

CLALLAM COUNTY AMATEUR RADIO CLUB

QTC
FEBRUARY 09

From DRT's shack...

Welcome to February! Where Punxsatawney Phil has seen his shadow and with the sunny weather we've had, no wonder he wanted to bite his handler. Not as far as Hams go, as we know there's a lot of work to do. Antennas to restore from winter weather, and activities to start lining up for the year.

January brought many new opportunities for me to grow, showing me the needs we must meet, and seeing how many members have skills to share in this hobby. Many thanks to Chuck Jones and his outgoing team for getting me off on the right foot. We are going to meet the ARRL target of 51% members to retain our affiliation, but those of you who are not ARRL members might consider joining as they support protection of our radio frequencies. Commercial interests want them for their purposes! ARRL is much more than just a magazine.

I want to work with you to decide where we want our Club to go, and how to expose our friends and neighbors to this hobby and increase the ham population. Our VEs do a great job, but we can help by sending them more people to train. How can we get this message out? Safety Days, Field Day, Sequim Days, word of mouth, being in the public view. ARRL works hard for us, so we need to work hard to help them. They have challenged us to get 500 more new hams this year in Western Washington. Clallam County has an outstanding reputation for licensing new hams, so let's meet the challenge. It's a win-win situation.

What ideas do you have that would improve how we get information to you? Would you like to have special guest speakers, or perhaps give a presentation yourself on your specialty? There are always ways to volunteer, whether a small contribution like being on a committee, or a big one like leading a committee. TEAM WORK gets the job done. Our three big events, Field Day, the International picnic, and the Christmas potluck dinner need some leadership. Please help us make these events fun and successful by volunteering.

Thanks for your time, efforts and making this a better Club!

Nita KE7DRT

CCARC President

House passes DTV delay

WASHINGTON (KRQE/AP) - Congress has passed a measure to delay the transition to all-digital television broadcasting until June 12.

The House approved the bill 264-158 on Wednesday, with 10 members not voting.

The Senate unanimously passed the bill last week.

President Barack Obama's spokesperson has said the president will sign it.

The bill's supporters are concerned that more than 6.5 million Americans with older televisions wouldn't be ready for the transition, which had been scheduled for Feb. 17. The Nielsen Co., using data it obtained while installing equipment used to collect television ratings, estimated the Albuquerque-Santa Fe media market that covers most of New Mexico to be the least prepared market in the nation.

Opponents of the delay warned it would confuse consumers, create added costs for television stations and burden wireless companies and public safety agencies that had been waiting for the airwaves that will be freed up by the switchover.

Full-power television stations are required to shut down analog broadcasts, switching instead to an all-digital format.

Most low-power television stations and translators will still broadcast in an analog format. Translators are small stations designed to relay a full-power television station's signal to areas that may not receive a signal from a station's main transmitter.

The transition does not affect subscribers to cable or satellite television services, since those providers are required to handle the necessary changes.

House Republicans defeated a similar measure last week, which was using a special fast-track procedure that needed a two-thirds vote to pass. Wednesday's vote was a floor vote, which only requires a simple majority.

From: "ARRL WWA Section" <memberlist@www.arrl.org>
To: n7bv@yahoo.com
Subject: 2009 CHALLENGE 500
Date: Mon, 26 Jan 2009 08:55:53 -0500 (EST)

Larry Bloomquist, KE7HGC, Vice President of the Clark County Amateur Radio Club, has offered a challenge to all other clubs and ARES teams in Western Washington. "Let's license 500 NEW hams in Western Washington, in 2009". What a great idea! And while we are at it, let's get the new 500 to join ARRL.

To that end, As Section Manager I am kicking off CHALLENGE 500. Keep track of the numbers who get licensed through your Club or ARES Team, and keep track of the ones who join ARRL. Report your numbers to me >and in December we will total the figures and the most outstanding team or club will be given special recognition. Remember, a new licensee counts for one point and a new ARRL membership counts for an additional point.

Let's share with others this hobby that has given us so much fun.

ARRL Western Washington Section
Section Manager: James David Pace, K7CEX
>k7cex@arrl.org

Here are some interesting tidbits of information from the most recent ARRL CONTEST UPDATE (News and Techniques for the Active Operator):

WorldRadio magazine is now on-line in PDF format. WorldRadio readers will feel right at home, with many of the same columnists now in electronic format. More Web publishing is happening--if you haven't seen the new on-line HAM-MAG, give it a try! Subscriptions are free and the first couple of issues have been entertaining, with a nice combination of short articles on a variety of subjects, including operating and things to build. Merci beau coup to both CQ and HAM-MAG!

One of the first to develop antenna modeling software for amateur radio, Brian K6STI maintains a Web site with lots of technical resources, particularly useful calculator programs. (Thanks, Tim K3LR)

Doug W9WI points out that using more than one wireless keyboard in a multi-op station may cause problems when the keyboards automatically negotiate with their base station to find a channel when the computer is booted or if the keyboard controller resets from EMI. For some models, if there's more than one base station within range, you have no idea which one it's going to handshake with! You could find the 40 meter keyboard controlling the 10 meter computer! Not all wireless keyboards have this problem, but a little due diligence is definitely in order.

Having occasionally earned their reputation as unwelcome sources of widespread harmful interference, HF operators will not be shedding any tears over the possibility of the European Union banning plasma video displays. Not, of course, because of emissions, but because of excessive power consumption. (The 100-watt incandescent light bulb is another technological "item non grata" for the same reason.)

