ORANGE COUNTY AMATEUR RADIO CLUB W6ZE

RF

VOL. LV NO. 10 P.O. BOX 3454, TUSTIN, CA 92781-3454 OCTOBER 2014

Special Halloween Issue

THE PREZ SEZ:

Hello and Greetings to all! October is the month when the year starts to feel like the holidays are around the corner, as we will only have one more General Meeting before the Christmas party on December 12th. We do have big plans for the rest of the year with the upcoming Club Auction this month. This is your opportunity to convert those items that are eating up space in your garage into money at the auction. Or you could donate them to the Club to help defray its expenses. Or you may want to buy some exotic radio accessory at a bargain price. The possibilities are endless as you can see. Again this year we will have the star auctioneer Chip K7JA, and this will guarantee a fun evening. You cannot miss this event, open to everybody, even if you are not a Club member. At the November meeting, we will have a highly regarded speaker and then the elections for next year's Board of Directors. This is your chance to help the Club run its daily business by becoming one of the Directors (or even President). If interested, please contact Greg W6ATB or myself to be in the list. Any current Club member can have any position on the board. The Christmas Party date has been set for Friday December 12th. Mark your calendars early so you don't miss it. As usual, I look forward to an eyeball contact with you all at the next General Meeting.

73 DE AF6CF

Scan this QR code to go to our website.

http://www.w6ze.org

OCTOBER AUCTION

The annual club auction will be held in place of the October general meeting. It will be held at the general meeting location. Doors will open at 6:00 PM for setup. Now is the time to start cleaning out the shack to make room for your new auction possessions.

See you FRIDAY, October 17th @ 7:00 PM Auction location and rules are on pg. 5

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The Next OCARC Breakfast & open club Board Meeting is on Sat. NOV 8th.

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P.O. Box 3454, Tustin, CA 92781

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Contact the Newsletter:
Feedback & Corrections:
rf_feedback@w6ze.org

Submit Articles:
editors@w6ze.org

Monthly Events:

General Meeting:
Third Friday of the Month
At 7:00 PM except Dec.
American Red Cross
600 N. Parkcenter Dr.
(near Tustin Ave. & 4th St)
Santa Ana, CA

Club Breakfast (Board Mtg.):
Second Saturday of the month at 8:00 AM at the
Jägerhaus Restaurant
2525 E. Ball Rd.
Anaheim, CA
(Ball exit west off 57-Fwy)

Club Nets (Listen for W6ZE):
28.375 MHz SSB ± QRM
Wed - 7:30 PM - 8:30 PM
Bob AF6C, Net Control

146.55 MHz Simplex FM
Wed - 8:30 PM - 9:30 PM
Bob, WB6IXN, Net Control

7.086 ± MHz CW OCWN
Sun - 9:00 AM - 10:00 AM
John WA6RND, Net Control

VISIT OUR WEB SITE
http://www.w6ze.org

for up-to-the-minute club information, the latest membership rosters, special activities, back issues of ***RF***, links to ham-related sites, vendors and manufacturers, pictures of club events and much, much more.

Club Dues:

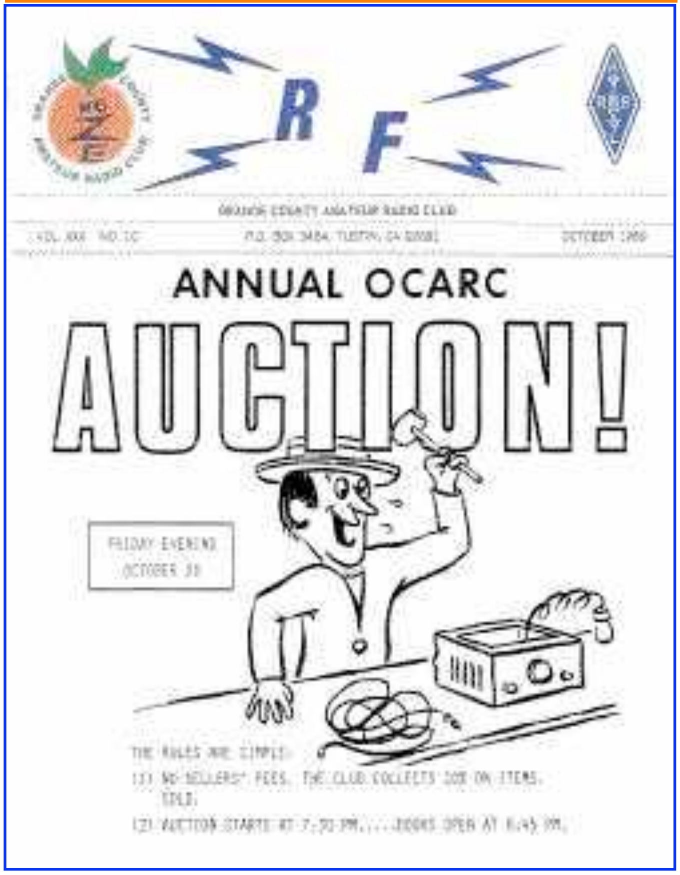
Regular Members	$20
Family Members*	$10
Teenage Members	$10
Club Badge**	$3

Dues run from January thru December & are prorated for new members. *Additional members in the family of a regular member pay the family rate up to $30 per family.

**There is a $1.50 charge if you'd like to have your badge mailed to you. We prefer you pickup your badge at a meeting.

New members joining after midyear may choose to pay for the remainder of the year and the next year at a savings of $5.

- 25 Years Ago in RF Newsletter - October 1989:



The front cover of the October 1989 issue of RF has a cartoon by Jim Talcott N6JSV depicting the upcoming club auction. Jim also was the acting editor for this issue of RF.

The newsletter is small at six pages instead of the more usual eight pages at that time. Part of the reason was that there is no October **Prez Sez** column because then President Frank Smith - WA6VKZ was in the process of relocating.

Page two is filled with club information just as our current issue is. In those days we were having our club breakfast at Denny's (17th and Tustin Ave.) in Santa Ana and the club meetings were held at Mercury Savings and Loan on Irvine Blvd. in Tustin. Club evening nets were held on 2-meter FM on Monday (9 PM), 15 meter SSB on Wednesday (8 PM) and 15 meter CW on Thursday (8 PM). Bob, WB6IXN hosted the FM and CW nets and Bob, KD6XO hosted the SSB net.

Page three is filled with **On the Nets** by Bob, WB6IXN. Covered are the FM nets of 9/6, 9/13, 9/20 & 9/27; the SSB nets of 9/6, 9/20 & 9/27 and the 9/14 CW net.

On the Nets continues onto page four. It is followed by **Not-So-Trivia Radio History Since 1901** which was probably compiled by the editor. One tidbit of trivia given is that on January 10th 1914 the first wireless transmissions from a train were conducted by Marconi.

Page five is dedicated to two short articles. One on hurricane Hugo that struck the Caribbean on September 17th and later moving up the east coast of the US, and the second is on the Congress bill HR 3299 which included a proposed license fee for radio amateurs.

The last page, page six, talks about a General Motors brochure titled ***Radio Telephone/ Mobile Radio Installation Guidelines.*** This book was produced by the GM Electromagnetic Compatibility Department. Also on page six is a 1989 update of countries permitting amateurs to handle third-party traffic with the United States.

Of course, in 1989 RF was mailed so page six also includes space for the address, return address and postage stamp (25¢)!

To read the full newsletter you only need to go our website and, in the index on the left, click on **'RF' Newsletter** under **Club Library**. At the top of the new page select **1989** and you will jump down the page to where links to the 1989 issues of 'RF'. Click on **October** and the PDF file of that issue will be opened in your browser or downloaded to your download folder depending on how you have your computer setup. You may also manually scroll down to 1989 and then click on **October**.

de Bob - AF6C

Let the Club Handle Your ARRL Renewal

Over the past few years very few members have taken advantage of joining or renewing their A.R.R.L. membership through the club. The club benefits by receiving a commission when a member joins or renews through the club. If you wish to join the ARRL, see the club Treasurer for a form. You pay the Treasurer directly and he will submit your form. If it is time to renew, bring your renewal notice to the Treasurer along with your renewal check made out to the OCARC and he will handle the submission. (you can renew early, even before you receive your renewal notice. Just see the Treasurer.)

HAMCON 2015
Sept. 11 - 13, 2015
Torrance, CA

Hamcon 2015 will be held at the Torrance Marriott in Torrance, CA between September 11th and September 13th. 2015.

Why is this being announced now? If anyone wants to get a hotel room, The Marriott will begin offering rooms at a special rate starting on October 15th.

The club's own George Jacob - N6VNI is the Vendor Chairman for this event.

Please talk up the convention; it's a short drive of about 50 miles to Torrance, and the last convention there was a good one!

For more information see the flyer on **page 26** of this newsletter. You will soon be able to get information when you want for the convention on our website.

Orange County clubs need to be represented at the 2015 ARRL convention.

? ? PUZZLER ? ?

In the April 2014 issue the following puzzler problem was presented:

You have two wooden cubes and a broad black felt-tip pen. You want to be able to use the cubes to represent the numeric day of the month by writing one digit on each of the faces of the two cubes.

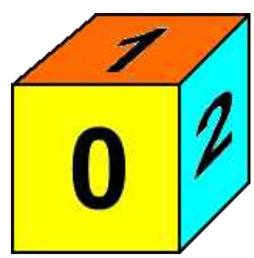
How do you do this so that any date of the month 01 through 31 may be displayed using both cubes?

Unfortunately neither the answer nor the names of those submitting correct answers were published – until now.

