



THE OHM TOWN NEWS

Voice of the Bridgerland Amateur Radio Club

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

April 2012

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ARRL Affiliated



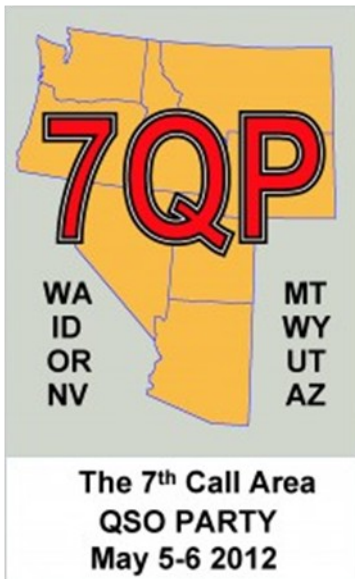
PRESIDENT'S MESSAGE

Ever found yourself without an antenna and wished you could just spray one? Soon, you may be able to do just that. [Chamtech Enterprises](#), of Sandy, Utah, has developed a spray on antenna material that it says is more lightweight and energy efficient than current technology. I don't know about spray-on antenna material, but it sounds intriguing.

Revealed at Google's inaugural "Solve for X" symposium, the company says that an antenna can be painted onto almost any surface including trees, walls and even on fabrics. Chamtech says that it is already talking with government based customers, and as such can't give too much detail on how it works. However it has released information that its material uses organic elements that have the ability to interact with magnetic and radio-frequency fields.

Well for now, I will just stay with something I know, good old copper wire. I can measure it, cut it, and if I goof, I can solder a piece back on if I need to when checking the SWR.

How about checking the out the club's new ICOM IC-7000 radio and work a contest? The club will be participating in the 7th Call Area QSO Party (7QP) contest on May 5th from 7 AM to after midnight. This is a state QSO party involving the 7th call area states. We will be at the club ham shack in the Engineering Lab Building room EL224 on the USU campus.

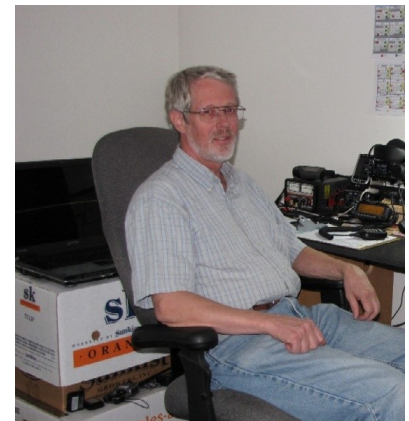


The 7QP contest is where 7th call area stations work everyone, others work 7th area stations only. Stations that are in the 7th call area give a signal report and a 5-letter state/county code. There are 259 counties in the 7th call area and each county may be active with a fixed, portable and/or a mobile station. Non 7th area stations give a signal report with their state/province/DX two-letter code. Last year, our club took third place in the multi-operator/single-radio/low-power category. More information on 7QP is at [7QP.org](#). Also Indiana QSO Party and New England QSO Party are happening the same weekend, and those stations will be giving their appropriate exchange.

This is a good time to learn about working a contest. There will be Elmer's there to help those who are new to contesting in providing exchange information specific to the contest, to learn how to use contest logging software, or you can just watch and listen to the contest. Drop by and we will get you involved with whatever you would like to do. Those who would like to meet for breakfast; we will be at Angie's at 5:45 AM.

We have had over 7 months of continuous sunspot activity. For this year's 7QP contest, the upper band should be more active than last year. It will be interesting to see what bands are open and what parts of the country can be reached during the contest.

Here is a site that lists amateur radio contests, [WA7BNM Contest Calendar](#). WA7BNM provides detailed information for an 8 day window, future contests, reoccurring contests, State QSO parties, and other formation on contests.



