO, Bruce Balla, is the first non-European RTTY-er to win the RTTY-Award EURD3 of DARC.

VK7TM, Tom Moffat will be on short-ly from the island state of Tasmania with a h.b. TU and Mod 15.
73 de Skip

Awards info.

At this time we would like to again bring to your attention details of an award for proficiency in RTTY-DX that many of the newcomers to the mode may not be aware of.

The Quarter Century Award is issued by the British Amateur Radio Teleprinters Group (BARTG) upon submission of satisfactory proof of two way communication with 25 countries.

Measuring 10" by 13" and printed in red and green, the certificate makes an attractive addition to any amateur station. Endorsement stickers are available for each additional countries.

Application for the award may be made by any of the following methods:

1. Submission of QSL cards for the countries being claimed. Cards are returned after checking. Alternatively, submission of photo copy of any QSL card is acceptable. This type of claim must be witnessed and signed by two other licensed amateurs.

2. Claims will be accepted based on a check list of call signs with details of date of contact and band used. This type of claim must be witnessed and signed as accurate by two officers of a recognized Radio Club or National Amateur Radio Society.

3. Claims may be accepted based on a contest log submitted for any RTTY contest sponsored by the BARTG. The claim should be made at the same time as the contest log is submitted.

Cost of Certificate is--U.K.-50P
Overseas, 3 dollars U.S. or 15 IRC's
Cost of additional stickers - U.K. -20P

For a long time we have all been enjoying the VHF articles as written by Ron W8BBB. Now that Ron is wishing to retire from the journal I have been ask by Don W6KCW the new editor to continue in Rons place. It will be hard to follow Ron, since he has always done such a first class job but I am sure that with the help of the VHF Clubs I will be able to present you with the up and coming things around the world of VHF.

Our prime target will of course be to keep you informed on whats going on in the VHF world on RTTY. To do this we will have to ask for input from the various clubs adding us to thier list of people that recieve thier news letters. In this way we will get your news into the RTTY Journal.

Here in the southwestern region of our country we have a lot of activity on the UHF and VHF portions of the bands with many repeaters on the 146.10 - 146.70 pair and a number of machines on the 223.10 - 224.70 frequency pair.

There is also a group working on the project of putting RTTY on 1260 mhz. It is a joke among that group about who is the best plumber due to the wave guide problems that they encounter.

The VHF repeater that we use in this area is located on Contractors Point located in the north western part of Los Angeles. This repeater runs about 7watts ERP and covers the area clear down into San Diego 150 miles to the south.

The site for this repeater has been furnished by Martin Geisler WA6TIC who is in the teletype business..... in the Los Angeles area.

The repeater belongs to the Southern Counties Amateur Teleprinter Society operates 24 hours per day. The elevation of the repeater is at the 3000 foot level.

For simplex operation we use 145.70 and from some areas in San Diego are able to work into the Los Angeles area.

Developments in the Ohio area over the assignment of the 146.10/70 repeater pair for use as a voice channel is still raging according to Bob Scott W8FSK..... 146.70 as a simplex RTTY channel since they have no repeater I would say this is understandable since under a gentlemen agreement dating back to I don't know when that frequency has been considered as the RTTY channel. Now don't get me wrong ... I know that NO freq. is reserved in the Ham bands for the exclusive use of any particular mode. It would seem tho that some consideration would be given to a group of hams that I don't go chasing all over the bands and stick to a relatively small freq area on all bands should not have a group set up a known frequency for a different mode of operation. This would be like the repeater group moving to the input of a voice repeater and as soon as the frequency was quite start rag chewing we will have to admit it would be legal but not ethical and of course being the type of hams they are RTTY'rs wouldn't do such a thing. Of course we here in Southern California don't have that problem.. Our group known as SCRA respects the 10/70 frequency as being used for RTTY and have so assigned those frequencies for that purpose, of course we do have repeaters on the frequency now but at one time we did not.. we use 145.70 for simplex work and that is also recognized through the gentlemen agreement to be for RTTY. We hope to someday see a coast to coast hook-up through repeaters and links for nation wide RTTY on VHF.