73, Chuck N7BV

February 11th Program

Jerry Kraft is a playwright, poet and theatre critic. He has written 15 plays, either published or produced, was the Seattle area theatre reviewer for the national theatre site www.AisleSay.com and www.TheatreSeattle.com, after reviewing Spokane area theatre for 15 years. His poetry has been published in various literary journals, and his first volume of poetry, "Rapids" was published in 2003. Retired after 30 years as a counselor with acute psychiatric patients, he now lives with his wife, Bridgett, a Nurse Practitioner, and their daughters Mckenna (12) and Luxie (9) in Port Angeles. The topic of the presentation is "Writing your Memoirs".

>
> WX7RIK

Clallam County Amateur Radio Emergency Service (CCARES)

The Clallam County ARES is organized in two levels; as an affiliate of ARRL/ARES and as the recognized RACES organization by the Clallam County Division of Emergency Management. Membership in CCARES is open to all licensed Amateur Radio Operators that are residents of Clallam County, who first register with ARRL/ARES through the Emergency Coordinator. They are not required to attend training meetings and function as a second response unit in emergencies.

CCARES members in good standing may register in the RACES program with the Clallam County Division of Emergency Management (CCEM) and serve as a primary responder during emergencies. RACES members are the core of the organization and are expected to attend training meetings and participate in drills and other events.

CLUB DUES TIME.....

It is time to prepare to re-up for the Clallam County Amateur Radio Club by submitting your 2009 Annual Dues of \$20.00

You may begin bringing in your payments of Cash or Cheque (Payable to CC-ARC) to December's Meeting on the 10th (Please note: Dues will not be collected at the Christmas gathering on the 1st of December).

You may also mail them to:

CCARC

PO Box 2562

Sequim, WA 98382

Your dues will cover you (& your XYL, if not a licensed Operator) for the year as well as ... (**Chuck, fill in the rest**). If you want a family membership where both members will have voting privileges, please send in \$30.00. (see By-Laws Article IX, Pages 5-6, for further clarification: http://olyham.com/CCARC_By-laws_2007.pdf)

Dues not collected by the end of January 2009 will be removed from the Membership Roster.

Thanks for all you do to make our Clallam County Amateur Radio Club such a Great Organization!

David R. McCoy, KE7JEJ

We need articles for the QTC newsletter. This is after all your newsletter.

Tell us how you became interested in Ham Radio. What did you do over the summer (just like school) huh!

The more you submit the better our newsletter will be.

Thanks, the staff!

2 METER NETS

CCARC :

Every Thursday 7:00 pm on the W7FEL Repeater.

ARES/RACES:

Every Tuesday except 1st Tuesday of the month at 7:00 pm on W7FEL Repeater.

W7FEL Repeater: 146.76 MHz., offset down 600 KHz. with a tone of 100 Hz.

Authentication-Results: mta166.mail.ac4.yahoo.com from=www.arrl.org; domainkeys=neutral (no sig)
From: "ARRL WWA Section" <memberlist@www.arrl.org>
To: n7bv@yahoo.com

Subject: VE Testing at Puyallup Flea Market

Date: Tue, 20 Jan 2009 13:28:53 -0500 (EST)

V.E. Exam Sessions - Schedule Information:

Date: Saturday, 07-Mar-2009

Times: Registration starts 9:30AM, and again at 12:30PM

Limit of 25 examinees per session. First Come First Served. Line up in the stair well.

Location: Puyallup Fair Grounds, Washington State Patrol Building adjacent to flea market.

Fee: \$15 (covers 1 try at each exam element), No retests for failed elements within the same session. You do not need to pay for a flea market ticket if you are not attending the flea market. Just enter at

the 'Gold Gate' and say you are heading to the state patrol building for the VE exams.

Government Issued Photo ID Required. (Children should be accompanied by parent with ID.) If you are upgrading your existing license you need to bring your signed license original document. If you are applying CSCE credit, you will need to bring the CSCE original document.

Examinees (and parents of child examinees) need to be aware that one of the forms that is submitted to the ARRL VEC and entered in the FCC database has the examinees FCC Registration Number (FRN) or social security number. So bring that with you. Current license holders can use the FRN number shown on their license instead. Examinees without an FRN can preregister at <https://fjallfoss.fcc.gov/coresWeb/publicHome.do> to get one.

The fair grounds does not offer handicap accessibility at the exam location (the exams are in a 2nd floor room and no elevator is available.) We encourage folks that are unable to use stairs to instead attend our regular exam session on the 3rd Saturday of each month in Renton WA.

Email ag7t@arrl.net with questions

> -----
> ARRL Western Washington Section
> Section Manager: James David Pace, K7CEX
> k7cex@arrl.org
> -----

From the desk of Norm Fusaro W3IZ. {ARRL}

Information for any one interested in some contesting fun, this one's for you. Good luck, and let us know your results!

73, Nita KE7DRT

Get Ready for Triple Play Worked All States.

The new ARRL award begins with contacts made after 0001 UTC January 1, 2009.

Two way QSO with each of the 50 U.S States on each mode – Phone, CW and Digital

(Total 150 QSOs = 50 Phone, 50 CW and 50 digital)

Confirm QSOs through LoTW only.

(No paper cards accepted)

See complete rules at <http://www.arrl.org/awards/>

CLALLAM COUNTY AMATEUR RADIO
CLUB
Minutes of the General Meeting
January 14, 2009

The meeting was called to order at 7:02 P.M. by club president, Nita Lyman, KE7DRT.

