

# RTTY

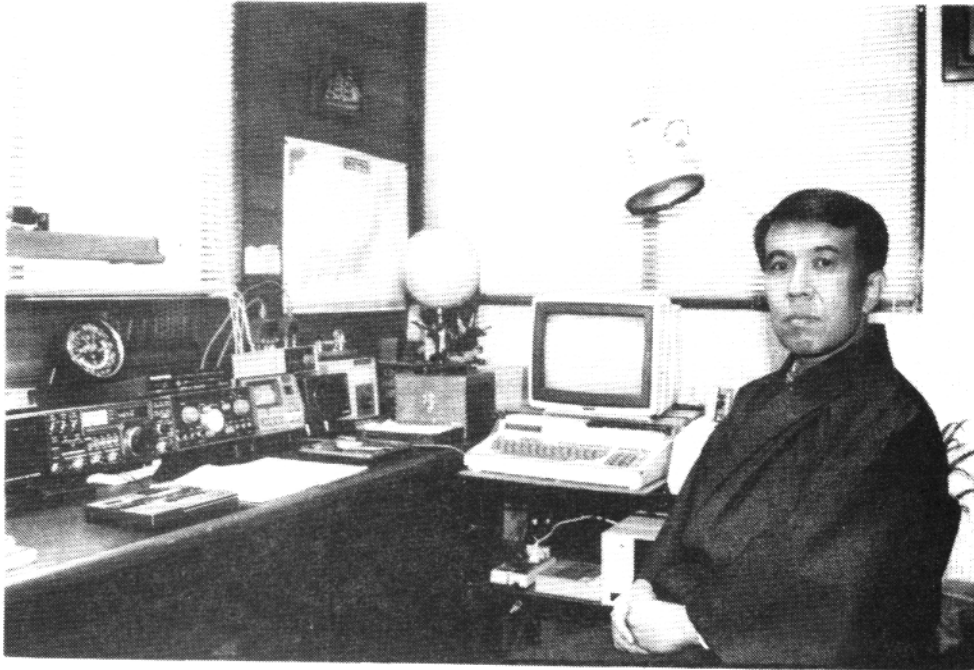
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## THE SWITCH

BY: Mark Spenser, WABSME  
General Delivery  
Beale AFB, CA 95903

I wonder if other proud owners of Info-Tech M-200E and M-44 model RTTY demodulators and AMTOR converters are intimidated by the number of interconnecting cables required to make the system work? After a few years of silent RTTY operation with the M-200E, I surrendered to the urge to try my hand at AMTOR and upgraded my station with the purchase of the M-44. A few hours after stripping RG-58U coax and resoldering ¼" phone plugs and RCA jacks, I was merrily chirping away on AMTOR, a mode come of age in the deepening decline of the sun spot cycle. After awhile I reminisced about straight RTTY, but when I looked at the tangle of cables to convert back and forth between RTTY and AMTOR, I said; nope, another day.

Enough was enough! I wanted to be able to switch between AMTOR and RTTY with just one switch. The result is the circuit in Figure 1. Though designed to interface with a Kenwood TS-930S, minor changes in FSK/TTL sense and PTT connections can make the circuit adaptable to other rigs.

### DESCRIPTION

The centerpiece of the Switch is the IC-GILS97, which contains 8 TTL switches, in two banks of four, that are enabled to pass TTL signals or disabled to high impedance by applying the appropriate voltages to a control line (in this case; low enables, high disables). Refer to figure 1 while each section is detailed.