So there you are fellow RTTY'rs get the word around to your councils and other RTTY operators. RTTY is getting stronger everyday!!!!

The Journal stands behind the gentlemen agreement to reserve the 146.10/70 pair for repeater RTTY use

VHF RTTY NEWS, cont.

TALK ABOUT PROBLEMS ! ! ! ! ! The Southern Counties Amateur Teleprinters Society had a cavity go bad on thier repeater WR6ACA and took it out for repairs. In the meantime one of the other groups that have a repeater in the same block house loaned us one of the extra cavities they had. This was installed and everything was working fine for about a week then one day the far out stations could no longer bring up the machine so off to the hills went the faithful tech committee for repairs. They found that someone had removed the borrowed cavity and replaced it with a coax connector

The one thing that makes us wonder is the fact that setting on the floor next to the machine was a cavity of the same type hooked into nothing why the one was removed from the repeater we will never know for needless to say it is still all a great mystry with the club having to replace the stolen cavity or make some kind of a dealwith the owner. WR6ACA is back on the air but the stations in the San Diego are are still unable to hit it.

What VHF rig ? - -

We have run many tests on VHF using a varity of 2 meter transceivers and have found that most will work quite well It was found that anumber of them,,, of course require external cooling for long transmissions. Some of the brands that I have used include the Icom 230, Kenwood, VHF One, and the Standard. It was found that the Standard required holes to be drilled in the case to permit air flow otherwise the finals went soft very fast. The others mentiond were used with a fan blowing on them and tests were run upwards to one hour of solid key down operation. Don W6KCW uses the EBC 144 Jr. and has run pix up to an hour and forty five minutes with out any problem at all although it is still advisable to run a fan on them.

Of course there are still many that use the older tube types such as the Motorola and GE series with fine jobs.

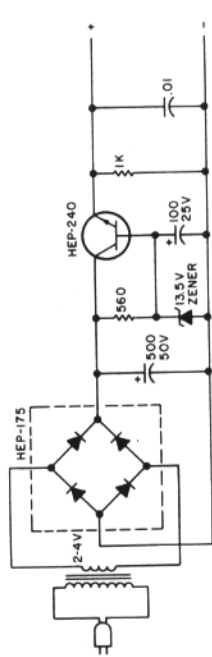
If you have been considering getting into VHF RTTY jump in there with your 2 meter rig and have a ball. for those of you that have the ten to fifteen watt jobs I have in this issue a very good and reliable AC power supply schematic.

Most of the parts can be purchased at Radio Shack stores.

Our new editor is one of the few fellows that have gone mobile TTY with a mite and HB TU all built into the case. of course there is no driving and typing unless the XYL is behind the wheel.

Guess that will be it for this month but would again like to ask the various clubs to send thier news letters so that your area and activities may be included in this column.

.....73....es C U L W6MNO.



Need a simple regulated supply for your 2m rig? Try this one. The transistor may be heat sunk directly on the side of a minibox, and the transformer is any unit rated at five Amps and 24 V. Standard components are used throughout. This supply is humfree, and regulation is good - the output voltage varies only .2 V between transmit and receive. This supply is especially for smaller transceivers such as the TR-22C, used by many during relaxation TV sessions in the evening. Thanks to W8DYF.

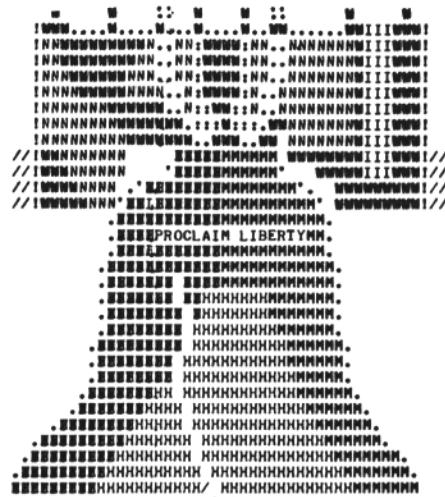
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RTTY ART de Don WA6PIR



"LIBERTY BELL"
ORIGINATED FOR RTTY BY RICK, WA6EA.
MARION, OHIO
1ST PLACE - 1976 RTTY ART CONTEST

Transforming assorted vowels, consonants and punctuation marks into a portrait of a Liberty Bell is not easy, especially when it is done on a teletype machine.

