

PAARAgraphs



The Official Newsletter of the
Palo Alto Amateur Radio Association, Inc.

The Friendliest Club Around

Celebrating 85 years as an *active* amateur radio club—*Since 1937*

<http://www.paara.org/>



Go-Kit Building Design

Vince d'Eon, AI7LK

Vince builds Go-Kits and will talk to us about design consideration so you can assemble your own. He'll also take us on a tour of his go-kit.

Vince has been licensed since 2002 in Canada as VE6LK and in the USA as AI7LK. An Accredited Examiner in Canada and the USA, he gave the first remote Canadian examination when the COVID-19 pandemic started. He participates in up to a dozen public service events per year around Western Canada and is active on the air while glamping. You can hear Vince on the Ham Radio Workbench podcast, follow him on [Twitter @ve6lk](https://twitter.com/ve6lk), and view the projects and articles at his website <https://ve6lk.com>.

IT'S Go-Kit Night

Have you made a go-kit? Bring it to the meeting and show it off.

**This meeting will be a
Hybrid Meeting
Zoom and In Person**

Time: October 7, 2022 07:00 PM Pacific Time

Please check <https://www.paara.org/> for
Zoom Details

Upcoming Events

Oct 7***	PAARA General Meeting, 7:00 PM
Nov 4	In-Person and Zoom Meeting
Dec 2	*** Zoom & IRL Meeting
Oct 19	Board Meeting, 7:00 PM.
Nov 16	Everyone welcome! Zoom Meeting,
Dec 21	eMail President for details!
Cancelled	Electronic Flea Market

President's Corner

October 2022

I hope you didn't have any surprise issues with the first bit of rain we received in late September. One can only hope that we'll be getting some more along the way this winter. Outside of not having my gutters cleaned, I got everything that had been left outside during the summer undercover before things got wet. I even got a free rather sloppy wash job on my rather dusty Bronco.

The day before it rained, I was at Hollister Hills SVRA to learn more about off-roading and collect some new dust. I'll bet it's a mud pit right now though with the dry earth, I'll bet most of the water-soaked in. One of the big topics of the day was off-roading with a ham radio to increase your chances of getting ahold of help should it be needed. Though not a guarantee you can make contact with someone, you improve your odds by a large margin as most off-roading is

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Mini Product Review Penntek TR-35 Four-Band 5W CW Transceiver Dave Conroy, K6NIA

I have had KX2, a truly wonderful portable transceiver, for many years. But I have also been on the lookout for a low-cost CW transceiver that I would be willing to put in checked baggage should I go on a trip.

Recently I learned about the Penntek TR-35 Four-Band 5W CW transceiver, the handiwork on John Dillon (WA3RNC), who sells both a kit version (\$279.00) and a fully assembled and

for CW; I only use CW-NARROW). The difference between SSB and CW-WIDE is the bandwidth of the crystal filter, and the difference between CW-WIDE and CW-NARROW is a 700Hz active bandpass filter in the audio path.

One consequence of supporting listening to SSB is that the receiver needs to be on the lower sideband on 40M and on the upper sideband on 20M and 17M (it's actually lower sideband on 30M as well), which is not how most CW operators configure their radios (I always listen to CW on the lower sideband, but it didn't take long to learn to turn the tuning dial the other way on 20M and 17M).



tested version (\$379.00) on his website (<http://www.wa3rnc.com>). The TR-35 has received very favorable feedback in a number of portable operator's blogs (such as AE5X, W0RW, and K4SWL), and the TR-25 (it's two-band predecessor) got a good review in the December 2021 issue of QST, so I bought one (in kit form; I like building things).

What sets the TR-35 apart from other transceivers is that although it uses a microprocessor and an OLED display, it resists the urge to have a menu-driven user interface. Every aspect of the TR-35 is controlled by a dedicated switch or a dedicated knob, which makes it very easy to learn and very pleasant to use.