Nita thanked the previous club administration for their service.

The Pledge of Allegiance was given.

Nita announced that:

1. Dues should be paid before March.
2. There was no charge to fix the repeater which is now up and running thanks to Steve DeBiddle, W6MPD, and others.

Self-introductions were made by those present.

Nita listed the following committees with their chairpersons and asked for volunteers:

Activities: needs to be filled

Public Relations: Rik Scairpon, WX7RIK

Health and Welfare: Chuck Jones, N7BV

Technical: Steve DeBiddle and Bob

Sampson, K6MBY

Field Day: Matt Lawson, KE7EQO, and Al

Fisk KD7TFK

Net Control Coordinator: Becky Winters,

W7RJW

Publications: Chuck Jones and Bob Sampson (and Sheldon, N7XEI, provides the Website)

Membership: Barry Dove, KE7WGO

Repeater: David Hannon, KE7TTT

There was discussion about the ARRL Official Observer position. Tom Mitchell, KG7U, said he took the exam and Chuck said it was going through. The position, as clarified by Tom Newcomb, KE7XX, has no legal standing and the O. O. does not speak to a violator directly. He will just report violations to ARRL. Examples of what would be reported: Keying without transmitting, bad CW, not identifying with call sign. The O.O. also sends "good job" cards out. Nita reminded us that we must police ourselves. David Hannon commented that if we are testing the repeater we should say "testing" and give call sign.

Additional announcements:

Johan Van Nimwegen, KO6I, will have a "Hands-On" Kit Building Exercise orientation meeting January 31 at his shop from 10 AM to noon.

Paul Honore, W6IAM, has offered to do another basic electronics class, including digital this year, if there is interest. Please let him know if you are interested.

The next license testing date will be May 1st. Techni-

cian and General Classes will be held on April 18 and 25 (the last two Saturdays in April). On May 1, there will be a review session in the morning and testing will begin at 1:00PM. Tom Newcomb, KE7XX, has the textbooks which will be used.

Dennis Tilton, AD7TV, requested a repeater report. Steve said that trouble began in September and that he and Chuck went out to the site in November and brought it back with them when they found out it was only putting out 1 watt. In December he found that the problem was a 25 year old cold solder joint. It was repaired with no parts involved so no charges. It was put back in service Sunday and has been working fine since. He has many spare parts so it should last many more years.

Sureswift Memorial Day Yacht Race:

A letter was received from Peter Mills announcing a \$10,000 grant to the American ham radio community. Johan said that basically there was \$4,000 available in Clallam County and suggested we purchase an amplifier or other repeater equipment. We have to prepare a proposal.

Dennis reminded everyone that board meetings would be the Thursday before the Wednesday of the monthly meeting and would be at Johan's house. For 2009, the dates will be: February 5, April 2, June 4, August 6, October 8, and December 3 at 1:30.

Bob Sampson gave a presentation on IRLP: Inter-Radio Link Project that links radios by using the internet. It was started by Dave Cameron, VE7LTD, of Vancouver, BC in November 1997. Current versions ship with open source CentOS version of Linux. It requires a dedicated line (not dial up), is very stable and can be run on a small computer. Dennis and David demonstrated how it could work, for example, if we wanted to "check in" from the Capitol Peak repeater near I-5 and connect to Sheldon 3062 release K7CPR. We could have an IRLP repeater on Striped Peak if we could get high speed internet access there.

After the break, the drawing was held and Nita was the winner.

it was announced that a broadband radio site was vandalized at the Crescent Water Easement on Burnt Ridge.

Tom Newcomb announced that since station KONP was moving to Melody Lane they are getting rid of a lot of old equipment including a 250 watt transmitter which could be had just for moving it. The old antenna is also coming down but it would probably be for sale.

The meeting was adjourned at 8:32.

VoIP – An alternative

In these days of the bottom of the sunspot cycle, there lies dormant the desire for worldwide HF communications. Good openings on the HF bands are fairly rare and spotty at best, but they do happen, along with the static (QRN), fade (QSB), interference (QRM) and other issues associated with HF radio communications..

There exists some alternatives for longer range communication via the Internet, using VoIP (Voice over Internet Protocol). Most of us have seen the term TCP/IP so here is the IP part. Echolink can be used with RF equipment (SysOp), or computer to computer over the Internet and requires a ham license. IRLP is used with RF equipment through a node pair but is also VoIP and requires a ham license. Skype provides computer to computer capability for free, or computer to telephone number calls over the Internet and debits your pre-established account balance, but no ham license is required. I personally have not delved into these modes enough to speak more on them except that Echolink in computer mode lists the people who are on the 'air' where they are and when they came on. You can scroll around and pick the person you want to try for. Each has it's own style and requirements.

That leaves the reason for this article...QsoNet with it's CQ100 program. I can hear some people saying, but that's not ham radio. Well, what IS ham radio besides two (or more) hams talking with each other using various modes of communication. Being a 'newbie' to CQ100, I can only say that none of the above noted 'Q' problems exist, and it's closer thing to ham radio.

When you have downloaded the program after your license image has been received, you will see a 'virtual transceiver' on your monitor screen. There is a calling frequency at 14.200 and when you call CQ you never know who might answer your call. As soon as you establish contact, you QSY and leave the calling frequency open for someone else. There is a real time bandscope, and you can spot the other contacts around you. Your mouse is the passport to connecting with them. There is a two speed tuning knob with a high speed dial in the center, and you can just drag your mouse to turn it, you can click on a 'pip', or use your keyboard left/right keys to move around the band and listen to QSOs in progress. The rest is up to you. (Note: This appears to be open to all classes of license as I have not heard of a restriction to General class and above.)