But the hours Rick Anderson, an amateur radio enthusiast, devoted to the design and production of his extraordinary creation recently were rewarded with top honors in a 1976 RTTY (radioteletype) Art Contest.

The Marion employee won the recognition after a national panel of judges selected his bell on the basis of its artistic merits and production technique. The picture is composed primarily of five letters - H,I,M,N AND W - COMBINED WITH AN OCCASIONAL SLASH, APOSTROPHE, PERIOD OR SEMICOLON.

Varying degrees of intensity and shading are achieved by the character used or by "overlining", where one letter is typed on top of another to create the desired effect.

Printing on a teletype machine is more complex than on a typewriter, says the engineer, who added that just placing the 10 marks on the top line of the portrait took 70 separate teletype functions. The finished product entailed a total of more than 2,200 keyboard procedures.

But that is not the difficult part, according to Anderson. "Coming up with a good subject - that's the hardest thing," he advises.

Anderson said he got the idea for his bell from the back of a magazine. He traced its pattern on teletype paper and then tried to fill in characters that would best suit it.

That initial run-through normally takes about two hours and can get discouraging. "The first version usually stinks," admitted Anderson, "BUT LOOKING IT OVER AT LEAST PROVIDES A STARTING POINT."

After three such attempts, Anderson came up with a satisfactory design.

From there, it was on to the editing stage which eventually led to the finished product. About four weekends of work later, Anderson developed the final layout.

Then came the tedious task of re-doing the portrait error-free while the teletype simultaneously coded it on paper tape. The tape could then be fed thru the teletype to send the art to other operators, fulfilling a requirement of the contest.

Additionally, the picture could be no more than 72 characters wide and take a maximum of 40 minutes to transmit at 60 words per minute.

Amateur teletype transmission is done through regular radio bands allotted for ham broadcasting. It is by no means used exclusively for pictures.

Anderson, who has been involved in teletype for ten years said that creating, sending and receiving the pictures does hold a particular fascination.

Cont. page 9 column 2

PERSONAL COMPUTING 77

Personal Computing 77 will be two full days of seminars, major exhibits and demonstrations in home and personal computers to be held 27 and 28 August in Atlantic City, N.J. Last year over 4,000 computer hobbyists and radio amateurs enjoyed Personal Computing 76. This year, Personal Computing 77 hopes to be able to sponsor a part of the micro-processor module to be included in the Phase III satellite that the Radio Amateur Satellite Corp. (AMSAT) is building for launch in 1979. By attending Personal Computing 77, you will help this organization to extend its support to AMSAT and you will see many fine radio and computer exhibits. For a free TRIP KIT write PC77, Rt 1, Box 242, Mays Landing, New Jersey 08390.

ASCII

Still OK thru Oscar 6 & 7

The FCC recently extended the STA allowing the use of the ASCII code for amateur communications using AMSAT oscar 6 and 7. However, as fewer amateurs are now using ASCII on the satellites, AMSAT is finding it more difficult to justify to the FCC further extensions.

If you have or plan to make ASCII contacts particularly in computer linking experiments via the satellites, please drop AMSAT a note discussing your results to Box 27, Washington, D.C. 20044.

