PAPA System Analog User Guide

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About The PAPA System

About the PAPA System - The PAPA System is a large community of radio amateurs enjoying the use of interlinked analog, D-STAR, DMR, and P25 repeaters, providing extensive coverage of the Southern California region and beyond. We have reliable communications from the Mexican border to North of San Luis Obispo and from the Arizona border and Las Vegas to “maritime mobile” well out into the Pacific Ocean. Many of our hilltops have emergency power as well.

The People of PAPA - Our membership is a family of radio amateurs who enjoy utilizing the system and its features, attending various organization events, and gaining new friendships through their affiliation and participation in the PAPA System. With members from every walk of life, the people are the real treasure of the PAPA System! We have a multitude of interests, talents and backgrounds, so there is always something interesting to be heard. We encourage visitors and new members to use the system, meet our members and enjoy the good times with all. The technology of the PAPA system is great, but it is the friendly people you will find on the air that really makes The PAPA System what we all consider to be the best repeater system anywhere!

How did we get our name? - The Pocket Auto Patch Association (PAPA) name derives from the telephone auto-patch feature that enabled amateur radio operators to place telephone calls from their ham radios prior to the advent of the cellular phone service in the 1980s. The name stuck and remains in use today!

Providing service to our Community - When the need arises, The PAPA System provides critical amateur radio support to various public safety, emergency, and rescue organizations. Many PAPA members donate their time to local disaster communications organizations such as RACES, ARES, CERT, American Red Cross and to other regional and community events like the annual Baker-to-Vegas Challenge Cup Relay (www.b2v.org) for law enforcement agencies.

PAPA members come together - Learn about all aspects of amateur radio – join us for our regional monthly meetings. Meeting details are below.

Connect with PAPA

PAPA maintains a number of resources for members to stay up to date with the system.

Please connect to any or all of the resources below.

PAPA Website	Our website	https://papasys.com
Facebook Group	The FB Group is for PAPA members to chat, ask questions, and meet other members	https://www.facebook.com/groups/PapaSys
Facebook Page	This page is designed more for attracting people to the PAPA System	https://www.facebook.com/papasys
Instagram	This page is designed more for attracting people to the PAPA System	https://www.instagram.com/papa_sys/
Threads	This page is designed more for attracting people to the PAPA System	https://www.threads.net/@papa_sys
YouTube	Recordings of guest speakers	https://www.youtube.com/@papasystem2587

A note from our President

For the last 30 years our membership has strived to maintain the PAPA System on the leading edge of technology. Growing from our analog roots, in 2007 the PAPA system was on the air with its first D-STAR repeater on Saddle Peak. 2014 saw our first DMR repeater on Mt. Lukens. 2020 saw our first P25 repeater on San Marcos. Mirroring our analog system, we currently have D-STAR, DMR, and P25 repeaters coverage similar to our analog system. The bottom line is, The PAPA SYSTEM provides the best coverage in Southern California.

Acknowledgement

PAPA would like to thank the Document Team members for their tireless contributions David KC6N, Ed KB6THO, Michael AF6FB, Nat N6BRV and several PAPA members for their support.

Cecil WD6FZA

PAPA Nets

A “net” is basically a meeting we hold over-the-air using our repeater system. We have many nets each week covering a variety of topics. We also allow other groups to use our repeaters because of the extended coverage we offer.

When	Name	Topics Discussed
Monday 8pm	DMR Net	Topics relating to DMR radios, programming, linking, hotspots, and networks
Tuesday 7pm	P25 Net	Topics relating to P25 radios, programming, talkgroups, hotspots, and networks
Tuesday 8pm	D-STAR Net	Topics relating to D-STAR radios, programming, linking, and hotspots
Wednesday 7pm	New Hams Net	Intended for new hams to get on the air and ask questions
Wednesday 8pm (only on the first Wednesday of the month)	PAPA System Net	Monthly update on the PAPA System
Thursday 7:15pm (only the first Thursday of the month)	MARC Net	Motorcycling Amateur Radio Club. This club talks about upcoming events and answers questions about putting ham radio gear on motorcycles. (not a PAPA net)
Thursday 8pm	Tech Roundtable	A question/answer style net open to general questions about amateur radio.
Friday 7pm	Antenna Net	A question/answer style net discussing antenna related questions. There is generally a theme for each net.
Saturday 6:30pm	Ladies Net	As the name implies this net is intended for the women of PAPA. A safe place for women to discuss the issues important to them.
Saturday 8pm	Saturday Night Roundtable	A net about anything outside of ham radio. There is generally a theme for each net.
Sunday 7am	Simplex Exercise	An opportunity for people to test simplex coverage from their location and practice relaying information. See the website for more details.
Sunday 8am	ARRL Southwest Division Net	ARRL holds a portion of their net on the PAPA System each morning. (not a PAPA net)
Sunday 7:30pm	Topanga DRT Net	The Topanga Disaster Recovery Team holds their weekly net on the PAPA System (not a PAPA net)
Sunday 8pm	Outdoor Net	Topics about being outdoors or using your radios in a portable manner.