Here's an example, On 28 Jan, I worked 13 stations, and the following were International: DO1RRM, Germany; RW6XT, Russia; VU3VQU, India; ZS6BYE, S. Africa; VK6GFJ, Australia; and M3GKW, United Kingdom plus those in the US. This was done in about 4 hours. I've worked 4 stations in Japan since.

When the 90 day introductory period is up, (or at anytime before that) if you want to continue, it's \$32 for a year. When payment is received (Paypal, bankcard, mail or 800 number call), you can then download QsoTV, which allow you to transmit or exchange pictures with the person to whom you are talking.

Go to www.qsonet.com for further information and you can download the full CQ100 instruction manual for free anytime. HAVE FUN!

73, John K7NIA

CQ Magazine announced a new e-mail list has been established to notify readers of the availability of each new issue of WorldRadio magazine, which is converting to a **free online-only** publication. Go to <http://www.cq-amateur-radio.com/WorldRadio.html> and sign up for Email notification of posting.. Submitted by Chuck N7BV

WorldRadio

ONLINE

TABLE OF CONTENTS

Year 38 Issue 8

February 2009

FEATURES

WELCOME FROM THE PUBLISHER *by Dick Ross, K2MGA*4

SS AMERICAN VICTORY STILL SAILS THE HIGH SEAS *by Barbara Ritter*7

KNOTS TO YOU *by Dick Arnold, AF8X*10

COLUMNS

EDITOR'S LOG6

RULES & REGS: The Rules Say12

DX WORLD: The TO5DX Experience14

MARS: Are We Ready?.....18

HF MOBILE: Ten Years!20

EMERGENCY COMMUNICATIONS:
Self-Regulation Creates Safe Communication.....22

TRAIL-FRIENDLY RADIO: Into the Field: Shining Light on a New Theme24

WITH THE HANDIHAMS: No antenna? No problem.....26

10-10 INTERNATIONAL: WorldRadio Lives On27

AMATEUR SATELLITES: A New Vision Statement for AMSAT-NA28

TRAFFIC: Public Relations30

PROPAGATION: Polar Mesosphere Summer Echoes.....34

AERIALS:Tuned Antenna38

DEPARTMENTS

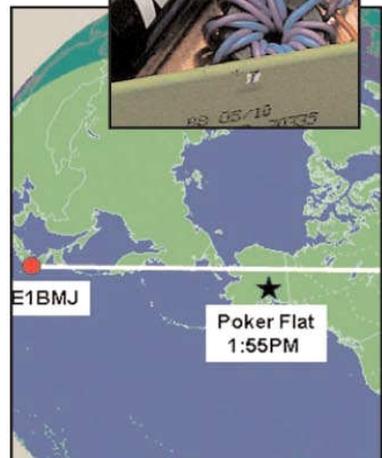
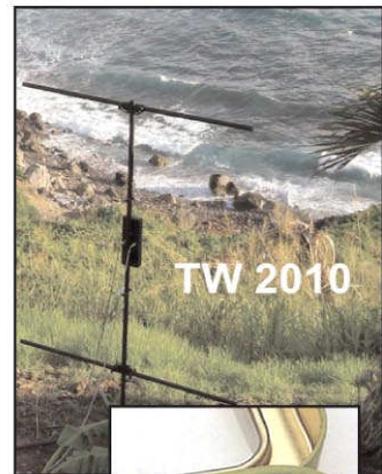
WorldRadio Online Newsfront2

Visit Your Local Radio Club32

Contest CalendarHamfests37

VE Exams.....39

WorldRadio Online Mart40



ON THE COVER

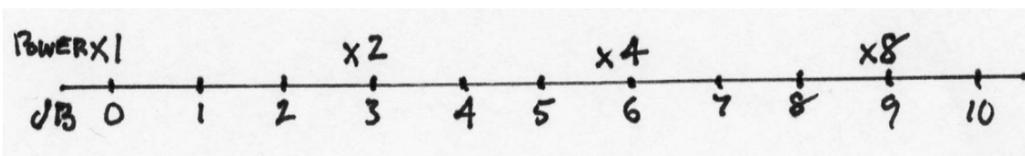
The SS American Victory still sails the seas. It now has an amateur radio station on board, W4AVM, which is operated by volunteers.

Electronic Fundamentals, Part-1 (Analog circuits)

Unit-11 Amplifiers

Without vacuum tubes or transistors to amplify a signal, there would be no radios as we know them. We would still be back with Marconi, probing the surface of a Galena crystal with a "cat's whisker" to find weak spark-gap generated CW transmissions. Today, we can easily construct circuits that amplify voltage or current -- either DC or AC at frequencies from sub-audio to well into the GigaHertz range. In fact, Amplifiers are the most common circuits to be found in any electronic device. To put it simply, an amplifier increases the power of a signal to do useful work. The efficiency with which it does this is measured in relative, rather than absolute terms. The *ratio* of output power to input power is expressed as **gain** in **decibels**, (tenths of a Bel, or **dB**). The dB scale is not linear. It is **logarithmic**. So, to find the gain of an amplifier, we must use the formula **Gain = $\log_{10} (P_{\text{output}} / P_{\text{input}})$** .