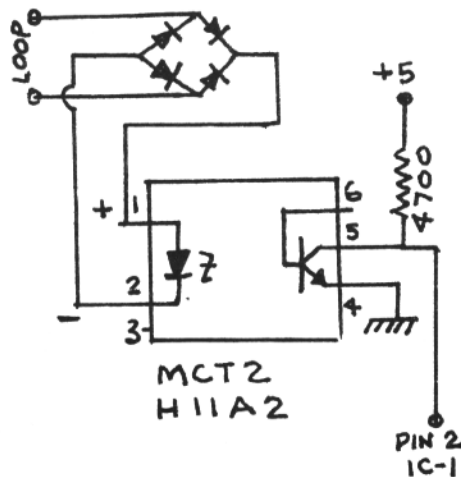


EVEN THE PRESIDENT

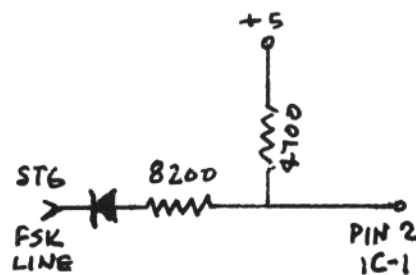
IMPROVED UT-4 DRIVER

Gary Buda WA0NDN
8212 Douglas Drive No.
Brooklyn Park, MN 55443

Here is a better switching system to drive your UT-4. The original didn't work well at all for me and Duane W9HWA suggested using an optical isolator. I use bridges in front of my optical isolator so I don't have to be concerned with loop polarities.



IMPROVED DRIVER FOR UT-4



ORIGINAL UT-4 DRIVER

1903-MARCONI 75th ANNIVERSARY-1978

TO ALL RADIO AMATEURS
FROM: ROBERT J. DOHERTY - K1VV
CONTROL OPERATOR - KMICC
MARCONI SPECIAL EVENT STATION
RFD 1 - 14 PINE STREET
SANDWICH, MASS. 02563, U.S.A.

1903 - MARCONI 75th ANNIVERSARY 1978

MARCONI'S CAPE COD TRANSATLANTIC WIRELESS STATION
BY FRANK CASWELL - W1ALT

Guglielmo Marconi came to Cape Cod Massachusetts in 1903 to establish the first transatlantic wireless in the United States. The station was constructed on the sand dunes of South Wellfleet, Massachusetts and was completed in late 1902. The transmitter was of about 30,000 watts power consisting of a three foot diameter spark-gap rotor generator. The aerial wires were supported by 200 foot masts. The masts, 20 in number, were placed in a circle 200 feet in diameter in the sand dunes. The Cape Codders were skeptical of the masts being erected in the sand dunes and as they predicted the masts were blown down in a northeast storm in November 1901. Marconi then erected four 200 foot timbered towers and in late 1902 the station went on the air for tests.

On the night of January 18, 1903, Marconi attempted to send the following transatlantic wireless message from the then President, Theodore Roosevelt to the King of England, Edward II, 'His Majesty, Edward II, in taking advantage of the wonderful triumph of scientific research and ingenuity which had been achieved in perfecting a system of wireless telegraphy, I extend on behalf of the American people most cordial greetings and good wishes to you and all the people of the British Empire. T.R. Theodore Roosevelt.'

The message was received at the Marconi station in Poldhu, England, and for the first time the United States had been linked with England by wireless. A return answer was received at South Wellfleet from King Edward VII and was

delivered to President Roosevelt through the South Wellfleet railroad telegraph station.

In 1907 the engineers realized that they had built the station too near to the ocean and by 1917 the sand dunes had eroded close to the tower bases. The station soon after had to be abandoned. Today approximately 1/2 of the site has been claimed by the Atlantic Ocean.

In its 15 year history of operation the station had three call signs, CC, MCC, and WCC. Old "CC" was a prime press outlet to ships at sea and to this day WCC, now located in Chatham, Massachusetts is the busiest commercial radio station on the east coast. The station handles world-wide traffic to and from ships at sea and is still communicating by Morse code as was used by Marconi in his day.

During the week of January 14-22, 1978, the town of Barnstable Radio Club will celebrate the 75th Anniversary of Marconi's first two way transatlantic radio transmission between the United States and Europe. The club will recreate this event with a multitransmitter amateur radio station operating from the original location in the Cape Cod National Seashore Park in South Wellfleet, Massachusetts. The station has received a special event call sign, "KMICC", from the Federal Communications Commission and will be manned by members of the town of Barnstable Radio Club. Operation will be on 160 through 2 meters, CW, SSB, RTTY, FM, and slow-scan TV. The Cornish Radio Club plans to operate a special event station in Poldhu, England during this period. "KMICC" will be capable and we hope you will come visit us.

de WHITEY - K1VV (X-WIGDB)

MARCONI SPECIAL EVENT STATION
Mail address:
Robert J. Doherty - K1VV
Control Operator - KMICC
Marconi Special Event Station
RFD 1 - 14 Pine Street
Sandwich, Massachusetts 02563 U.S.A.



