

President's Corner

As I write this note, I am pleased to announce that the Poway City Council has directed all Poway Home Owners Associations (HOAs) to implement the FCC and PRB-1 antenna regulations we all hold so dear. It wasn't just the enactment of the long awaited tower ordinance in Poway. The Council has "seen the light".



Over the past several months we've had the pleasure of very fine club programs. Last month's SDR-101 by KY6LA (Howard) covered a lot of ground regarding the development of radio architectures since the dawn of radio, and all who attended should have gained considerable knowledge about the guts of "knobless radios". Thank you Howard. On March 8th, PARC held a workparty up at the repeater site. Well attended. We frequently overlook the fact that repeater sites are the "infrastructure of ham radio", and seldom give it much thought. Those who went to the work party had a great tour of the many buildings and equipment that keep our venerable PARC repeaters on the air. If you have not done so, I think you should join one of our "infrastructure maintenance parties" and see the guts of our systems. And the drive up to Palomar Mountain will enthrall you with the fantastic visibility of San Diego County. I am pleased to look forward to the April program covering the capabilities of Yaesu's C4FM Fusion system. Soon five of our repeaters will be upgraded to that technology, will be able to repeat digital and analog signals, and will seamlessly translate one mode into the other in real time. I hope to see many of you at the April General Meeting. And before I forget, Happy April Fool's day (in case you took the opening sentence too seriously)

73 de NN3V



Save the Date

Club Meeting 1 April 2015

Mr. Chris Wilson from YEASU will present about System Fusion

Board Meeting 8 April 2015

Palomar Amateur Radio Club board meeting at 7:00pm at W6GNI QTH.

Club Events April 2015

Support Boy Scout Radio Merit Badge at Scout Fair! Write scope@palomararc.org for info

Advertisements are free for members

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Spectrum Analyzers, two HP141T working mainframes. HP8555s (10 MHz - 22 GHz) parts units, HP 8554s (good 1.2 GHz) and HP8553 (good 110 MHz) RF plugs ins. With HP8552A & B I.F. modules. Lots of spare parts. Make offers. WB6IQS@amsat.org. John, Vista.

The Ham Radio Lunch Bunch meets Fridays for lunch and socializing at any one of a number of restaurants on a rotating schedule.

The Lunch Bunch signup is <http://w0ni.com>

Reminders are sent out on Wednesdays.

All are welcome for food and fun!

Some of the restaurants on the schedule are Fuddruckers, UTC Food Court, Spices Thai, Savory Buffet, Denny's, Callahan's Pub and Grill, and Phil's BBQ.



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Nonoperational => Operational

The 6m repeater has been nonoperational for 3 years as of February 2015. John W6JBR, Bill N6PIG, and Michelle W5NYV have picked up the project and made a lot of progress since beginning work on 1 February 2015. The team is approaching the repairs as an open source and open process project. The tracking document, which is a chronological record of the work done on the repeater, is located here:

<https://docs.google.com/document/d/1vrIMv0jMd83iTxgk8H1ZgbULF-comYmVPwpy3Uqz2-c/edit?usp=sharing>

A final report will be written and published once the repeater is re-installed at the repeater site on Palomar Mountain.

Is there a piece of hardware or software that you would like to work on to benefit the club? The Scope is interested in your proposals! Send them in to scope@palomararc.org

Field Day T-Shirt Alert

The ARRL web site (arrl.org/shop) will offer limited edition 2015 Field Day antenna t-shirts with conductive ink resonant on a range of bands, from size small (6 meter band) to XXXL (80 meters). While supplies last. ARRL will begin on-line sales of these unique walk-around antennas on 4/1/15.

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System Fusion - Photography



SIDE BY SIDE COMPARISON
HIGH TO LOW QUALITY



FT1D USB CAMERA SETTINGS FOR THIS PHOTO WERE SIZE: 160 BY 120, AND QUALITY SET TO LOW (2kB)

FT1D USB CAMERA SETTINGS FOR THIS PHOTO WERE SIZE: 320 BY 240, AND QUALITY: HIGH (20kB)

Above are two photos taken with the FT1D handheld microphone on 4 March. One is at lowest file size, lowest quality, and the other is at highest file size, highest quality. Quality seems to be level of JPG compression, as both photos had a resolution of 72 pixels per inch. They were received on a FTM400, and forwarded back to the FT1D. I'm holding up the microphone and trying to point it towards me. There's no screen on the FT1D, so you have to just point and shoot and hope all those years of taking camera phone photos helps guide your aim :) Setup was extremely easy and everything worked out of the box. -Michelle W5NYV



AIMING THE MICROPHONE CAMERA COULD POSSIBLY TAKE SOME PRACTICE. HERE IS A SHOT THAT DOESN'T APPEAR TO INCLUDE EXACTLY WHAT WAS INTENDED!