Please see https://papasys.com/home/papa-meetings/papa-nets/ for more details about each net.

PAPA Meetings

In person meetings are a great way to get to know people. The PAPA System covers a large area so we hold regional meetings to make it easier for people to attend.

Most of our meetings have exam sessions before the meeting and have a raffle. We frequently have guest speakers as well.

All meetings are on Saturdays, different regions meet on different weeks. Here are the details:

Week	Time	Location	Notes
1st Saturday	11:00am	Palm Desert	This meeting is only held three or four times each year.
2nd Saturday	9 am	Mentone (Redlands)	
2nd Saturday	11am	Culver City	This location only meets on odd numbered months
2nd Saturday	7:30 am	Van Nuys	This location only meets on even numbered months
3rd Saturday	11am	San Marcos	
4th Saturday	11am	Fullerton	

Please check the PAPA Calendar (https://papasys.com/calendar/) for specifics on each meeting. Look for RSVP requirements as well, these are required for some meetings.

Introduction to Analog

Analog FM is where most hams get started. The radios are more affordable, and repeaters increase coverage enough to make a hand-held radio really exciting.

- Typical radios cover the 2m (144 MHz) and 70cm (440 MHz) bands. These two bands cover most of the repeaters in common use.
- FM stands for Frequency Modulation. This means the signal is always the same bandwidth or amplitude, it is the frequency that varies to modulate the voice signal.
- Don't think you are stuck with just voice communications, there are also digital modes available. You can use things like Packet and FT8 on these bands.

Using your radio

Modern radios offer many interesting features but are not overly complex to operate. Don't let this intimidate you, once you have the initial setup done the radios are very easy to use. In most cases the manual that came with your radio is a good place to start. Not all of them are well written, but in general if you dedicate a little time to reading through the manual, and watching some YouTube videos, you will be miles ahead in the long run.

One of the easiest ways to learn how to use your radio is to find an "Elmer" (an Amateur radio mentor). Come to one of our meetings and ask questions. There is a very good chance you will find someone to help.

Other resources:

- Join one of our many nets and ask questions.
- You can submit your questions to our support system. "ASK PAPA" can be found on the PAPA System Website. "ASK PAPA" is monitored by some of our more seasoned folks to address your questions in a timely manner. The usual response time for "ASK PAPA" is within 24 hours.

Please check the appendix for a list of terms you might find helpful.

Programming your radio

When programming your radio there are two groups of settings to consider.

First, the radio settings. Radio settings include changing the display characteristics, turning various tones and beeps on or off. In other words, these are settings that affect the radio, not an individual channel.

Second, are channels. For your analog radio, each repeater will have a channel. A channel holds all of the settings unique to a repeater or other system. The more basic settings include the channel name (shows on the display), the receive (RX) frequency, the offset (or the TX frequency), access tone, transmit power, and a few others.

Both radio settings and channels can be programmed from the front panel of the radio. But, this can get confusing and tedious. Programming software makes this much easier.

Some radios support a means to organize channels into collections. This could be called Groups, Banks, or Zones. When active on your radio, your tuning will be limited to the channels in the selected collection. For example, you may belong to more than one club. You could create a collection for each club. You can also create a collection for the frequencies used on a special event.

As a member benefit, meaning you need to be logged in to the website, is a set of code plugs (or configuration files) for many different radios. You can find this resource at https://papasys.com/members/codeplugs/. This will save you a lot of time and get you “on the air” faster.

If you don’t see your radio listed, you will need to create this on your own. Chances are good that another member has the same radio; you should ask at meetings and one one of the nets. You should also suggest they send it in to be included on the list. They can create an “Ask PAPA” ticket and attach the file.

Most manufacturers provide software for programming their radios. Manufacturer software is sometimes limited or cumbersome to use. Here are a couple of other options:

- RT Systems: https://www.rtsystemsinc.com/ . RT Systems software is also sold through Ham Radio Outlet. The software and the cable will typically cost about $50.00. One advantage to RT Systems is the ability to export channels from one

radio and import them for a different radio.

- Chirp: https://chirpmyradio.com/projects/chirp/wiki/Home. This freeware is written to work with many of the popular radios on the market. All you will need is your programming cable to connect the radio to your computer.