73,
Cordell
KE7IK

UPCOMING ACTIVITIES

BARC Club Meeting - 14 April 10:00 AM
Training on transmitter hunting

[ARRL Rookie Roundup \(SSB\)](#) - 15 April, 1800-2359 UTC

RACES VHF Net - 19 April 8:00 PM

[ARRL Idaho State Convention](#), Boise, Idaho - 20-22 April

[Albuquerque Spring Tailgate Swapfest \(Albuquerque, NM\)](#) - 28 April

[EMCOMMWEST](#), Reno, Nevada - 4-6 May

[7th Call Area QSO Party \(7QP\)](#) - 5 May 7:00 AM - Midnight

[ARRL Rocky Mountain Division Net](#) - 9 May 7:30 PM IRLP Node: 9871

BARC Club Meeting - 12 May 10:00 AM

[Dayton Hamvention](#), Dayton, Ohio - 18-20 May

RACES HF Net - 19 May, 8:00 AM 3920 KHz

Mountain Man Rendezvous - 21, 22 May

Little Red Riding Hood - 2 June

[Mobile Amateur Radio Club Tailgate Party \(Delta, CO\)](#) - 2 June

Tour De Cure (Box Elder Co.) - 9 June

Wasatch Back Relay - 15 June

RACES VHF Net - 21 June 8:00 PM

Radio Rocket Recovery - 21-23 June

Items for Sale or Trade, Items Wanted, Items Available

This section is to be a regular part of The Ohm Town News newsletter. If you have something you would like to advertise as available or are looking for please contact the newsletter editor at newsletter@barconline.org with the details.

I have not been given information on any items to advertise this time, if you have anything that you would be interested in advertising here please let me know.

BARC MEETING MARCH 10, 2012

This month's BARC meeting announcements included:

Drawing for Grand Prize at this year's Christmas party will be from a pool of tickets earned by club members through their activity in club events and service projects.

ARES meeting on Thursday, March 22, will be a presentation about the upcoming "The Great Utah Shakeout" exercise to be conducted April 17-19, 2012.

A BRRR orientation meeting will be held immediately following the BARC meeting.

PRESENTATION

SOLAR POWER

By Kyle Hartman and Mike Wight of Gardner Engineering.

The recent history of photo-voltaic generation technology was first reviewed, citing the founding of [Gardner Engineering](#) in 1991. Present day capabilities and options, with associated costs, were then described. Although their primary focus was on installations in private homes, they showed several major commercial and utility examples covering the full range from small portable units to huge multi-megawatt systems, plus hybrid systems combining solar with wind generation.

Most home installations in areas with municipal power service will be connected to, and synchronize with, the power grid. Bi-directional metering allows the owner to recoup the cost of installation through "banked" credit for electrical power provided to the grid when solar generation exceeds local consumption. Typical home systems would generate an average of 3 KW and occupy about 215 square feet area of the roof. Optimal angle of the panels in our area is 30 degrees from vertical, facing from 160 – 240 compass degrees. Various panel technologies and mounting options were presented, along with financial projections. Various battery and power conversion systems were described, with their cost and projected lifespan. The state and federal financial incentive programs were reviewed, showing their significant relief of the financial burden of installation.

Following the BARC meeting, the upcoming Rocket Recovery and Field Day activity, scheduled for June 20-24, was presented by Guy Hatch, N7WAT, for those interested.

The ARRL Letter for March 8, 2012

On the Air: New 60 Meter Privileges Now in Effect

As of March 5, US amateurs have new privileges on the 60 meter band. In addition to an increase in effective radiated power from 50 to 100 W, hams can now transmit CW and PSK31 on the following channel-center frequencies:

- Channel 1: 5332.0 kHz
- Channel 2: 5348.0 kHz
- Channel 3: 5358.5 kHz
- Channel 4: 5373.0 kHz
- Channel 5: 5405.0 kHz

Amateurs can also transmit USB voice and PACTOR III on the following suppressed carrier frequencies (the frequencies typically shown on transceiver displays):

- Channel 1: 5330.5 kHz
- Channel 2: 5346.5 kHz
- Channel 3: 5357.0 kHz
- Channel 4: 5371.5 kHz
- Channel 5: 5403.5 kHz

For more information, please see [60 Meter Operations -- New Privileges and Recommended Practices](#), published by the ARRL HF Band Planning Committee. A [revised ARRL band chart](#) is also available. Watch for the article "New Privileges on 60 Meters" by ARRL Regulatory Information Manager Dan Henderson, N1ND, in the April 2012 issue of QST.