FULL SUN OUTDOOR SHOTS APPEAR A LOT MORE SHARP THAN THE LOWER LIGHTING INDOOR SHOTS.

EARS General Meeting

When Thu, April 9, 7pm – 9pm
Where 900 Canterbury Pl, Suite 300 (third floor)
Escondido, CA 92025 ([map](#))
Description EARS Monthly General Meeting.

[more details»](#) [copy to my calendar»](#)

ALERT! ALL HANDS ON DECK! EARS AUCTION IS COMING UP IN APRIL. NOTICE THE NEW LOCATION IN THE INFO ABOVE.

March Membership Meeting - FT1D Photos

HERE IS THE SORT OF INDOOR PHOTOGRAPHY YOU CAN EXPECT TO ACHIEVE WITH THE MH-85A11U YAESU CAMERA MICROPHONE FOR FT1DR/FTM-400DR. THESE PHOTOS WERE TAKEN AT SIZE: 320 BY 240, AND QUALITY: HIGH THE MICROPHONE CAMERA RETAILS (AT PRESS TIME) FOR \$134.95. THERE IS AN EXTENSION CABLE AVAILABLE FOR \$50.



What is C4FM?

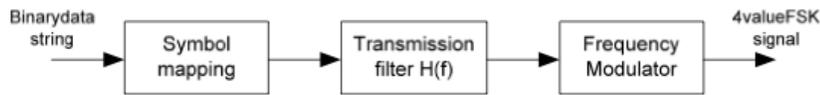


Figure 3-1 C4FM modulation procedure



Figure 3-2 C4FM demodulation procedure

(2) Encoding

The binary data series of the serial input is entered into the modulation system after being converted into dibits starting from the leading bit of the signal format and then mapped onto the various symbols of the C4FM. The corresponding relationship between the dibit, symbol and frequency deviation is shown in **Table 3-1**.

Table 3-1 C4FM Mapping

Dibit	Symbol	Frequency Deviations
00	+1	+900 Hz
01	+3	+2700 Hz
10	-1	-900 Hz
11	-3	-2700 Hz

C4FM is the modulation scheme used in System Fusion. It stands for Constant Envelope 4-Level Frequency Modulation.

Above is a section of the System Fusion Digital Specification document from Yaesu. System Fusion uses C4FM.

Modulation, the process of making a carrier mean something, and demodulation, the process of extracting meaning from a signal, are expressed in block diagram form. A binary string of data, whether voice, text, or photo, is taken two bits at a time. These sets of bits are referred to as dibits in this document. Each dibit can be one of four values (00, 01, 10, and 11). Each of these values is called a symbol and is assigned a name (+1, +3, -1 and -3). Each symbol is associated with a specific frequency deviation.

In FSK, which stands for Frequency Shift Keying, the carrier changes frequency based on the symbol. In C4FM, there are four different frequency deviations. The deviation is added or subtracted from the center frequency.

In order to demodulate the signal, matched filters are used. There are four filters. Each filter is tuned to one of the four frequency deviations. When energy is detected by the filter, then for that time slot, a particular symbol is recorded as being received. The symbol corresponds to a particular dibit, and a binary stream is therefore reconstructed. The impulse response of the filter used in C4FM is expressed below. -W5NYV

$$|H(f)| = \int_0^1 \cos\left[\left(\frac{T}{4\alpha}\right)(2\pi|f| - \pi(1-\alpha)/T)\right]$$

$$0 \leq |f| < (1-\alpha)/2T$$

$$(1-\alpha)/2T \leq |f| < (1+\alpha)/2T$$

$$(1+\alpha)/2T \leq |f|$$

ARRL Announcement

From the ARRL:

"The Amateur Radio Parity Act of 2015 -- H.R.1301 -- has been introduced in the US House of Representatives. The measure would direct the FCC to extend its rules relating to reasonable accommodation of Amateur Service communications to private land use restrictions. US Rep Adam Kinzinger (R-IL) introduced the bill on March 4 with 12 original co-sponsors from both sides of the aisle -- seven Republicans and five Democrats."

It behooves every ham, whether an ARRL member or not, to make their voice heard in Congress (House as well as Senate) about how important getting this bill passed is for the amateur radio service.