A cube has six sides so a total of twelve numbers can be put on the cube. Since you need to represent the numbers 01 through 31 both cubes must have the digits 0, 1 and 2. Duplicate ones and twos are needed for 11 and 22, and duplicate zeros are needed because all single digit numbers need a zero. The next six of the remaining numbers 3 through 8 occupy the six remaining sides. To create a nine you need only invert the six.

Here are those who supplied correct answers in the order received,and their answers:

```
Corey KE6YHX:  0 1 2 4 6 8  &  0 1 2 3 5 7
Dan   KI6X:    0 1 2 3 4 5  &  0 1 2 6 7 8
Fried WA6WZO:  0 1 2 3 4 5  &  0 1 2 6 7 8
```



Fried also offered a solution if you only use one cube for the dates 1 through 9:

```
Fried WA6WZO:  0 1 2 4 5 6  &  1 2 3 7 8 9
```

? ? PUZZLER ? ?

AUCTION

OCARC RADIO AUCTION

Friday October 17, 2014 7PM

www.w6ze.org

Auction Rules

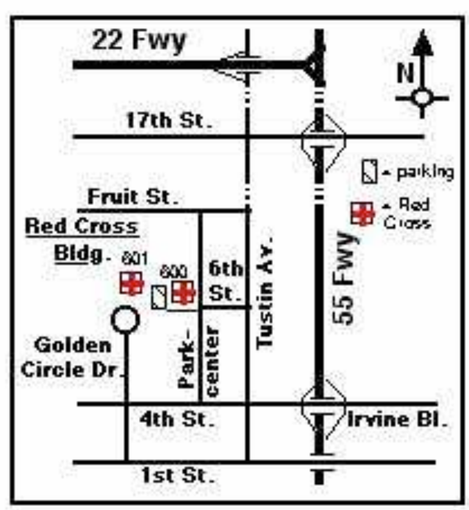
The OCARC Annual Auction will take place on Friday evening, October 17th, 2014, at 7:00 PM at the American Red Cross facility located at 600 N. Parkcenter Drive, Santa Ana. The room will open at 6:00 PM to allow registration, set-up and viewing. All buyers and sellers are welcome. The following rules for the auction will be in effect:

1. Only ham radio or electronic equipment / items will be auctioned (i.e.: no fishing equipment, etc)
2. Buyers and Sellers must register at the door with the OCARC Treasurer.
   There is NO registration fee.
3. Sellers should number each item in their lot. A tag should indicate the minimum bid they expect.
4. Only 3 items from a Sellers lot will be auctioned during each turn. After auction 3 items, the auctioneer will move on to the next lot. After the first 3 items from every lot have been offered for bid- ding, the auctioneer will start the second round of auctioning with the next 3 items in Lot #1.
5. Auction bidding will take place as follows:
   (a) $0.00-to-$5.00 bidding will take place in $0.50 increments.
   (b) Over-$5.00-to-$50.00 bidding will take place in $1.00 increments.
   (c) Over-$50.00-to-$100.00 bidding will take place in $5.00 increments.
   (d) Over-$100.00 bidding will be in $10.00 increments.
6. Rules 4 and 5 may be changed at the auctioneer's discretion to expedite the auction.
7. Payments for purchased items are due at the end of the auction and shall be by cash or check with the appropriate ID. No two-party checks or credit cards are allowed. **Disbursements to the Sellers will be by OCARC check, only.** Sellers will be charged 10% of the selling price for items sold by OCARC.

A special table will be set up for **donated items.** The proceeds of donated items will go to OCARC.

The American Red Cross
George M. Chitty Building
600 Parkcenter Drive
Santa Ana, CA.

Second Floor, Room 208*
Enter from the West Side.)
Note: The door locks after 7PM.
If no one is there to let you in
call W6ZE on the TALK-IN freq:
146.55 MHz Simplex
* Room is subject to change.



September 2014 General Meeting Minutes

The OCARC General Meeting was held at the Red Cross Complex on September 19th 2014. The meeting was called to order at 7:03 pm. There were 2 visitors.

The evenings featured presenter was member Clem Brzoznowski – W0MEC with his presentation “A History of Morse Code”.

Clem presented a variety of information on the early history of telegraphy. The most interesting part was Clem’s personal history as a telegraph operator with the Great Northern Railroad. Clem painted a vivid picture of his life as a railroad telegrapher. His story was filled with interesting antidotes, such as arriving at his new job as a capable CW operator and discovering that for the first several weeks, between the railroad shorthand, unique personal styles of code some of the other operators applied, and general workplace “good natured” harassment of the new guy, he could hardly understand any code being sent. Finally, Clem’s pictures of the stations he worked in, and collection of historical equipment added to the enjoyment of the evening.

After the break there was a brief business meeting. All officers were present except Greg – W6ATB and Bob – AF6C.

Announcements: Currently on the club website there are a number of items for sale:

http://www.w6ze.org/FOR-SALE/For-Sale-Portfolio.html

The October meeting is the Auction.

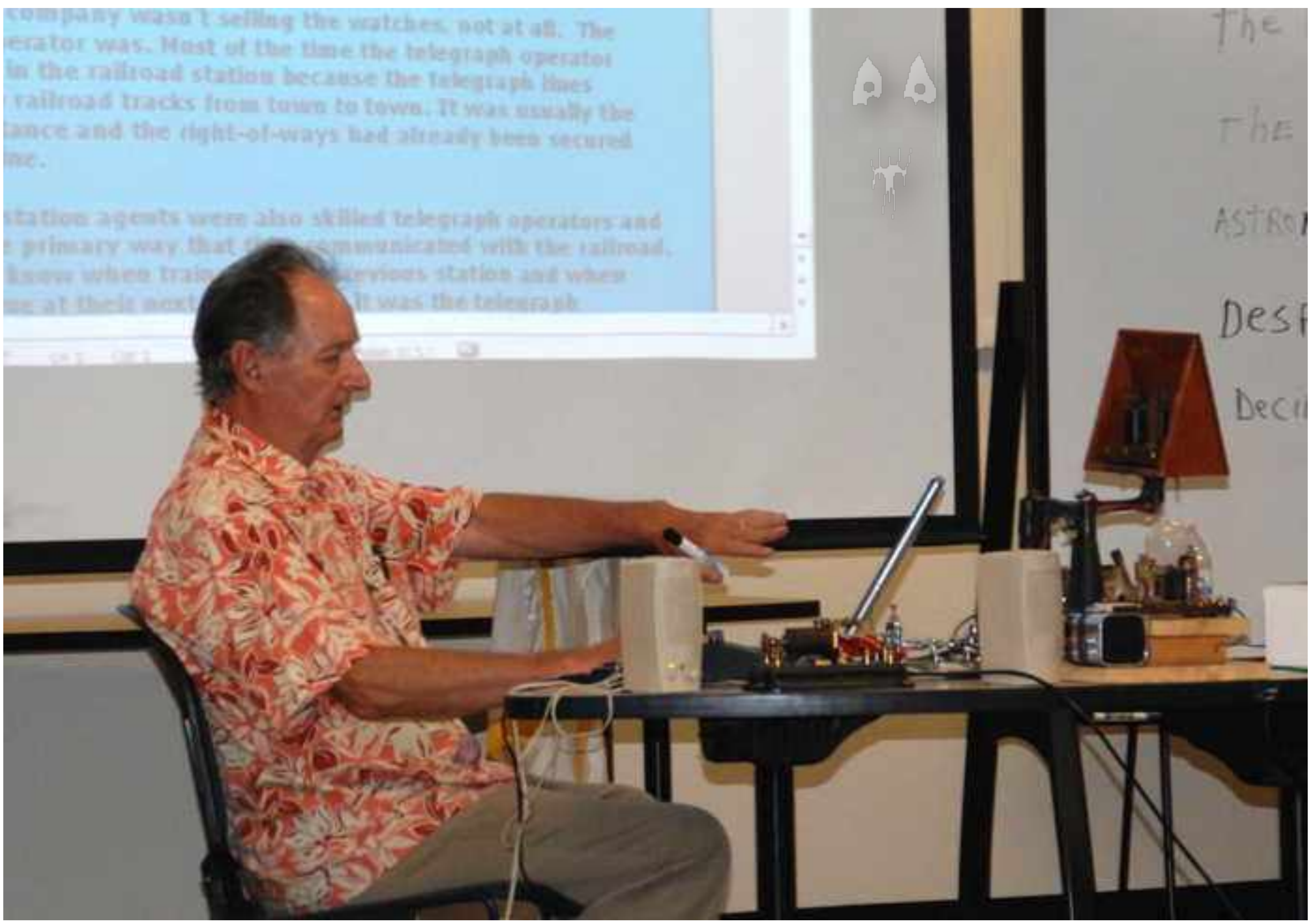


Fig 1: Clem - WØMEC demonstrating his railroad telegraphy equipment.

Fig. 2. Clem – WØMEC answers questions from Wayne – W6IRD during break time.

The election committee chair – Greg- W6ATB is working on a slate of members to stand for election as next year's board members.

Plans are in the works to visit and operate from the radio room of the USS Iowa Ship and Museum in San Pedro. More details to follow.

The meeting adjourned at 9:56 pm.

Respectively submitted by:

Tim - N6TMT
Secretary

INVITATION TO JOIN A T-HUNT

I am proud to be an OCARC member. I invite all OCARC members to participate in the second-Monday-of-the-month cooperative T-hunts held on the input (146.295 MHz) of the 146.895 MHz OCRACES repeater (136.5 Hz PL), immediately after the Monday night RACES net, which begins at 7:00 PM. Hunters compare bearings on the 449.100 MHz OCRACES repeater (110.9 Hz PL), which is a private repeater, but available for all hunters to use during the T-hunts. Hunters compare bearings in order to find the fox quickly. The hunts are an exercise in working together to quickly locate interference. Hunters are also encouraged to beacon their positions via APRS. They use loops, beams, and/or Doppler direction-finding systems. The fox hides on publicly accessible paved property, within a pre-announced city in Orange County. The next hunt will be on October 13th., followed by one on November 10th.

