



Whyalla Amateur Radio Club Inc. Quarterly Newsletter



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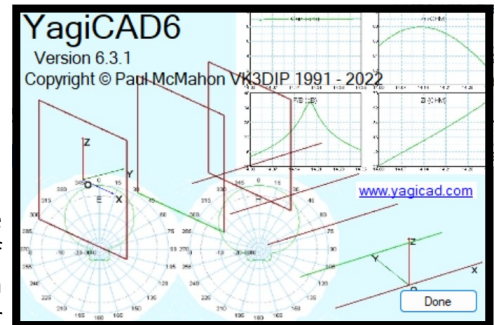
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WHAT IS YAGICAD?

Yagicad is a fully integrated analysis and design package for yagi, quad, and quagy, aerials.

WHAT CAN YAGICAD DO?

With Yagicad it is possible to enter a base design from scratch or use one of a number of saved well known designs. This design can then be optimised or scaled to suit particular requirements. Once this has been done a matching unit can be estimated and overall performance characteristics can be calculated and displayed graphically. Also available are radiation patterns and hardcopy print-out of results. Allowances in an analysis can also be made for element cross sections other than simple circular ones, as well as boom mounting techniques.



DEFAULTS AND SUGGESTIONS.

Whenever YAGICAD prompts you for some value it will suggest a value that based on experience may be suitable. These values can be over written if required.

AN EXAMPLE.

The operation of YAGICAD can be most easily understood by studying an example. Suppose you are interested in a Yagi for two metres.

1. Get the base design by either typing it in using the **Add Element** menu item under the **Edit** menu, or use one of the saved designs and choose a design that is close to your requirements.

2. Say you choose to use the saved NBS 6 element design. So you load (using File, Open) the NBS6.YAG file.

3. If, as in this case, the saved frequency is not what is required then you can quickly scale the design roughly to the new frequency say 147 MHz using the SCALE function under the Toolbox menu. You could also have changed the element diameters to some new value if desired also using the SCALE function, or even allowed for non circular cross section elements by using an EFFECTIVE DIAMETER. These also are found under the Toolbox menu. CALCULATION options are "L" shaped, rectangular, or folded dipole. You could have also edited the saved data using either the EDIT menu Functions, or just double clicked on the item to be changed or to add or delete an element etc..

4. You could then do a BASIC calculation (Calculation Menu) to determine the gain, front to back, etc., for this new design. Graphs of pattern and other features are also available under the Calculation menu.

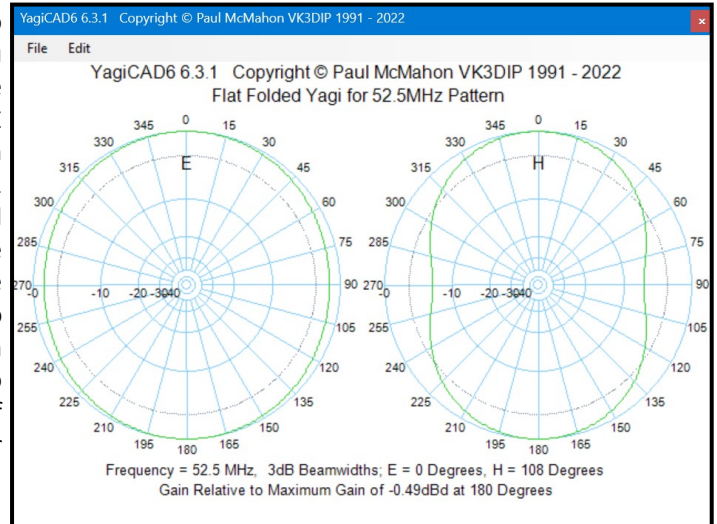
5. The design could now be optimised for MAXIMUM FORWARD GAIN, (FRONT TO

Elem.	Position	Length	Diam.	Material	Type	Segs/HW.	NA
R1	0	0.4702173	0.004	Lossless	Dipole	15	0
Drv.	0.0763004	0.3929422	0.004	Lossless	Folded...	15	0.06575225
D1	0.3329377	0.3886859	0.004	Lossless	Dipole	15	0
D2	0.4178462	0.2935738	0.004	Lossless	Dipole	15	0

