

# The Contest JUG



NEWSLETTER OF THE  
NORTHERN CALIFORNIA CONTEST CLUB  
44 TOYON TERRACE  
DANVILLE, CA 94526  
DECEMBER 1986

NO. 174

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MEMBERSHIP: W6REC, DUANE	W6REC, DUANE, KA6ING, LOUESE
NCCC REPEATER, W6RGG, 147.24 Mhz	

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## NCCC XMAS DINNER DECEMBER 13

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### COMING EVENTS

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DECEMBER	5-7 ARRL 160 METER CW CONTEST
DECEMBER	13-14 ARRL 10 METER CONTEST
DECEMBER	13 XMAS DINNER
JANUARY	8 BOARD OF DIRECTORS MEETING
JANUARY	23-25 CQWW 160 METER CW CONTEST
JANUARY	26 NCCC MEETING 7:30 HAYWARD
FEBURARY	20-22 CQWW 160 METER SSB CONTEST
FEBURARY	21-22 ARRL DX CW

### FROM THE PREZ

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CQWW CW has just finished and now the fun begins (going over all the dupes the dopes put into your log) ! It's amazing the difference in propagation in just a few months and 10 and 15 meters are coming back to life. This gives the guy with the average station somebody to work and some other band to work other than 20.

While putting labels on the JUG, I noticed a very large number of members



who have not send in their recent dues. If your label has 6/86 on it, you have not send in your dues yet! Please do so, they are \$ 20.00.

In the last year the NCCC put on the best state QSO party (with the best awards, wine), will be giving out various plaques and wine to winning club members, and will sponsor a new DX Club award for CQWW in thr 1987 Contest. That just a short run down-make it better by joining in on the activity yourself and have fun on the begining of the new upward cycle of sunspots and contesting.

On the topic of awards, SS summary sheets go to W7MAP. If you want to submit an entry into "The first 12 hours of operating in SS " and win a bottle of NCCC wine, send a summary sheet with just your first 12 hour totals to KA6ING .The categories are for stations A and B, CW and SSB. Further details in the October JUG.

If your QSL supply is getting down, don't forget that the NCCC has QSLs available from NU6S with the Club logo. They start at \$35.00/thousand and get better per thousand ( love those JA's from the bureau).

For those who want to be a big signal for an International Contest, read "The Ultimate Portable 160 Contest Machine", by K9RS that is in this months JUG. It looks easy and fun to setup.

The November meeting on the 24th had K3EST, Bob, talking about the history and set up of N2AA . Thanks a lot Bob for a glimpse at the ultimate MULTI-MULTI in the world!

Wayne, W6REC, , also gave a talk at the meeting about practical hints and tips about guying antennas, towers, etc., that was not only interesting, but of real useful information. W6RGG, Bob, thought it was so good, he recommended Wayne put it to paper and submit it to CQ Magazine!

By the way, there were only a dozen or so members present at 7:30 PM and the meeting did not start until 7:50PM. We had close to 30 members show up for the meeting , but the BOD has laid down the law to start the meetings at 7:30 PM as a courtesy to those who made the effort to be on time. Don't stay away because you may be late, just try to be on time!

I know it is very hard for most of the members to make weekday night meetings. So, do not miss the NCCC XMAS dinner that will be on Saturday,



December 13, 1986. It will be nice to have some eyeball QSO'S with folks we only either hear or meet only once or twice a year. So come early and make the rounds and tell us all tall tales about what you have been up to!

73, Al, WR6R

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## THE ULTIMATE PORTABLE 160 CONTEST MACHINE

BY RAY SOKOLA, K9RS

(National Contest Journal)

Ballons and beverages - Sound like a party? It's also the way to be a 160 meter big gun! This system has been used at K9RS for a multi-op effort for the last several 160 meter CW contests.

The machine consists of two parts - a helium balloon for transmitting and Beverage antennas for receiving. Combine this with a decent radio and a KW for 160 and you will have a Top Ten capable setup.