The TR-35 supports 40M, 30M, 20M, and 17M. The receiver has three bandwidths; a bandwidth suitable for listening to SSB, and two bandwidths suitable for listening to CW (although the CW-WIDE bandwidth is, in my opinion, so wide that it's not really very useful

The TR-35's design is straightforward. The receiver is yet another variation on the "two SA612 mixers with a crystal filter between them"

design used by many low-cost transceivers (such as the KX1). The transmitter is a class C design using an IRF510. All of the clocks (VFO, BFO, TX) are generated by a Silicon Labs SI5351 synthesizer.

The kit was very easy to assemble. It's actually a semi-kit; almost all of the components on both the CPU board and the RF board are surface mount and have been pre-placed and factory soldered. Building each of the boards involves installing only the through-hole components (mainly switches, connectors, electrolytic capacitors, and pre-wound toroids). All of the components come cleverly packaged so that everything needed by each assembly step is

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separated, and there really isn't any need to audit the contents of the kit before assembly begins. It took me about an hour and a half to build each board, and another hour to assemble the complete radio and do the final adjustments.

There is a tiny bit of surface mount rework on the RF board, which I assume will be eliminated in some future release. When I first saw the rework I thought that a surface mount component had been poorly installed, but a careful examination showed that it was deliberate rework that matched the schematic (and I found myself glad, once again, that I invested in a stereo microscope).

The final adjustments were easy, but did require some test equipment; at a bare minimum a dummy load and a multimeter that can measure both resistance (checking for shorts) and a 5mA change in a current around 100mA (setting the bias point of the power amplifier). An adjustable voltage power supply made it easier to set the trip point for the low-battery LED, and a wattmeter made it easier to know if the expected output power was being generated (with a 12.0V power supply I measured 8W out on 40M and 30M, and 7W out on 20M and 17M; there is a power output knob on the front panel, so it's easy to turn the power back to 5W if necessary).

I have taken the TR-35 out into the field many times, and I agree with the favorable opinions of the other reviewers. My best DX so far has been with K1PUG, using an EFHW, who gave me a 559 in CT (2600 miles away).

Sept 2022 Board Meeting Minutes

Present were President Jim Thielemann K6SV, Secretary Ric Hulett N6AJS, Treasurer Bob Korte KD6KYT, board members Walt Gyger K6WGY, Doug Teter KG6LWE, Darryl Presley KI6LDM, and Joel Wilhite KD6W. Also present was Christopher Hoover AI6KG.

The meeting was called to order at 7:10 pm

President's Report — We have had a request from a club member to send out a club-wide e-mail, inviting folks to a 'build and operate' party.

We decided that we can publicize the event at the monthly meeting and on the Monday night net. However, we want to limit the number of emails to all members.

This led to a discussion about a Q&A session at the regular meetings. We agreed to give this a try.

Secretary's Report — PAARA members: It is time to renew! Memberships expire at the end of December. Please visit the website <https://paara.org> and click to renew by paypal. Or, send a check to PAARA Membership, P.O. Box 911, Menlo Park, CA 94026. Club membership is a bargain: Still only \$25 per year -Stock up now!

When renewing, please let us know your current information: address, e-mail address, and phone numbers.

Treasurer's Report — Payments were made to the bookkeeping service, and to the printer for PAARAgaphs printing.

VP / Program Chair Report — Our guest speaker for October will be Vince d'Eon, VE6LK and AI7LK. His topic is: Go-Kit Design and Building. Also, members are encouraged to bring their own Go-kits for show-and-tell.

Old Business

PAARA members: We continue to need your content for PAARAgaphs. If you have a ham radio story, or an interesting experience, put it on paper (or bits) and send to the editor. Our cupboard of stories is nearly bare – you can help make PAARAgaphs special.

Education Committee: Darryl will work on energizing this activity.

Storage for Gerry – On September 16, Doug KG6LWE, and his son Ian, Gary KI6HIG, Christopher AI6KG and Jim K6SV visited the 'PAARA remote site' and loaded up 3 pickup trucks with obsolete equipment and junk, for transport to the recycler. Gerry has been very generous to store this stuff for so long, and we appreciate that greatly.