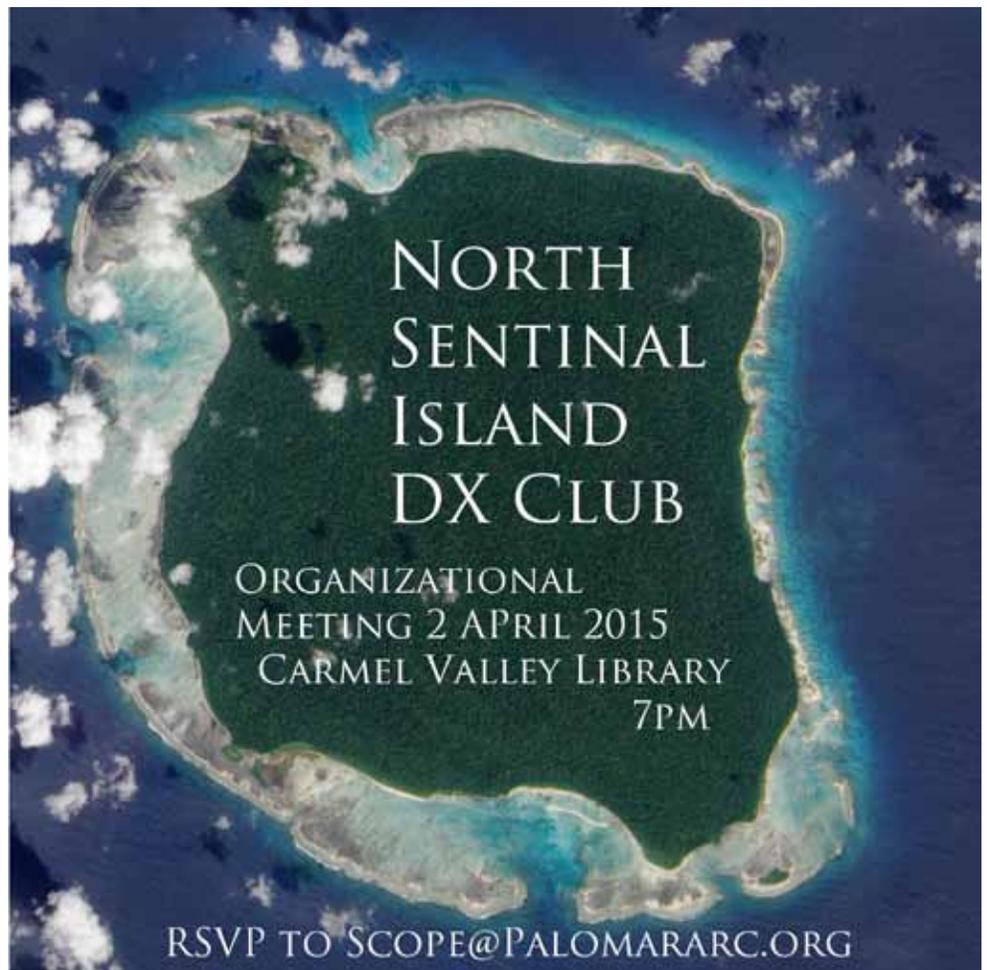
Having fought the battle for antennas in Poway, I don't need to tell you that this is an opportunity to nullify some of the special interests that oppose ham radio.

Should this measure be enacted, thousands of hams nationwide will be able to re-enter the hobby which they have been denied by "Ms. Clipboard".

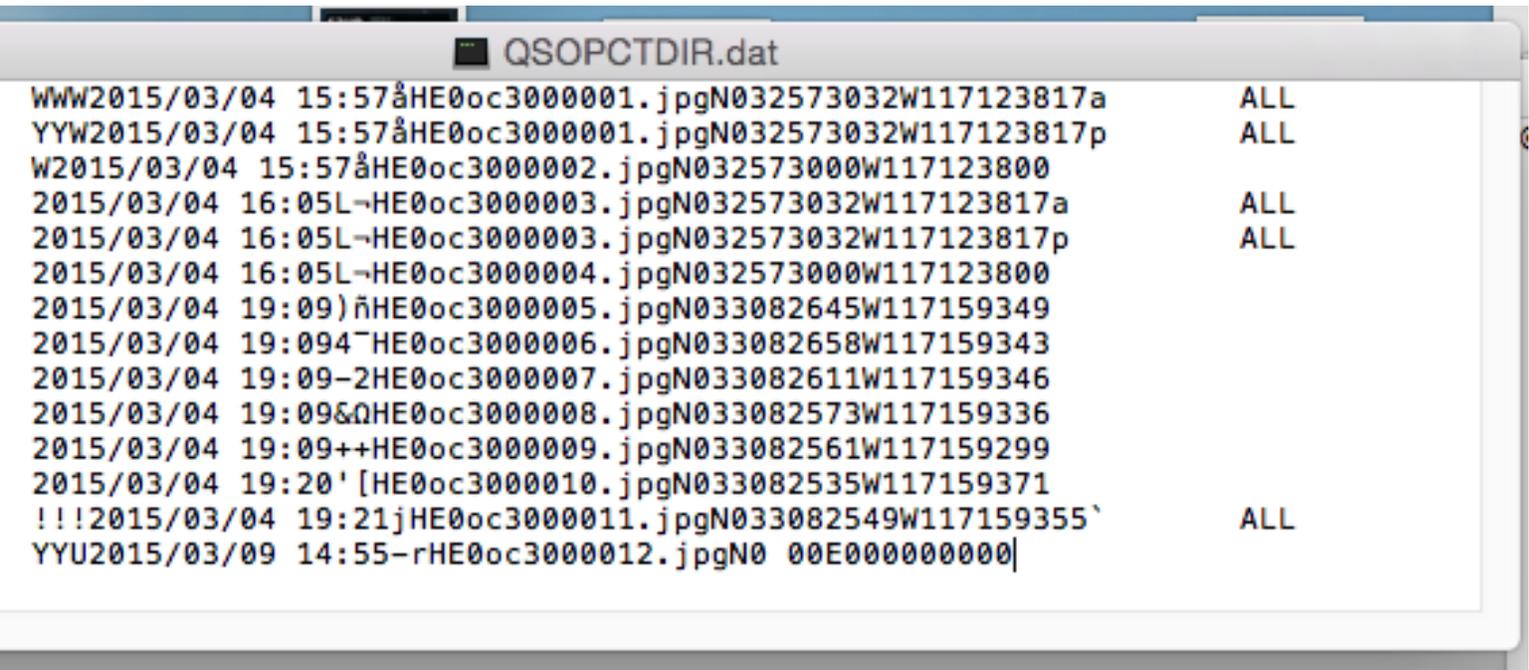
The ARRL webpage at <http://www.arrl.org/hr-1301> has extensive coverage of this, and includes draft letters recommended to be sent to Senators and Congressional representatives, including links to your individual Senator or Representative (determined by your Zip code).