Whether the M-200E is demodulating and displaying incoming RTTY from the receiver or displaying TTL data streams from the keyboard (M-300C) or M-44 AMTOR converter, is determined by the signal presented at the RA AUX jack. If the input signal is at high impedance state, then the M-200E will display received RTTY signals. If the signal presented is active/TTL, then the M-200E will display data being sent from the keyboard (via RA/MON) or processed by the M-44 and sent to the M-200E via J-4. IC1a provides the proper signal. If RTTY is selected, IC1a is disabled and at high impedance. Signals from the keyboard are active when the unit is transmitting or high impedance when in stand-by thus allowing the M-200E/M-300C pair to function normally. If AMTOR is selected, IC1a is enabled allowing the active

TTL signals for the M-44, J-4 to control the M-200E. Properly programming the M-300C according to handbook instructions will prevent keyboard interference, i.e. keep the keyboard in the non-transmit mode during AMTOR operation: control X, control 0 and type away.

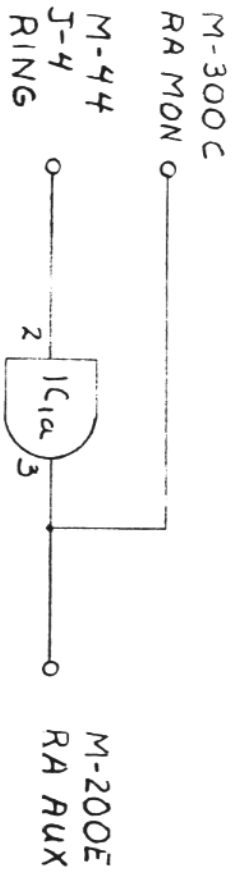
I'd like to take a moment to discuss two mods required to drive the TS-930S FSK circuit with the M-44 or M-300C. As supplied by the factory, the M-44 FSK output consists of audio tones intended to be fed into the mike jack of a SSB transceiver. One problem with using this technique with the TS-930S is that narrow IF filtering is available only in the CW or FSK modes. This filtering sure comes in handy, and often! To modify the M-44 to provide TTL signals compatible with the TTL requirements of the TS-930S FSK input, unsolder and lift one side of capacitor C-17 and run a wire from point H to J-3 (ring). These parts are marked on the M-44 schematic and easily identified on the circuit board.

A similar modification is required to provide TTL FSK signals from the M-300C. As supplied by the factory, the FSK output is provided by a switching transistor design to accommodate older, high voltage/current systems. However, this output transistor is driven by TTL signals that can be taped to drive both the M-44 or TS-930S FSK inputs. Simply attach a wire to pin 11 of IC16 (7406) in the M-300C. I added a separate ¼" phone jack for this signal. This signal is in the proper sense to drive the M-44 but, must be inverted by IC2a to the proper sense to drive the TS-930S.

The remaining sections of IC1 perform similar switching/isolation functions for FSK signals from the M-300C or M-44 sent to the TS-930S. IC1b, when enabled, passes FSK data from the M-44 to the TS-930S. IC1c in turn, passes M-300 FSK data to the M-44. When RTTY is selected, IC1g is enabled, allowing FSK data from the M-300C (in proper sense) to drive the TS-930S. The resistor and capacitor were added on the M-300C FSK line to provide some filtering of the line. I had trouble getting the M-44 to respond to the M-300C signals. The pull up resistor and filter capacitor cured the trouble.

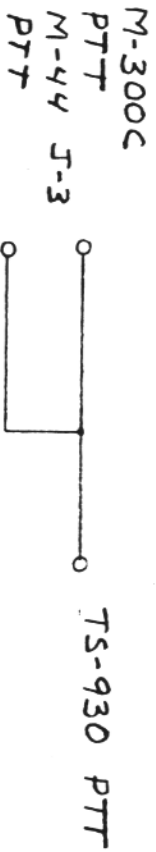
The remainder of the circuit is straight forward. S1 is a double pole/double throw switch. One section switches receiver audio between the M-44 and M-300C. Finally, the M-44 and M-300C PTT