Our bookkeeper has the books up to date. She's working on the raffle filling for last year which is due October 1.

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PAARA 85th year event: October 29

We will have a barbecue and 3 ham transceivers (listen for W6P on the air!) to celebrate 85 years as an active radio club.

The board discussed tasks to make this happen:

The stations will be captained by KG6LWE and KI6LDM, with a GOTA (Get On The Air) station led by AI6KG. We need to have logging software and laptops for each station (AI6KG). K6SV got the press release out to the ARRL & Jim Armstrong.

Joel KD6W and Christopher discussed the 900MHz repeater, and agreed on some additional tasks.

General meeting Zoom interface, Ben. We were late bringing up Zoom last month. But in general, the Zoom meetings are working pretty well.

Doug will follow up on a request for tower/antenna takedown in Los Altos.

Pacificon: Mikko is again leading the W1AW/6 activity in San Ramon. We need volunteers to help out with setup, station operation, and teardown. Contact Mikko mikkops@yahoo.com to sign up.

Dream to Reality Raffle: We will have an Elecraft radio again as the big prize. Members should definitely plan to attend the December meeting and sign up for a chance at this great rig.

New Business

The IDXC (International DX Convention) will be held in Visalia April 21 to 23, 2023. This is a unique ham activity, with a different focus and good vendor participation. PAARA members should consider attending. We will announce this at the club meeting.

The meeting was adjourned at 8:35 pm.

Respectfully submitted,

Ric Hulett N6AJS
 PAARA Secretary

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done in areas where there is no cell coverage. It's good to see that one group of enthusiasts embraces amateur radio, though not everyone using them seems to be licensed, thus there's another topic for discussion.

October is fast approaching. I hope everyone has registered for Pacificon on October 14 ~ 16th. It's our one and only local Hamvention. If you have not registered, here's the link: <https://www.pacificon.org/registration/attendees>. As we have for the past several years, we will once again be hosting the Special Event Station, W1AW/6. This is your one opportunity to use the W1AW call sign without traveling to the ARRL HQ. Thanks go out to Mikko, AB6RF, for being the station captain and putting the whole thing together.

Mikko needs the support of members to assist in setting up, taking down, and most importantly staffing the station during the operating hours of noon on the 14th to midnight on the 15th. He created an online signup sheet for those interested in manning the station during the event. The sheet is at tinyurl.com/y8pr9yey. The link is also on our website. Assisting in any part of the event is a great way to learn about setting up and operating a large event station and helping the club in the process.

Speaking of October events, I hope everyone added the PAARA 85th-anniversary event to their calendar. It is being held at Memorial Park in the City of Cupertino on October 29th. Additional info and a map can be found at www.PAARA.org. Yes, there will be 2 HF radio stations, a GOTA radio station, and food at the event. Thus, member or not, ham or not, you'll have a chance to operate one of the stations. It will be very similar to our FD event but using the special event call sign W6P. I hope to see everyone there with family and friends, especially around 1 PM for an ARRL presentation.

September is the start of the election cycle. Clark, KK6ISP, once again accepted chairing the election committee. Nominations for all of the officers and three of the director's positions are now open and will remain open until the end of the November meeting. At the end of the November meeting, the election slate will be set and nominations closed. The election slate will

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be published in the December issue of PAARAgaphs. Elections will be held during the December meeting. You must be a current member in good standing and present at the December meeting to vote. The results of the vote will be announced just before the close of the meeting. Please contact Clark if you wish to run or have questions about a board position.

Don't forget December is also the annual Dream to Reality raffle where the grand prize will once again be an Elecraft KX3 HF radio with a few accessories. You still have a little time to salt away a few extra dollars for the raffle to improve your odds of going away with a new radio for Christmas! Remember the December meeting is an **in-person** meeting only. We're hoping to have a large turnout for this meeting with many members and guests making eyeball QSO's for the first time in quite some time.