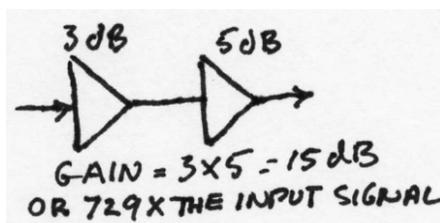
I'm sure the last thing you want now is a short course in logarithms but it is important for you to know what is being said when you read that an amplifier has unity gain, or an incoming signal reads S9+20dB on your receiver's S-meter. The best way I can relate this information is with a chart.



(Fig 11-1)

It shows dB from 0 to 10 and relative power output at key points so you can see the relationship between them. 0 dB is referenced to a power gain of 1 or **unity**. What goes in, comes out. No gain -no loss. Note that for every 3dB of gain, the power doubles. You could carry the chart as far as you like in either direction. A relative gain of 12dB would be a power increase of 16 times. 15dB would be 32 times, etc. In the opposite direction -3dB would be a power **Loss** of 2, etc.

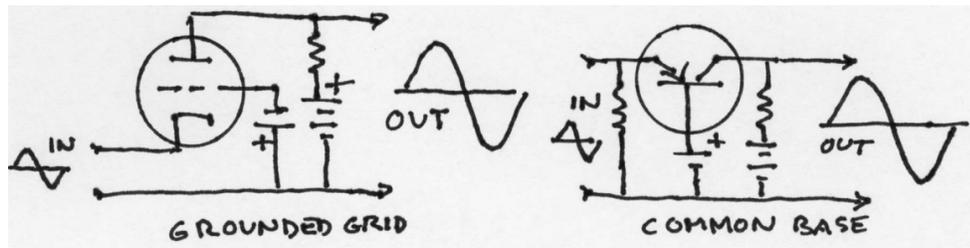
It's important to remember that the standard notation for gain with regard to amplifiers is **Power**. Voltage gain is a different ball of worms because power is an **average** sort of thing but voltage relates to the instantaneous value, wherever it occurs on the waveform. For instance, a 3dB voltage gain is an increase of only 1.414 whereas a gain of 3dB power gain represents an increase of 2. Just keep the relationships in mind. You'll never have to deal with the calculations because there are tables available to do them for you. One important point to remember is that gains in dB do not add, they *multiply*. If you have two amplifier stages in tandem, one with a gain of 3dB and the other with a gain of 5dB the resulting overall gain would be **3dB X 5dB = 15dB** for a total amplification of **729** times the input power.



(Fig 11-2)

Amplifiers can be classified according to use, such as RF; Audio; video, etc, but all have the same characteristics. Regardless of use, amplifier circuits can be divided into three basic

types. In the case of vacuum tube amplifiers, they are **grounded grid, grounded cathode, and cathode follower**. The equivalent transistor types are **common base, common emitter, and common collector**. Let's take them in turn, beginning with the grounded grid and common base types

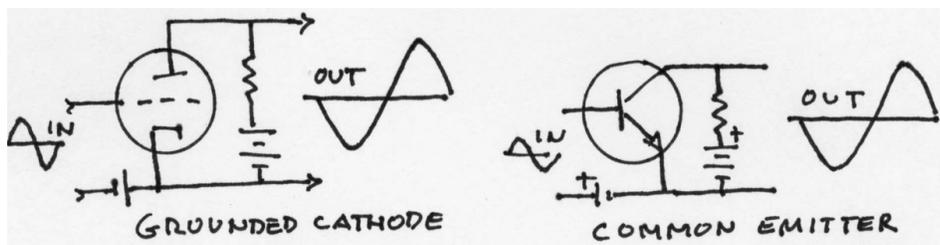


(Fig 11-3)

In a vacuum tube amplifier, the input signal is inserted between the cathode and grid, and the amplified output is taken between the plate and grid. The grid is not actually grounded because a slight negative **bias** voltage is required to make the tube operate properly. This circuit is used primarily for RF frequencies. The “grounded” grid acts as a shield to isolate the input and output signals from each other to eliminate capacitive feedback that might cause the tube to go into oscillation.

A PNP transistor can be used in the same way, except the base is biased slightly positive. The input signal is applied between the emitter and base, and the output is obtained between the base and collector. In both the vacuum tube and the transistor circuits, the output signal is **in phase** with the input, **the input impedance is low** and **the output impedance is high**.

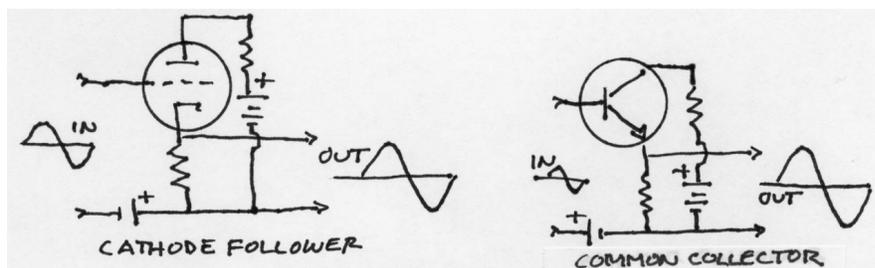
Grounded cathode and common emitter circuits look like this:



(Fig 11-4)

In the vacuum tube amplifier, the grid is biased slightly negative with respect to the cathode and for the transistor amplifier, the emitter is biased slightly positive with respect to the base. In both amplifiers **the input and output impedances are high, and the output signals are inverted -- 180° out of phase with input signals**. The advantage of an inverted signal is that any stray feedback in the circuit will be degenerative, making the circuit more stable and less likely to oscillate.