# Info-Tech M-44 Amtor M-200E Rtty Switch



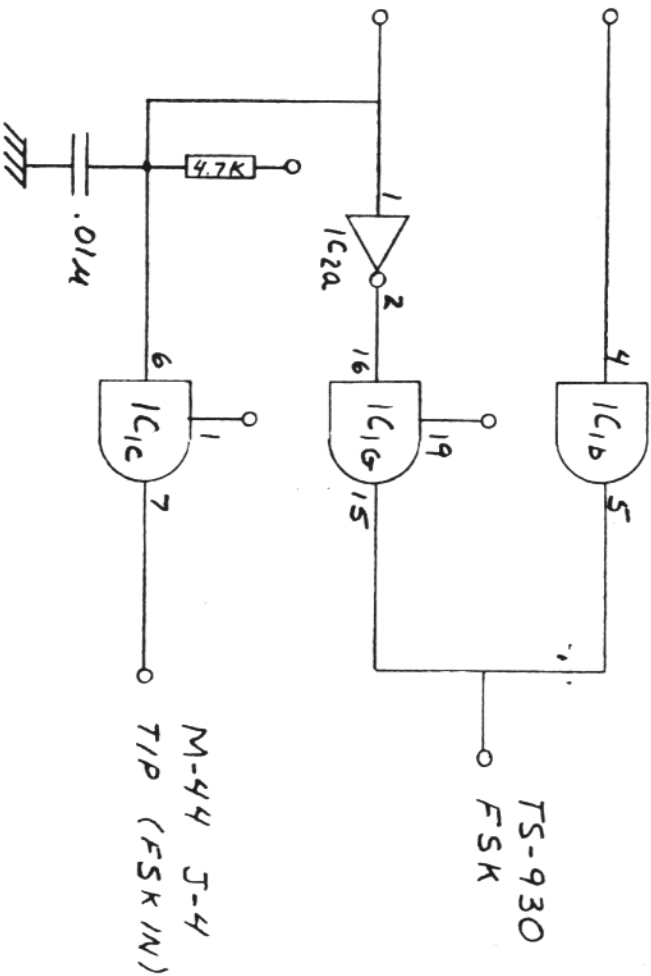
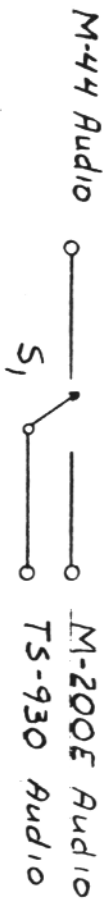
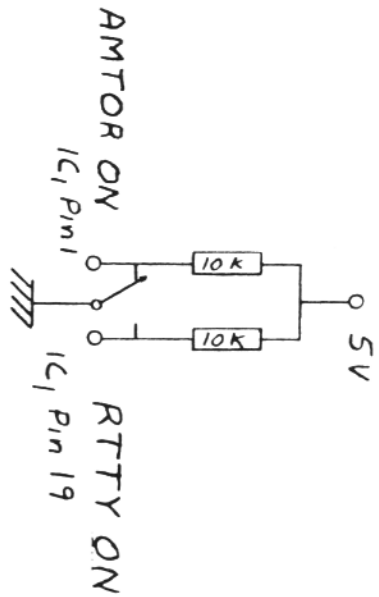
IC1	IC2
5V	20
GND	10
	14
	7

IC<sub>1</sub> = 81LS97  
IC<sub>2</sub> = 7404



M-300C  
IC-16  
Pin 11

M-44  
J-3  
RING







BY: Dick Uhrmacher, KØVKH  
212-48th Street  
Rapid City, SD 57702

## MSO'S

Hi Gang! MSO activity continued hot and heavy in the past month, and system sophistication continues to grow. I recently received a list of the commands to operate the WAIUF Mailbox, (located on the International Mailbox Frequency, "Mark"= 14.097.500 KHz), and I will list a few of them here. Jerry is one of the "old timers" in MSO type operations, and runs a fine machine. Commands are:

IUFZW-Send mailbox WRU, (Who are you?)  
IUFZL + (Your callsign)- Logs you onto the IUF Mailbox System.  
:Q - Sends 5 lines of Quick Brown Fox.  
:D + (Your callsign) - Checks Directory for your messages.  
:D - Lists all "Read Only" messages.  
:DM - Lists callsigns of all stations having messages.  
:DA - Lists all callsigns in the Directory.  
:M + (Callsign) - To store a message for "callsign". Drop your carrier immediately after the callsign. After system replies, continue with your text. Store message with 4 N's. (NNNN).  
:P - Causes system to send your messages.  
:P (Filename) - Plays read only files with (filename).  
:KILL - Deletes your files from the system.  
:X - Used to log off the system, and reset any speed changes.