I urge you to get involved in making your voice heard, for the benefit of all our fraternal amateur radio operators.

73 de NN3V



System Fusion Hood - Data Files on the SD Card



parts of the QSOPCTDIR.dat file. You can see it's somewhat human-readable. My callsign is W5NYV, which can be seen in the left-most column. The numbers immediately before my call sign are the radio ID. F03af is my FTM-400 radio, and F03b is the radio ID of my FT1D handheld.

date code. You can see a lot of activity on March 4th at around 2:05pm and again at 3:57 pm, the day that I was stalled in my vehicle. This is when I tested the photography functions with the microphone camera. Right column shows photo file names (see corresponding file names in directory structure snapshot at left).

mp and the filename are additional characters. It's not clear yet what they indicate. They could be some other sort of character that does not translate when these files are opened in a text editor.

the filename are GPS coordinates. The first set of photographs were taken on my handheld, in my vehicle, with radio ID N032W117123817. The second set were taken on my handheld, at the PARC meeting, located at coordinates N159349. The last line has a radio ID that belongs to the mobile rig in the radio. Coordinates are N159349. I believe this is a reception (on the handheld) of a photograph taken with the mobile rig and then transmitted to the handheld.

Some of the date codes are additional letters. You can see WWW, YYW, W, YYU, and !!!I. I'm not sure yet what they mean. On many Yaesu, there are codes for when APRS messages have been received (the asterisk, *). Perhaps these letters may be in the same category as the characters that appear between the timestamp and the filename. If you find out, track it down, or figure it out, write me and let me know at scope@palomararc.org!

Sometimes the word ALL is present. This corresponds to who the photograph was transmitted to. When you take a photo, you have the option of transmitting it to "ALL" System Fusion radios in range, or a custom Group Monitor list. You can set up lists of people that might want photos of your Field Day setup to the "Field Day" Group Monitor list, or to a list for leaving the club meeting to your "Friends and Family" Group Monitor list.

In one of the System Fusion forums that there is metadata added to the photos taken by the Yaesu microphone camera. This discussion was sparked by an operator that put his own JPGs on the SD card (not taken with the microphone camera) and then attempted to transmit the photo. This attempt failed. In discussions with Yaesu tech support, the operator discovered that there was metadata associated with the photograph, and only photos with the microphone camera can be transmitted from the radio. This metadata was assumed to be something that identified the photo as coming from the microphone camera. This would seem to be an attempt to force operators to use only the Yaesu microphone camera with the microphone camera.

A Brief Review of FT1DR Programming Options

Chirp was relatively easy for me to use. I have used it before on other radios, so I had a clue. I have not worked with saving as a csv yet, but this is the method for cross platform programming.

For the FT1D, programming frequencies required filling out four (4) fields for standard shifts. Offsets entered automatically. Splits like Crest (+945) and EVENT (+2.655) did need to be entered.