Contact Ken Bourne - W6HK for further info.

Club Members Talk at ARRL Southwestern Division Convention

The talks were tempered somewhat by the hot weather and the lack of working air conditioning in some of the presentation rooms!

At the recent ARRL SWD convention held in San Diego, CA two OCARC members gave well received presentations.

Arnie - N6HC talked on the FT8ZM DXpedition he participated in to Amsterdam Island in the south Indian Ocean.

Ken - W6HHC talked on Digital Amateur Television (DATV) and the development of the DATV-Express board, a multinational development project. The boards are now available for purchase.

ABOVE: Arnie - N6HC prepares to greet the audience before his presentation on the FT5ZM Amsterdam Island DXpedition.

LEFT: Arnie describes the journey from Perth Australia to Amsterdam Island aboard the charter ship *The Braveheart*.

Heathkit of the Month #60
by Bob Eckweiler, AF6C

AMATEUR RADIO EQUIPMENT
Heathkit SB-610
Station Monitor Scope

Introduction:
In 1962 Heathkit released the HO-10 Station Monitor Scope. At that time my station was a Heathkit Apache (TX-1) and a National NC-88 receiver. I was still in high school and when I saw the ad for the HO-10 I knew I had to have one. At that time one of the local NYC radio stations held a contest; “Write us and let us know what you want for Christmas and why!” (Do radio stations still have essay type contests?) I wrote my essay as to how a Heathkit HO-10 would help keep my amateur radio signal quality clean - heck, they were into radio too, I felt I had a chance. Well truth is I never got an HO-10. And to be honest, though I later built the SB-301/401 twins, I never bought the later SB-610 Station Monitor Scope either (shown in Figure 1). Thus when I recently saw an HO-10 for sale at a good price I picked it up.

Heathkit introduced their SB-300 / SB-400 HF Radio twins in 1963; Other than IF filters they added few accessories except for the SBA-300-3 and SBA-300-4 converters for 6 and 2 meters, which were added in late 1964 or early 1965.

However, in 1966 when Heathkit released the upgraded the twins to the SB-301/401 they also started to add a bunch of station accessories. They released the SB-600 Speaker, the SB-610 Station Monitor Scope and the SB-620 “Scanalyzer” Panadapter; all introduced during 1966. The SB-610 replaced the older HO-10 and the SB-620 (yet to be covered in Heath of the month) replaced the HO-13. It is interesting that the SB-300 never had a matching speaker until the SB-600 came out in 1966!

Figure 1: Heathkit SB-610 Station Monitor Scope

The Heathkit HO-10 Monitor Scope:
The HO-10 (shown in figure 2) was produced by Heathkit from 1962 until it was replaced by the SB-610 in 1966. Over its lifetime it sold for \$59.95. It features a 3” 3RP1 CRT display that can display receiver IF signals, RF envelope and both AF and RF trapezoid signals. The monitor can also be used as a basic oscilloscope and as a cross pattern RTTY indicator. We’ll discuss these modes of operation more in the SB-610 section.

Figure 2: Earlier Heathkit HO-10 Station Monitor Scope

HO-10 and SB-610 Monitor Scope Specifications

	HO-10	SB-610
Vertical Amplifier:		
Input Resistance:	50KΩ	100KΩ
±3 dB Freq. Response:	10 cps to 500 kc	(See text)
Deflection Sensitivity:	500 mV/inch	(See text)
Horizontal Amplifier:		
Input Resistance:	1 Meg Ω	
±3 dB Freq. Response:	3 cps to 30 kc	3 cps to 15 kc
Deflection Sensitivity:	800 mV/inch	
Sweep Generator:		
Recurrent Type:	Sawtooth	
Freq. Range:	15 to 200 cps1	5 to 200 cps
Tone Oscillator:		
Frequency #1:	1,000 cps	1,500 cps
Frequency #2:	1,700 cps	1,950 cps
Output Voltage (nominal):	15 mV	50 mV
General:		
RF Attenuator:	6, 12, 18, or 24 dB	
Freq. Coverage:	160 - 6 meters	
Input Impedance:	50 - 75 Ω	
Signal Power Limits:	5 W to 1 KW	5 W to 1 KW
Power Requirements:		
Voltage:	105-125 VAC	105-125 VAC
Optional Voltage:	(none)	210-250 VAC
Frequency	50/60 cps.	
Power	35 watts	
Dimensions:		
Height	5-1/4 inches	6-5/8 inches
Width	7-3/8 inches	10 inches
Depth:	11 inches	11-1/8 inches
Net Weight:	8 lbs. 4 oz.	9 lbs. 10 oz.

Table I

The HO-10 uses six tubes including the CRT. The negative 1,500 high voltage for the CRT is provided by a winding on the power transformer and rectified by a 1V2 HV diode vacuum tube. The vertical amplifier, used for some of the functions, uses both sections of a 12AU7 tube in cascade. A two-tone oscillator is built-in to the scope. The front panel **TONE** switch can select either a 1,000 cps tone or a dual tone at 1,000 and 1,700 cps. The rest of the circuitry is very similar to the SB-610.

The HO-10 is styled in two shades of green to match the Heathkit *Apache* Transmitter (TX-1) and *Mohawk* Receiver (RX-1) as well as the *Marauder* (HX-10) SSB Transmitter. The HO-10 and SB-610 specifications are shown in Table 1.

The Heathkit SB-610 Monitor Scope:
In late 1966 the HO-10 was replaced by the SB-610. The SB-610, appeared in the 1967 catalog (810/67A) listed as NEW, where it sold for $69.95. The new monitor scope closely matches the style of the SB line. In the same catalog Heathkit announced the SB-620 *Hamscan* as "Available Soon", "Watch for details in the Christmas Flyer". The SB-610 remained in production until 1976.

In 1975 Heathkit introduced the all solid-state (except for CRT) SB-614 for $139.95 that matched the new SB-104. The SB-610 no longer appeared in the Winter 1976 catalog.

Operating Modes:
The SB-610 has five operating modes:

- Receiver Envelope Monitoring.
- Transmitter Monitoring.
- RF Trapezoid Monitoring
- RTTY Monitoring
- Oscilloscope Mode

The HO-10 has an AF Trapezoid mode which is electrically similar to the RTTY monitoring mode.

Receiver Envelope Monitor Mode:
This mode is used on receive, and monitors the received signals at the last IF stage. It can detect flat-topping in a remote transmitted signal. The manual gives examples for transmitted tones and voice for different receiver bandwidths. Narrow bandwidths tend to distort the scope pattern.

To use this feature you must capacitively couple a low-capacitance coax lead between the

Alternate #1 – Untuned

Frequency	Sensitivity *	Ckt **
10 cps to 400cps	2.0 V	5a
400 cps to 10 kc	1.0 V	5a
10 kc to 455 kc	500 mV	5a

Alternate #2 – 455 kc to 2475 kc Tuned

Frequency	Sensitivity *	Ckt **
455 kc	70 mV	2a
1000 kc	(not given)	2b
1600 to 1680 kc	200 mV	2c
2075 kc	200 mV	2d
2215 kc	200 mV	2d
2475 kc	200 mV	2d

Alternate #3 – 3000 kc to 6000 kc Tuned

Frequency	Sensitivity *	Ckt **
3000 kc	400 mV	3a
3055 kc	400 mV	3a
3395 kc	500 mV	3b
5000 to 6000 kc	600 mV	3c

* Nominal input voltage (rms) per inch of vertical deflection.

** # is figure in manual. Letter is component selection.

Table II: SB-610 Alternate Vertical Amp Wiring

grid or plate of the last IF to the **VERT INPUT** jack of the scope. Typical instructions are given in the manual.

The SB--610 vertical amplifier can be wired as one of three circuits with 9 different component choices based on the receiver's IF frequency and the desired usage. Table II shows the options for these alternate wiring choices. The untuned circuit is listed for 1 kc to 150 kc, operation, but the specifications mention its use between 10 cps and 455 kc. This is reflected in table II.

Horizontal deflection in this mode is supplied by the built-in sweep oscillator.

The HO-10 has a single universal vertical amplifier input and is broadband to be able to work with most IFs at the cost of deflection sensitivity at some IF frequencies. Otherwise it acts identically.

Transmitter Monitoring Mode:
This mode monitors your transmitted RF signal. The transmitter RF is fed to one of the vertical deflection plates after passing through an attenuator that can reduce the signal by 0, 8, 16 or 24 dB. For 100 watts and 50 Ω that represents about 71, 28, 11 or 4 volts respectively. This is accomplished by a switch on the rear apron. On the rear apron of the monitor scope are two SO-239 UHF connectors (**ANTENNA**). They are connected together and the signal is tapped off internally to the scope. The transmitter output is connected to either of the connectors and the antenna or dummy load is connected to the other. In the manual 21 patterns are shown and discussed to help determine signal problems.

Horizontal deflection in this mode is supplied by the built-in sweep oscillator.

RF Trapezoid Monitoring:
This mode is a good one to monitor the performance of a linear amplifier. The output of the transmitter is connected, through a pair of RCA jacks (**EXCITER**) on the rear of the monitor scope, and to the input of the linear amplifier. The output of the amplifier is connected to the antenna through the ANTENNA connectors.

The exciter signal is demodulated and fed to the horizontal channel while the amplifier signal is fed to the vertical channel. This results in a trapezoid pattern appearing on the CRT during modulation (both AM and SSB). A straight sided trapezoid coming to a point at peak modulation denotes linear amplification. The manual gives six other less desirable patterns and their causes.