Jerry reminds all users that each command should be preceded by a CR/LF Carriage return/line feed), as well as followed by a CR/LF. Commands not received on the left most margin, (left justified), are ignored by the system. While logged onto the system, commands must be received by the system within one minute, or the system will automatically log you off.

Try it you'll like it! [Editors note: That's what I have on my bumper, preceded by "Amateur Radio".] The systems have many other neat features, such as remote user commanded speed changes, retransmission capabilities, etc. Thanks

for cluing us in Jerry!

### MSO RAMBLINGS:

Harry, W6KFX, of Hollister, California, reports that he has recently acquired a new HAL ARQ 1000 AMTOR Terminal, and plans to chirp along with the best of them!---- Both AL, NIAP1, and Brownie, K5FL, have experienced some difficulties with their TS-940S's, in MSO service. Nothing drastic, But it did require that the rigs make the trip to Compton for service. ---- Dick, WD4MTC, continues to recuperate from his surgery. We all hope that he rejoins us soon on the National Autostart Frequency. ----Clark, W9CD, has returned to Urbana, Illinois, after some vacationing in Oklahoma, and using what can only be described as a compromise antenna. Welcome back Clark! ---- Don, W5QXK, reports that he has his driveway in at the new homw, but still hasn't had time to put up a tower and beam. Hurry up Don, we miss that whopping signal of yours!

### MSO SOAPBOX:

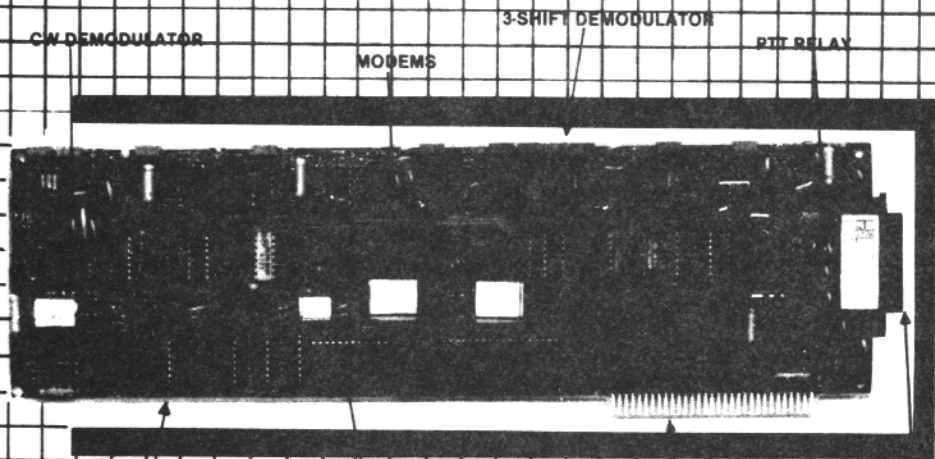
Although I am sure that all MSO SYSOP's are aware of the Control Operator requirements of Part 97 of the Commission's Rules, I think it is a good idea to once again define "unattended operation". Subpart 97.79 specifically states that, "The control operator shall be present at a control point of the station, except when the station is operated under automatic control". ("Automatic Control" is at present NOT authorized in the HF Spectrum). It simply means that if you are not where you can control your Amateur Radio equipment, (no matter what the mode), it can not be left unattended!