Transmit - We use a Drake T4XC and a Dentron MLA 2500 amplifier to drive the balloon vertical. The vertical consists of 150' of #22 stranded insulated wire held up by a balloon filled to 3 to 4 feet in diameter. The wire is fed at the base against ground through a series 1000 pF air variable which conveniently matches it to 50 ohms. Wind usually keeps the wire from being vertical but that doesn't seem to hurt it's performance. One caution - DON'T USE NEAR ANY OVERHEAD POWER LINES! Fortunately, I don't have any!

Ballons are available from many party stores and even FAIR RADIO, also 6' Balloons ( which work very well filled to 3 to 4 feet in diameter ) can be had by mail order from JERRCO for \$ 6.50 each- their phone number is (312) 475-8440 and credit cards are accepted. Welding supply shops and medical gas suppliers as well as party stores are good sources of helium. I rent a 110 cubic foot tank which is easily good for five or six fills for \$ 35.00.

Receive- A Drake R4C, Ameco preamp, five position switch, four pieces of RG59 and some wire are all that's required for receiving. The RG 59 runs go to an adjacent field where Beverage antennas are formed by



connecting the shields of the cables to two foot long ground rods and the center conductors are connected to various length wires ( 200 -1000' ). The wires are either left laying on the ground or stomped under snow to keep from being pulled up by snowmobilers. No attempt is made to match or terminate the wires. The five position switch allows choosing any of four Beverage antennas or the transmit antenna for listening. The preamp is not absolutely necessary but does help boost the low levels on the beverage antennas to the point where the signals are closer in strength to the transmit antenna.

The system can be set up just about anywhere there is space. With the balloon transmit antenna and a KW, your biggest problem will be hearing everyone who calls you. If you have a remote antenna switch, you could use that instead of multiple coax runs for the Beverages. Best of all, it's cheap and can be set up in less than two hours to make you one of the loudest signals on the band. It has worked here and can work for you too! Give it a try.

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## **1987 CQ WORLD -WIDE 160 METER DX CONTEST**

**CW: JANUARY 23-25      SSB: FEBRUARY 20-22**  
**STARTS 2200 GMT FRI      ENDS: 1600 GMT SUN**

**CLASSES : SINGLE AND MULTI-SINGLE**

**EXCHANGE : RS (T) AND QTH. STATE FOR U.S. AND AREAS  
FOR VE. DX NEED NOT SPELL OUT THEIR QTH.**

**SCORING : CONTACTS WITH STATIONS WITHIN OWN  
COUNTRY, 2 POINTS. CONTACTS WITH STATIONS IN  
ANOTHER COUNTRY BUT SAME CONTINENT, 5 POINTS.  
CONTACTS OUTSIDE CONTINENT, 10 POINTS.**

**MULTIPLIER : EACH U.S. STATE (48), CANADIAN (13) AND  
DX COUNTRY. U.S. AND CANADA ARE NOT CONSIDERED AS A  
MULTIPLIER.**

**FINAL SCORE: TOTAL QSO POINTS TIMES THE SUM OF  
MULTIPLIERS**

**LOGS CAN BE MAILED TO CQ MAGAZINE, OR N4IN, DONALD  
McCLENON, 3075 FLORIDA AVENUE, MELBOURNE, FL 32904  
MAILING DEADLINE IS FEB 28TH FOR CW, MARCH 31ST FOR  
SSB**

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**NCCC Annual  
Christmas Dinner  
December 13, 1986  
at Mac's of Los Altos  
325 Main Street,  
Los Altos, Ca, 941-0234**

The NCCC again invites all OM 's and XYL's to Join host N6BT, Tom, to celebrate the holiday season with the NCCC! The price is only \$15.00 and the entrees are Roast Sirloin of Beef or Pacific Snapper/Vera Cruz with Rice. The dinner is at 7:00 PM. Cocktails at 6:00 PM and hors d'oeuvres will be served at the no host bar.

Please R.S.V.P. NOW with KA6ING , (415) 583-5333, with the number in your party and selection of entree. The deadline is December 5 1986.

**Directions:**

From Highway 101, take the San Antonio Westbound off ramp. Continue past El Camino Real. Turn right on Main Street .

From Highway 280, take El Monte off ramp eastbound . Turn left on Foothill Express. Right on San Antonio, then left on Main Street.