Fields entered:

RX frequency

Name

Tone type - no tone, tone, tone decode, dcs

Tone frequency

Offset/split if split

Offset frequency if non standard

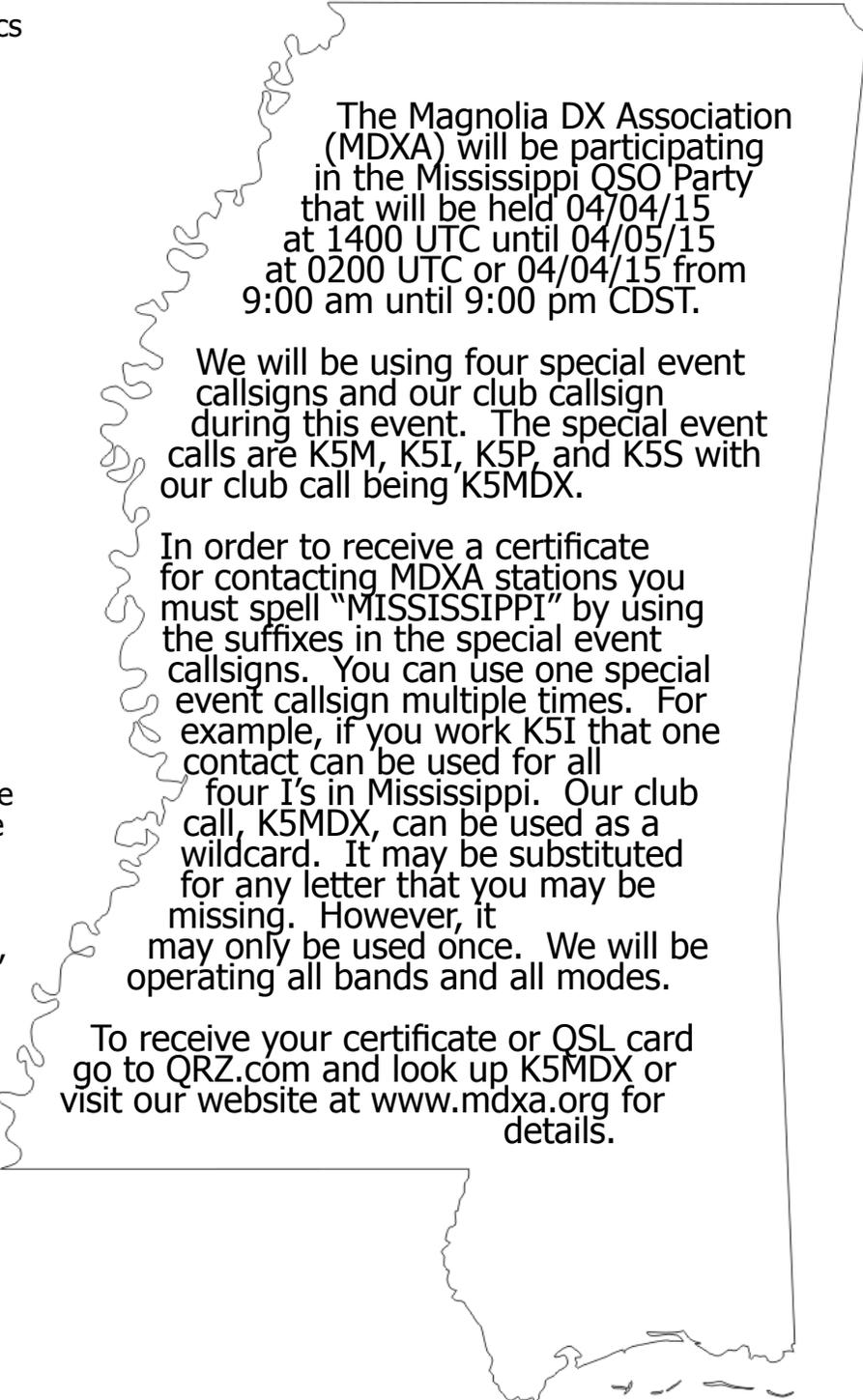
Time taken: about an hour and a half of piddling around, no hurry. Some time checking out CSV saving.

I have also worked with RT systems programming. I like their product and use it on other radios using the same loads.

Dennis KD6TUJ

Update from Newton

Bowing to public pressure, the ARRL Board of Directors is considering a name change of the annual Field Day event. If approved, the name change would be effective with the 2016 Field Day. Those opposed to the current Field Day name cite several reasons for the need to update the name. First, many groups operate inside a building, not in a field, so the name does not fit actual 21st Century practice. Park Day might be a better description. Second, for decades, debate has raged inside the ARRL as to whether Field Day refers principally to the electric or magnetic field generated by good-humored participants.



The Magnolia DX Association (MDXA) will be participating in the Mississippi QSO Party that will be held 04/04/15 at 1400 UTC until 04/05/15 at 0200 UTC or 04/04/15 from 9:00 am until 9:00 pm CDST.

We will be using four special event callsigns and our club callsign during this event. The special event calls are K5M, K5I, K5P, and K5S with our club call being K5MDX.

In order to receive a certificate for contacting MDXA stations you must spell "MISSISSIPPI" by using the suffixes in the special event callsigns. You can use one special event callsign multiple times. For example, if you work K5I that one contact can be used for all four I's in Mississippi. Our club call, K5MDX, can be used as a wildcard. It may be substituted for any letter that you may be missing. However, it may only be used once. We will be operating all bands and all modes.