BACK, RESONANCE of the DRIVEN ELEMENT, or MINIMISE LARGEST SIDELOBE could also have been chosen). This is done by selecting the appropriate entry from the AUTO area under the CALCULATION menu and selecting the value to be varied, i.e. a spacing, or a length. A powerful genetic multi parameter optimization option is also available for say wideband optimisation. i.e. OWA of the design to say optimise several attributes at once over a range

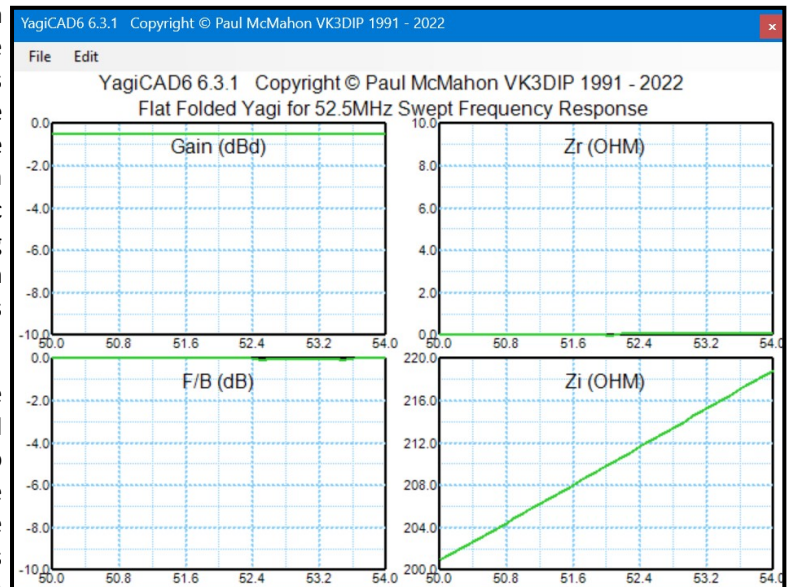
6. Steps 4 and 5 are repeated as many times as is necessary. When satisfied you could do a SWEPT FREQUENCY RESPONSE to see how the design performs over a range of frequencies.

7. Assuming all is OK you could now proceed to calculate a matching network for your design. You select MATCH from the TOOLBOX and say decide to use a FOLDED DIPOLE. (GAMMA, or TEE matches, or many others could also have been used). Let us say you are going to use a 4 to 1 coaxial balun with 50 ohm coax i.e. the required input impedance to be matched is 200 ohms. The program gives you the required diameter of the folded part of the element. If you had chosen to use a gamma match then it may have been appropriate to RESONATE the driven element to some negative (Capacitive) reactance. A figure of say -15 to -20 Ohms has been found to give better results than a true resonance i.e. 0 Ohms.



8. You could now get an OVERALL RESPONSE of the design including the effect of the matching network, but it would be best to allow for the folded dipole by first CALCULATING its EFFECTIVE DIAMETER and EDITING in the new effective diameter of the driven element. Steps 6,7, and 8 could then be repeated to ensure that nothing untoward has happened. The final resultant plot as with all other graphics can be either printed out (File, Print) or copied to the clipboard for pasting into some other program. The option is also given to save the numerical results of the plot to a .CSV file (File, Export) if you wish to say use a spreadsheets graphing capability instead.

9. You may now wish to allow for a metallic boom. This is done using the BOOM item in the TOOLBOX. The values suggested by YAGICAD allow for the element being mounted though the centre of a circular cross section metal boom with good electrical contact. (Classic option), or insulated through boom using the G3SEK formula. You can allow for non circular booms with the EFFECTIVE DIAM'S tool.



10. It would be a good idea to investigate the effects of varying the parameters and type of the mathematical model used to calculate the Yagi's performance. A large number of variations are available via the Options menu. In general the SX model is probably the least accurate (but fastest) and increasing the number of segments used on the NEC2 model should produce a better result. 11. When satisfied the final results can be printed out using the File, Print function.

12. Finally the new design can be saved to disk for possible future: use using the File, Save option. In fact if you come up with some particularly good design why not send the data file to a friend using packet, or put it on the web.