Offset, PL, Transmission power, Mic gain

Offset: This refers to the difference between your receive and transmit frequencies. These frequencies need to be different so the repeater does not hear itself when it transmits as this would cause feedback, just like putting a microphone in front of a speaker. Typically an offset is specified in relation to the receive frequency on your radio; it will be indicated as a “plus” or “minus” offset. Each band has a different standard offset. See the table below for some examples.

All of the PAPA repeaters offer full duplex operation, which means it can receive and transmit at the same time. Most radios are half-duplex, meaning they can either transmit or receive, not both at the same time. The network that connects our repeaters together is also full-duplex and can mix or combine signals from multiple repeaters. Sometimes this gets confusing, but in an emergency situation it will allow you to reach someone even when the repeaters are in use.

The following is an offset table. This is usually the default programmed into your radio with factory settings. This means when you enter a frequency say 445.420 MHz for PAPA 4 and select Dup (-). When press the PTT button, the radio will transmit on 440.420 to the repeater

Band describes the wavelength	**Output Frequency** (mHz) showing on radio in listening mode	**Offset**
2 meters	144-148 mHz	+/-600 kHz (0.600 mHz)
1-1/4 meters or 222 MHz	223.85 – 224.98	-1.6 mHz
70 cm or 440 mHz	440-450 mHz	+/- 5 mHz (In SoCal it is -5 mHz)

CTCSS: Continuous Tone-Coded Squelch System, sometimes called Private Line (or PL), access tone, CTC, or SQ, is used to prevent a repeater from responding to

unwanted signals or interference. Repeaters are typically set to require a tone before it will start retransmitting a signal. These tones are in a sub-audible part of the spectrum (below 300 Hz), they are transmitted for as long as you hold the PTT button. Repeaters can also send tones, so you can do the same filtering on the receive side of your radio. This is handy if there is a distant repeater using the same frequency pair.

You should know there are also digital tones, these are called by multiple names like DCS (Digital Coded Squelch) or DPL (Digital Private Line). These are specified as numbers like 073 or 241.

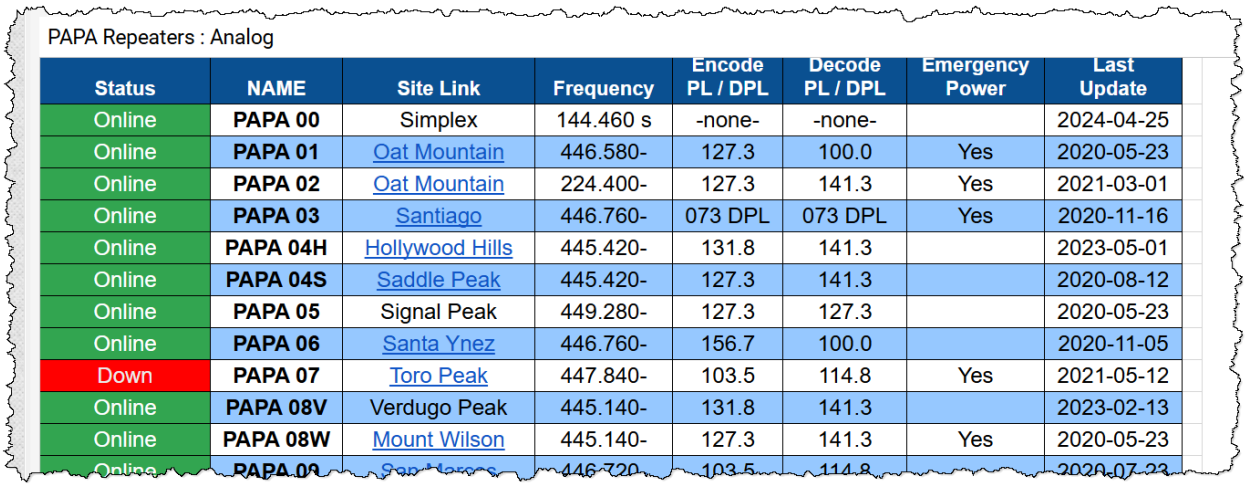
TABLE OF COMMON PL TONES (in Hz)

67.0	94.8	131.8	171.3	203.5
69.3	97.4	136.5	173.8	206.5
71.9	100.0	141.3	177.3	210.7
74.4	103.5	146.2	179.9	218.1
77.0	107.2	151.4	183.5	225.7
79.7	110.9	156.7	186.2	229.1
82.5	114.8	159.8	189.9	233.6
85.4	118.8	162.2	192.8	241.8
88.5	123.0	165.5	196.6	250.3
91.5	127.3	167.9	199.5	254.1

Transmission power: Typical hand-held (handie-talkie or HT) will have a max transmit power of 5 watts and will reach stations 60+ miles away. Most radios will have several power settings, for example Extra Low (EL), Low (L), Medium (M), and High (H). There are a few radios that offer higher power like 7-10 watts. In general you want to use the least amount of power you can to get the job done. Try low power first and increase power until you get through with a clean signal. You might try asking for help on this, key up with something like “This is KL6XXX I would like to test different power levels, can someone give me feedback on my signal?”. Then you can go through the different power levels and get some feedback on how your signal sounds. You can also do this to test different repeaters in your area to see which will work best for you.