AF Trapezoid Monitoring:
This mode is discussed only in conjunction with the HO-10. It is similar to the RF Trapezoid mode except it is expressly for use on AM transmitters. Instead of the exciter RF signal driving the horizontal channel, it is driven by the audio signal from the AM modulator. The SB-610 can do this too, but it is not discussed. Electrically the AF Trapezoid of the HO-10 and the RTTY of the SB-610 are identical modes, though the switch positions have been changed.

Top Row – Center to Right

SWEEP:	3-pos. rotary sw.
INT.ernal, **RF TRAP**ezoid, **RTTY**	
FUNCTION:	3-pos. rotary sw.
SINE, **AF TRAP**ezoid, **RF TRAP**ezoid,	
SWEEP FREQ.uency:	Potentiometer
PULL FOR CLAMP:	sw. on pot. (pull shaft)

Middle Row – Center to Right

TONE GEN.erator:	3-pos rotary sw.
OFF, **1.5 KC**, **2-TONE**	
OFF, **1 KC**, **2-TONE**	
HORIZontal. **GAIN:**	Potentiometer
HOR.izontal **GAIN:**	Potentiometer

Bottom Row – Left to Right

INTENSITY:	Potentiometer
Power **OFF:**	sw. on pot. (full CCW)
FOCUS:	Potentiometer
VERTICAL GAIN:	Potentiometer
VERT.ical **GAIN:**	Potentiometer
VERTICAL POS.ition.:	Potentiometer
VERT.ical **POS.**ition:	Potentiometer
HORIZ.ontal **POS.**ition:	Potentiometer
HOR.izontal **POS.**ition:	Potentiometer

Bold indicates true nomenclature on front panel. When different, light blue signifies the SB-610 and yellow signifies the HO-10.

Table III: Heathkit SB-610 and HO-10 Front Panel Controls

HO-10 Tube Line-up

No.	Tube	Type	Function
V1A	1/3-6BN8	Diode	RF Demodulator (1)*
V1B	1/3-6BN8	Triode	Clamp Switch (2)
V1C	1/3-6BN8	Diode	Clamp Rectifier (1)
V2A	1/2-12AU7	Triode	1st Vertical Amp (2)
V2B	1/2-12AU7	Triode	2nd Vertical Amp (2)
V3A	1/3-6C10	Triode	1/2-Sweep Osc
V3B	1/3-6C10	Triode	1/2-Sweep Osc
V3C	1/3-6C10	Triode	Horizontal Amp (2)
V4A	1/2-6J11	Pentode	1,000 cps Tone Osc
V4B	1/2-6J11	Pentode	1,700 cps Tone Osc
V5	3RP1	CRT	Cathode Ray Tube
V6	1V3	Diode	HV Rectifier

SB-610 Tube Line-up

No.	Tube	Type	Function
V1A	1/3-6BN8	Diode	RF Demodulator (1)*
V1B	1/3-6BN8	Triode	Clamp Switch (2)
V1C	1/3-6BN8	Diode	Clamp Rectifier (1)
V2	6EW8	Pentode	Vertical Amp
V3A	1/3-6C10	Triode	1/2-Sweep Osc
V3B	1/3-6C10	Triode	1/2-Sweep Osc
V3C	1/3-6C10	Triode	Horizontal Amp (2)
V4A	1/2-6J11	Pentode	1,500 cps Tone Osc
V4B	1/2-6J11	Pentode	1,950 cps Tone Osc
V5	3RP1	CRT	Cathode Ray Tube

Table IV: HO-10 & SB-610 Tube Line-up

RTTY Monitoring:

This mode requires the SB-610's vertical amplifier be wired in the "Alternate – Untuned" mode. The mark and space outputs from the RTTY terminal unit (RTU) are connected to the horizontal and vertical inputs respectively. Once the scope is properly adjusted so the gain of the two amplifiers are equal, a mark produces a horizontal oval and a space produces a vertical oval. The narrower the oval the better is the RTU channel separation. The resulting cross pattern can be an aid in tuning in a RTTY signal.

Oscilloscope Mode:

If the monitor scope is wired in the "Alternate – Untuned" mode, the monitor scope can be used as a simple oscilloscope using either the internal sweep oscillator or an external signal connected to the horizontal input.

Front Panel Layout:

There are nine controls, in three rows on the front panel and the 3" CRT face, which is located to the upper left. The controls are listed in Table III, A neon pilot lamp in a red holder near the top center of the front panel designates the power is on.

Rear Panel Layout:
Seven connectors, one switch and the power cord fill the rear panel. From left to right are a dual RCA jack **EXCITER** [**EXCIT**], two female UHF connectors **ANTENNA** [**ANT**.], the 4-position **XMTR. ATTEN.** attenuator switch, a triple RCA jack (**TONE**, **VERT**., **HOR**.,) and the AC power cable. The two **EXCITER** connectors are directly connected internally, as are the two **ANTENNA** connectors. See Figure 3.

Figure 3: Heathkit SB-610 Station Monitor Scope - Rear view.

SB-610 Circuit Description:
While I am focusing on the SB-610 here I might briefly refer to differences with the HO-10. The circuit may be broken down into five main areas: the power supply, the CRT circuit, the tone generator, the vertical circuits and the horizontal circuits. The latter two will be further broken down. The SB-610 uses five tubes, three of which are multi-section and two are eleven-pin Compactron style. The HO-10 uses the same tube lineup except for the vertical amplifier; it also uses a sixth tube for HV rectification. Table IV shows the tube lineups. The schematic is shown in figures 5A and 5B. The schematics overlap and are save in a resolution that should allow good magnification.

Power Supply:
The power supply is transformer based with dual primaries for operation on 120 and 240 VAC power SB-610 only). There are four secondary windings. A heavily insulated filament winding supplies 6.3 VAC to the CRT. This winding sees the -1,400V CRT cathode voltage. A second filament winding powers the remaining tube filaments.

No.	Part #	Function	Notes
D1	2N2071	B+ Doubler Rectifier Leg 1	[1]
D2	2N2071	B+ Doubler Rectifier Leg 1	[1]
D3	2N2071	B+ Doubler Rectifier Leg 2	[2]
D4	2N2071	B+ Doubler Rectifier Leg 2	[2]
D5	57-44	HV Doubler Rectifier Leg 1	[3]
D6	57-44	HV Doubler Rectifier Leg 2	[3]
D7	1N191	Horizontal Sync Rectifier	[4]

[1] Silicon - D1 and D2 are in series.
[2] Silicon - D3 and D4 are in series.
[3] Selenium rectifier- 1750 PIV @ 2 ma.
[4] Used in SB-610 only.

Table V: HO-10 & SB-610 Diodes

The B+ winding provides 210 VAC which, after a full-wave voltage doubler using silicon diodes, is filtered and divided into four decoupled voltages: 600 VDC which is taken from the high half of the voltage divider and 280 VDC, 265 VDC and 215 VDC which are from the low half.

The HV winding provides 600 VAC which, after a voltage doubler that uses a pair of selenium HV rectifiers, produces around negative 1600 VDC for the CRT. This supply is capable of only a few milliamperes. The HO-10 has a 1200 VAC winding with a 0.62 VAC filament winding at the top and uses a 1V2 HV rectifier tube instead of a voltage divider.

Solid state devices used in the SB-610 and HO-10 are shown in Table V.

CRT Circuit:
The 3RP1 CRT control grid is fixed at about -1380 VDC. A voltage divider chain, which includes the **INTENSITY** and **FOCUS** controls, divides down the negative high voltage. The wiper of the INTENSITY control provides a voltage to the cathode that is about 125 V more

positive than the control grid at minimum intensity and near the grid voltage at full intensity. The wiper of the FOCUS control provides a variable voltage of between about 550 and 750 volts to the focusing grid of the CRT. A positive 280 volts from the B+ supply is applied to the accelerator anode. A blanking pulse, provided in certain operating modes by the horizontal circuitry, is capacitively coupled to the CRT control grid to blank the trace when appropriate. Blanking is missing on the HO-10.

Dual Tone Generator:
The tone generator in the SB-610 is independent of the remaining circuitry (expect for the power supply). It can produce either a single 1.50 kc tone or a dual tone of 1.50 kc and 1.95 kc. Each tone oscillator is independent using one half of a 6J11 dual pentode Compactron tube. The front panel **TONE OSC.** switch enables the oscillators by applying screen voltage to the tube. Two internal controls set the **TONE LEVEL** and the **TWO TONE AMPLITUDE BALANCE.** Output of the tone generator is an RCA jack on the rear apron marked **TONE**. The oscillators are similar using P.E.C. (packaged electronic circuit) 180° phase shift network modules to set the frequency. The P.E.C. is composed of four resistors and five capacitors.

The HO-10 is similar except its tone outputs are 1.0 kc and 1.7 kc. Also instead of using different P.E.C. modules for the two frequencies it

Figure 4: Heathkit SB-610 Scope - under chassis view.

uses the same module and the 1.7 kc oscillator is forced to operate at a higher frequency by limiting the cathode coupling on that tube causing additional phase shift. I assume this was done as a cost savings at the time. The output level controls are independent on the HO-10.

Horizontal Circuit:
The horizontal circuit can be broken down into three parts: the horizontal amplifier, the RF demodulator and the the sweep generator. The horizontal circuit is what drives the spot on the CRT screen in the horizontal direction.

The horizontal mode is selected by the three position **SWEEP** switch [**FUNCTION** switch on the HO-10]. In the **INT.**ernal [**SINE**] position the horizontal amplifier is driven by a multivibrator. In the **RF TRAP**ezoid position it is driven by the RF demodulator, and in the **RTTY** [**AF TRAP**ezoid] position it is driven by a signal applied to the **HOR.** input RCA jack on the rear apron.