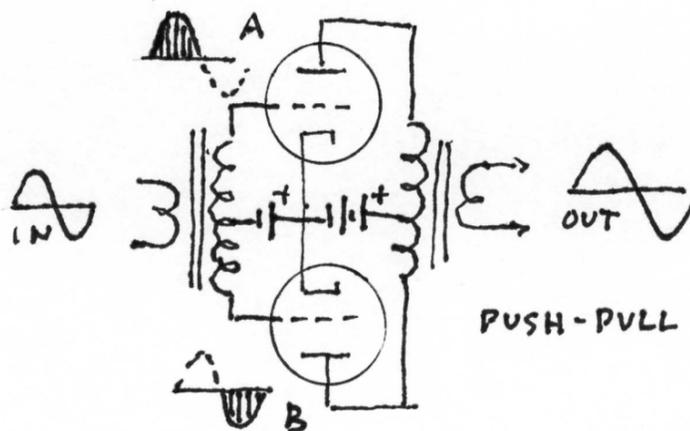
Cathode follower and common collector circuits look like this



(Fig 11-5)

They are degenerative in nature. That is, the output voltage is inverted and fed back to the input, yielding a *net loss* in voltage gain. Output and input voltages cancel but the output and input currents are in phase, therefore it is a current amplifier exhibiting a **high input impedance and a very low output impedance**.

For very high power amplifiers, the signal can be shared by two vacuum tubes or transistors in what is known as **push-pull** amplification



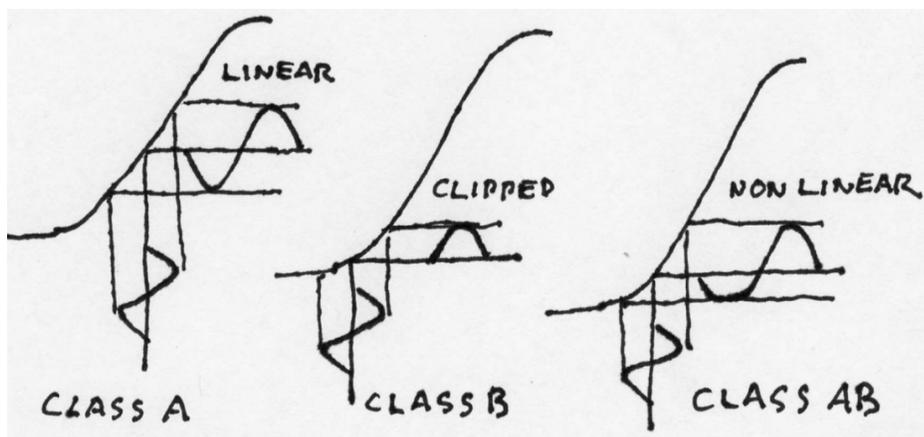
(Fig 11-6)

In a push-pull circuit, the vacuum tubes or transistors are biased in such a way that each device conducts during opposite half-cycles of AC. Therefore, each tube or transistor has to handle only *half* the total power in the circuit. At the output, the amplified signals are combined into a complete waveform. The output can be in or out of phase with the input, depending on the polarity of the transformer windings.

Another way of classifying amplifiers is by their efficiency. **Class A** amplifiers, for instance are voltage amplifiers, operated so that the wave shape of the output exactly duplicates the input.

Class B amplifiers are biased so that half the input waveform is cut off (push-pull). They are used, primarily in high power RF amplifiers where maximum power output is important.

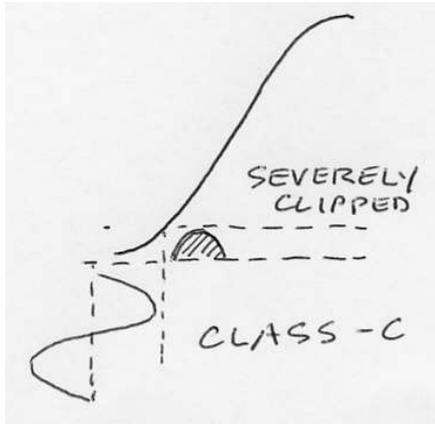
Class AB amplifiers are biased so that at low signal levels they behave like Class A amplifiers but at high signal levels they behave like Class B amplifiers. This has some advantages in circuits where linearity can be sacrificed for efficiency



(Fig 11-7)

The **Class C amplifier** is biased so that less than half of a waveform is used.

Most high powered vacuum tube RF amplifiers, whether push-pull or single ended, operate in the Class C range in order to get maximum power with minimal input.

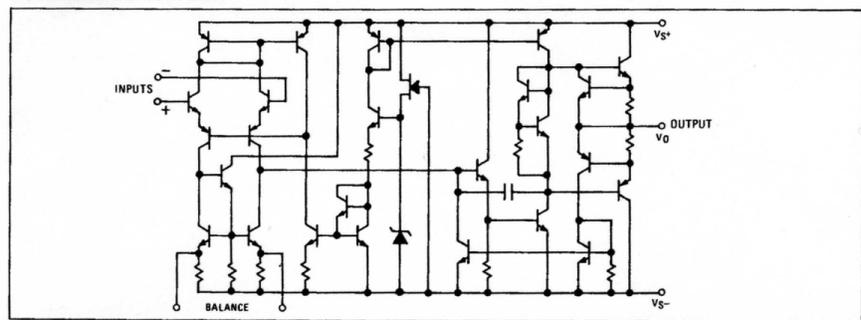


(Fig 11-8)

The amplifier is biased well below the cut-off point so that only the peak of a positive is amplified. This type of amplifier is used with a resonant LC **tank circuit** which requires very little drive to maintain a clean, sine-wave output, typically, the output stage of an RF transmitter.