Microphone gain: Microphone gain adjusts your transmitted audio level. If you are listening to the radio you may notice someone with a quiet voice, or a particularly loud one. This is more apparent when two people are talking and one is lower or higher than the other. If someone says you are too quiet, or too loud (over modulated) you can adjust your mic gain up or down. You should also be practicing good microphone etiquette. Hold the microphone about two inches from your mouth and talk across the microphone, not directly into it.

Putting it all together: Start by going to the repeater list and select a repeater close to you (https://papasys.com/papa-repeaters/analog/). If you don't know the hilltop names, use the repeater map to find a local repeater (https://papasys.com/repeater-map/).



PAPA Repeaters : Analog

Status	NAME	Site Link	Frequency	Encode PL / DPL	Decode PL / DPL	Emergency Power	Last Update
Online	PAPA 00	Simplex	144.460 s	-none-	-none-		2024-04-25
Online	PAPA 01	Oat Mountain	446.580-	127.3	100.0	Yes	2020-05-23
Online	PAPA 02	Oat Mountain	224.400-	127.3	141.3	Yes	2021-03-01
Online	PAPA 03	Santiago	446.760-	073 DPL	073 DPL	Yes	2020-11-16
Online	PAPA 04H	Hollywood Hills	445.420-	131.8	141.3		2023-05-01
Online	PAPA 04S	Saddle Peak	445.420-	127.3	141.3		2020-08-12
Online	PAPA 05	Signal Peak	449.280-	127.3	127.3		2020-05-23
Online	PAPA 06	Santa Ynez	446.760-	156.7	100.0		2020-11-05
Down	PAPA 07	Toro Peak	447.840-	103.5	114.8	Yes	2021-05-12
Online	PAPA 08V	Verdugo Peak	445.140-	131.8	141.3		2023-02-13
Online	PAPA 08W	Mount Wilson	445.140-	127.3	141.3	Yes	2020-05-23
Online	PAPA 09	San Marcos	446.720-	103.5	114.8		2020-07-23

On the repeater list, you will look at the Frequency column and the Encode column. You will notice a "-" or "+" after the frequency, this is the offset mentioned earlier. Make sure you select a repeater that shows "Online". Repeaters that are "Down" are not functional and "Stand Alone" repeaters are not on the network. Neither of these are good for your first attempt at a contact.

Find your manual and look for the section on programming channels, make sure you have the repeater information. Let's get you started:

- Turn your radio on and put it in the VFO mode.
- You will usually enter your desired frequency using the number pad on the radio; do that now.
- Find the Dup (or Duplex) function and set it to match the list.

- Then find the Tone function and set it to match the list.
- Listen for a minute to make sure the system isn't in use, then press the PTT button and say your call sign, release the PTT button.You should hear a corresponding beep from the repeater, and a few seconds later the repeater will stop transmitting (we like to say the "repeater dropped").
- If that all worked, you did it! You are able to talk on a repeater.
- If you wish to save the information to one of the radio's memory channels then follow the instructions in your manual to save a memory channel.
- Your radio probably gives you a way to name your channels. Something like "P03 Santiago" is the recommended channel name. But, you could name your channels any way you like.

By now, you have probably decided this is going to be a cumbersome and lengthy process to program all of the PAPA repeaters. This is where code plugs and software come in handy.

Use PAPA code plugs

Your radio might come with programming software and a programming cable. This software, often called CPS (Customer Programming Software), allows you to enter your channels and radio settings using the screen on your computer and its keyboard to simplify the process.

The PAPA System code plugs contain all of the PAPA repeaters as channels. The code plugs for PAPA system can be found at https://papasys.com/members/codeplugs/.

If you don't see your radio on the list, you might look for the RT Systems or Chirp files. These can be imported into these software packages to get you started.

Once you have your radio set up, you should only need to make changes when you want to add or update a repeater.

You may want to have more than one code plug. For example, when working an event you may want to create a code plug that has only the event channels. This way you can't accidentally knock yourself off channel.

If you belong to multiple clubs you will need to combine channels for the different groups. When doing this look in your manual for “Channel Groups” or a similar way to segregate channels. This allows you to filter down your channel list to just one of your groups.

YouTube videos

The PAPA System YouTube channel (https://www.youtube.com/@papasystem2587) has many interesting videos to help you understand different topics. You can also search YouTube for videos specific to your radio.