It's already time to start thinking about next year. There are some fun events in store at the start of the year. The largest ones I can think of are Quartzfest (January 22th ~ 28th), Yuma Hamvention (February 17th & 18th), and much more locally, the IDXC (International DX Convention) on April 21-23 in Visalia, CA. Though a bit further away than Pacificon, the event is much different from Pacificon as the focus is on DX or making contacts outside of the US. As one would imagine, there are numerous vendors we don't see at Pacificon. I encourage everyone to attend the show to learn about current advances in DX or if you're interested in learning about DX. After all, there is a whole world out there waiting for you to make contact with them. Registration is open. For more information go to <https://www.dxconvention.com/>.

A BIG THANK YOU goes to Doug, KG6LWE, Ian (Doug's son), Gary, KI6HIG, Christopher, AI6KG, for their assistance in helping Gerry, N6NV, in cleaning out some of the years of accumulated "stuff" that he'd been storing at the farm. In ½ a day we were able to fill 3 pickup trucks full of stuff and transport the load to a recycling center. Mind you, not all of it went to the recycler.

I look forward to seeing a room full of smiling faces at the October 7th meeting.

73, Jim K6SV

Get on the air to keep the airwaves alive!

QST QST QST

PAARA 85th Anniversary Event

The Palo Alto Amateur Radio Association (PAARA) is pleased to announce an event to celebrate the 85th anniversary of our founding.

PAARA is devoted to further HAM Radio skills amongst members and friends for recreational purposes as well as for emergency communications. HAM Radio communications have proven critical in emergencies to be the only way of communicating between citizens and disaster response teams.

PAARA's approximately 150 members always welcome new HAM Operators and those interested in learning about Amateur Radio and support them in their operations.

Please join us on October 29th, 2022 at Memorial Park in Cupertino, CA. The event starts at 10 AM and runs until sunset. Food and non-alcoholic beverages will be provided around noon. The event is open to members and non-members. There will be a special American Radio Relay League (ARRL) presentation around 1 PM which you'll not want to miss.

We'll be located in the Group Picnic Area. The best place to park is to take Stevens Creek Blvd., turn left on N Stelling Rd., then left on Alves Dr. Halfway down the block you'll find a lot on the right. You'll find the Group Picnic Area at the large grass field's left end.

Two HF (high frequency) stations will be operating along with a GOTA (Get on the Air) station so anyone can try their hand at operating HF. We'll be using the Special Event Call Sign, W6P for the event. We plan on operating on whatever band is open on the 29th so check the spotting sites to see where we're operating.

We look forward to seeing everyone there. It's an opportunity to socialize with old friends and meet some new ones.

Please check our website, www.paara.org, for QSL card information and further information about the event.

PAARA



1st Prize Bioenno Power Lithium Iron Phosphate Battery, 12v, 12 Ah



2nd Prize ARRL Handbook Six-Volume Set.



3rd Prize Olight swivel light.



4th Prize PAARA cap



Palo Alto Amateur Radio Association, Inc.

PO Box 911 Menlo Park, CA 94026

Officers

President	Jim Thielemann, K6SV	408-839-6815
	thielem@pacbell.net	
Vice President	Rob Fenn, kc6tyd	650-888-9060
	kc6tyd@gmail.com	
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	energyconserved@sbcglobal.net	
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	bob@rgktechsales.com	

Directors

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	kd6w@arrl.net	
Director ('20-'21)	Walt Gyger, K6WGY	408-921-5901
	walt@tradewindsaviation.com	
Director ('21).....	Doug Teter, KG6LWE	650-743-7892
	dteter@wvci.com	
Director ('21).....	Darryl Presley, KI6LDM	650 255-2454
	ki6ldm@arrl.net	