Subpart 97.91, One-Way Communications, simply states that you may not "broadcast" from your Amateur Radio equipment. Code practice, emergency drill practice, and informational bulletins, (such as WIAW's RTTY bulletins), are exempted. However, you may NOT call a file from your MSO just to "broadcast" it across the airwaves!

Subpart 97.123, Unidentified Transmissions. No licensed radio operator shall transmit unidentified communications or signals. This simply means that you MUST identify your transmissions! If you're accessing a MSO, calling a friend, testing your equipment, no matter what the excuse, IDENTIFY your signals!

Subpart 97.125, Interference. No licensed radio operator shall willfully or maliciously interfere with or cause interference to ANY radio

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communication or signal.

Subpart 97.119 Obscenity, Indecency, Profanity. No licensed radio operator, or other person, shall transmit communications containing obscene, indecent, or profane words, language, or meaning.

At the risk of implying that soem SYSOP's may not be familiar with the FCC Rules, the above information is provided as a reminder that we all live by a set of rules. Without rules, anarchy would reign supreme, a situation that none of us would like. Recently, an East Coast Amateur Radio Station has been observed repeatedly violating most of the FCC rules mentioned above. His blatant violations continue despite the warnings and obvious distaste shown by fellow Amateur Operators.

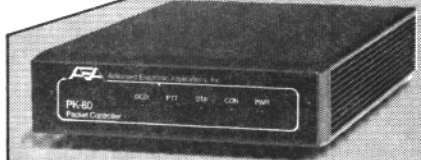
The prupose of listing the rules above is not an attempt to change his ways, but are listed as a refresher for all SYSOP's. Several formal complaints have been filed with the FCC concerning these infractions of the Rules by the East Coast station, which simply means that the FCC Monitoring Stations are closely monotoring his activities, and consequently, those of MSO operations. Over the eight years of MSO operations with which I am familiar, most every MSO SYSOP strives to comply with the Rules. MSO's have provided a valuable service over the years, and will continue in the future, providing that we operate and maintain our equipment within the framework of the Commissions's rules. With the advent and apparent popularity of Packet Radio, which lends itself to unattended operation, there may be changes in the future. However, let's keep our operations within the Rules, and not let one obviously illegal operator ruin it for all!

**DAYTON RTTY DINNER**

As of this date, (February 5, 1986), 32 individuals are pre-registered for the Annual RTTY Dinner, to be held during the Dayton HAMVENTION. With space limited to 50, those interested in attending should register soon. Only KØVKH, Dick, and K4K0Z on the National Autostart Frequency, and WA1IUF, on the International Mailbox Frequency, are authorized to accept reservations. Come and join us, we always have a very nice time, and we'd be proud to have you at the Saturday night get together!

That's it for this time gang. Let's hope that band conditions improve a bit, and that those of us on the 'sick list' get to feeling great again. Enjoy RTTY and the MSO's! DE: Dick, KØVKH.

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RULES

TEST PERIOD: Saturday, MAY 10th, 12:00 GMT to Sunday, MAY 11th 1986, 12:00 GMT (in the future it will be held every 2nd weekend of MAY).

BANDS : 3,5 - 7 - 14 - 21 - 28 Mhz Amateur bands.

CLASSES : a1) single operator/all bands; a2) single operator/ single band. b) multi operator/single transmitter (list the name and call of all operators involved). c) SWL.

EXCHANGE POINTS: Contacts between stations of the same Country are not valid (count for zero exchange points, zero multiplier and zero qso; example : W2... can work W3-4-5-1-ect. but not other W2 stations). All two-way RTTY contacts will count for points in accordance with the Exchange points table. The two-way RTTY contacts, with stations outside one's own Continent, made on 3,5 or 28 Mhz are worth the double.

CONTACTS : Stations may not be worked more than once on any band. Additional contacts may be made with same station if a different band is used.