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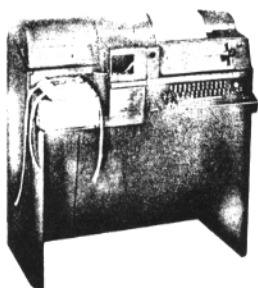
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Model 28ASR

WA6PMA



Model 28KSR

DOUG

A SIMPLE SCOPE AMP.

Nat Stinnette W4AYV

If your terminal unit does not have quite enough output to drive a scope, here is a simple amplifier which will give it a boost and improve the display.

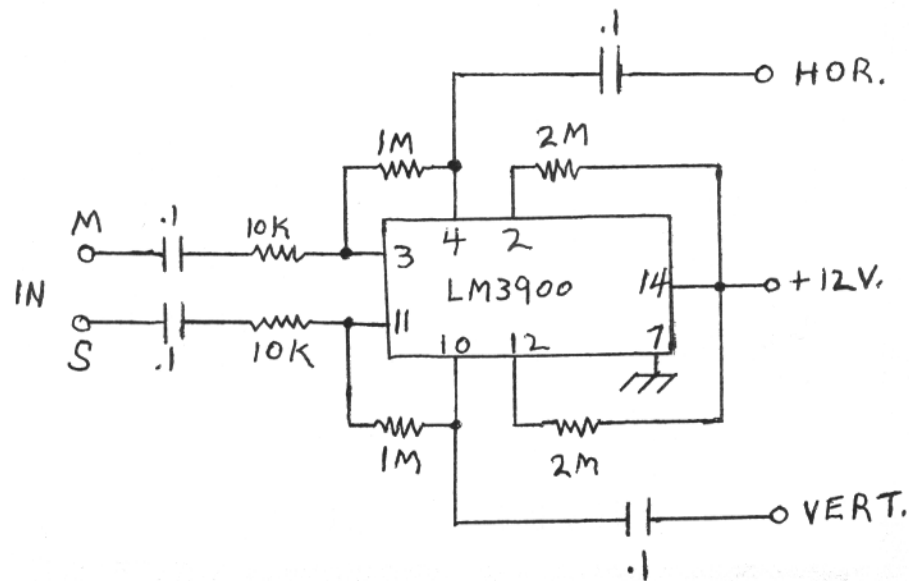
The circuit is shown in Fig. 1 and uses an LM3900. This IC contains four operational amplifiers. These op-amps are current differencing amplifiers (CDA)

The circuit is shown in Fig. 1 and uses an LM3900. This IC contains four operational amplifiers. These op-amps are current differencing amplifiers.

The circuit is shown in Fig. 1 and uses an LM3900. This IC contains four operational amplifiers (CDA) and will do almost everything the conventional op-amps (709 etc.) will do. The LM3900 requires only a single +/- 12v. power source.

A perfboard or homebrew p.c. board can be used for mounting. If your TU has 1M resistors from mark/space filters to the scope output terminals, leave them in the circuit. Should this little amplifier not give enough drive, try reducing these 1M resistors to 500K... Don't go any lower, however, as a high resistance is needed for isolation of the filters. Only two of the op-amps in the IC are used, the other two are not connected.

There is another good scope amplifier shown in the "Beginners RTTY Handbook"; submitted by Hoff, W6FFC. This one uses tuned filters which will give a straight line cross pattern and shows up better, particularly on narrow 170 Hz shift. Sometimes this can be deceptive, however, as the tuned filters tend to correct any deficiencies in the true pattern that comes from the TU but it makes an excellent amplifier for a scope tuning indicator.