You could now build the Yagi feeling reasonably sure that it will behave at least close to the calculations.

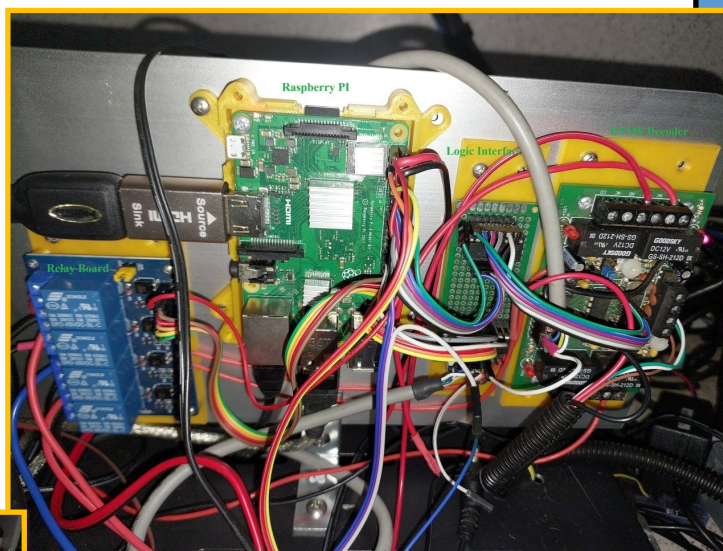
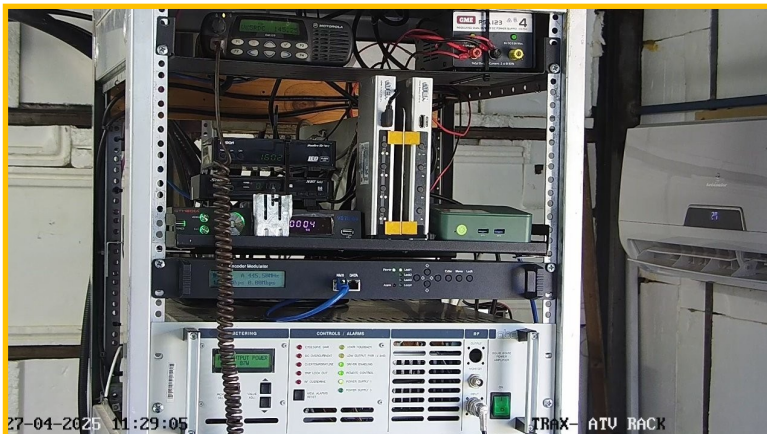
VK5RDC Amateur Television in the Mid-North

Amateur television (ATV) in South Australia has a vibrant community of enthusiasts who engage in broadcasting and receiving television signals using amateur radio equipment. This hobby allows individuals to experiment with video transmission and reception, often using various modes such as analog and digital formats.

In South Australia's mid-north, amateur television operators participate in local broadcasts on a nightly basis. In the region we have a core of about 8 active participants from Whyalla and Port Pirie areas.

These groups provide support, knowledge, and opportunities for members to share this know-how and experiences related to ATV.

It's important to note that amateur television operators must adhere to regulations set by the Australian Communications and Media Authority (ACMA), which governs the use of amateur radio frequencies and ensures that all transmissions are conducted legally and responsibly.



It is worthwhile noting that the ATV in South Australia originated in the mid-north area and some of the original instigators still form the basis of this elite group of enthusiasts.

We welcome Steph VK5FQ in Adelaide who has been re-broadcasting our ATV into the Adelaide area where it has been well received. Many thanks to Steph.

In The Past...

Sometime in the early to mid eighties, the club organised a public display of the Whyalla Amateur Radio Club at Westlands.

It was very successful and helped immensely because we had members who had the time and energy to man the display.

It was regretted that on the day we were not able to either have a working radio or to display any antennas as this would have added to the grandeur of the day's display.

What is very noticeable was that the QSL cards were very much in abundance in those days and everyone seemed to have their own particular printed cards and these were sent out via the QSL bureaus.

You may also note that there seemed to be very few radios above the VHF frequencies.