Wide Area Linking

Wide area linking is the process of connecting repeaters or systems of repeaters together over an Internet connection. The PAPA System supports EchoLink and AllStar.

EchoLink

EchoLink is a system that allows computers (desktop, laptops, and mobile devices) to connect to a repeater or a group of repeaters. This is an easy way to stay in touch with the system when traveling or you don't want to take a radio with you.

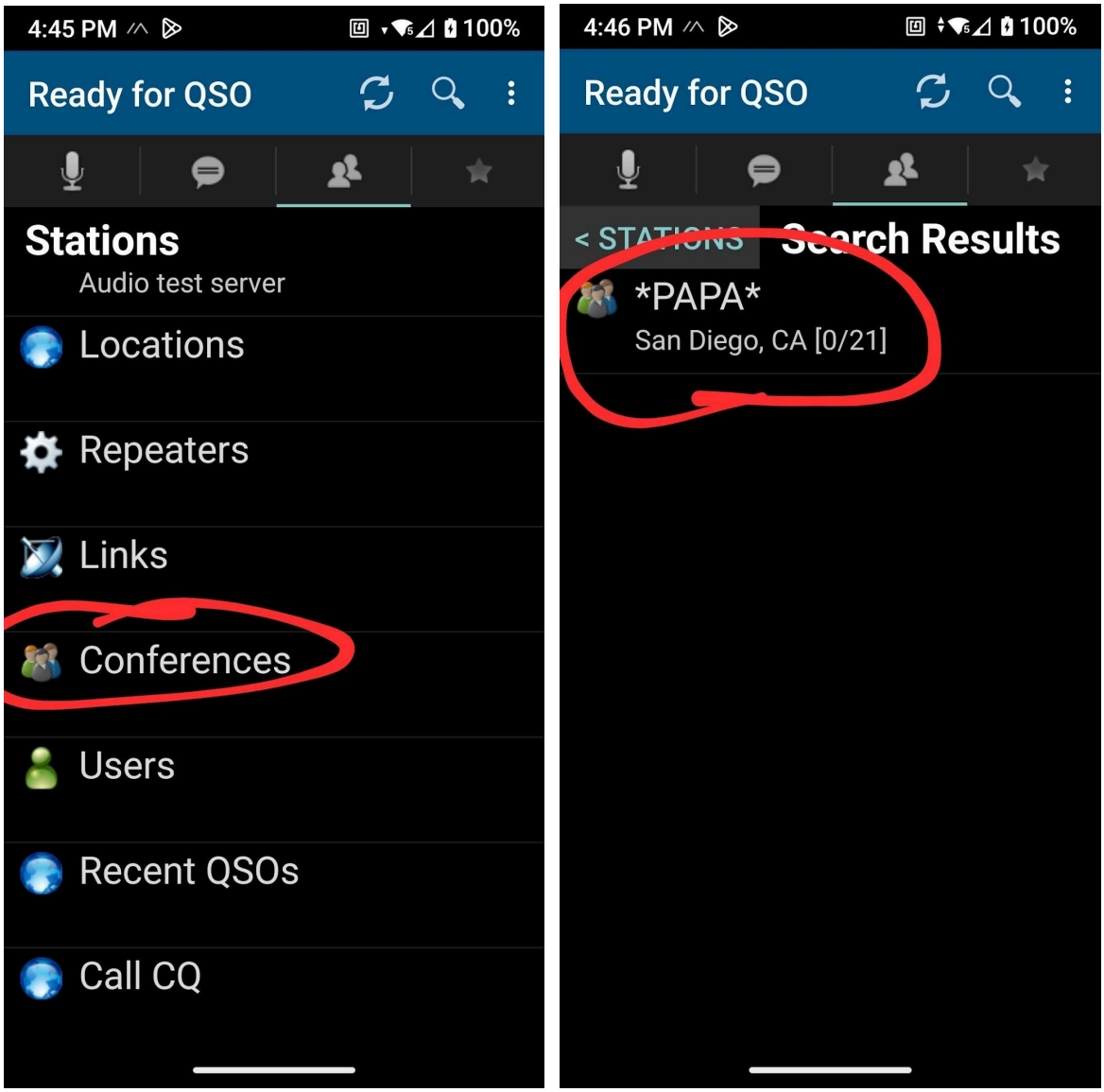
PAPA provides a conference server for both members and guests to use. This connects to our network of analog repeaters. When connecting, instead of saying the repeater you are using, you would say something like "N6ABC on EchoLink".

EchoLink.org maintains a Windows application only. Other developers have created applications for Mac, Android, and iOS. You can find the download links here https://echolink.org/download.htm. Follow the instructions given for EchoLink setup and usage.

You must have a valid amateur radio license and create an EchoLink account. The approval process usually takes about 1 or 2 days, or if you choose to register via the phone, it only takes a few minutes. You must be registered on EchoLink.org before you can use the EchoLink system.