MULTIPLIERS: A multiplier of one is given for each Country contacted. The same Country may be claimed for extra multiplier if a different band is used. An additional mult. is given for each Intercontinental country worked at least in 4 bands. Contact with a station which would count as a multiplier must be found in at least 4 other logs, or contest log from the multiplier station must be received in order to be valid.

SCORING : Total exchange points times the total number of multipliers times the total number of QSO.

COUNTRY LIST: ARRL Country List plus each USA, Canada and Australia call area (1 trough 10) will be considered as separate Country.

MESSAGE : RST - QSO nr. - ZONE nr.

SWL's : The same rules for scoring, but based on stations and message copied.



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## LIGHT COMPUTER

In my column last month, I discussed the photons and the raw speed obtained by use of photons. Now let's look at other advantages they have. Photons have no charge or mass and are often thought of as ghostly waves rather than particles. Photons have little effect on other photon nearby. They can even pass right thru each other.

This phenomenon excites computer scientists because multiple beams of light in an optical switch, could remain separate, whereas several currents in a single transistor inevitably become mixed.

This optic ability evokes visions of being able to exploit, better than ever, the innovative computer architecture known as parallel processing instead of solving problems step by step as most computers now do. New types of computations will probably come out of optics parallel machines, break apart computational puzzles and solve their thousands or millions of separate parts all at once.

Let's look at another general advantage that optical switches might be able to operate in more than the "Off" and "On" states of transistors which are sometimes known as "0" and "1". Additional functions could be created, for example, by having increasing, but discrete, levels of laser brightness in an optical switch. These bursts of light could be the basis for creating a richer logical system, representing for instance, "0", "1", "2", "3" and so forth. This could allow scientists to roam far beyond the binary logic that has long dominated computer design.

The quest to create optical switches is hampered by the very quality that makes photons so attractive, namely their ability to not interfere with each other. It is the interference between two streams of electrons, after all, that creates

the switching action in transistors.

The solution to this non-interference hurdle is our friend the transphaser. It fires a laser beam, a highly focused light at a special crystal that is made of antimonide. Most of the beam bounces off it, but some also passes inside, where it bounces back and forth with very little escaping.

When a second, weaker laser is also directed at the crystal increasing only slightly the intensity of the light, a major threshold is reached inside the crystal and the reverberating waves of light start to reinforce one another, causing laser light to suddenly flash out the other side of the crystal. In effect, a weak beam of photons exerts control over a strong one. The leverage is similar to that in a transistor where a weak flow of electrons can control a strong one.

The present state of the art of such optical switches require a great deal of power and are much bigger than silicon electronic devices however, each optical switch is separate as transistors were in the 1950's. The goal now is to shrink optical switches and pack them tightly together. The cost and size will decrease much as the integrated circuit accomplished in the use of the transistor.

Many hurdles remain to be solved. The creation of tiny optical switches made from gallium arsenide, a material mainly used in solar cells and semiconducting lasers is a step toward the final solution.

Optical computing may prove to be a powerful adjunct to the fibers of glass that carry light wave communications. These can carry thousands of times more information than metal wires on telephone poles.

I will end my column this month, I hope my column on optical computers was interesting and thought provoking.

So long for now, George, WA6CQW.....

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FOR SALE: CWR6850 Telereader, 12 VDC or AC Cost \$995, Sell \$400. Robot 800 w/AMDEK 100 13" B/W monitor, cost \$800, Sell \$300. Dennis, 619/227-6780 x2777 M-F.

1986 NATIONAL CONVENTION- September 5, 6 & 7, 1986. Now taking advanced registrations. Postmark before April 15, 1986 is eligible for both the "EARLY BIRD" and "ADVANCE REGISTRATION" prizes. Advance registration is \$7. \$10 after 8/15/86. Banquet (prime rib) \$25. Ladies luncheon \$10. Friday night Dinner/Dance/Cruise with open bar and transportation to/from ship \$33. Prices are per person. Checks payable to: SANDARC, Inc., POB 82642, San Diego, CA 92138. Town & Country Convention site reservations call 800/542-6082 from CA; 800/854-2608 in USA. Ask for ARRL rates. Arrange discount air while on line. See you there.