Few amplifiers in modern equipment are constructed from discrete components. Amplifiers are so common in electronic circuitry that manufacturers have produced generic **integrated circuit amplifiers** that can be tailored to specific uses by the addition of a few external resistors and capacitors. These generally fall under the heading of **operational amplifiers. (Op-Amps)** Op Amps have become so cheap and so common it's hardly worth the effort to build an amplifier out of discrete components any more. They are made by laying down patterns of P-type and N-type materials, along with metal oxides and impurities in such a way as to define complete equivalent circuits in a single package. Here's an example of an already obsolete type from a Raytheon spec sheet.

SCHEMATIC DIAGRAM



CONNECTION INFORMATION

<p>TE (TO-99) Metal Can Package (Top View)</p>	<p>NB Dual In-line Plastic Package (Top View)</p>	<table border="0"> <thead> <tr> <th>PIN</th> <th>FUNCTION</th> </tr> </thead> <tbody> <tr><td>1</td><td>BAL</td></tr> <tr><td>2</td><td>-INPUT</td></tr> <tr><td>3</td><td>+INPUT</td></tr> <tr><td>4</td><td>V⁻</td></tr> <tr><td>5</td><td>BAL</td></tr> <tr><td>6</td><td>OUTPUT</td></tr> <tr><td>7</td><td>V⁺</td></tr> <tr><td>8</td><td>NC</td></tr> </tbody> </table>	PIN	FUNCTION	1	BAL	2	-INPUT	3	+INPUT	4	V ⁻	5	BAL	6	OUTPUT	7	V ⁺	8	NC
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<p>Order Part Nos.: RM1556T, RC1556T</p>	<p>Order Part No.: RC1556NB</p>																			

(Fig-11-9)

In this unit, we've explored various types of amplifiers and defined power gain. In the next unit I'll introduce the oscillator.

Terms to remember

dB	deciBel (1/10th of a Bel) Relative power
Gain	Amplification (relative increase in power)
Loss	Degeneration (relative decrease in power)
Op Amp	Operational amplifier

Paul Honore' W6IAM
(rev-1 Nov '08)

Electronic Fundamentals, Part 2 (*Digital circuits*)

Unit-1 Introduction

Why digital? Why, indeed. We got along very well with analog circuits for more than a century and managed very nicely. Now the whole world seems to be rushing into digital technology for everything from communication to photography. The fact is, some things can be done better using digital techniques. Others can only be accomplished digitally. Let me give you an example.

More years ago than I care to think about, I was involved in a project to change the running time of recorded sound without affecting its pitch. At the time, television commercials were mandated to exactly 58 seconds, no more-no less. Writers and narrators got pretty good at hitting the mark but sometimes it took a lot of work and a gazillion re-takes to get the darned things to come out exactly on time. It occurred to us that it would be handy to have a device whereby we could record a commercial the way we wanted it and then compress or expand it as required to fit the 58 second time slot.

The answer was a digital approach --so basic and so beautifully simple it demanded a patent. We had to begin at the beginning. There were a few analog to digital converters available but so far no one had marketed a digital to analog converter. I guess no one anticipated that once something was converted into ones and zeros, there could possibly be a need to return it to its analog form. We designed and built our own converter -- so far as I know, the first ever.

Let's suppose you want to "shrink" the playing time of a recording by 10%. The first step in the process is to chop the analog waveform into slices, assign a digital value to each slice, and store them in a buffer. That brings us to step 2 of the process -- remove every tenth sample of the stored signal and "glue" the remainder together again, resulting in an audio stream 10% shorter than the original recording but with no apparent gaps and no shift in pitch. The same process applies if you want to increase the playing time of the recording. In this case, you simply duplicate every tenth sample and insert it in the playback stream.

It took nearly a year to develop but it worked. The trouble was, it couldn't be built in a marketable package. Computers were still room size monsters programmed with punched cards.

Fast forward about 40 years. Microchips have replaced vacuum tubes and digital building block circuits are cheap and universally available. Today, every self-respecting recording studio owns a digital "sound shrinker-stretcher." It's about the size of a breadbox and costs only a few hundred dollars. The point is, what used to be unthinkable in the days of analog circuitry is now practical using digital techniques.

The basis for today's digital revolution dates back to the 1850s and Charles Boole who postulated a system of logic upon which is based the many computer program languages in current use. But it's been a long and painful journey to arrive at the tiny but powerful devices we take so much for granted -- all of which have come into being since I parted company with the electronics industry. Not much was done to apply Booles logic to practical machines until the 1930s when folks began playing with crude computing devices incorporating mechanical switches and relays. No further progress was made until 1943 when the first real computer -- ENIAC -- was unveiled. It was a monster, and slow by today's standards. It weighed 200 tons, used 18,000 vacuum tubes and consumed 200 kW of power just to keep it idling -- not your ordinary desktop computer but it worked pretty much in the same way -- using ones and zeros to add, subtract, multiply and divide very large numbers.