To connect to The PAPA System, you will open the EchoLink app and look for "Conferences" and search for "`*PAPA*`", the asterisks are important. This will connect you to the PAPA System of analog repeaters. You can do this from anywhere in the world to talk on the local system or participate in a net.

These images show selecting the "Conferences" list, then the "*PAPA*" conference. This example is showing the Android app.



AllStar

AllStar is an interesting system. You can build your own AllStar node to keep at home or take with you when you travel. You can get a node like the ClearNode from Node Ventures (https://www.node-ventures.com/) that is ready to go when you get it, or a SHARI kit from Kits 4 Hams (https://kits4hams.com/), or you can build your own using instructions on the AllStar web site (https://allstarlink.org/).

What can you do with an AllStar node? Well, similar to how EchoLink can connect to the PAPA System of repeaters, using an AllStar node and your radio, you can also connect to the PAPA System…and many other places. This could even be a friend of yours that also has a node.

These nodes have small transceivers on them that will listen for you to key up your radio, they will forward your signal over the Internet to whatever node you are connected to. When there is traffic coming from the other node, your node will transmit the signal for you to receive on your radio.

In the most basic sense, an AllStar node is a private linked repeater over which you have complete control.

Just like with EchoLink, this is great if you are traveling, or if PAPA doesn't get great coverage where you are. Or, maybe you want to participate in a net on a far away repeater. There is a complete list of nodes on the AllStarLink.org website. There are almost 40,000 of them as of Spring 2025.

PAPA maintains two AllStar nodes for people to use.

- 49171 is for members only
- 49172 is for non-members

There is a separate guide for using AllStar and Echolink.

Etiquette and Best Practices for Analog

How to make your first contact.

Many are afraid of making their first call, being unsure of how they will sound on the air, who is listening, and even the proper procedures for making a call.

Let's make this really easy. Here are some ways to get started:

- Meet up with another ham, practice making your first call on a simplex channel. This will do a good job of reducing the number of ears that might hear your call.
- Come to a PAPA meeting (or other club) and practice there.
- Join the PAPA New Hams net and just try giving your call sign during check-ins.
- Put on your "Badge of Courage" and just go for it.

Regardless of how you decide to break through the barrier of your first contact, you should know that hams are generally friendly and helpful people. Nobody is going to get mad if you do it wrong.

You should also look for the Smooth Operator Guide in the "Members | Guides" menu (https://papasys.com/members/guides/). It goes into more detail on this topic.

Repeater Etiquette

Here are some things to think about when you are getting started:

- Listen first, listen for about a minute to make sure the frequency is available.
- When you are ready to key up, press the PTT and wait about a second before speaking. This will allow all repeaters on the system to key up before you start to talk; this keeps your first syllable from being lost. This is frequently the first character or two of your call sign, so it's important to get that out there.
- Give your call sign first and try one of the examples below.
- Remember to ID every 10 minutes (only if your conversation goes that long) and at the end of your conversation. You do not need to give your call every time you key up.
- You will hear lots of people give both their call and the other person's call periodically. This is not required, you only have to give your call.

Your first transmission could be something like, “WD6FZA on PAPA 4”. This is your call sign and the repeater you are calling into. This last part is something unique to the PAPA System. Here are some other examples of perfectly acceptable ways to ID:

- “KO6DCE This is my first time on the air and I’m not sure what to do”
- “N6XNH on 4, anybody around for a quick QSO?”
- “KO6ABC on 4, I have a question about XXX, I’m hoping someone can help”
- “KK6AL on 3 looking for any call”

When in a conversation you should always wait for the courtesy tone (learn more below) before you key up your radio. This is important because the repeater has a timeout timer to protect itself in the event there is a stuck transmitter. Each time the courtesy tone is sent the timer is reset. It also gives a little time for others to join the conversation.

Joining an existing conversation is fine and there is a procedure for this. Between transmissions you can key up and give your call sign. You do not need to say “COMMENT” or “QUESTION”. One of the other operators will acknowledge you and let you join in. You should only do this if you have something to add or a question about the ongoing conversation. Or, in the event of an emergency. It is considered bad form to change the topic or make a call when you are joining a conversation.

The term “BREAK” is special on the radio and indicates an important need for communications. “BREAK-BREAK” would indicate a need to use the repeater for an emergency situation. “BREAK-BREAK-BREAK” is the highest priority, meaning immediate danger to life or property. Using “Breaker” (or any CB-ish language) is considered bad form and should be avoided. Allow breaks as soon as possible – don’t say, “Break acknowledged” and then go on talking. Rather, you should yield the channel to the calling station with something like “Go ahead break”. Then, prepare yourself to assist. The caller may need a phone call placed or some other help. Allow all amateurs to use the system in an emergency

Use the system – talk, chat, communicate and, discuss. That’s what the system is for. Chat with people you don’t know, not just the comfortable cliques. Our system motto is “***No call goes unanswered***” (except jammers). Whether you are experienced or not, if you hear someone make a call on the system you should respond. You can use something as simple as “Good morning, this is AF6FB, how are you today?” and see

where the conversation goes from there.