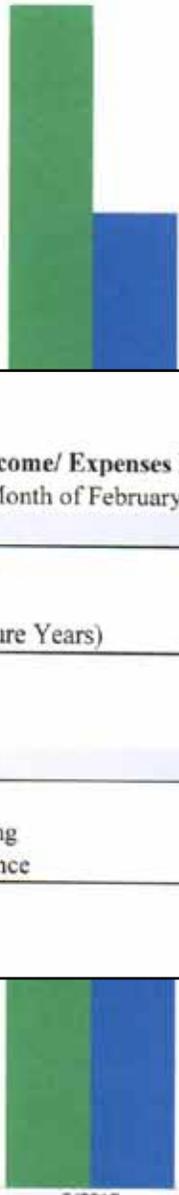
To receive your certificate or QSL card go to QRZ.com and look up K5MDX or visit our website at www.mdx.org for details.

Income/Expense by Payee - Last month

2/1/2015 through 2/28/2015

\$
1,000

800
600
400
200
0



PARC Income/ Expenses Monthly	
Month of February	
INCOME	
SCOPE Advertisement	\$288.00
Donations	\$00.00
Dues (May include Future Years)	\$645.00
TOTAL INCOME	\$933.00
EXPENSES	
Utilities	\$298.63
SCOPE Printing/ Mailing	\$132.37
Repeater Site Maintenance	\$339.66
TOTAL EXPENSES	\$770.66

2/2015



continued from page 8

radio. If this metadata could be identified and duplicated, then other cameras can be attached to the radio.

Looking at metadata of the photos taken with the microphone camera in Adobe Lightroom, nothing unusual was seen on a first pass. Opening up the photos in Photoshop and looking at the raw data didn't reveal anything remarkable there, either.

However, it occurred to the Scope Editorial Science Staff that simply placing photos in the PHOTO directory wouldn't necessarily work since the photos were also logged in the QSOPCTDIR.dat file. There might not be any extra metadata in the photo after all.

So, an experiment was made where a new photo, not taken with the microphone camera, was substituted in for a photo that was taken with the microphone camera, and already existed on the SD card and therefore already appeared in the QSOPCTDIR.dat log. By using the same filename, the photo would be "findable" by the firmware on the radio, if the firmware is using the listing in QSOPCTDIR.dat to transmit the most recently taken photo.

A 320 by 240 pixel test image was created in Photoshop, saved as a JPG, saved to the SD card as the latest image (replacing an existing image), and then image transmission was attempted. The image was successfully received on the mobile rig, thus proving that there is no

metadata in the image preventing other cameras from being used.

It was assumed that the "smarts" to update and manage the QSOPCTDIR.dat file are in the radio, and not in the camera microphone. Therefore, if we can build an interface that mimics the one in the camera microphone, we should be able to take photos or images and send them out without having to use the camera microphone.



spectra measurement and photography setup. Photos and measurement images by Paul KB5MU

The next thing looked at was spectra from the FT1D, so we could see what's emanating from the radio. With assistance from Paul KB5MU in photographing the measurements from our spectrum analyzer, the four images on the facing page were obtained.

The FT1D was held 5 feet away from the Tektronix 492 and was set to lowest power. These images show the transmissions in the frequency

domain. Frequency is the horizontal axis, and power in dBm is the vertical axis. For this set of measurements, the settings were 2kHz per division (horizontal) and 10dBm per division (vertical).

First, an FM carrier with no voice was measured. Then, an FM transmission of DTMF tone 4. Next, an FM voice transmission with max hold turned on was made over the course of about a minute and an half. Finally, a photograph was sent using data mode and the spectra measured.

by Michelle W5NYV

HAM RADIO

Jose XE2SJB
Jerry N5MCJ
Joe N6SIX

H
R
O

OUTLET

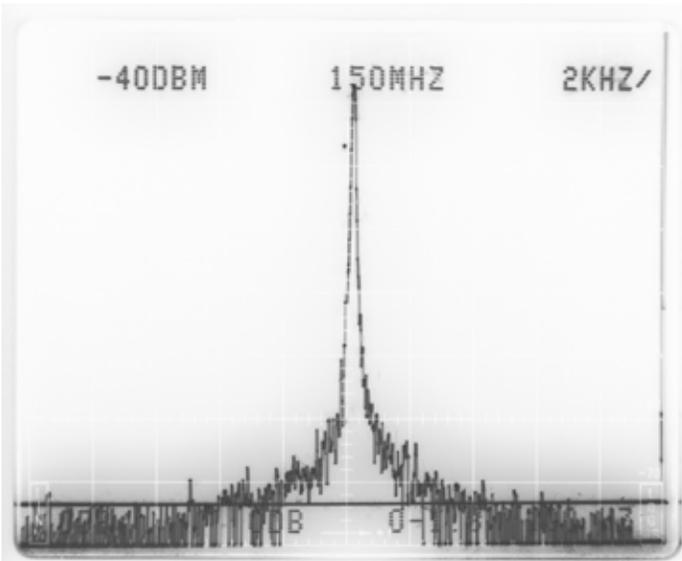
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Cushcraft And Others
too
Numerous to
Mention!