Morse code transmissions are the oldest form of two-way radio communication, and since "morse" is accomplished by simply switching the RF carrier on and off, it can be considered a

digital form of communication. By WW-I, teletype had become a practical reality, using a frequency shift method of “:mark and space” keying. This remained the norm until after WW-II when surplus RTTY equipment became available to ham operators. From there, it was only a short time before experimenters began improving the art using audio tones to encode their transmissions for greater speed and reliability. But it wasn’t until the advent of the personal computer and its integrated “sound card” that amateur digital communications really took hold. Now, there are a dozen or more variations and the mouse and keyboard are fast replacing the telegraph key and the microphone in the ham shack.

Digital technology is starting to invade the innerds of our radios, too. My own *Elecraft K2* transceiver contains no fewer than three separate microprocessors to control and stabilize its operation. The same can be said for test equipment. Three indispensable pieces of equipment in my arsenal of analysis tools are digital in nature -- a digital multimeter, frequency counter, and storage oscilloscope.

Analog circuits will never completely disappear from the picture but on balance, digital is gradually taking on a larger and larger role in the communications field. If we are to keep pace, we need to know something of how it works.

In the next Unit, we’ll look at digital encoding methods

Paul Honore’ W6IAM

Club members, I have boxes of older QST's in my garage that are packed full of idea's, articles, and just about anything you would be interested in pertaining to Ham Radio. I would like to find a new home for them. No, I want them gone actually. If interested, contact me before the end of the year, or they'll go to recycle or to the library. These were passed on to me to store temporarily, and it's now been 3 years. It's time for a new home. If you think you would like to store them for others to have access to, to check out when they have a project and need some guidance, or keep them for yourself, let me know on the air, at a meeting, or at the annual Christmas party on the 14Th., {hint hint}, then we can make arrangements to pass them on. Last chance. Thanks for the space to advertise!

Nita~KE7DRT

Get Your License Here

The CCARC Amateur Radio License Classes will be April 18 and 25 and May 2nd. If you know of anyone who would be interested in a Technician or General Class License, please have them call Chuck, N7BV 360-452-4672 or Tom KE7XX 360-452-8228.

Thanks, Chuck VE-L

Treasurer's Report

First Federal Savings & Loan of Port Angeles Balance:	\$ 2,850.96
Outstanding Cheques:	- 0.00
Current Book Balance:	\$ 2,850.96
CD at WestSound Bank (6-month, 3.40% APY):	+ 1,037.74
CD at WestSound Bank (18-Month, 5.13% APY):	+ 3,000.00
Total Cash Assets:	\$ 6,888.70

Birthdays for February, 2009 and the first week of March.

Dillard, Don	K5MTW	Feb-06
Baguley, Michael	KE7RFP	Feb-18
McCoy, David R.	KE7JEJ	Feb-19
Tate, Mary	AC7IY	Feb-20
Cain, Jerald C.	KE7BVZ	Feb-25
Ladwig, Lewis R.	WB0NAI	Feb-26
Abbott, Dan	N7DWA	Mar-09
Smith, Michael B.	K7MBS	Mar-09

YL's Birthdays

Dove, Belinda (Barry C.)	KE7WGO	Feb-06
Franklin, Patricia (Michael I.)	KE7SLI	Mar-05

Thanks,

David R. McCoy,

KE7JEJ
CC-ARC Treasurer

YL LUNCHEON

February 13 Old Mill
721 Carlsborg Rd.

Time: 11:30 a.m.

Find us on the web at
www.olyham.com
Check it out. Lots of
information about ham radio
in Clallam County!

2009 YL Luncheons

February—Old Mill Café 721 Carlsborg Rd, Carlsborg
March—Gordy's Pasta and Pizza 1123 E. First, Port Angeles
April—Oak Table 292 W. Bell, Sequim
May—Downriggers 115 E. Railroad Ave, Port Angeles
June—Mariner 707 E. Washington, Sequim
July Joshuas-113 DelGuzzi Dr., Port Angeles
August—Tarcisios 609 W. Washington, Sequim
September—Sergios 205 E. 8th, Port Angeles
October—Fortune Star 145 E. Washington, Sequim
November—Chestnut Cottage 929 E. Front, Port Angeles
December—Paradice 703 N. Sequim Ave, Sequim

Description	Time/Date	Location	Contact
Clallam County ARES/RACES meeting	7 pm, first Tue of every month	Clallam County Courthouse EOC, 223 E. 4 th St., PA	Dan Abbott N7DWA 360-582-3824
Clallam County Amateur Radio Club general meeting	7 pm, second Wed of every month	Port Angeles Fire Station 5 th & Laurel Streets, PA	Tom Newcomb KE7XX 360-452-8228
Clallam County Amateur Radio Club social breakfast	8 am, first Sat of every month	Joshua's Restaurant Hwy. 101 & Del Guzzi Dr.	Tom Newcomb KE7XX 360-452-8228
Clallam County Amateur Radio Club YL social lunch	11:45 am 2d Fri of every month	Rotates - announced on Thursday night Net	

CLUB OFFICERS For 2009

President: Nita Lyman KE7DRT 360-457-5022 ke7drt@yahoo.com
Vice President: Dennis Tilton AD7TV 360-452-1217 3tiltons@wavecable.com
Secretary: Alicia Diemer KE7TTY 360-683-5102 pathfindernorth@aol.com
Treasurer: David McCoy, KE7JEJ 360-461-5470 mccoy.d.r@olyphen.com
Chairman of the Board: Bill Carter, W7WEC 360-681-4375 w7wec@arrl.net
Board Member: Al Dawson, W7YLV 360-457-0752 adawson@tfon.com
Board Member: Johan Van Nimwegen, KO6I 360-681-7300 jvn@olyphen.com