## TS 940S PHASE NOISE FIX FROM KENWOOD

( copyright The DX Bulletin)

Kenwood received the first reports of "phase noise" problems with the TS-940S at the Dayton Hamvention this Spring. The ARRL had recently tested the TS-940S and no "phase noise", was noted. They were able to measure the blocking dynamic range without any problem.

Kenwood reported these comments to there Engineering department in Tokyo to see if they could provide additional information on these reports. They had not received any comments from the various other worldwide Kenwood sales offices. They indicated that this type of problem would require some testing to determine the cause, and cure, if a problem could actually be isolated.

The phase noise characteristics of the TS-940 were evaluated by Kenwood and determined to be are lower than the TS-930S .

Kenwood issued a Service Bulletin, number 911, which addresses an improvement in the Carrier to Noise ratio of the TS-940S. Kenwood claims the Carrier to Noise ratio will be improved in the order of 15dB within the range of +/- 20 kHz from the center frequency of the VCO . The recommended changes on the PLL unit involve adding a couple of capacitors, removing a few capacitors, and changing the values of two resistors. The time required for this modification is one hour or less. This change will be incorporated on all units shipped from Trio-Kenwood after 9/15/86.

The service bulletin can be obtained by writting :

Trio-Kenwood Communications  
Attn: A/R Technical Service  
1111 West Walnut Street  
Compton, CA 90220

Further technical assistance can be obtained by calling (213) 639-7140, Craig L. Martin, KR6T, customer service manager. Parts may be ordered at (213) 639-9000



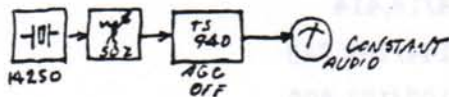
# EQUIPMENT NOTES

## Phase Noise in the Kenwood TS-940S Testing the Kenwood Fix by Maury Harp KF7L

I installed Kenwood's modification to reduce phase noise

However, I have been able to measure only 2-5 dB improvement, not the 15 dB that they mention. I wonder if my unit is not typical? I would like to know what others have measured.

My measurement is done by evaluating the reciprocal mixing within the receiver. I use a crystal oscillator with a calibrated attenuator. Using the CW filter to separate carrier from noise, I tune across the region of interest with the AGC off. I continually reset the attenuator to hold constant audio output. Thus carrier to noise ratio can be read from the attenuator (see diagram). It is hard to know the absolute accuracy of this method, but relative comparisons should be very good.



TS-940S Reciprocal Mixing Test

The test setup imitates the real world situation of a receiver exposed to a very strong signal on a nearby frequency. For the CW contester or DXer, noise at offsets of 2-3 kHz are important, as this is typical of CW pileups. Rating noise at 20 kHz offset doesn't reflect CW requirements.

The Kenwood modification requires changes to the PLL circuit board. This requires considerable dismantling. You must first take off the speaker and switchboard assembly on top. This uncovers the digital A unit. Removing this exposes the PLL unit, which must be taken out of the rig for the modifications. You will remove a total of 36 cable connectors; it may help to keep notes and label the cables. Don't pinch any wires during reassembly. It took me seven hours. [Kenwood says the modification requires one hour or less. Maybe they'll starting from a disassembled radio.-ed.]