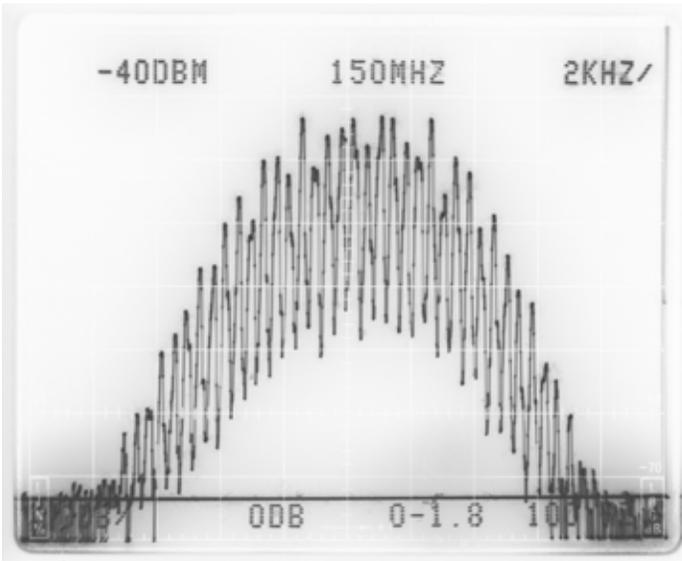
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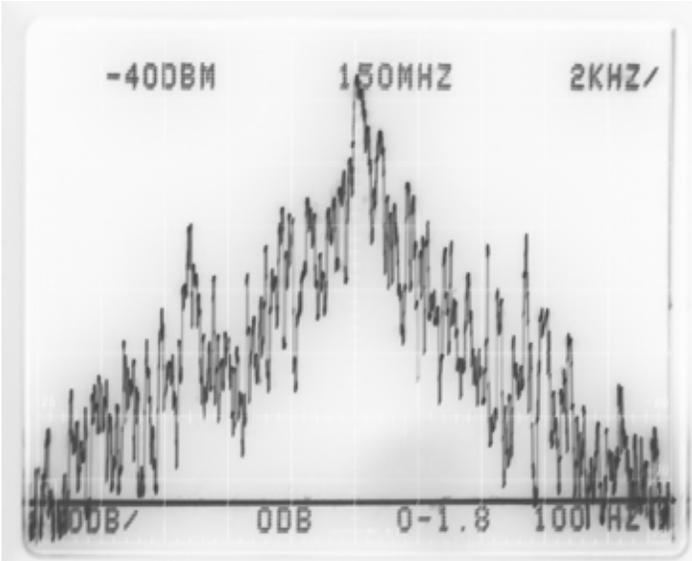
Directions: On 163, take **Clairemont Mesa Blvd.** off ramp to East. Stay in right-hand lane. Turn right at stoplight. As you are turning right you can see our beams in this shopping center. Travel 100 yds. On Kearny Villa Rd. and U-turn back to shopping area and HRO sign. Be sure to see our equipment in action on **real** antennas!