Appointed Positions

Membership.....	Vic Black, AB6SO	650-366 0636
	ab6so@smrn.com	
Database	Ric Hulett, N6AJS	408-332-4593
	energyconserved@sbcglobal.net	
Chaplain	Rick Melrose K6RDM	408-341-9070
	K6RDM@yahoo.com	
Public Affairs	<i>Position Vacant</i>	
Station Trustee w6OTX, w6ARA....	Gerry Tucker, N6NV	
Station Trustee k6YQT..	Doug Teter, kg6lwe	650-743-7892
Station Trustee k6OTA...	Ron Chester, w6AZ	
Property Manager	Gerry Tucker, N6NV	
Badge Coordinator	Doug Teter, kg6lwe	650-743-7892
	dteter@wvci.com	
Historian Position	<i>Position Vacant</i>	
Raffle Coordinators	Rob Fenn, kc6TYD,	rtyd@aol.com
	Shrikumar, KA6Q	
	shri.paara@enablery.org	
Field Day Coordinator ...	Doug Teter, kg6lwe	650-743-7892
ASVARO Rep.....	Clark Martin, kk6isp	
	kk6isp@comcast.net	
Webmaster	John Miller K6MM	
	webaron@gmail.com	
Technical Coordinator ...	Joel Wilhite, KD6W	408-839-5948
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QSL Manager.....	Marty Wayne, w6NEV	408-234-8023
Speaker Coordinator	Rob Fenn, kc6tyd	650-888-9060

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	ab6so@smrn.com	
Photographer.....	<i>Position Vacant</i>	

VE Exams

Redwood City Main Library, Community Conference Room, 4th Saturday 10:30 am each month and De Anza Park, Sunnyvale, 2nd Saturday 10:30 am each month except November and December. See website for details and exceptions: <http://amateur-radio.org> or Contact Al, WB6IMX@att.net

Electronics Flea Market

Sponsorship by **A.S.V.A.R.O.** — Association of Silicon Valley Amateur Radio Organizations

Second Saturday of month, March-September, 6am-12 noon

Contact: <http://www.electronicfleamarket.com/>

PAARA — Palo Alto Amateur Radio Association

Meets 1st Friday 7:00pm each month at Room H-6, Cubberley Community Center; Net 145.230 - PL 100Hz Mondays at 8:30. See our website at <http://www.paara.org> for more information or contact: Joel Wilhite KD6W, KD6W@ARRL.NET, 650-325-8239

FARS — Foothills Amateur Radio Society

Meets 4th Friday each month at 7:30pm

Contact: <http://www.fars.k6ya.org>

NCDXC — Northern California DX Club

Meets 3rd Thursday 7:30pm each month,

Repeater for member info 147.360, Thursday 8:00PM

Contact: <http://ncdxc.org> or Mike Gavin W6WZ, (650) 851 8699

50 MHz & Up Group

Meets 1st Thursday each month at 7pm in the Summit Room at the Sunnyvale Sports Basement, 1177 Kern Ave, Sunnyvale

Contact: <http://50MhzandUp.org>

San Mateo Radio Club W6UQ.ORG

Meets, 3rd Friday, January through November

Tuesdays, [Directed] Net, 7pm, N6ZX 145.370Hz -600KHz PL107.2Hz

Contact: <http://W6UQ.org/calendar>

SPECS

Southern Peninsula Emergency Communication System

Meets each Monday 8:00pm on Net 145.27, 440.80 MHz

Contact: <http://specsnet.org> or Tom Cascone, KF6LWZ, 650-688-0441

SCARES

South County Amateur Radio Emergency Service

Meets 3rd Thursday 7:30pm each month, Belmont EOC, Belmont City Hall, One Twin Pines Lane, Belmont CA 94002. Net is on 146.445 [PL 114.8] & 444.50 (PL-100) 7:30 Monday evenings. Contact: President Gary D. Aden, K6GDA 650-743-1265 (D), 650- 595-5590 (N)

Web: <http://k6mpn.org> E-mail: pres@k6mpn.org

SCCARA

Santa Clara County Amateur Radio Association

Operates W6UU & W6UU/R, repeater 146.985-pl

Nets: 2m, 7:30pm Mon; 70cm, 10M (28.385) 8PM Thur.

Meets 2nd Mon each month @ 7:30 PM.