Horizontal Amplifier:
One section of the 6C10 triple triode tube acts as the horizontal amplifier powered by the 600V B+ from the power supply. The selected input is AC coupled, then adjusted by the **HORIZ. GAIN** potentiometer, amplified in a voltage amplifier and capacitively coupled to one of the horizontal CRT deflection plates. This plate is DC biased through a 3.3 MΩ current limiting resistor by the 280 V B+ source. The other horizontal CRT deflection plate is biased through the **HORIZ. POS.** voltage divider potentiometer by the 600V B+ source. A small capacitor couples a blanking pulse to the CRT grid when in the **INT** position, blanking the retrace.

INT. [SINE] Sweep Position:
The other two sections of the 6C10 tube form a multivibrator circuit. It's sawtooth output is coupled to the horizontal amplifier. The sweep frequency is controlled by the **SWEEP FREQ**. control, and is variable from around 15 to 200 cps in a single range.

RF TRAPezoid Sweep Position:
In this mode the scope horizontal input receives audio from the exciter output. RF from the transmitter is fed through the two interconnected EXCITER connectors on the rear of the scope. A sampling of this RF is detected in the RF Demodulator section; one of the diode sections of the 6BN8 tube. An RFC coil provides a DC path for the detector, the 47K resistor provides the load and the 100 pF capacitor filters out the remaining RF. The result is a demodulated signal which is then fed to the horizontal amplifier and drives the horizontal component of the CRT trace at the modulated audio rate. This is compared to the RF amplifier output signal which is discussed in the vertical circuit description.

RTTY [AF TRAP] Sweep Position:
The final position directly connects the external HOR. input to the input of the horizontal amplifier. This can be used to apply an audio signals from an AM transmitter with the RF signal input to the vertical display, or monitor one of the signals from the RTTY terminal unit with the other signal displayed on the vertical display.

HO-10 Horizontal Circuit Differences:
The two devices share almost the same circuit with a few small component changes and some different nomenclature. The RF TRAP switch position is in the middle on the SB-610 and on the right on the HO-10.

The biggest change is the addition, in the SB-610, of blanking for the CRT retrace in the INT. mode and a sync circuit from the RF input to the sweep oscillator.

Vertical Circuit:
The vertical circuit can be broken down into the vertical amplifier, antenna RF input circuit with attenuator, and the clamp circuit.

Vertical Amplifier Input:
As commented before, the vertical amplifier on the SB-610 can be wired in numerous different configurations. Two of these configurations contain tuned circuits specifically for monitoring a receiver's IF signal. In each of these circuits, components are chosen for the desired IF frequency. When one of these two circuits is chosen the vertical input is limited to monitoring the receiver's IF. If the third circuit is selected, it can be used for other purposes such as RTTY, or as a general scope input. It can also monitor low frequency IF frequencies below 500 KC, but with lower gain.

The output of the amplifier is capacitively coupled to one of the vertical CRT deflection plates. As with the horizontal section, this vertical plate is DC biased by the 280 v B+ supply. The other plate likewise is biased through the **VERTICAL POS.** control voltage divider from the 600 V B+ supply. With the control near center the vertical plates have the same voltage and the trace is centered.

Vertical RF Antenna Input:
Both scopes can monitor the RF envelope. The two **ANTENNA** connectors on the rear apron are wired directly together allowing the scope to tap off some of the RF going to the antenna. This RF is fed to a capacitive attenuator that provides about 24 dB of attenuation in eight dB steps. This switch is labeled **XMTR. ATTEN**. and is located on the rear apron. The attenuated RF is then AC coupled to the CRT deflection plate not connected to the vertical amplifier. Thus the RF will directly drive the trace vertically. Since no amplifier is in the circuit the frequency response allows good deflection at even the higher HF frequencies and beyond.

The SB-610 has a refinement missing in the HO-10. When monitoring your RF signal with the RF on the vertical deflection and the internal sweep generator driving the horizontal sweep. Heathkit added circuit using a crystal diode (D7) that demodulates some of the vertical RF and couples it to a cathode of the sweep oscillator. The idea being that repetitive modulation on the RF will sync the sweep oscillator and allow the pattern to appear steady on the face of the scope.

RF Clamp Circuit:

A bit of the ANTENNA RF energy is tapped off before the attenuator and is rectified by the second diode in the 6BN8 tube. The resulting negative voltage is filtered and fed to the grid of the triode section of the 6BN8. The plate of this tube is connected to the CRT horizontal deflection plate that also has the HORIZ. POS. control; but the cathode is open if the SWEEP control is in the INT position or the **PULL FOR CLAMP** switch on the SWEEP FREQ. control is pushed in. However in both the RTTY and RF TRAP positions of the SWEEP switch the cathode of the triode will be grounded when the clamp switch is pulled out. In this case, when RF is sensed on the ANTENNA connections the triode is biased off. However, when the RF is not present, the triode conducts and pulls the horizontal deflection plate voltage to near zero; meanwhile the other horizontal plate is at the nominal 280 VDC and the whole trace is moved off screen protecting the CRT phosphor from burn-in by the resulting single spot on the surface of the CRT should the intensity be set too high.

HO-10 Vertical Circuit Differences:

The HO-10 has only one choice for wiring its vertical amplifier. It is similar to the untuned amplifier of the SB-610. However it uses both sections of a 12AU7 dual triode tube in cascade. This circuit functions similarly to the "Alternate Untuned" wiring option of the SB-610 as shown in Table II.

Other than the vertical amplifier, the remaining vertical circuitry is nearly identical to the SB-610 with the exception of the sweep sync capability.

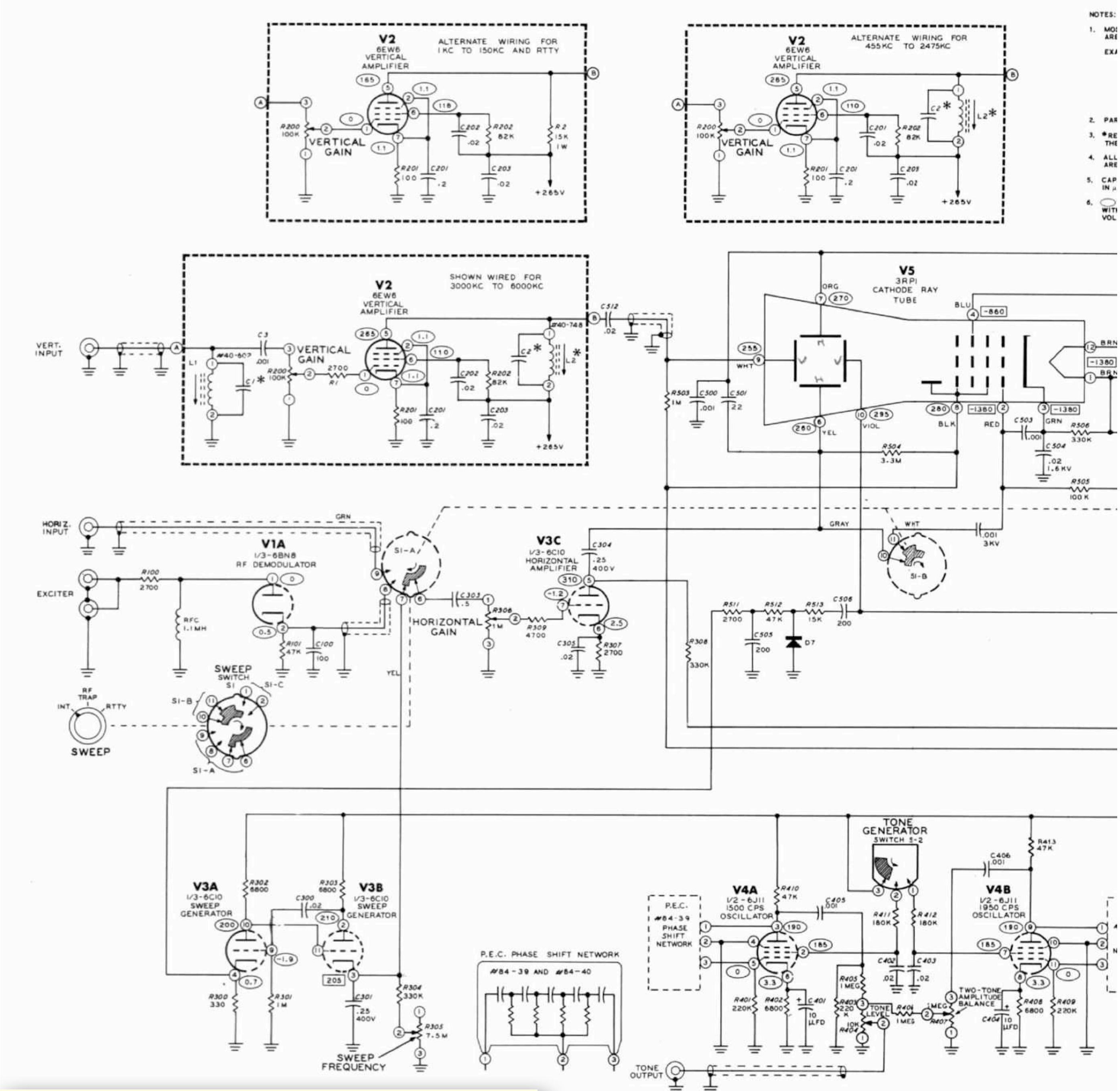
Comments:

These were cool gadgets for your shack. Probably the most useful function is the RF trapezoid when running a linear amplifier on SSB. A lot of these units were sold over the years.