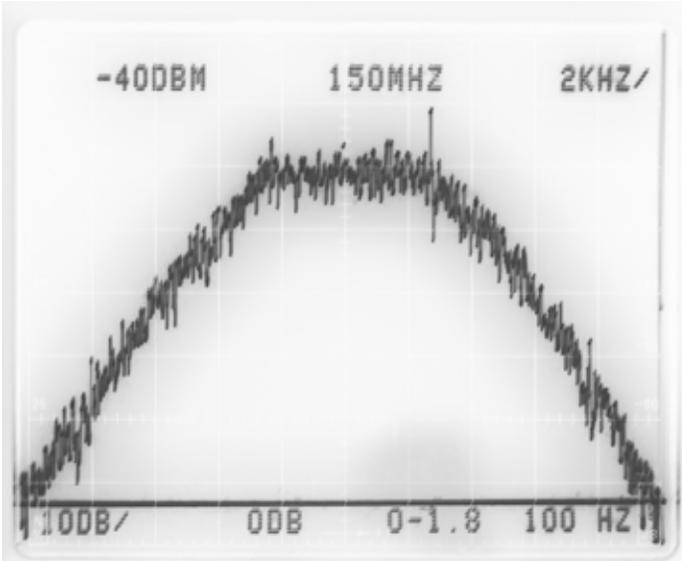
FM CARRIER WITH NO VOICE ON FT1D



FM TRANSMISSION OF DTMF TONE 4 ON FT1D



FM VOICE TRANSMISSION ON FT1D



MICROPHONE CAMERA TRANSMISSION USING DATA MODE

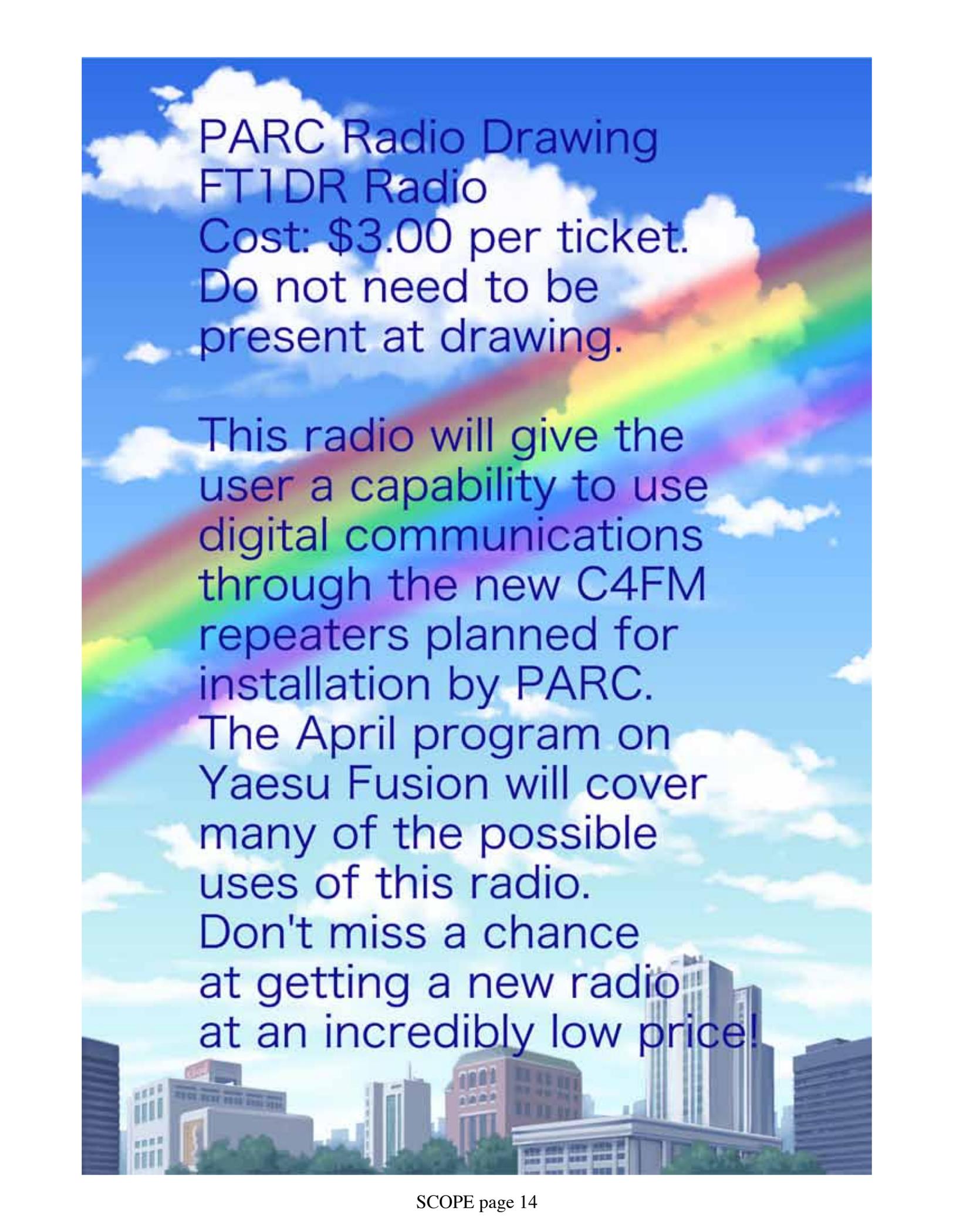
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PERIODICALS

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You can join or renew your membership, find a repeater listing, find contact information for the board all on the club's web site <http://www.palomararc.org>

Editor: Michelle Thompson W5NYV

Submissions: scope@palomararc.org

Questions? Ideas? Comments? W6NWG@amsat.org

Featured Program:

At 7:30pm on 1 April 2015, Palomar Amateur Radio Club will have a program. Mr. Chris Wilson from YEASU will present about System Fusion. We look forward to seeing you at the Carlsbad Safety Center, 2560 Orion Way, Carlsbad, CA. Arrive at 7:00 for socializing, and for the HF Remote Special Interest Group meetup.

Sign up for the PARC Email Lists:

<http://www.palomararc.org/mailman/listinfo>