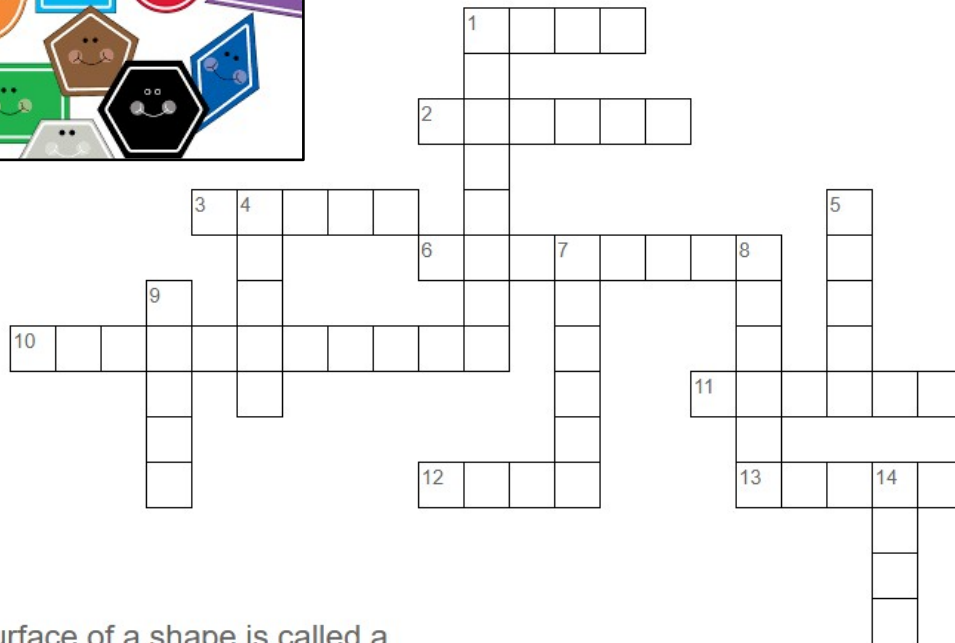
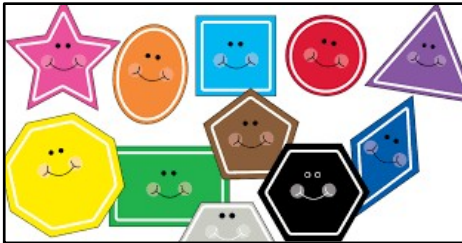
As evidenced from the photos, there was a lively interest shown by the public for most of the day with many



interested enough to stop by to talk to Peter Baker, then VK5BWI and his cohorts.

The Quarterly Crossword

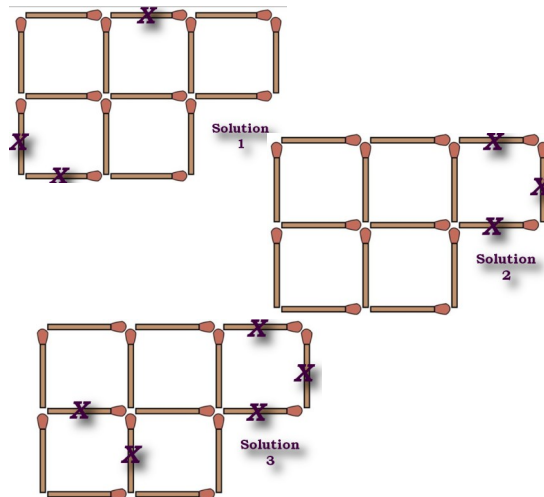
3D Shapes



Across

- 1 The surface of a shape is called a _____
- 2 What shape has 4 rectangular faces and 2 square faces?
- 3 Right/Wrong? A cylinder has 2 vertices
- 6 The mathematical term for more than 1 corner
- 10 What is the mathematical name for a triangular based pyramid
- 11 The mathematical term for a single corner
- 12 What 4 letter 3D shape has 12 edges?
- 13 What are the meeting points for faces?