LED RTTY T.U. » »

K.H. Sueker W3VF
110 Garlow Drive
Pittsburgh, PA. 15235

This article is addressed primarily to those kindred spirits who still like to build their own equipment. The LED terminal unit is designed to meet the needs of the RTTY newcomer and to serve as an auxiliary TU for the old timer. It uses no exotic parts, requires no adjustments, offers good FM limiting, has integral FSK provisions and features a unique tuning indicator system using light emitting diodes (LED's). It represents about the simplest unit available for serious RTTY work on the bands with sky wave propagation.

The LED leans heavily on the excellent work of others. The newcomer should read particularly the ST-5-- article by Irv Hoff.*

Also for valuable background information on TU theory. Several other handbooks also describe filter characteristics and various types of RTTY terminal units. **, ***. The discussion here will attempt to explain the rationals behind the LED design rather than repeat the general explanatory.. material which has been covered so well elsewhere.

Fig. 1 shows the schematic diagram of the unit. Control power is derived from an inexpensive 120/12 volt transformer and two half wave rectifiers. all the frills of better filtering and zener regulators have been eliminated for economy. The power supply shown is entirely adequate for our purposes. Any available lead mount silicon power diodes can be used since the voltage and current are both quite low. The loop supply is derived from another 120/12 volt transformer connected... 'backwards' to the 12 volt line. A bridge rectifier is used to minimize voltage drop in the high reactance transformers. This arrangement provides an isolated loop supply and yet allows the use of inexpensive, readily available transformers. Diodes in the bridge should be lead mount silicon power types rated 500 volts or more. Don't skimp on the voltage rating. If the recommended

capacitors are not available, higher voltage and/or higher capacitance units can be used.

CIRCUIT OPERATION

Incoming audio from a speaker line is transformed by an input transformer made from an 88 mH toriod. The..

Incoming audio from a speaker line is transformed by an input transformer made from an 88mH toroid..... The primary consists of approximately 50 turns which can be unwound, cut and then rewound on the core, as an independent winding. The 27 ohm resistor isolates the unit from the speaker line and prevents distortion at high audio volumes. A miniature output transformer could be used 'backwards' but you will have three toroids left from the usual five pack, and well-- well-- waste not, want not. I leave disposition of the remaining two to the reader's ingenuity.

The clipper, a 741 opamp, establishes a constant drive for the toroidal filters and effectively removes the amplitude modulation from the signal. Some dynamic range is deliberately sacrificed with the 1M/1K negative feedback, but this strategem eliminates an input offset adjustment pot. Clipping is symmetrical and very satisfactory as shown.

Filters are entirely conventional except that the operating audio frequencies have been moved down to the IF bands pass range of modern communications receivers with standard BFO crystals. The articles referenced describe circuit constants for other audio frequencies. Filters are balanced for 170 Hz shift since tgos predominates on the high frequency bands. Operation on 850 Hz is satisfactory but noise rejection is not as good due to filter unbalance. Detector diodes are silicon signal types such as the 1N4148 or 1N914.

Tuning indication is provided by the paired transistors and light emitting diodes following the detectors. Light output from the LED's is quite linear (to the eye) with current and the diodes form highly sensitive indicators of filter output. They have no time delay, require no special power supplies, work beautifully and are fun to

watch. When receiver tuning is proper the LED's will blink alternately for mark and space signals. The driver

The driver transistors are any silicon types capable of operating on a 15 volt supply. Note that a PNP/NPN pair is required. They do not have to be matched or, for that matter, even related types. Surplus units are fine. LED's are also surplus types costing about a quarter each. If you want to get fancy, you could use red for mark and green for space (or vice versa). I used plain, old-fashioned red.

After the signal is detected and filtered, the second 741 opamp acts as a switch, or 'slicer', to drive the loop keyer transistor on mark signals. A polarity switch is included for 'upside down' signals. The keyer itself is a 2N3440 transistor which costs about a dollar and has ample voltage and current margin. Any other type rated 250 volts or more and 200 mA or more could also be used. If in doubt, stick with the 2N3440. The 10 W resistor appears too low for a 60 mA loop but the power supply voltage is only 50-60 volts due to transformer regulation. Note that the drop is caused mostly by reactance and the transformers are not being overloaded. If better transformers are used, increase the resistor to get about 50-60 mA of loop current. Precision is not necessary.