If someone asks for a “radio check”, something that is frowned upon, ask them what they are “checking”. Here is why the “radio check” is frowned on. If you don’t know what they are checking, you don’t know what to evaluate. For example, they could be trying a new microphone. Your response should talk about the quality of their voice…is the level good? Is the audio distorted? Does it have too much bass or treble? Is there too much noise in the background?

If you want a good “radio check” be specific about what you are “checking”. Try something like “I’m testing a new microphone” or “I’m checking a new radio to make sure it is programmed correctly”.

Listen for a few seconds after changing frequencies before transmission. Identify every 10 minutes and after your last transmission. ID when the repeater IDs and you will always be legal.

- **Never** discuss the control codes or the system details on the air.
- **Never** acknowledge or discuss a jammer on the air, not in any way.
- **Never** discuss or conduct business on the air.
- **Don’t** “kerchunk” the machine without saying anything. At least give your call sign.
- **Never** chastise anyone on the air (or even off the air) for using the system incorrectly. We all made mistakes once in a while. If you want to contact a member, check the roster and send them an email. Do it in a constructive and friendly way.
- **Avoid** unnecessary jargon, such as “destinated”, “hihi”, the royal “we” and “we’re”, “for ID,” “negative contact,” and “nothing heard”.
- **Never** use CB jargon or police codes on ham radio, such as ten-codes and slang

Courtesy Beep Telemetry

A courtesy beep is an audible tone sent by the repeater after someone finishes talking.

The PAPA Repeaters send two types of tones. One gives you the status of the repeater’s network connection, the other indicates the user is on the same repeater.

As each person unkeys the repeater will send one or two beeps. See the table below for their meaning.

Single Beep	Other station is on a different repeater
Double Beep	Other station on the same repeater

A few closing words

Amateur Radio has been my passion since the early 1980's, and with the PAPA System for most of that time. The PAPA System has two great things going for it: The facilities and the people. The facilities are first class, with linked coverage over most of Southern California. The People of the PAPA System are the real treasure. With the variety of interests and talents in the group, there is always something interesting on-the-air.

A couple of things when you are using the system. Whenever you have the radio on, announce your presence on frequency. If you hear someone that you've never talked to, introduce yourself. I encourage everyone to attend PAPA meetings. These gatherings are places where we can share information that can't be discussed on the air. Please invite your friends.

In the last few years, almost all of the PAPA correspondence has been done via email. Please provide your email so PAPA can keep you more informed on various activities. The features on the system are there to be used.

Southern California has had more than its share of disasters over the last several years. The PAPA System is proud to be of service to the community during times of need. During such emergencies, the PAPA System can be made available to any licensed Amateur Operator for any emergency purpose. The frequencies and tones can be given out (even on the air).

Have fun with the system! Use the system, but allow others to use the system too. Limit QSOs to 15 minutes. Leave plenty of time for others to break in. This is particularly true during the commute hours…try to keep it short.

Some of our members wait for a long period of 'quiet' before they jump on, so remember to leave some breaks and invite others to join in. The more the system is used, the better. Keep in mind underutilized ham bands have been reassigned by the FCC in the past. If we don't use them, we might lose them.

The most important part of the PAPA system is our members, so please don't hesitate to join a conversation, offer suggestions, and volunteer.

Remember the PAPA System motto is “**No call goes unanswered**”.

Glad to have you as a PAPA member! I look forward to chatting with you on the system,

73 for now, Cecil

Please see the papasys.com website for key contacts.

Appendix

Reference Sites

1. Introduction to Ham Radio history → http://www.arrl.org/ham-radio-history
2. ARRL Ham Radio Glossary → http://www.arrl.org/ham-radio-glossary
3. Repeater Basics → http://w4qr.org/files/repeater-basics_jon-perelstein.pdf
4. EchoLink → http://www.echolink.org/

Terms you might hear on the air

There are many abbreviations in Ham radio communication. These were developed to shorten on the air time.