The Matchstick Solution



Down

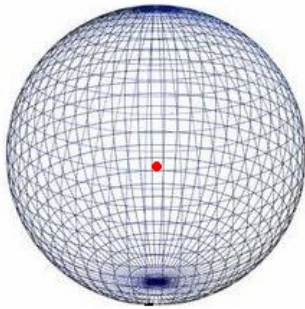
- 1 On a tetrahedron, if you add up the number of faces, vertices and edges what number do you reach?
- 4 Right/Wrong? A cone has 2 faces, 1 vertex and 1 edge
- 5 A square based prism has _____ edges
- 7 How many corners does a hexagonal prism have?
- 8 What 3D shape has no edges and no vertices?
- 9 A triangular _____ has 9 edges
- 14 They connect the corners together and are the meeting point for the faces

dBi

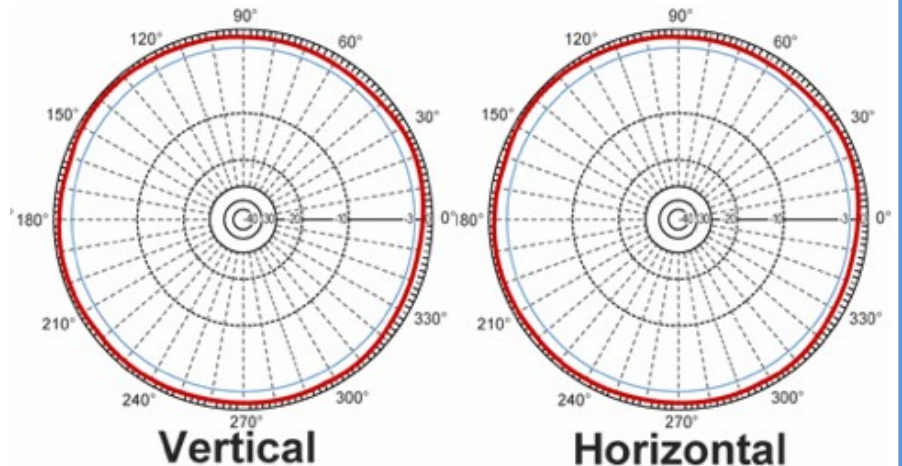
What does the i stand for?

In a nutshell!

An isotropic antenna is a theoretical antenna that radiates equally in all directions - horizontally and vertically with the same intensity. The antenna has a gain of 1 (0 dB) in the spherical space all around it and has an efficiency of 100%.



An isotropic antenna is used as a reference antenna to evaluate antenna gain.



Antenna Pattern of an Isotropic Antenna in the Vertical & Horizontal

Many antennas specify gain in dBi (decibels over isotropic), which is the power transmitted by an antenna in a specific direction, divided by the power transmitted by an isotropic antenna emitting the same total power.

Isotropic radiators are used as reference radiators with which other sources are compared, for example in determining the gain of antennas. A coherent isotropic radiator of electromagnetic waves is theoretically impossible, but incoherent radiators can be built. An isotropic sound radiator is possible because sound is a longitudinal wave.

The term *isotropic radiation* means a radiation field which has the same intensity in all directions at each receiving point; thus an isotropic radiator does **not** produce isotropic radiation.

In physics, an isotropic radiator is a point radiation or sound source. At a distance, the Sun and other stars are isotropic radiators of electromagnetic radiation.

Antenna Theory

In antenna theory, an **isotropic antenna** is a hypothetical antenna radiating the same intensity of radio waves in all directions. It thus is said to have a directivity of 0 dBi (dB relative to isotropic) in all directions. Since it is entirely non-directional, it serves as a hypothetical worst-case against which directional antennas may be compared.

In reality, a *coherent* isotropic radiator of electromagnetic waves of linear polarization can be shown to be impossible. Its radiation field could not be consistent with the Helmholtz wave equation (derived from Maxwell's equations) in all directions simultaneously.

THE INTERNET CHANGED EVERYTHING, NOW EVERYTHING IS CHANGING THE INTERNET

QSL World and Internet in general.

Article from the creator of QSLWorld

Innovation is not just a buzzword; it's the driving force behind every technological shift we see today. From the moment the internet entered our lives, it fundamentally changed the way we communicate, work, and play. But what's fascinating is that now, every new innovation is shaping and redefining the internet itself. And the best part? We are all part of this revolution.