The zener diode at location A and the 2K pot provide a continuously adjustable FSK mark voltage from plus FSK mark voltage from plus 6 volts to zero.

This output is intended to control an FSK diode or varicap in the transmitter VFO as the keyboard contacts are operated in transmitting. If reversed polarity is required, the zener diode can be located in the loop return at location B instead. The 2N3440 emitter should then be connected to ground. The machine keyboard contacts are simply connected in series with the loop. A switch on the 741 slicer is included to permit holding on mark for tuning or transmitting.

Construction

The small power transformers and simple circuitry permit quite a compact unit. My first two LED units were

built on perfboard using miniature push-in terminals (flea clips). No special precautions need be observed in layout. Most small components can be obtained at the local parts store (even today!) or from advertisers in QST or Ham Radio. The transformers should be rated at least 0.6 A. Opamps can be individual TO-5 types, individual mini DIPs or a dual unit such as the 747. They are widely available.

Tuning capacitors should not be..... ceramic. Mylar is good and is available in an assortment package from Radio Shack and others. Nearly any type of zener diode from 5 to 8 volts may be used for the FSK circuit.

If the TU is to be used for receive only, the FSK circuitry can be removed by deleting the zener diode and the 2K pot. The keyer transistor can be obtained from a distributor handling RCA or Motorola semiconductors. Careful... shopping should keep the total parts bill to about \$20.00. If the TU is housed in a cabinet, the LED's can be wired to extension leads and glued to holes in the front panel. They should be shielded from direct, bright light for best visibility.

Modifications

Those readers who are interested in VHF RTTY will probably want to use the standard tones of 2125, 2295 and 2975 Hz for compatibility. If so, the filter constants of the ST-5 are..... suggested. This includes the output resistors from the first opamp as well as the tuning capacitors and loading resistors. The 2.7K LED resistors may have to be changed for the best results. The objective is to have equal brightness on maximum signal and linear light output with voltage.

When sharp receiver selectivity is available, the TU should be tuned to take advantage of it. By placing mark and space signals for 170 Hz shift in the narrow bandpass of the receiver this can be accomplished. This will make a dramatic improvement in copy. The receiver calibrator may be used to set the shift by frequency matching. Use of the calibrator in conjunction with the S-meter allows accurate determination

Use of the calibrator in conjunction with the S-meter allows accurate determination of the narrow bandpass of

the receiver. Since the two frequencies are close together on 170 Hz shift, the actual frequencies are not too important as long as the difference approximates 170 Hz and both fall in the receiver bandpass.

Operation

Tuning and operating with the LED is the essence of simplicity. With normal listening audio level, the receiver is simply tuned until the LED's are blinking alternately with equal intensity. The filters are broad enough to allow for a reasonable amount of drift in the receiver or signal. Shifts of 300-450 Hz can be copied in the 170 Hz position by operating on the 'back' side of the filter characteristic, although tuning is somewhat more critical. The principal operating problem with this TU is getting mesmerized by the... blinking LED's and forgetting to read the copy!

FSK procedures are covered in RTTY handbooks and the reader is referred to them for help.

Summary

To recap quickly, the LED terminal unit 1) is as simple as possible for good copy, 2) uses inexpensive, readily available parts, 3) requires no adjustments, 4) has FSK control voltage, 5) does not require a special receiver BFO crystal and 6) has a built-in tuning system that really works.