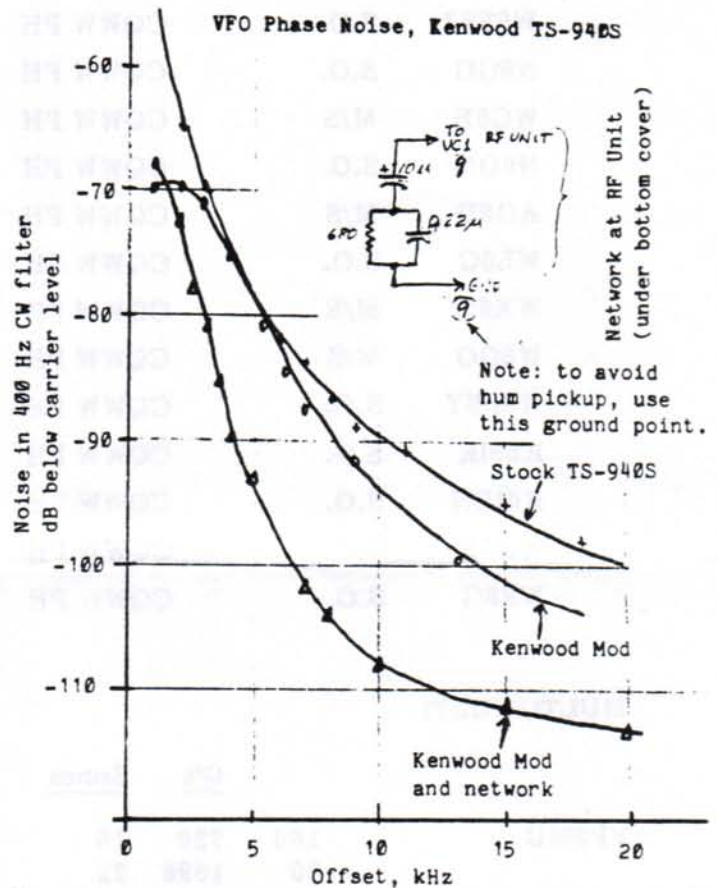
**Results** The Kenwood modification does not add significant filtering to the control lead. Removal of the capacitors reduces the available error signal from the phase discriminator, hence less loop gain. In any case, the speed of control and error correction is little affected.

In order to evaluate the intrinsic oscillator noise, an extremely slow filter was tested (BC=1 sec.) This test eliminates discriminator noise. It is found that about 15 dB is all the improvement available from working on the loop design. I decided to add some filtering to the loop until about 15 dB improvement was attained, but no more than that, to prevent affecting the speed of correction.

I have enclosed curves showing what I measured. The simple network shown was computer generated to best meet the target explained above. This network applies to the 10/20 MHz VFO; a different network would be optimum for the 20/30 MHz section. The network connects to the readily-available connector on the RF unit under the bottom cover. However, it depends on having the Kenwood modification already in place.

**Loop Acquisition Time** As to slowing the time response causing a problem, I find it is impossible to break the lock by spinning the dial. However, when one

goes to full breakin and split frequency, the loop must switch back and forth between dots. For splits of a few kHz, the time measures about 2-4 msec. For wide splits, don't use full breakin, as times as great as 40 msec. are required for the switch. (The time measurement can be easily taken from the UL lead.) It is interesting to note that VFO-A and VFO-B are one and the same oscillator. Switching A to B reprograms the frequency synthesizer, as does the use of RIT.



Phase Noise of Stock TS-940S, with Kenwood's modification, and with Kenwood's and KF7L's fix.

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1986 CQWW PHONE

STATION	CLASS	CONTEST	BREAKDOWN
			Q's/Zones/Country/Total
W6BIP	M/S	CQWW PH	845/110/243/840,140
W6FSJ	S.O.	CQWW PH	610/90/180/458,190
N6GG	S.O.	CQWW PH	127/47/88/48,465
WC6H	M/S	CQWW PH	1368/116/264/1,474,780
N6OM	S.O.	CQWW PH	73/18/44/18,414
AG6D	M/S	CQWW PH	470/84/144/288,648
WE6G	S.O.	CQWW PH	408/66/109/197,575
WX6M	M/S	CQWW PH	743/102/199/582,435
W6GO	M/S	CQWW PH	1066/121/266/1,125,396
W6BSY	S.O.	CQWW PH	619/74/164/396,508
K6SIK	S.O.	CQWW PH	316/72/141/184,884
K6HIH	S.O.	CQWW PH	333/77/111/169,764
WR6R	S.O.	CQWW PH	3829/120/214/3,937,192
WE6G	S.O.	CQWW PH	408/66/109/197,575

MULTI/MULTI

		Q's	Zones	Countries
VP2MU	160	720	16	61
	80	1696	22	86
	40	2455	27	94
	20	7125	37	124
	15	6151	29	89
	10	2740	17	29
TOTAL:		20887x631 =		13,179,697
		FINAL =		13,179,697

This is the total of all summaries received as of December 1, 1986. If others are available please send them in.