ARRL Rocky Mountain Division update -- March 2012

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ARRL Rocky Mountain Division update -- March 2012
Division website: www.RockyMountainDivision.org
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==== Seeking the Thrill of Ham Radio: With Patio Furniture =====

We continue with a new feature of our monthly Division-wide communication: to spotlight hams who are participating in or promoting the seemingly endless fun and magic of ham radio. Does this describe you or your group? If so, please touch base (n5zqt@arrl.org) and we'll pick someone or some group in a future Division-wide email for all to enjoy.

This month we look at an interesting bit of fun Mark Brueggemann K5LXP of Albuquerque, New Mexico had, in his own words:

Encouraged by excellent operating conditions on 10-meters during the CQWW contest in November 2011 where I operated using a less than unity gain antenna (an ATAS on the car driving back from Texas), I thought I would try something a little different for the ARRL 10-meter contest the following month -- compromise antennas.

I frequent a number of ham radio forums on the internet and a recurring theme is the ability, or rather inability to put up antennas whether it be an HOA restriction or an unsympathetic landlord or XYL. I'm lucky enough to have a nice tower with a tribander on top but working the contest with that wouldn't be much of a challenge with band conditions as good as they are. So I figured I'd make a point out of not only using a less than optimally-installed antenna, but specifically non-antennas. What objects do many people already have, and could be pressed into service as an antenna?

Looking around in my back yard there were three objects that seemed worthy. The barbecue grill, patio furniture, and the grandkids' swing set. I could've characterized each of these and come up with an optimum feed and matching setup but instead I chose what most hams would typically do: hook a piece of coax to it, and tune it in the shack with an antenna tuner.

First up was the steel patio furniture. I made a groundplane vertical of sorts by putting a chair on top of the table with wood between the feet and tabletop as an insulator. I prepared a 75 foot piece of RG-8x with some alligator clips on one end, then connected the center conductor to the chair and the shield to the table. Back in the shack the tuner was able to find a match, and I was on the air.

Now, before you think this is the answer to anyone's antenna troubles, I'm here to tell you this is not an ideal compromise antenna. Comparing the patio chair to my tri-bander showed a good 30-dB of difference. Compared to a dipole, this antenna turns 100 watts into 2 watts ERP. But, with a hot band, QRP can and does work. In the span of an hour, I made 36 contacts, mostly SSB, working 11 states and 5 DX (Brazil, Japan, Ukraine, Guam and Russia).

On Sunday, I clipped the coax to the swing set. Interestingly, this didn't seem to work as well as the patio furniture. Over 3 hours I managed to work 10 states (including Hawaii three times) and two DX (CO2 and KP2).

Discouraged by the performance of the swing set I switched to the barbeque grill. This was even worse than the swing set but due to shifting propagation late in the day I managed to snag a few JA's, Cayman Islands, Alaska and Hawaii both.

I don't recommend any of these as a permanent antenna. But I saw it as a challenge and wanted to prove a point that no matter what your limitations are, worldwide contacts with terrible antennas is not easy, but very possible. For about four total hours of operating I managed 63 contacts -- 19 states, 9 DX. Even a basic dipole or groundplane vertical would've been a terrific performer compared to what I was using, so no matter how limited one thinks they are, I'm here to tell you working the world is possible with just about anything for an antenna when the bands are hot.

Thanks for sharing this, Mark.

===== 2012 Rocky Mountain Division Convention: Save the Date! =====

The 2012 Rocky Mountain Division Convention, hosted by ARRL's Utah Section, will take place at Ruby's Inn, gateway to Bryce Canyon National Park on July 27-29. Please mark your calendars and begin thinking of a fun trip to a wonderful weekend of fun. The organizing committee is hard at working planning a super event that every ham across our Division (and beyond) is welcomed to attend.