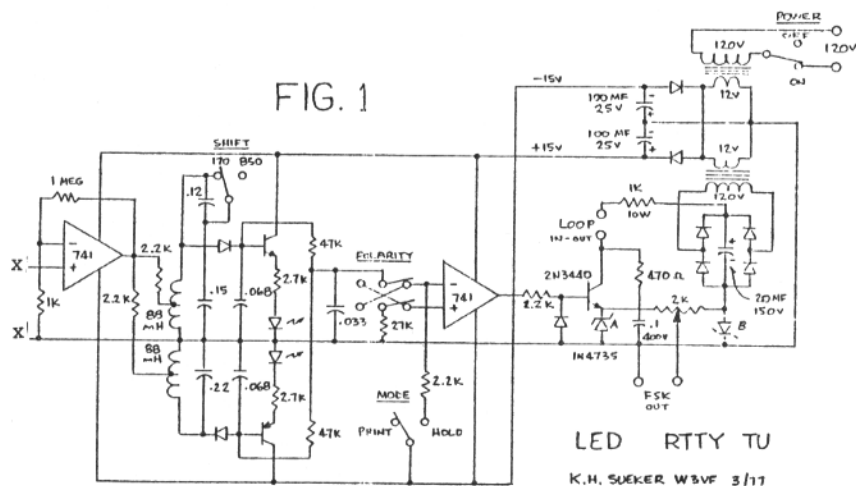
I will attempt to answer any reader questions the unit for an SASE.

Regretfully, I cannot build these units on request.

* Mainline ST-5 RTTY Demodulator, Irv Hoff W6FCC, Ham Radio, Sept. 1970 P 14.

** Beginners RTTY Handbook, RTTY JOURNAL, P.O. Box RY, Cardiff by the Sea, CA 92007.

*** The Radio Amateurs Handbook, American Radio Relay League. Any recent edition - look under 'RTTY' in the index.



K.H. SUEKER W3VF 3/17



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THE DOVETRON DCM-100 is a poly-phase Direct Conversion Modem employing BASEBAND techniques that completely eliminate the need for input bandpass filtering and channel filters, permitting the error rate to approach the theoretical minimum. A high degree of selectivity is not required in the companion receiver, since this technique also eliminates all the image windows. The Mark and Space channels are both continuously tuneable from 1200 to 3000 Hertz and a dual LED display on each channel permits fast and precise tuning. Full IN-BAND Diversity provides automatic single channel copy during deep selective fades. Auto Markhold, anti-space and anti-CW are standard. FSK and MARK Autostart is offered, and the MARK Autostart is adjustable for Fast or Slow response. The high level loop supply is strappable for either 60 or 20 mil operation. The phase-continuous AFSK tone keyer may be preset with two different Mark-Space-Shift tone combinations, which are operator selectable from the front panel. Rear panel connectors permit plug-in interfacing of the speed-changing regenerators (including the Dovetron Microprocessor and the UT-4). The TSR-200 and TID-100 may be mounted internally. Twenty of the 25 integrated circuits are identical and all are socket mounted. All digital circuits are high noise-immunity CMOS. Availability: January 1977. Amateur list price: \$295.00. FOB. DOVETRON, 627 Fremont Ave., South Pasadena, CA. 91030.

DOVETRON TSR-200 TELEPRINTER SPEED CONVERTER-REGENERATOR is a 5" by 5" PC card designed to mount inside the MPC-1000/MPC-1000C and HAL ST-6 terminal units. It consists of a programmable UART Regenerator, a programmable Dual Xtal-Controlled Clock and a CMOS Bilateral Steering Section, which provides automatic data and clock switching when the TU is switched between REC and XMIT. Power requirements are +5/+20 at 20 mils and -12/-20 at 5 mils. Availability: Stock. Amateur list price: \$99.50 Postpaid USA. DOVETRON, 627 Fremont Ave., South Pasadena, CA. 91030.

MINI-MANUALS, \$3.95 each postpaid - M15/19 Wiring Hints, Diagrams and schematics. CV89/URA8 FSK Converter data. TDA2 Steima Distortion Analyzer, AN/SGC-1 AFSK Converter, conversion details, etc. Teletype Gear Guide. Schematic for CV57 FSK TU - \$1.20 postpaid. Technical Manuals, Teletype Equipment and Parts, Surplus Electronics. SASE for lists. Jim Cooper, W2BVE, POB 73, Paramus, NJ 07652.