- **73** – Best regards (see ARRL figure terms)
- **PTT** – Push To Talk, this is the button you push when you want to transmit your voice.
- **VFO** – Variable Frequency Oscillator (VFO) mode in electronics is an oscillator whose frequency can be tuned (i.e. varied) over some range. In this mode you can change the Receive and Transmitted frequencies.
- **Memory** – Memory Mode is what stores the information in your radio, so it is easily accessible when you need the settings fast. Each memory usually has the transmit and receive frequencies and the PL tone.
- **MW** – Memory Write button. Stores all the current settings into a memory.
- **CW** - Continuous Wave is a simple unmodulated signal. Interrupting the signal with a key is how we send Morse code.
- **AM** - Amplitude Modulation was the first mode used by hams for voice transmission. In AM, the amplitude of the carrier signal is varied in step with the speech information and the carrier as well as both sidebands will be present.
- **SSB** - Single Side Band is a special case of AM where the carrier and one sideband of the AM signal have been suppressed. This mode is commonly used in HF.
- **FM** - Frequency Modulation is another mode used by hams for voice and data

transmission. In FM, the frequency of the carrier signal is varied in step with the speech and data information.

- **PL** - Private Line, Motorola's proprietary name for a signaling scheme called Continuous Tone Coded Squelch System, or CTCSS. A sub-audible tone is used to prevent a repeater from responding to unwanted signals or interference.
- **Duplex** - an operational mode where the transmitter and the receiver operate simultaneously. Most repeaters operate in “duplex” mode. Your telephone is an example of a duplex device.
- **Half Duplex** - an operational mode where the transmitter and the receiver are operating on different frequencies but not at the same time. Your handheld radio (and most of your other radios) operates in “Half Duplex” mode.
- **Simplex** - an operational mode where the transmitter and the receiver are operating on the same frequency but not at the same time.
- **Code-plug** - a data file saved by radio programming software. This file contains all radio and channel settings. The PAPAsys.com website maintains a collection of code plugs to get you started. Code plugs can be shared between radios to make setup quick and easy.
- **VoIP** - Voice over Internet Protocol. A technology for transferring voice via Internet connections.
- **DTMF** - Dual Tone Multi-Frequency. In this system each button generates two tones. This is the same system as is used on a touch tone phone.

Digital Modes

- **RTTY** - Radio teletype (RTTY) uses a Baudot (5 bits per character) or ASCII code (7 bits per character) to communicate. RTTY is almost as reliable as CW and there are many hams who use this mode on a regular basis on the HF bands.
- **Packet** - is a data transmission mode that uses the AX.25 protocol for digital text communications.
- **TOR Modes** - "Teleprinting Over Radio." These modes include AMTOR, Pactor, G-TOR and Clover. These modes incorporate error correction to ensure data arrives without any errors.
- **PSK-31** - Is a data mode that uses a sound card in the computer to send and receive through the radio. This greatly reduces the hardware cost compared to some of the other modes.
- **SSTV** - Fast scan TV (FSTV) and slow scan TV (SSTV) are modes used to send pictures or images over the radio

- **IRLP** - Internet Radio Linking Project is a method of linking the Internet with Amateur Radio
- **EchoLink** - another methodology for linking analog repeaters via the internet. This one allows you to access the PAPA system using your computer, Android or iOS cellular devices (download the app).
- **AllStar** - Not an RF mode, rather this is a system for connecting repeaters over the Internet. It also supports personally owned “nodes” that allow individuals to connect to each other, or systems like PAPA.
- **D-STAR** (**Digital Smart Technologies for Amateur Radio**) is a digital voice and data protocol specification for amateur radio. Uses frequency-division multiple access and less bandwidth than analog voice modes such as AM, FM, and SSB. The quality of the data received is also better than an analog signal at the same signal strength. D-STAR compatible radios are available for HF, VHF, UHF, and microwave Ham radio bands.
- **System Fusion** - Open specification with proprietary vocoder system from Yaesu. Uses AMBE CODEC with C4FM modulation
- **DMR** - Digital Mobile Radio is found in both commercial and public safety equipment from multiple vendors. This mode uses AMBE+2 codec over a C4FM modulation variant with TDMA. Time Division Multiple Access (TDMA) allows for two conversations on a single repeater that do not interfere with each other. The separate conversations are referred to as timeslots (1 and 2).
- **P25** - Another AMBE based mode that is based on C4FM. This mode is used by public service, utilities, and many other markets. As such, equipment is readily available on the used market. Advantages over some of the others are a faster sampling of audio and full use of the bandwidth giving a very robust and clear audio signal.

You will also hear “Q” codes from time to time. “Q” codes are short codes used with CW (or Morse code) on the HF bands. Outside of QTH, QSY, and QSL these are generally frowned upon for the VHF and UHF bands.

- **QRP** – Reduced transmitter power
- **QSL** – I am acknowledging message; Got it
- **QSO** – I can communicate with...direct; Contact
- **QSY** – I am changing frequency to…
- **QTH** – My position is...latitude...longitude; your transmitting location; or, Home location
- **QRZ** – You are being called by...