The event, themed "Continuing the Pioneer Spirit of Amateur Radio", will be action-packed, including: Technical and non-technical seminars, midnight Wouff-Hong ceremony, a swap meet, vendors/dealers, an ARRL Forum, fun & games, mobile installation contest, homebrew boutique, VE exams, special guest speakers, lots of prizes, women's crafts, children activities, Friday BBQ dinner, Saturday pulled pork dinner, Sunday breakfast buffet, and more! Special discounted room rates are available at Ruby's Inn, and a block of RV sites are available at Ruby's Inn Campground and RV Park.

More details, including registration information, is posted at www.UtahHamfest.org Register soon, talk it up within your clubs, and we hope to see you at the 2012 ARRL Rocky Mountain Division Convention.

===== Upcoming Hamfests, Tailgates & Conventions =====

April 7	Longmont ARC LARCFest (Longmont, CO)
April 29	Mesilla Valley Radio Club Bean Feed and Tailgate (Las Cruces, NM)
July 14	Pike Peak Radio Amateurs Association Megafest (Monument, CO)
July 27-29	2012 ARRL Rocky Mountain Division Convention (Bryce Canyon City, UT)
Aug 19	Denver Radio Club Hamfest (Golden, CO)

Links to websites belonging to the above events are found on the Rocky Mountain Division site:
www.RockyMountainDivision.org

===== Upcoming On-Air Activities =====

In addition to chewing the rag with fellow hams, here are some additional on-air activities which await you on the airwaves.

Upcoming special event stations:

<http://www.arrl.org/special-event-stations>

Upcoming contests: <http://www.arrl.org/contest-calendar>

Operating awards: <http://www.arrl.org/awards>

===== Final Note... =====

Please touch base with your Section Manager if he can be of assistance to you:

Jack Ciaccia WM0G (Colorado): <http://www.arrl.org/Groups/view/colorado>

Bill Kauffman W5YEJ (New Mexico):

<http://www.arrl.org/Groups/view/new-mexico>

Mel Parkes NM7P (Utah): <http://www.arrl.org/Groups/view/utah>

Garth Crowe N7XKT (Wyoming): <http://www.arrl.org/Groups/view/wyoming>

Vice Director Dwayne Allen and I continue to welcome your concerns, questions or ideas regarding ARRL policies. See you on the airwaves!

73,

Brian Milesosky N5ZGT, Rocky Mountain Division Director Dwayne Allen WY7FD, Rocky Mountain Division Vice-Director Division website: www.RockyMountainDivision.org

ARRL Rocky Mountain Division
Director: Brian P Milesosky, N5ZGT
n5zqt@arrl.org

The ARRL Letter for March 15, 2012

ARRL Warns Members to Be Aware of Bogus E-mails

Some ARRL members with **arrl.net** e-mail accounts have recently received bogus e-mails, notifying them of a bill that supposedly needs to be paid. The e-mail instructs the reader to click on a link to view the bill; clicking on the link could release a virus that can infect your computer. Please be aware that these e-mails are not coming from the ARRL. "If you receive an e-mail like this and it looks like it originated from ARRL, please do not respond," explained ARRL IT Manager Michael Keane, K1MK. "The best thing you can do when receiving bogus e-mails is to simply add them to the spam list in your computer's e-mail program and delete it. Please don't forward it to ARRL HQ -- we will have already seen it and are already responding to it."

On the Air: Understanding the New 60 Meter Privileges

On March 5, radio amateurs were granted new privileges on the 60 meter band. The effective radiated power level was increased from 50 to 100 W, along with the ability to use CW and the digital modes PACTOR III and PSK31.