If you are in the market for an SB-610 there are a few things to consider. First, the transformer is susceptible to shorting, especially the high voltage winding. Second, the coils to change the vertical amplifier from one configuration to another are rare. People didn't consider keeping the unused parts supplied with the kit, or they got lost over the years. Finally check the CRT for burn-in. That does happen, though I found the 3RP1 and 3RP7 CRTs quite reliable. Chances are, if you find one of these units it may need to have some of the paper and electrolytic capacitors replaced. Hopefully the four section can capacitor is good; but if not, Google "Hayseed Hamfest" to find a replacement. They are not cheap, but are quality. Along with the can capacitor they can supply as a kit the other electrolytic and replacement capacitors that may need replacing. The paper capacitor replacements are higher quality mylar or polyethylene type capacitors. Generally mica and ceramic disc capacitors do not need replacement unless they are found to be defective.

One other problem that seems to haunt older SB-610 and HO-10 Heathkits are the controls. They often get very stiff or freeze. On my HO-10 the TONE switch was frozen solid, and on an old SB-610 I looked at, the focus and horizontal gain potentiometers were either hard to turn or frozen solid. Freeing these up requires a lot of patience. They are usually frozen due to the grease between the shaft and bushing becoming dry and corrosion forming. A lot of different techniques have been discussed on Heathkit forums to free up these parts; they all require patience and time. Many of these controls are hard to find replacements for. Repair is best done with the part removed from the Heathkit.

73, from AF6C



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Remember, if you are getting rid of any old Heathkit Manuals or Catalogs, please pass them along to me for my research.

Thanks - AF6C

Figure 5A: SB-610 Schematic Part A
Due to the size of this schematic it is split into two overlapping pages.

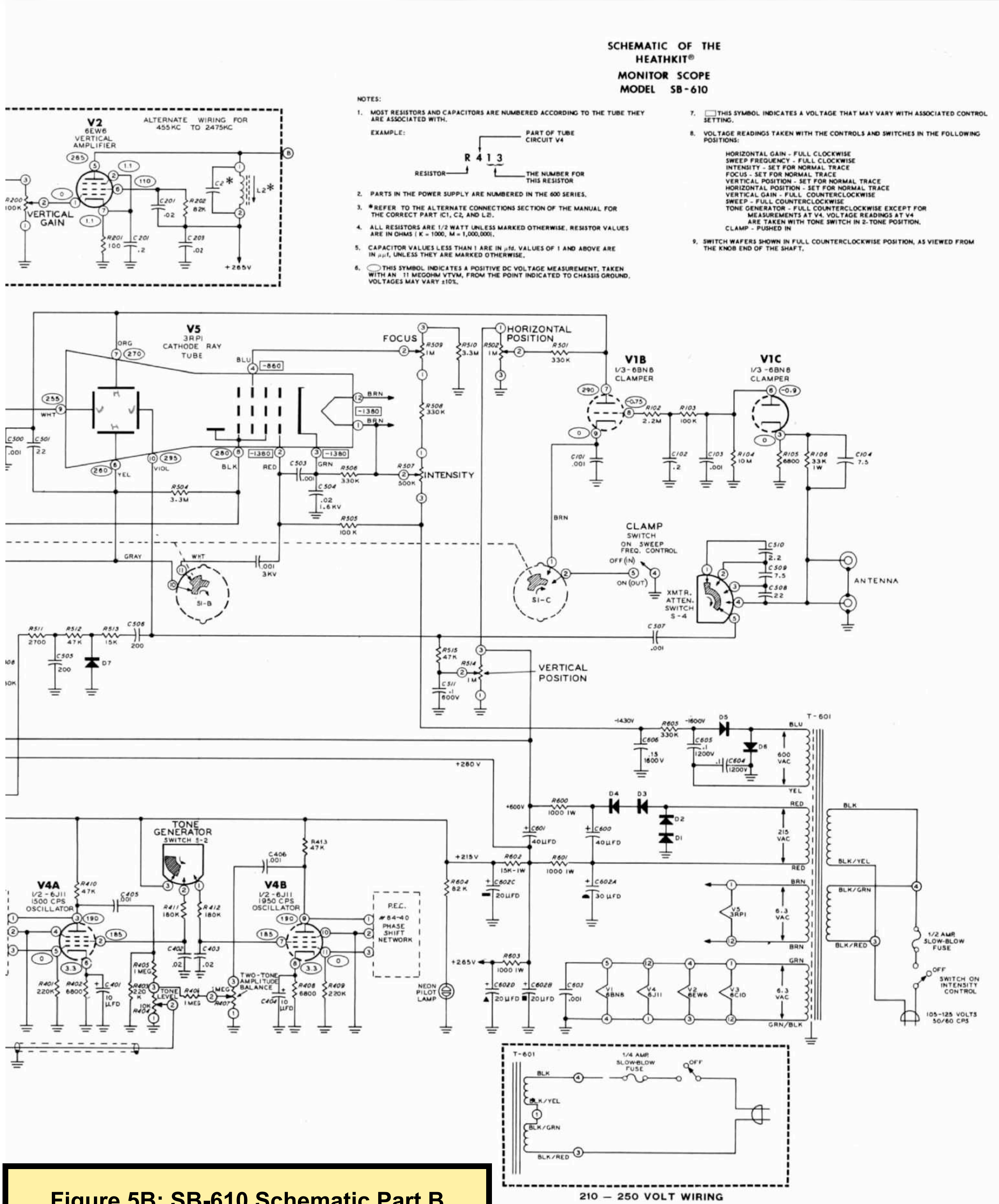

Figure 5B: SB-610 Schematic Part B
Due to the size of this schematic it is split into two overlapping pages.

TechTalk115
DigitalATV – Overview of ITU-T_J.83B Protocol
by Ken W6HHC

Earlier OCARC TechTalk articles about Digital-ATV have provided details about how DVB-S protocol works, and went on to cover DVB-T and DVB-S2 protocols. DVB-S is still currently the most popular modulation standard being used by hams for DATV. This month I will look at some of the technical details of the DATV protocol defined by the ITU-T_J.83-Annex B standard.

The complete list of commercial origins of the DATV protocols being used by hams are listed below:

- DVB-S (satellite based)
- DVB-S2 (satellite for HDTV)
- DVB-T (terrestrial reception)
- ATSC (commercial terrestrial reception in US)
- ITU-T_J.83-Annex B (US/Canada cableTV)

ITU-T_J.83B
The ITU-T_J.83-Annex B protocol (I've shortened to ITU-T_J.83B) is commercially used by the US/Canada cableTV industry. This standard is very closely related and similar to the DVB-C protocol used in Europe and most of the world for cable TV. One main attraction of ITU-T_J.83B for hams is that several cable channels can fall directly on the 430 MHz ham bands. Therefore a terrestrial transmission by hams can be received directly to a cable-ready TV without adding any special receiver cost (aka more money). Just connect an antenna and tune your TV to the right channel. This is the nice attraction of the old analog-ATV approach on 430 MHz band.

ITU-T_J.83B for the cable world is designed to work with strong signals and a low noise environment. The main issue with ITU-T_J.83B when used by hams in a terrestrial mode (over the air – OTA), is that the environment can change to weak signals and lots of noise. That is: the received S/N gets much worse when you leave the cable environment.

Typical Transmitter Block Diagram
Fig. 01 is a block diagram of an ITU-T_J.83B basic ham station for DATV using QAM64 modulation to transmit a full HD video. Hams typically use MPEG-4 encoding to achieve enough data compression to fit a full 1080i high definition signal into a 6 MHz bandwidth. Typical manufacturers of ITU-T_J.83B exciters used by hams (mainly here in USA) are the Drake (model DSE-24) and Thor (model H-VQAM-SD). Typically a HDMI connector is available for HD cameras to be plugged in and composite video connectors (RCA jacks) are available for NTSC cameras and Standard Definition (SD) using MPEG-2 encoding. The DATV receiver is a commercial "cable-ready" TV set tuned to the 420-430 MHz USA cable TV channels 57-60 that overlaps the ham radio 70 cm band.

- 421.25 MHz CH-57
- 427.25 MHz CH-58
- 433.25 MHz CH-59
- 439.25 MHz CH-60

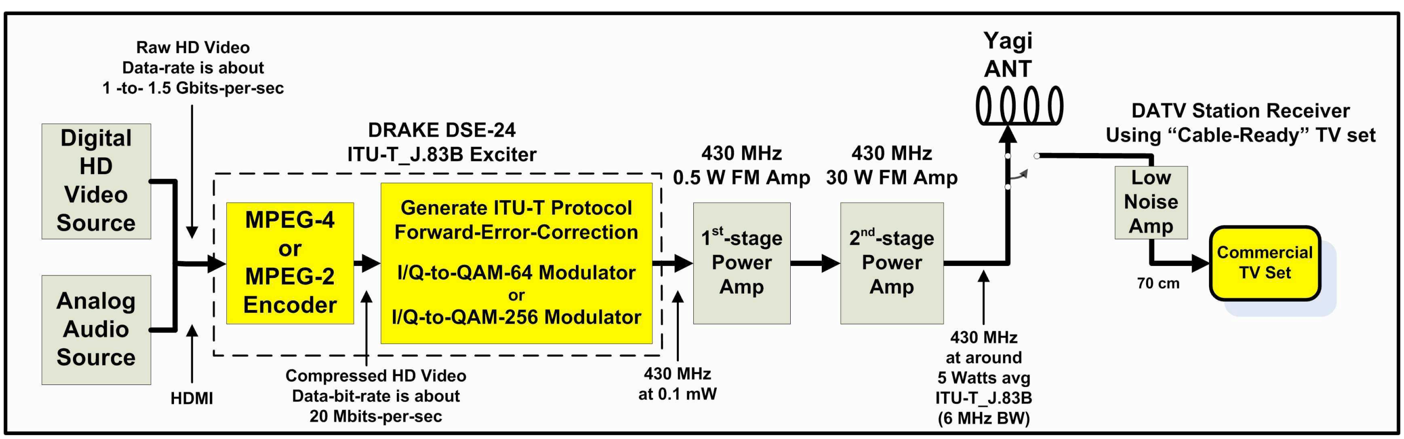

Figure 1 – Block Diagram of Basic ITU-T_J.83B Station for DATV

Table 1 – Camera Video Data Streams and MPEG-2 / MPEG-4 Data Streams

Video Data Stream	Data-Rate	Notes
Analog NTSC camera	168 Mbits/sec	A/D digitized, uncompressed
NTSC MPEG-2	2-3 Mbits/sec	compressed
NTSC H.264/MPEG-4	~1.5 Mbits/sec	compressed
VHS MPEG-2	1-2 Mbits/sec	compressed
Analog PAL camera	216 Mbits/sec	A/D digitized, uncompressed
PAL MPEG-2	2.5-6 Mbits/sec	compressed
HDTV camera	1-1.5 Gbits/sec	uncompressed
HDTV MPEG-2	15-60 Mbits/sec	compressed
HDTV H.264/MPEG-4	12-20 Mbits/sec	compressed