HAL COMMUNICATIONS STRIKES AGAIN! If you have an IBM-PC, then you want to utilize the new HAL PCI-2000 interface and software to turn it into the ultimate in a computer based RTTY system! Morse, Baudot and ASCII, 103/202 modems, all speeds and shifts, split screen and a host of other features. Write or call Dick, KOVKH, DIALTA Amateur Radio Supply, 212--48th St., Rapid City, SD 57702 602/343-6127. Our prices can't be beat!

THE DAYTON-CINCINNATI chapter of the Quarter Century wireless association will hold its' 1986 annual banquet on April 25th, the Friday night of the Dayton Hamvention. Leland Smith, National QCWA President, will speak on, "THE FUTURE OF AMATEUR RADIO." Happy hour is at 6:30; dinner is 7:30, at the newly remodeled Imperial House, I-75 and Needmore Road. For tickets and information contact: Bob Dingle, KA4LAU, 657 Dell Ridge Dr., Dayton, OH 45429. Come and bring a friend. Q WA membership is not required to attend.

TELETYPE EQUIPMENT -Warehouse full of Model 28, 33 and 35 KSR's, ASR's, TD's, typing reperfs, mod kits and parts. Collected over 15 years. Must vacate by June 30th- \$5,000.00 for the lot. Also RTTY demodulators and video RTTY equipment. Send SASE for complete list and prices. Lawrence R. Pflieger, K9WJB, 2600 S. 14th Street, St. Cloud, MN 56301. PH. 612/255-9794.

RTTY PAPER AND SUPPLIES- 8 1/2" wide, 4 1/2' dia. rolls \$5 each, reperf tape 11/16" \$2.50 roll, 1" \$3/roll. Fan-fold paper 8 1/2 x 14" sheets, \$25/box. New heavy-inked UPI ribbons \$2.50 each. Teletype motorized 28/33/35 paperwinders \$60 each. Spring-wound tape take-up reels \$15 each. Back issues RTTY JOURNAL 1957-1964, \$10/year. Manuals for Model 15/28/33/35 machines. Gearshifts for all Model 28 machines. Send SASE for complete list and prices. Lawrence R. Pflieger, K9WJB, 2600 S. 14th Street, St. Cloud, MN 56301. Ph 612/255-9794.

WANTED-Teletype repair parts, unused. Sell gears, parts, manuals, supplies. SASE list. TYPETRONICS, Box 8873, Ft. Lauderdale, FL 33310. After 9PM EST 305/583-1340. N4TT.

HENRY RADIO IS OVERSTOCKED with used and demo RTTY and SSTV gear; IRL 1000 TU's, new \$325! Hal ST-6000 \$550, DS-3100 \$1450, new CWR 6850/AMTOR 10A combo for \$995, used only \$750; AEA Micro-patch \$115; used HAL CT-2200 W/KBU \$550; used 12" green monitors \$99; Robot SSTV, 400, 450C, 800C, used call for prices. Okidata and Panasonic printers, Mitsubishi P50-U video printer \$399; Used HAL AMTOR ARQ-1000 \$499. Call George, AB6A at Henry Radio, Los Angeles, 1-800/421-6631 or 213/820-1234.



**DX**

**JOE WOOD, AJ8X  
P38 64  
LAUREL, MS 39440**

**PROPAGATION, LOOK 'M UP!**

A few days of the month of February brought exceptional band conditions. Ten and fifteen exhibited signs of comparable to peak years and twenty was a 24 hour DX band to all parts of the world. These days will become more prevalent as we move through the bottom of this cycle and to take advantage of them, one must listen, watch the propagation reports, listen and call! Wonder how many good days we have had and didn't know they were good 'cause everyone was just listening? Operating is going to be fun again and soon.