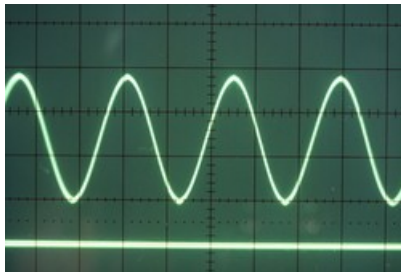
"CW operators seem to have little problem figuring out where they need to transmit, but some PSK31 operators are reading the text of the FCC's *Report & Order* and coming away a bit confused," said ARRL Regulatory Information Manager Dan Henderson, N1ND. "The *R&O* states: 'We adopt a modified instruction for PSK31 channel use to correct an error introduced in the *NPRM*. To have a PSK31 signal transmitted on the center frequency, the control operator should not set the carrier frequency to the center frequency but should instead set the carrier frequency 1.5 kHz below the center frequency (i.e., the same as for phone and data emissions).'

"The word '*carrier*' in this context means the suppressed carrier frequency of a transceiver when operated in the USB mode, but some have taken it to mean the PSK31 signal itself," Henderson noted. "They read this text and come to the conclusion that the PSK31 signal should be 1.5 kHz below the channel center. They are mistaken. The PSK31 signal *must be in the center of the channel*." Read more [here](#).



ARRL News Editor Khrystyne Keane, K1SFA (right), shows ARRL Member Services Representative Kim McNeill, KB1WUX, how to operate using the new privileges on 60 meters. McNeill received her Technician license earlier this month and is already studying for her General. [Joe Carcia, NJ1Q, Photo]

On the Air: Mark Your Calendars: It's Time for the Spring FMT



The Frequency Measuring Test (FMT) continues its successful "round-table" format when it takes to the airwaves on the evening of April 19 (April 20 UTC). The test moves to Thursday from the November FMT's usual Wednesday evening, giving everyone an opportunity to participate. Recognizing the higher solar flux, the FMT will lead off with a 20 meter segment -- one transmission beaming east, and the other west from Connie Marshall, K5CM, in Oklahoma -- with both transmissions on the same frequency. The sponsors are particularly interested in your comments on frequency differences observed between the directions due to propagation-related effects. Read more [here](#).

The ARRL ARES E-Letter for March 21, 2012

Training: ICS Communications Unit

Every incident requires that certain management functions be performed. The problem must be identified and assessed, a plan to deal with it developed and implemented, and the necessary resources procured and paid for. Regardless of the size of the incident, these management functions still will apply.

There are five major management functions that are the foundation upon which the ICS organization develops. These functions are:

- 1) **Incident Command** -- Sets the incident objectives, strategies, and priorities and has overall responsibility for the incident.
- 2) **Operations** -- Conducts operations to reach the incident objectives, and establishes the tactics and directs all operational resources.
- 3) **Planning** -- Supports the incident action planning process by tracking resources, collecting/analyzing information, and maintaining documentation.
- 4) **Logistics** -- Provides resources and needed services to support the achievement of the incident objectives.
- 5) **Finance & Administration** -- Monitors costs related to the incident. Provides accounting, procurement, time recording.

The **Communications Unit** comes under the **Logistics** function, and develops the *Communications Plan* (ICS 205), to make the most effective use of the communications equipment and facilities assigned to the incident. Additionally, this Unit installs and tests all communications equipment, supervises and operates the incident communications center, distributes and recovers communications equipment assigned to incident personnel, and maintains and repairs communications equipment on site.

The Communications Unit is responsible for effective incident communications planning, especially in the context of a multiagency incident. All communications between organizational elements during an incident should be in plain language (clear text) to ensure that information dissemination is clear and understood by all intended recipients. Planning is critical for determining required radio nets, establishing interagency frequency assignments, and ensuring the interoperability and the optimal use of all assigned communications capabilities.

The **Communications Unit Leader** should attend all incident Planning Meetings to ensure that the communication systems available for the incident can support tactical operations planned for the next operational period.

Incident communications are managed through the use of an incident **Communications Plan** and a communications center established solely for the use of tactical and support resources assigned to the incident. Advance planning is required to ensure that an appropriate communications system is available to support incident operations requirements. This planning includes the development of frequency inventories, frequency-use agreements, and interagency radio caches.