Every leap in technology introduces not only new tools but new habits. As we adapt to these changes, these habits often pave the way for even more groundbreaking technology. It's a cycle of innovation that perpetuates itself, constantly evolving the way we live and interact with the world.

Take the creation of **QSLWorld.com**, for instance. This platform wasn't just about building another service for the radio amateur community. It was about challenging the status quo and offering a fresh perspective. Many technologies today, especially in niche communities like ham radio, have become stagnant, stuck in old ways of thinking. The industry's major players haven't embraced the full potential of modern tech, and this led to my decision to launch QSLWorld—a project driven by passion and the desire to explore new ways to improve the hobby.

When QSLWorld started, there weren't any grand commercial intentions. There was no hidden agenda or a corporate strategy to monetize the platform. I wanted to create a tool that would help people, a free service that could evolve and improve based on real feedback from users. I didn't want to follow the beaten path; I wanted to break free from it. That's what innovation is all about—finding new solutions, even if it means breaking away from the norms. And sometimes, as I've learned, this means facing scepticism.

It's disappointing how some people view innovation with scepticism or outright distrust. It's especially frustrating when past mistakes are attributed to new ventures, even when they're unrelated. The reality is that introducing something new, especially in a long-established hobby or industry, comes with challenges. And while some users reacted negatively to the QSL sending feature, for example, those experiences helped me refine and grow the platform. What makes innovation even more exciting is that new technologies shape how we think and act.

Take the habit of digital communication or how we now expect instant access to information. With each new tool we use, our behaviours shift, and we adapt. As our habits evolve, they push the boundaries of what's possible and drive the need for new technologies.

That's why QSLWorld is so important. It's not just about offering a new tool to ham radio operators—it's about giving people a new way of thinking about how they interact with their community, how they share information, and how they embrace the possibilities that new technology offers. The feedback from users has been overwhelmingly positive, with many expressing their excitement about new possibilities in the ham radio space.

The truth is, the people who push the boundaries of innovation often face resistance, not because their ideas are flawed, but because they challenge long-held beliefs. Yet, if we always stayed within our comfort zones, we would never have experienced the transformative changes that the internet brought in the first place. It's a reminder that change is not always easy, but it's always necessary.

As we continue to embrace new technologies, we must also embrace the new habits they bring. These habits will create opportunities for even more innovation and transform the way we live, work, and connect with each other. Whether it's in the world of amateur radio, business, or any other field, the connection between technology and habit will continue to shape our future.

At QSLWorld, the goal is simple: to keep innovating, keep improving, and most importantly, to keep making a difference for those who dare to embrace change. The journey is far from over, and the best part is, it's only just beginning.

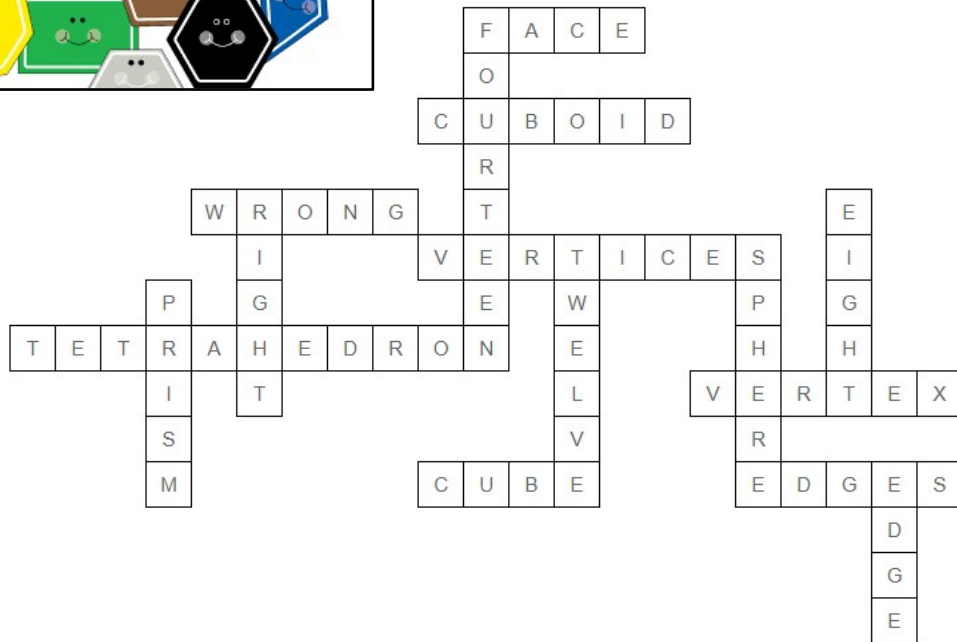
So, my message to you is this: Don't shy away from trying new things. Don't be afraid to embrace the unknown. Innovation is a process, and it requires not only technology but the willingness to adapt and change. And remember, new technologies will always lead to new habits, which will, in turn, lead to even more exciting innovations.