ARRL/VEC license testing contact 408-507-4698

SVECS — Silicon Valley Emergency Communications

Operates AA6BT repeater (146.115 MHz+)

contact: <http://www.svecs.net> or Lou Stierer WA6QYS 408 241 7999

TEARS — The Elmer Amateur Radio Society

Dedicated to operational training, knowledge building & FCC exam testing.

KV6R repeater under construction.

Contact: AA6T@ARRL.NET

Most members are Extra Class or VE's. See QRZ dot com/kv6r for class info

WVARA — West Valley Amateur Radio Association

W6PIY six-meter repeater on 52.58MHz. Normally, six-meters is linked with 147 and 223, while 441 and 1286 repeaters are linked.

VHF: 52.58 (-500) 151.4 ctcss UHF:

147.39 (+600) 151.4 ctcss 441.35 (+5.0) 88.5 ctcss

223.96 (+1.6) 156.7 ctcss 1286.20 (-12m) 100.0 ctcss

Meetings are 2nd Wednesday of every month except July, August and December.

Contact: <http://wvara.org>, Bill Ashby N6FFC, 408-267-3118, president@wvara.org

American Red Cross, Santa Clara Valley Chapter

Contact: <http://santaclaravalley.redcross.org> or Scott Hensley KB6UOO, (408) 967 7924 shensley@Novell.com

(Please send changes to PAARAgaphs editor)

This Ad space is available

PAARA Weekly Radio Net

Info and Swap Session
 every Monday evening at 8:30pm
 on the N6NFI 145.230 MHz repeater

Week Control Operator

1 st	Doug - KG6LWE
2 nd	Doug - KG6LWE
3 rd	Ric - N6AJS
4 th	Rob - KC6TYD
5 th	Rob - KC6TYD

If you're interested in trying out at Net Control, Contact Doug, KG6LWE. It's good practice, and lots o' fun! Give it a try.

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Email: KARLDRESDEN@juno.com

Palo Alto Amateur Radio Association P.O. Box 911, Menlo Park California 94026-0911

Club meetings are on the first Friday of each month, 7:00pm at the Room H-6, Cubberley Community Center.

Radio NET & Swap Session every Monday evening, at 8:30pm, on the 145.230 –600 MHz repeater, PL 100Hz.

Membership in PAARA is \$25.00 per calendar year, which includes one subscription to PAARAgaphs \$6 for each additional family member (no newsletter).

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PAARA Badges

In the absence of in person meetings, you can still order a badge from the Club's website, PAARA.org. Go to the bottom of the membership page to order. Badges will be mailed to purchasers, at an additional cost of \$4.95 until we can meet face to face again.

PAARAgaphs Ad Rates

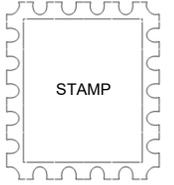
PAARAgaphs accepts paid advertisements from non-members. (short personal ads remain free for members in good standing). All ad rates listed are per issue.

- Not-for-profit ads by association members for ham-related items and wants. No cost for business card-size ads (additional space at \$2.50 per business card size per issue).
- For Profit organizations and/or individuals: \$5-business card size, \$14.00-quarter page, \$25-half page, \$50 full page or back cover per issue.

These fees may be reduced or waived in exchange for a valuable consideration that is given to the Association or its general membership. Such consideration must be in addition to any existing arrangements with the association. The PAARAgaphs editors reserve the right to reject any ad deemed to be not in the best interest of the Association.
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PAARAgaphs — October 2022

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FTDX101MP | 200W HF/50MHz Transceiver
 • Hybrid SSB Configuration • Unparalleled 70 dB Max. Attenuation VC-Tune • New Generation Scope Display 30SSS • ABL (Active Band Indicator) & MPVD (Multi-Purpose VFO Outer Dial) • PC Remote Control Software to Expand the Operating Range • Includes External Power With Matching Front Speaker



FTDX10 | HF/50MHz 100 W SDR Transceiver
 • Narrow Band and Direct Sampling SDR • Down Conversion, 9MHz, IF Filtering Filters Produce Excellent Shape Factor • 5-Full-Color Touch Panel w/30 Spectrum Stream • High Speed Auto Antenna Tuner • Microphone Amplifier w/2-Stage Parametric Equalizer • Remote Operation w/optional LAN Unit (SDI-LAN10)