**TWENTY METER BAND PLAN**

Several months ago, among the more active stations in the 14075 to 14100 RTTY segment, rumbles began..... MSU's are killing the DX stations, DX stations are transmitting on top of the MSU's, AMTOR is chewing up the lower part of the segment, wide spread confusion is starting and is going to get worse as band conditions improve. Then HF packet started its' motor..... these users were smart; they had listened to the many suggestions that we move above 14100 KHz and utilize that part of the band, and why not? It's a legal mode all of the way up to 14150 KHz. I, over the period, had asked for comments from RTTY'ers, AMTOR users, DX'ers, packeteers and other interested parties as to their thoughts on occupying additional "legal" spectrum. The ARRL through my director, was asked to give thought to the situation and jointly, with our input, give blessing to a new "gentlemens" band plan agreement. This was not to happen. Perhaps their action (?) is understandable, although not forgivable. Bill Snyder, W4LHS former MC of this column and now associated with WORLDRADIO, perhaps explained ARRL's reluctance to move on this when he approached the League with regard to MSO operation..... to quote Bill (from his column in the March 1986 issue of WORLDRADIO) "The League went into action, President Vic Clark appointed an ad hoc committee to look into the matter.

Well, the director who was named chairman of the committee wrote me a letter and asked, 'What is an MSO?' I wonder if he ever figured it out?" Another political appointment....no doubt....and certainly not the answer to getting the job done. You said it all Bill, and my apologies to you for not understanding your feelings when all of this started.

Someone has to take the "bull" by the horns, and with the input that has been provided this writer over the past few months, the following band plan for twenty meters is suggested for implementation now!

-----  
The new Gentlemens Agreement for Twenty Metter, AMTOR, Mailbox (MSO), Packet:

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14065-14075 AMTOR and AMTOR Mailbox use. 14070 AMTOR National Calling Frequency.

14075-14098 RTTY and two Mailbox (MSO) frequencies, 14085.625 mark and 14095.355 mark to be shared with general RTTY use.

14100-World Wide (CW) Propagation Beacons.

14101-14115 Packet. 14110 Packet National Calling Frequency.

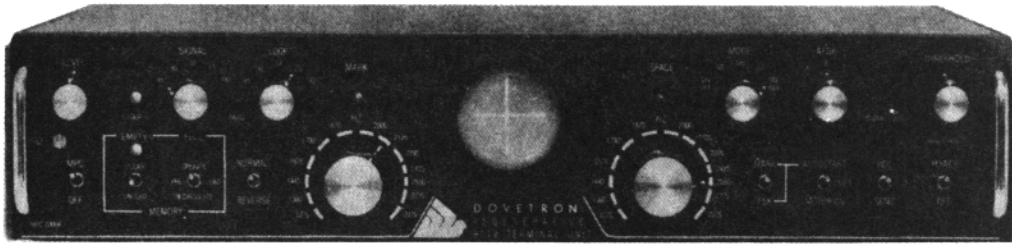
14115-14125 RTTY General Use other Mailbox (MSO) Operations 14120 RTTY National Calling Frequency.

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A note on the preceeding frequencies.... As mentioned earlier, a deluge of suggestions prompted this writing. AMTOR has fairly well positioned itself at the bottom of the segment replacing some RTTY operation there and thus squeezing the RTTY segment upward. The CW segment is squeezed downward a bit, but by its' very nature is a space conserving mode and should not suffer. The existing RTTY segment was somewhat further squeezed by Mailbox activity. This is of concern, but is acceptable if Mailbox and general RTTY use follow the rule of co-existence through good operating techniques. The two recognized frequencies for Mailbox activity have approximately thirty stations listed for them. This is good spectrum management by further relieving other parts of the segment. Above this is the World Wide CW Propagation stations. A valuable service to the Amateur fraternity and certainly worth the apace occupied. Packet is further accomodated with an allocation within the plan. A growing mode that may well relocate a number of todays RTTY, AMTOR users. Upwards, general



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