Nets

Radio networks for large incidents may be organized as follows:

1. **Command Net** -- The command net links together Incident Command, Command Staff, Section Chiefs, Branch Directors, and Division and Group Supervisors.
2. **Tactical Nets** -- Several tactical nets may be established to connect departments, agencies, geographical areas, or specific functional units. The determination of how nets are set up should be a joint function designed by Planning, Operations, and Logistics.
3. **Support Net** -- A support net may be established primarily to handle changes in resource status but also to handle logistical requests and other nontactical functions.
4. **Air-to-Ground Net** -- To coordinate air-to-ground traffic, either a specific tactical frequency may be designated, or regular tactical nets may be used.
5. **Air-to-Air Nets** -- Air-to-air nets may be designated and assigned for use at the incident. An air-to-air net is designed to be used by airborne assets; ground units should not utilize this net. - FEMA ICS

The ARRL Letter for March 22, 2012

New ARRL Membership Benefits Coming in June

The ARRL is excited to announce two new membership benefits that will be introduced in June 2012. In addition to the print copy of *QST*, all members will have access to an online digital edition of *QST* -- at no extra cost. You will be able to access *QST* from anywhere -- on nearly any computer, laptop, mobile device, smartphone and tablet (including Apple iPad, iPhone, iTouch and devices using the Android operating system). Members will also gain access to archived issues of *QST* from December 1915 to the present; previously, only issues through 2007 were available to members. If you are familiar with the current periodicals archive, that platform will be expanded to include all of *QST* from December 1915 through December 2011. A second, new archive will be introduced for issues beginning January 2012, featuring enhanced functionality including full-text search. Read more [here](#).



Beginning in June, ARRL members will have access to a digital edition of *QST* that can be read on smartphones, tablets and computers.

The ARRL Letter for March 29, 2012

Luxembourg Issues Stamp to Celebrate 75 Years of Amateur Radio

Founded in 1937, the Réseau Luxembourgeois des Amateurs d'On-des Courtes ([RL](#)) -- that country's IARU Member-Society -- is celebrating its 75th anniversary. In honor of this milestone, Luxembourg's Entreprise des Postes et Télécommunications (P&TLuxembourg) has [issued a .60 € postage stamp](#) (about 80 cents in US currency); P&TLuxembourg is that country's government owned corporation for mail and telecommunications. This is one of three commemorative stamps issued by Luxembourg in 2012 .



In honor of the 75th anniversary of the Réseau Luxembourgeois des Amateurs d'On-des Courtes, Luxembourg has issued a .60 €

The ARRL Letter for April 5, 2012

Google Declares "Morse Code Is Perfect" with New Gmail Tap Mail Program



Gmail Tap

On April 1 (yes, April Fools' Day), Google announced that it has unveiled a new way to use its popular *Gmail* e-mail system. Called *Gmail Tap*, it uses dots and dashes to form letters, a system of communicating that should be very familiar to radio amateurs. "Morse code is perfect," said *Gmail Tap* Engineer Mitch Fedenko. "It's just a dot and a dash. What's simpler than that?" Read more [here](#).

On the Air: FCC Seeks Public Comments on Emergency Communications by Amateur Radio and Impediments to Amateur Radio Communications

In response to the Congressional directive to prepare a study to assess Amateur Radio's role in emergency and disaster communications and the impact of private land use regulations on the Amateur community's ability to provide such communications, the FCC issued DA 12-523 soliciting comments from the public. The period for public comment runs until May 17, 2012.

"As part of the study contained in Public Law No. 112-96, the Commission has opened a 45 day period for comments to be filed on the issue," said ARRL Regulatory Information Manager Dan Henderson, N1ND. "Because of the short deadline for the study to be completed and presented to Congress -- before the end of August -- the ARRL and the amateur community must quickly mobilize their response." Read more [here](#).