## 1986 CQWW CW RAW SCORES

### MULTI/MULTI

		<u>Q's</u>	<u>Zones</u>	<u>Countries</u>
N6TU	160	54	15	25
	80	215	22	45
	40	760	37	96
	20	550	38	111
	15	452	29	72
	10	<u>133</u>	<u>14</u>	<u>28</u>

TOTAL:                    2164   155   367

3.9 Meg!!  
Great Job!!

### OPERATORS AT N6TU:

KA6LAF	Jess
N6RZ	Dave
WA6OCV	Susan
W6NV	Ollie
AA6T	Lloyd
WA6SHD	Bud
WA6ITV	Ron
N6TU	Bruce

### MULTI/SINGLE

		<u>Q's</u>	<u>Zones</u>	<u>Countries</u>
AI6V	160	21	11	11
	80	90	21	45
	40	600	36	88
	20	408	35	92
	15	296	24	53
	10	<u>41</u>	<u>13</u>	<u>25</u>

TOTAL:                    1456   140   314

1.8 Meg!!  
Congratulations!!

### OPERATORS AT AI6V:

AI6V	Carl
W6SZN	Kip

Other Multi/Single but no breakdowns at press time include:

W6BIP with (WA6AVE)        783 Q/116 Z/222 C/264,654 K.

AG6D with (N6AUV, N1EE, W6NWS)

1,141 Q/113 Z/190 C/345,723 K.

WR6R - No Info. Available.

All Band/Single OPS:

	<u>Q's</u>	<u>Zones</u>	<u>Countries</u>
N6RO (WA6VEF OP) 160	21	11	16
80	164	23	46
40	738	33	80
20	529	31	75
15	333	22	43
10	35	13	23
<b>TOTAL:</b>	<b>1818</b>	<b>133</b>	<b>283</b>

	<u>Q's</u>	<u>Zones</u>	<u>Countries</u>	<u>Scores</u>
K6CSL	104	46	51	21922
N6BT	634	91	168	-
K6PU	197	64	101	Only Dipoles
N6EK	426	94	170	-
W6GO	731	-	-	697 K!
K6XO	50	-	-	-
W6VG	45	16	19	-
N6JL (2 Band)	200	35	30	-
W6ISQ	350	100	150	380 K
W6WB	315	70	153	-
W6SYL	64	?	25	-
W6REC	513	94	170	297,950

SINGLE OP/SINGLE BAND:

	<u>Q's</u>	<u>Zones</u>	<u>Countries</u>	<u>Scores</u>
WC6I (20)	517	34	80	-
W6QHS (20)	708	36	91	- (Dave - Join Now!!)
N6QR (40)	915	37	104	WOW!
W6BSY (15)	135	25	48	-



**1986 SWEEPSTAKES**

			<b>Q/SECT/TOTAL</b>	<b>CLASS</b>
W60SP	Single	SSCW	1550/73/113150	100 W
N6GG	Single	SSCW	642/73/93732	100 W
K6CSL	Single	SSCW	262/63/31752	100 W
K6ZM	Single	SSCW	241/59/28438	KW
W6BIP	Single	SSCW	676/74/100048	KW
AJ6V	Single	SSCW	322/65/41860	KW
W6BIP	Multi	SS Phone	609/71/86478	KW
WE6G	S.O.	SS Phone	478/69/65964	KW
WE6G	S.O.	SSCW	172/59/20296	100 W
K6KM	S.O.	SSCW	262/70/36680	100 W
AD6E	S.O.	SSCW	525/72/72432	100 W
AD6E (12 HRS)	S.O.	SSCW	316/68/41480	100 W
N6RO	S.O.	SSCW	1029/74/152292	KW
N6RO (12 HRS)	S.O.	SSCW	695/72/100080	KW
N6EK	S.O.	SSCW	481/68/65416	100 W
N6EK	S.O.	SS Phone	259/68/35224	100 W
WR6R (12 HRS)	S.O.	SS Phone	466/68/63376	100 W

## NOTES FROM THE VPCC

Thank you one and all for your participation in the C.Q.W.W. contest! As always, CQ continues as the premier DX contest. Now that all the smoke has cleared, lets make sure your Contest Summaries are in! Remember, this is a club competition.