FT-9911A | HF/VHF/UHF All Mode Transceiver
 • Real-time Spectrum Scope with Automatic Scope Control • Multi-color waterfall display • State of the art 32-Bit Digital Signal Processing System • 3kHz Tracking Filter for enhanced performance • 3.5 inch Full Color TFT USB Capable • Internal Automatic Antenna Tuner • High Accuracy TCXO



FTDX101D | HF + 6M Transceiver
 • Narrow Band SDR & Direct Sampling SDR • Crystal Routing Filters Phenomenal Multi-Signal Receiving Characteristics • Unparalleled -70dB Maximum Attenuation VC-Tune • 15 Separate (HAM 10 + GEN 5) Powerful Band Pass Filters • New Generation Scope Displays 3-Dimensional Spectrum Stream



FT-891 | HF-50 MHz All Mode Mobile Transceiver
 Rugged construction in an ultra compact body • Stable 100 Watt Output with Efficient Dual Internal Fans • 32-Bit IF DSP Provides Effective and Optimized QRM Rejection • Large Dot Matrix LCD Display with Quick Spectrum Scope • USB Port Allows Connection to a PC with a Single Cable • CAT Control, PTT/RTTY Control



FTM-300DR | C4FM/FM 144.430MHz Dual Band
 • 50W Ballistic Output Power • Real Dual Band Operation (V-X, U-H, V-L, U-H) • 2-inch High-Res Full Color TFT Display • Band Scope • Built-in Bluetooth • WIRELESS X-Portable Digital Noise Filter Mode with RH-200



FT-2980R | Heavy-Duty 80W 2M FM Transceiver
 • Massive heatsink guarantees 80 watts of solid RF power • Loud 3 watts of audio output for noisy environments • Large 6 digit backlit LCD display for excellent visibility • 200 memory channels for serious users



FT-818ND | HF/6M/2M/440 All Mode Portable Xcvr
 • Ultra-Compact/Portable • Multi-Color Easy to See LCD • 208 Memory Channels/10 Memory Groups • Built-in Electronic Keyer • Internal Battery Operation Capability • Two Antenna Connectors • Built-in High Stability Oscillator $\pm 0.5\text{ ppm}$



FTM-4000XD | 2M/440 Mobile
 • Color display-green, blue, orange, purple, gray • GPS/APRS • Packet 1200/9600 bit/sec • Spectrum scope • Bluetooth • MicroSD slot • 500 memory per band



FT-70DR | C4FM/FM 144.430MHz Xcvr
 • System Fusion Compatible • Large Front Speaker delivers 700 mW of loud audio output • Automatic Mode Select detects C4FM or Fm Audio and Switches accordingly • Huge 1.05 Channel Memory Capacity • External DC Jack for DC Supply and Battery Charging



FT-5DR | C4FM/FM 144.430 MHz Dual Band
 • High-Res Full-Color Touch Screen TFT LCD Display • Easy-Francis-Free Operation w/Built-in Bluetooth Unit • Built-in High Precision GPS Antenna • 1200/9600bps APRS Data Communications • Supports Simultaneous C4FM Digital • Micro SD Card Slot



FT-65R | 144.430 MHz Transceiver
 • Compact Commercial Grade Rugged Design • Large Front Speaker Delivers 1W of Powerful Clear Audio • 5 Watts of Reliable RF Power With-in a compact Body • 3.5-Hour Rapid Charge-included • Large White LED Flashlight, Alarm and Quick Home Channel Access



FTM-6000R | 50W VHF/UHF Mobile Transceiver
 • All New User Operating Interface E20-III (Easy to Operate-III) • Robust Speaker Delivers 3W of Clear, Crisp Receive Audio • Detachable Front Panel • Mounted in Multiple Positions • Supports Optional Bluetooth® Wireless Operation Using the SSM-BT10 or a Commercially Available Bluetooth® Headset



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