On the Air: ARRL Seeks Comments on Proposed 33 cm Band Plan



A few months ago, the ARRL UHF/Microwave Band Plan Committee asked the Amateur Radio community about current, planned and projected uses of the amateur bands between 902 MHz-3.5 GHz. The response was beyond our expectations, with hundreds of comments and suggestions received. After reading the feedback, the Committee began working on the band plans, and the draft plan for 33 cm (902-928 MHz) is now ready for review. Read more [here](#).

On the Air: ARRL Rookie Roundup's Third Year Includes New Categories



With the Rookie Roundup beginning its third year of competition, 2012 brings some new changes in the event -- including new entry categories. The first Rookie Roundup of 2012 will use SSB (phone) and will be held on Sunday, April 15 from 1800-2359 UTC. All amateurs are welcome to participate, especially those in DX locations.

The focus of the RR remains those who are newly licensed -- hams who received their very first license during the current year or the two previous calendar years (2012, 2011 or 2010). Those licensed before 2010 are encouraged to get on and work the Rookies. Or consider acting as an Elmer and

coaching Rookies in their contest efforts without actually making QSOs -- or performing logging or any other station functions. Read more [here](#).

Questions for Extra Class License

1. (E1B05) What height restrictions apply to an amateur station antenna structure not close to a public use airport unless the FAA is notified and it is registered with the FCC?
 - A. It must not extend more than 300 feet above average height of terrain surrounding the site
 - B. It must be no higher than 200 feet above ground level at its site
 - C. There are no height restrictions because the structure obviously would not be a hazard to aircraft in flight
 - D. It must not extend more than 100 feet above sea level or the rim of the nearest valley or canyon
2. (E2C08) Why are received spread-spectrum signals resistant to interference?
 - A. Signals not using the spectrum-spreading algorithm are suppressed in the receiver
 - B. The high power used by a spread-spectrum transmitter keeps its signal from being easily overpowered
 - C. The receiver is always equipped with a digital blanker circuit
 - D. If interference is detected by the receiver it will signal the transmitter to change frequencies
3. (E3B10) What is the cause of gray-line propagation?
 - A. At midday, the sun, being directly overhead, superheats the ionosphere causing increased refraction of radio waves
 - B. At twilight, solar absorption drops greatly, while atmospheric ionization is not weakened enough to reduce the MUF
 - C. At darkness, solar absorption drops greatly, while atmospheric ionization remains steady
 - D. At mid afternoon, the sun heats the ionosphere, increasing radio wave refraction and the MUF
4. (E4C11) Which of the following is a desirable amount of selectivity for an amateur single-sideband phone receiver?
 - A. 1 kHz
 - B. 2.4 kHz
 - C. 4.2 kHz
 - D. 4.8 kHz
5. (E5C06) In polar coordinates, what is the impedance of a network consisting of a 100-ohm-reactance capacitor in series with a 100-ohm resistor?
 - A. 121 ohms at an angle of -25 degrees
 - B. 191 ohms at an angle of -85 degrees
 - C. 161 ohms at an angle of -65 degrees
 - D. 141 ohms at an angle of -45 degrees
6. (E6C05) Which of the following is an advantage of CMOS logic devices over TTL devices?
 - A. Differential output capability
 - B. Lower distortion
 - C. Immune to damage from static discharge
 - D. Lower power consumption
7. (E7E01) Which of the following can be used to generate FM-phone emissions?
 - A. A balanced modulator on the audio amplifier
 - B. A reactance modulator on the oscillator
 - C. A reactance modulator on the final amplifier
 - D. A balanced modulator on the oscillator
8. (E8C10) Which of these techniques causes a digital signal to appear as wide-band noise to a conventional receiver?
 - A. Spread-spectrum
 - B. Independent sideband
 - C. Regenerative detection
 - D. Exponential addition
9. (E9E03) What is the name of the matching system that uses a short perpendicular section of transmission line connected to the feed line near the antenna?
 - A. The gamma match
 - B. The delta match
 - C. The omega match
 - D. The stub match

(For answers to test questions see page 13)

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Answers to questions on page 12: 1-B, 2-A, 3-B, 4-B, 5-D, 6-D, 7-B, 8-A, 9-D