Video Data-Rate and Compression

For HD DATV, a digital camera output is compressed using MPEG-4 encoding (aka H.264 and even sometimes called Advanced Video Coding - AVC). This encoder CODEC provides more compression of the video than the older MPEG-2 CODEC. For SD DATV, the analog NTSC/PAL camera output is first digitized by the optional MPEG-2 encoder shown in Fig 1, and then compressed by the MPEG-2 algorithm. The reason the compressed video data rate varies in Table 1 is that the smaller value means little motion in the video scene and the larger value means a lot of motion. H.264/MPEG-4 can reduce the bit-rate by a factor of 50% over the older MPEG-2.

FEC Inflation of Payload Data Stream Data-Rate

Forward Error Correction (FEC) is a technology that not only can detect errors on the received signal, but adds enough redundancy of the data so that it can correct several wrong bits. But, there is a trade-off when choosing the amount of redundancy. Since redundancy inflates the data-rate of the output stream, the trade-off is between more redundancy…or… keeping the inflated data-rate smaller. As we will see a little later in this article, the larger the inflated output data-rate, the higher the required RF band-width. So at some point the FEC algorithm will not have enough redundancy to correct too many errors, and the DATV receiver screen will go blank or freeze or pixelate.

The FEC technology used by the ITU-T_J.83B protocol is that same as used by DVB-S protocol. That is: the two FEC algorithms are the Viterbi coding technology and Solomon-Reed. The puncture coding value used by ITU-T_J.83B DATV is not selectable and was difficult for me to pin down in the standard, but Ron W6RZ explained to me that the Viterbi FEC is 14/15. The total FEC overhead produced Ron W6RZ explained, is approximately 11%. That translates into the MPEG-4 “payload” video data rate of about 20 Mbits/sec increasing to a “gross data rate” to a value of about 22.2 Mbits/sec that has to be encoded into the Symbol-Rate (SR) stream.

Digital Modulation Symbols and Symbol-Rates

Digital modulation technologies like BPSK (an example is PSK-31), QPSK (Quad Phase Shift Keying), 8PSK, 32APSK (Amplitude and Phase Shift Modulation), and QAM-64 (Quadrature Amplitude Modulation) with 64 “constellation points” have the ability to put more information into a more narrow frequency spectrum than analog modulation. The complexity of the digital modulation scheme, allows us to pack more “data bits” into each SYMBOL. Table 2 lists out how many data bits can be packed into a symbol for several well-known digital modulation tech-nologies.

Table 2 – Symbol Bit-Packing for Various Digital Modulation Technologies

Modulation Scheme	Data Bits per Symbol (Me)
BPSK	1
GMSK	1
QPSK	2
8PSK	3
8-VSB	3
QAM-16	4
32APSK	5
QAM-64	**6**
QAM-256	**8**

ITU-T_J.83B protocol allows the use of two dig- ital modulations: QAM-64 that packs 6 bits of data into each symbol transition and QAM-256 packs 8 bits of data into each symbol transition.

Figures 2 and **3** shows a comparison of the more simple QPSK modulation constellation and the much more complex QAM-64 constellation.

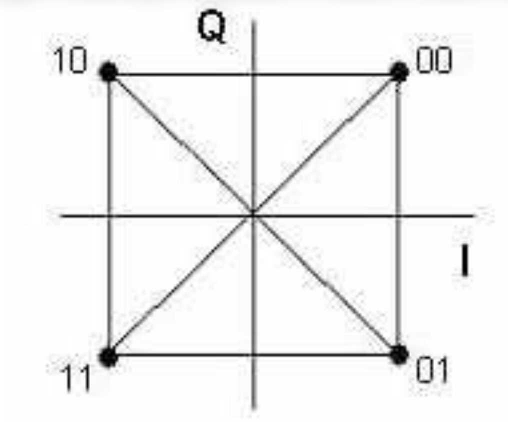

Figure 2 – The modulation constellation of QPSK used in DVB-S packs 2 bits of data in each symbol transition

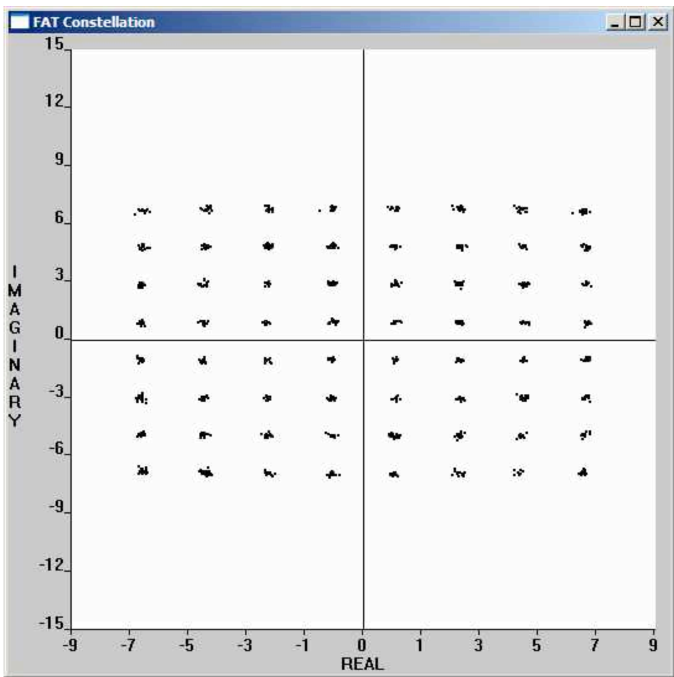

Figure 3 – The more complex modulation constellation of QAM-64 used in ITU-T_J.83B packs 6 bits of data into each symbol transition
(courtesy of W6RZ)

The complexity of a digital modulation scheme like QAM-64 allows much more data to be carried in a defined RF bandwidth...but also carries a penalty in signal robustness. The greater the modulation complexity...the greater the signal to noise ratio (SNR and aka C/N) needs to be. **Fig 4** compares the SNR needed to receive four different digital modulations, including QPSK and QAM-64. Even though this analysis is looking at COFDM world, it clearly shows that QAM-64 is less robust than QPSK. I think it is very easy to envision that the QAM-256 modulation would carry an even greater SNR robustness penalty (requires 8 dB more).

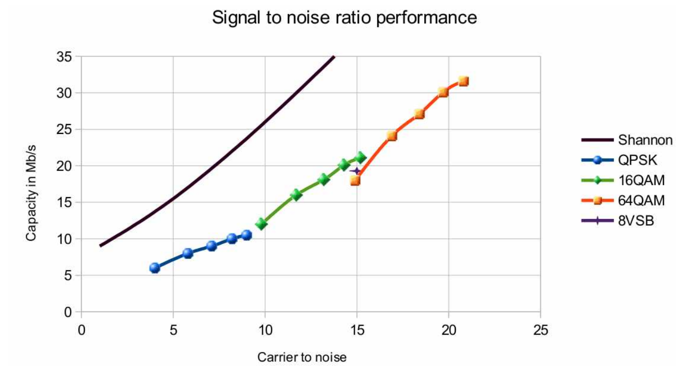

Figure 4 – A comparison of SNR of four different modulations including QAM-64 and QPSK shows the signal robustness penalty of complexity
(courtesy of ZL1WTT)

ITU-T_J.83B Bandwidth

The ITU-T_J.83B standard defines the RF bandwidth as 6 MHz wide "channels". In a manner similar to DVB-S protocol, the RF bandwidth of an ITU-T_J.83B transmission is defined by its Symbol Rate (SR). That is:

$$RF_{bw} = SR \times 1.18 \text{ (roll-off factor)}$$

So if we have a 6 MHz bandwidth, the Symbol Rate should be approximately:

$$SR = 6.0 \text{ MHz} / 1.18 = 5.057 \text{ MSymb/s}$$

The "gross data-rate" at this SR would then be ~30.3 Mbps. This is enough to carry a HD signal using MPEG-4 encoding.Ron W6RZ pointed out to me that: "At the 26.97 Mbps TS rate, you could easily have a 26 Mbps video stream (or two HD program streams at around 13 Mbps each)".