For the last year, I have been collecting Contest Forms for all major contest. This collection includes Prefix checkoff sheets, Dupe sheets and other helpful contest printed matter. The idea of collecting this information was to bind the forms and either sell it to recover the reproduction and binding costs or just copy the material as a stack and distribute the goods at a club meeting. Well, the binding method does not seem to lend itself to a book format due to the odd sizes of some of the dupe sheets et al; and the stack of papers idea troubles my tidy mind, so I need some suggestions! In the mean time, I will try to use the Contest Jug as a source for the membership.

December and January have some really good contests. The December 160 ARRL and January 87 CQWW 160 forms are included this month for your review. For those of you interested in the VHF side, I have included the VHF Sweepstakes entry forms. (Even if your not planning an active entry on the VHF contest, lets try to support those that are - these folks really work for thier Q's!)

Now is a good time to think about the ARRL DX Test ... I have got plans to go to Mexico this year and some early planning can pay off in inexpensive opportunities to be DX as well as participate in a fun contest.

Good Contesting,

Chuck,W7MAP



Do not write above this line.



# A.R.R.L. 160-Meter Contest

CALL USED ..... ARRL SECTION or COUNTRY .....

CALL OF OPERATOR *IF DIFFERENT FROM CALL USED* .....

**CHECK ONE:** Single Operator Station \_\_\_\_\_ Multioperator Station \_\_\_\_\_

If multioperator, show calls of all operators, loggers .....

SCORING: \_\_\_\_\_ QSO points x \_\_\_\_\_ sections + countries = \_\_\_\_\_ claimed score

Count 2 points for W/VE QSO, 5 points for DX.

Claimed Score	QSOs	Multipliers	Hours of Operation
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Rig ..... Power Output .....

Antenna .....

"I have observed all competition rules as well as all regulations established for amateur radio in my country. My report is correct and true to the best of my knowledge. I agree to be bound by the decisions of the ARRL Awards Committee."

Date ..... Signature ..... Call .....

Please enclose log, photos, comments, ideas, etc. with your entry and mail promptly to: ARRL Communications Department, 225 Main Street, Newington, CT 06111.

### MULTIPLIER CHECK-OFF LIST

1	2	3	4	5	6	7	8	9	0	VE	DX
CT	ENY	DE	AL	AR	EB	AZ	MI	IL	CO	MAR	
EMA	NLI	EPA	GA	LA	LAX	ID	OH	IN	IA	PQ	
ME	NNJ	MDC	KY	MS	ORG	MT	WV	WI	KS	ON	
NH	SNJ	WPA	NC	NM	SB	NV			MN	MB	
RI	WNY		NFL	NTX	SCV	OR			MO	SK	
VT			SC	OK	SDG	UT			NE	AB	
WMA			SFL	STX	SF	WA			ND	BC	
			TN		SJV	WY			SD	YU/NWT	
			VA		SV	AK					
			WIN		PAC						

Print or type:

NAME: \_\_\_\_\_ CALL: \_\_\_\_\_

ADDRESS: \_\_\_\_\_

\_\_\_\_\_

(ZIP/POSTAL CODE)

1. Check log for duplicate QSOs.
2. Copy ALL QSO info carefully. A penalty is assessed for incorrectly copied QSO info.
3. Observe mailing deadline.
4. Dupe/check sheet must accompany all entries of 200 or more QSOs.



Do not write above this line.

# ARRL 10-Meter Contest

CALL USED .....ARRL SECTION or COUNTRY .....

CALL OF OPERATOR IF DIFFERENT FROM CALL USED .....

**CHECK ONE:**

Single Operator

- Phone & CW
- Phone only
- CW only

Multioperator

.....QSO points\*

X.....Multipliers

=.....Claimed score

License Class

- Novice
- Technician
- Other

\*(Count 2 points per phone QSO, 4 points per cw QSO  
W/K Novice/Technicians count 8 points.)

If multioperator, show calls of all operators, loggers .....

Claimed Score

QSOs

Multipliers

Hours of Operation

"I have observed all competition rules as well as all regulations established for amateur radio in my country. My report is correct and true to the best of my knowledge. I agree to be bound by the decisions of the ARRL Awards Committee."

Date ..... Signature ..... Call .....