The internet changed everything. Now, everything is changing the internet. The question is, will you be a part of that change?





3D Shapes (The Answers)



ICOM Does It Again



Miniaturization unrivalled by other manufacturers

Following on the heels of the innovative 'DigiTriX' HF Transceiver Apple Watch app introduced last year at this time [\[see the April 2019 Communicator\]](#), iCom will be releasing its most compact handheld transceiver to date today.

The new iCom 'Micro' is a dual band 2m/70cm unit measuring only 3cm high, and weighing 20 grams! This ultra-portable boasts an impressive 5 Watts of power and uses revolutionary new dynamic inductance battery technology for extended operational periods.

The supplied 'rubber duckie' antenna is also unique in that it only extends 2cm from the transceiver yet delivers a great signal.

Small enough to fit almost anywhere, and in any Grab 'n Go kit, it's sure to be a hit with the emergency communications community.

Well done ICOM!

Anagrams You Can Relate To

THE MORSE CODE:

When you rearrange the letters:
HERE COME DOTS

ASTRONOMER:

When you rearrange the letters:
MOON STARER

SOLDERING IRON: Temperature Chart

APPLICATION	RECOMMENDED TEMPERATURE		COMMON SOLDER / TOOL
	FARHRENHEIT	CELSIUS	
Electronics & PCB Soldering	600°F	315°C	Sn60/Pb40 or Sn63/Pb37
Through-Hole Assembly	625°F	330°C	Sn60/Pb40
Surface Mount Technology (SMT)	520-600°F	270-315°C	Leaded or lead-free paste
Soldering Copper Pipes (Plumbing)	700-750°F	370-400°C	Lead-free solder (Sn97/Cu3)
Stained Glass or Mosaic	680-725°F	360-385°C	50/50 or 60/40 solder
Jewelry making & repair (soft soldering)	600-750°F	315-400°C	Silver bearing solder
Engraving & Wood burning (Pyrography)	600-750°F	315-480°C	Wood burning pen tips
Working with plastic (Hot knife)	300-480°F	150-250°C	Plastic Welding Tips
Lead free solder (General)	450-650°F	230-345°C	SAC305 or Sn99.3/Cu0.7

Essential Tools and Materials for SMD Soldering

Prior to SMD soldering, a few basic tools and materials must be ready to ensure a seamless soldering process. Below, we've listed a few and explained their roles.

Soldering Iron: The soldering iron melts the solder at a controlled high temperature, and forms a strong permanent connection when the solder cools. A soldering iron equipped with a temperature control function will be more flexible and can adjust the working temperature according to different materials and welding requirements. For soldering fine-pitch surface mount components, a thin soldering iron tip is a good choice.

Hot Air Gun: By generating heated airflow, it can melt the solder and solder

the components. It is often used to solder or desolder large-area SMD components.

Solder: It is available in a variety of forms, including wire, paste, bars, and pellets. The component and the pad establish a robust mechanical and electrical connection.

Liquid/Paste Solder Flux: Flux effectively removes oxides and contaminants from metal surfaces, allowing molten solder to flow evenly and better adhere to metal surfaces. This can highly improve the soldering quality.

Stencil: It is a tool used to precisely apply solder paste on [PCBs](#), usually made of stainless steel plates with corresponding openings cut out according to the shape of component pads. It helps solder paste to be applied only to areas that need soldering, avoiding solder bridges or insufficient soldering.