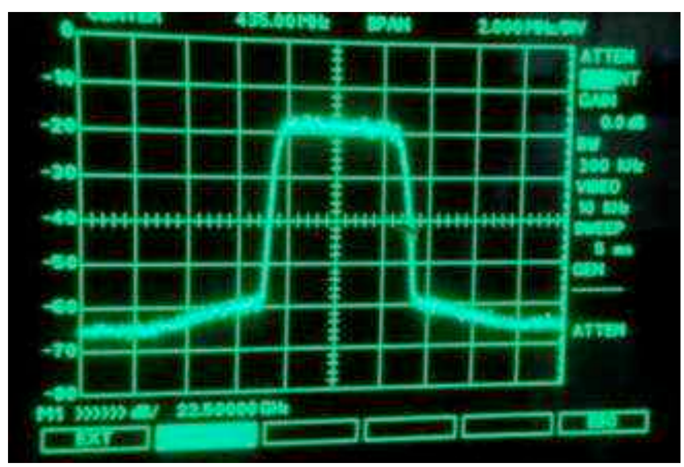

Figure 5 – A spectrum analyzer view of an ITU-T_J.83B QAM-64 transmission "haystack" on the 70 cm band
(courtesy of WA6SVT)

The cable-ready TV receivers are set-up to receive transmissions on the pre-defined set frequencies. These channels are spaced 6 MHz apart. I have not heard of any hams being able to receive QAM-64 transmission bandwidths more narrow than 6 MHz on commercial TV sets.

Status of Ham ITU-T_J.83B DATV

One of the pioneers in US for DATV using the ITU-T_J.83B protocol is Jim KH6HTV. He participated in setting a DX record of 121 KM on the 70 cm band using QAM-64. Two ATV repeater groups in US have tested adding the ITU-T_J.83B protocol to their DATV repeaters. The ATN group in Southern California tested a 70 cm DATV repeater on Mt Wilson, where uplinks were received via analog-ATV and downlinked using DATV as W6ATN. The ATCO group in Columbus Ohio (they installed the first DVB-S DATV repeater in USA in 2004) also installed ITU-T_J.83B protocol to their WR8ATV DATV repeater downlink on 70 cm.

When I first started preparing for this article, I contacted Mike WA6SVT of the W6ATN repeaters and also contacted Art WA8RMC of the WR8ATV repeater to get feedback and obtain their insights on using ITU-T_J.83B for a DATV repeater. To my surprise, I learned that both repeater groups had stopped using the ITU-T_J.83B protocol and were installing DVB-T down-links. The W6ATN tests had signal robustness difficulty being received across the large Los Angeles basin into Orange County.

Art WA8RMC explained that “nobody was using the ATCO ITU-T_J.83B downlink”. Art went on to report that: ”I could see the CATV QAM signal but even though a vertically polarized signal was being sent, I could only receive it with my horizontally polarized antenna. After some additional testing and assumptions we concluded, ‘The QAM signal suffers from multi-path cancellation issues which is minimally accommodated in the receiver. Also, minimal FEC is applied to the transmitted signal because it is not needed when in a cable.’ ATCO concluded that be- cause of multi-path issues, DATV using this mode is not practical“. Jim KH6HTV has also redirected his DATV interests and activities to DVB-T protocol because “...it far outperforms the CATV DTV 64QAM. I only used the QPSK modulation because of its superior receiver sensitivity. I found I was still able to transmit very acceptable, HD 1080p pictures using simpler QPSK compared to QAM.”

Conclusion

The ITU-T_J.83B approach to DATV offers “easy appliance-like installation” for DATV and also offered the glamor of being able to transmit full 1080 HD video. But, the penalty of the higher C/N requirements of the QAM-64 modulation is too large...compared to other now-available alternatives. I do NOT see the ITU-T_J.83B protocol becoming a significant factor for DATV in the future.

Acknowledgement

I want to thank Ron W6RZ for providing some of the mathematical details and obscure ITU-T_J.83B protocol specification details for this article.

Useful URLs

- ATCO - Amateur Television of Central Ohio – see www.ATCO.tv
- British ATV Club - Digital Forum – see www.BATC.org.UK/forum/
- CQ-DATV online (free monthly) e-magazine – see www.CQ-DATV.mobi
- DATV-Express Project for DATV – see www.DATV-Express.com
- DigiLite Project for DATV (derivative of the “Poor Man's DATV” design) – see www.G8AJN.tv/dlindex.html
- KH6HTV Application Notes DATV with ITU-T_J.83B and DVB-T – see http://KH6HTV.com/application-notes/
- Orange County ARC entire series of newsletter DATV articles and DATV presentations – see www.W6ZE.org/DATV/
- TAPR Digital Communications Conference proceedings (free downloads) – see www.TAPR.org/pub_dcc.html
- Yahoo Group for Digital ATV - see groups.yahoo.com/group/DigitalATV/

Western Amateur Radio Association

Phone Numbers: Home Phone 562 691 7898 Cell Phone 562 544 7373
Email: jac2247@gmail.com Or n6vni@arrl.net

Sponsoring Club: N6ME Western Amateur Radio Association, "WARA"

<u>Test site location</u>:

La Habra Community Center.
101 W. La Habra Blvd.
La Habra, Ca. 90631

Pre-Registration is requested and preferred. Walk-ins are welcome.

2014 TESTING SESSIONS

Thursday, Oct 16th 2014 6p.m.
Thursday, Nov 20th 2014 6p.m
Thursday, Dec 18th 2014 6p.m.
Thursday, Jan 17th 2015 6p.m.

1. A legal photo ID (driver's license, passport) or two other forms of non-photo ID; e.g., birth certificate, social security card, library card, utility bill or other business correspondence with name of the examinee as it appears on the Form 605 and current mailing address.
2. Your Social Security Number (SSN) or FCC-issued Federal Registration Number (FRN).
3. If applicable, the original and a photocopy of your current Amateur Radio license and any Certificates of Successful Completion of Examination (CSCE) you may have from previous exam session. (Photocopies will not be returned.)
4. Two number two pencils with erasers, and a pen.
5. A calculator with memory erased and formulas cleared (no iPhones, iPads, etc.).
6. Test Fee: $15.00 (cash or check).

If you fail an element and wish to retake it, we are required to charge an additional test fee. If you pass an element, we typically offer and encourage you to take the next element. We do not charge an additional test fee for this and it gives you the opportunity to see what the next exam element is like.

A FEW AUCTION ITEMS

Here are just a few items that are expected to be at the auction.
Items are subject to prior sale. Photos may be generic.

Kenwood TS-130SE Transceiver

Dusty, but complete with FA-1 fan accessory. No power cable (See next entry) nor microphone. However these are easily available. With manual.

Item 30-1 Minimum Bid $70 - Untested, but does power up.

Kenwood PS-30 DC Power Supply

Clean. Runs on 120/220 VAC power. Rated at 13.8VDC 20A ICAS, 15A CCS. Includes built-in power cable to fit most Kenwood radios including TS-130 above. No manual, but manual is available online.

Item 30-2 Minimum Bid $100 - Tested, but does power up and powers up TS-130.

Kenwood TS-520SE Transceiver

Clean with fan. Runs on 120 VAC power. No manual, but manual is available online.

Item 30-3 Minimum Bid $100 - Untested

Kenwood AT-200 Antenna Tuner

With manual. Clean except for some slight corrosion on top cover - Flat untextured gray paint, easily repainted. Front and rear panel are very clean.

Item 30-4 Minimum Bid $50 - Untested

MORE AUCTION ITEMS

Here are just a few items that are expected to be at the auction.
Items are subject to prior sale. Photos may be generic.

Alinco DM-112MVT Variable 12V Power Supply

Clean - adjustable power supply with both volt and amp meters. Rated at 10 A. Multiple output connections. This is a hard-to-find item.

Item 1-1. Minimum Bid $25 - Tested

Yaesu FT-270R

Like New, with FNB-83 NiCad battery, NC-88B wall charger and manual.

Item 1-2. Minimum Bid $50 - Tested

Hallicrafters S-38C Communications Rcvr.

A very clean S38C receiver. Powers up with a lot of hum. Needs electrolytic and paper capacitors replaced. This is a historic receiver model worthy of restoration. CAUTION: this is an AC-DC radio. Modifications are suggested.

Item 1-3. Minimum Bid $20 - Untested

Additional Items:

- Astatic D-104 Microphone.
- Comet CY-1205 1.2 GHz, 5 el., handheld Yagi
- MFJ-260 300W Dummy Load
- Hallicrafters 38 (Original)
- Viewstar VS-300A (Canada) 300W Ant. Tuner
- Realistic HTX-100 10 meter transceiver
- ~~Hallicrafters S-40B Receiver.~~ S O L D
- DX Specialties 3/4 M test J-pole Antenna
- MFJ-941D Antenna Tuner
- Kenwood TS-520S w/12V pwr. accessory
- WRL Globe 6 - 2 VFO
- Packratt PK-64 TNC w/ manual


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HOTEL INFORMATION
The Torrance Marriott South Bay Hotel
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This is our convention site and one of the area's premiere hotels. A special discounted room rate of $119 per night (including free in-room high-speed internet) is available for HAMCON 2015 attendees. Reservations must be made at the Marriott website, www.marriott.com, or by calling 1-800-228-9290. The Marriott reservation code needed for this special rate will be available by October 15, 2014.

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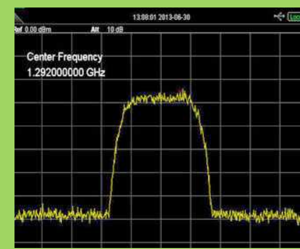

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- Requires PC running Ubuntu linux (see User Guide)
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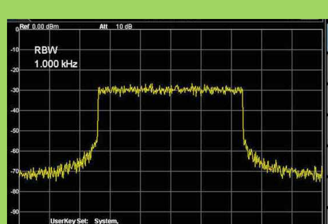

For more details and ordering

www.DATV-Express.com

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