Please enclose log, photos, station description, comments, ideas, etc. with your entry and mail within 30 days to:

ARRL, 225 Main Street, Newington, CT 06111

### MULTIPLIER CHECK-OFF LIST (list DX multipliers on other side)

1	2	3	4	5	6	7	8	9	0	VE	
CT	NJ	DE	AL	AR	CA	AZ	MI	IL	CO	VE1	VO1
MA	NY	MDC	FL	LA	HI	ID	OH	IN	IA	VE2	VO2
ME		PA	GA	MS		MT	WV	WI	KS	VE3	VY1
NH			KY	NM		NV			MN	VE4	
RI			NC	OK		OR			MO	VE5	
VT			SC	TX		UT			NE	VE6	
			TN			WA			ND	VE7	
			VA			WY			SD	VE8	
						AK					

Print or type:

NAME: \_\_\_\_\_ CALL: \_\_\_\_\_

ADDRESS: \_\_\_\_\_

\_\_\_\_\_

(ZIP/POSTAL CODE)

1. Check log for duplicate QSOs.
2. Copy ALL QSO info carefully. A penalty is assessed for incorrectly copied QSO info.
3. Observe mailing deadline.
4. Dupe/check sheet must accompany all entries of 500 or more QSOs.







# VHF Sweepstakes

Call used \_\_\_\_\_

Grid square locator \_\_\_\_\_

ARRL section \_\_\_\_\_

\_\_\_\_ Single operator station. I wish to be listed in QST as: \_\_\_\_\_ Multi-band  
(check one only) \_\_\_\_\_ Single-band \_\_\_\_\_ MHz

\_\_\_\_ Multioperator station (show calls of all operators/loggers) \_\_\_\_\_  
\_\_\_\_\_ (not eligible for single-band awards)

QSOs  
(minus duplicates)

QSO Points

Grid Sq.  
Multiplier

Claimed Score

50 MHz (1 pt. each)				50 MHz
144 MHz (1 pt. each)				144 MHz
220 MHz (2 pts. each)				220 MHz
432 MHz (2 pts. each)				432 MHz
902 MHz (4 pts. each)				902 MHz
1296 MHz (4 pts. each)				1296 MHz
2300+ (8 pts. each)				2300+
TOTAL ALL BANDS				TOTAL ALL BANDS

Figure your score for *each* band operated as well as your total score for *all* bands. Band scores equal QSO points X multiplier on that band. All-band score equals *total* QSO points X *total* multipliers from all bands operated.

Club participation? Yes No

If yes, print the name of your ARRL Affiliated Club: .....

I have observed all contest rules, as well as all regulations established for amateur radio in my country. This report is true and accurate to the best of my knowledge. I agree to be bound by the decisions of the ARRL Awards Committee.

Date \_\_\_\_\_ Signature \_\_\_\_\_ Call \_\_\_\_\_

Name \_\_\_\_\_ Comments: \_\_\_\_\_

Address \_\_\_\_\_





Year

SSB

CW



# 160 Meter W.W. Contest

CALL SIGN   COUNTRY

SINGLE OPERATOR:  MULTI-OPERATOR:

QSO'S (MINUS DUPLICATES)	QSO POINTS	STATE AND PROVINCE MULTIPLIER	COUNTRY MULTIPLIER	SCORE
<input type="text"/>	→ <input type="text"/>	×	<input type="text"/>	+
			<input type="text"/>	=
				<input type="text"/>

HOW TO SCORE: QSO POINTS X (STATES AND PROVINCES + COUNTRIES) = FINAL SCORE

STATION DESCRIPTION \_\_\_\_\_

ANTENNA(S) \_\_\_\_\_

OPERATORS \_\_\_\_\_

REMARKS (BIGGEST THRILL IN CONTEST, FUNNIEST STORY, COMMENTS, ETC.) \_\_\_\_\_

CLUB COMPETITION \_\_\_\_\_

This is to certify that in this contest I have operated my transmitter within the limitations of my license and have observed fully the rules and regulations of the contest.

(Signature) \_\_\_\_\_

Type or Print

Name \_\_\_\_\_ Call \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_

State or Country \_\_\_\_\_ (Zip) \_\_\_\_\_

Logs must be postmarked no later than Feb. 28th—CW, March 31st—SSB.

Mall to: 160 DX Contest Director  
Don McClenon, N4IN  
3075 Florida Avenue  
Melbourne, FL 32901, USA