SMD Tweezers: SMD components are very small and require the use of SMD tweezers to clamp, position, and place components. Additionally, it can lessen the possibility that components will be harmed by static electricity.

Magnifying Glass: This is used to check the solder joints' quality to ensure there are no defects such as solder bridges, short circuits, etc. It works particularly well for small parts whose flaws are invisible to the human eye.

Anti-static Wristband: It can prevent static electricity from damaging sensitive electronic components and ensure SMD soldering safety.

Cotton Swabs: These are used to clean welding areas.

Alcohol: Alcohol is often used with cotton swabs to clean the surface of the PCB and remove flux residue after soldering.

How to Solder SMD Components: A Step-by-Step Guide

Hot air gun and soldering iron are two commonly used methods in SMD soldering. Choosing which one to use depends on the actual requirements, component size, complexity, etc. In real-world applications, using both tools together frequently yields the best soldering outcomes. Before soldering, please prepare the tools and materials needed. Check the required components and find out their polarity indications.

SMD Soldering Using a Hot Air Gun

1. Inspect the PCB for any dirt or other particles and clean the area where soldering needs to be done.
2. Put the right amount of solder paste evenly on the pads. For less-complex PCBs, you are able to apply solder paste on the pads manually. For

complex PCBs, a stencil is required.

3. You must take a pair of tweezers to place the SMD component accurately on the pad. The viscosity of the solder paste will temporarily fix the component in place.
 4. After placing components, soldering can be done using a hot air gun. Adjust the wind speed to moderate to avoid blowing away the components. First, preheat the circuit board to avoid thermal shock of the components. After preheating, heat the pad area and the components with the hot air gun nozzle, then heat them evenly until the solder paste melts to form a solid solder joint.
 5. Let the solder joint cool off on its own for a good connection, and avoid moving the component. Check the quality with a magnifying glass.
- Once soldering is done, alcohol may be used to clean the soldering area in order to maintain circuit board cleanliness.

1 SMD Soldering Using a Soldering Iron

1. You need to clean the circuit board and make sure the PCB pad surface is clean.
 2. Apply a layer of flux on the pad. This will make the soldering quality improve.
 3. Heat up the soldering iron tip to the right temperature. One hand can be used for holding the component with a pair of tweezers and placing it precisely over the pad, while another hand touches the solder wire to the hot soldering iron tip. Once melted, apply the solder into the soldering area.
 4. To continue soldering the subsequent solder joint or component pin, follow the previous procedures.
 5. Solder joints should be checked under magnification.
- Once the soldering has been done, the area of soldering can be cleaned and flux residue can be removed using a cotton swab and some alcohol.

1 Useful Tips for Successful SMD Soldering Every Time

2 Here we have listed ten useful tips to help you perform successful SMD soldering each time.

1. Please use anti-static tools like wearing anti-static wristbands. This can protect components from electrostatic discharge.
2. The soldering iron and heat gun will be very hot during the soldering process, so please avoid burning your eyes and skin.
3. Do not inhale fumes produced from soldering because they may be superheated.
4. The soldering iron tip should be always cleaned for good conduction of heat and to avoid contamination.
5. Try not to hold heat in one position for too long. If a first attempt to solder a location fails, wait until the circuit board cools before attempting again.
6. The soldering work should start from the center of the board to the edge.

This will ensure even heat distribution and prevent local overheating, which may cause warping.

7. First solder small components and then large components. Small components take less space, and later on, it is easy to position and solder large components.
8. Preheating is necessary to avoid thermal shock to the PCB that may cause warping.

Prepare a board layout sheet and a list of components to be soldered. When a component is successfully soldered, record it in the sheet. This method ensures accuracy and completeness during the soldering process.

A phenomenon wherein one end of the component lifts up because of unbalanced soldering, which is called tombstoning. It happens quite often with small components during soldering on a PCB. This can easily be avoided through proper fixing using tweezers and, thus, creating a uniform solder joint between the pad and component.

Photos from 'Yesterday'



Alex (then VK5ZLX as he was) at home in the Shack in 1980.