



June 5, 2004 - Volume 41, Number 28a - Edition 1320 - ISSN 899-9733

**EiC Notes**

Welcome to IRCA: **Mike Hawkins** - Tracy, CA (SDXM only)

**IRCA Convention. Dates:** July 23-25, **Hotel:** Rodeway INN, 1115 North Curtis Rd, Boise ID 83706 (1-208-376-2700 or 1-800-272-5993). **Rates:** \$59.95 plus 12% tax or \$67.14. **Starts:** Friday 9 AM, **ends:** Sunday afternoon after Bar-b-que. **Tentative tours:** KIDO/KFXD and KBOI. **Convention fee:** \$25.00, can also be paid via Paypal at: **N7SOK@aol.com**. **Auction items:** send to Frank Aden, 4096 Marcia Pl., Boise ID 83704. **E-mail inquires:** send to: **IRCA2004@aol.com**... make your plans NOW – pb.

**WTFDA 2004** - Omaha, NE. The WTFDA annual convention takes a stop in Omaha, NE July 30 - Aug 1, 2004, hosted by **Matt Sittel** and **Michael Hawk**. This year's \$28 convention fee brings you a tour of skip-magnet KMTV, technical talks, the annual banquet, and on-site antenna and radio demos. The convention site is centrally located at the Park Plaza Regency Lodge. More information is available at <http://www.amfmdx.net/WTFDA2004/>, or write **Matt Sittel** at [mcsittel@cox.net](mailto:mcsittel@cox.net) or 15013 Eureux St, Bellevue, NE 68123.

**DX Test** *Lynn Hollerman*

**Daily 0255-0305 1220 WRIB Providence RI (Healy)**

Daily, from 2:55am-3:05am EST - WRIB-1220 - Providence, RI - This test is scheduled to run indefinitely.

Reception reports (with return postage) may be sent to:

**Craig Healy**, NG1U  
WRIB  
200 Water St.  
East Providence, RI 02914  
OR

**WWW:** <http://www.wrib.com>  
(Arranged by **Craig Healy**, NG1U and AM-DX.COM.)

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**WESTERN DX ROUNDUP**  
**Nancy Johnson – 265 Waterton Wy – Billings, MT 59102-7755**  
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WDXR DEADLINES: June 4, June 25, July 9, July 23. Please use Eastern Time.

**REPORTERS FOR THIS ISSUE:**

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Radio Shack DX-398, Yaesu FRG-7, loop
- \*\*\*\*\*
- 550 KFYI AZ, Phoenix 5/17 0005-0006 local news in the Phoenix area, QRM from a C&W station (may have been KUZZ Bakersfield, CA). First time heard in NV. (RA-NV)
  - 580 KIDO ID, Nampa 5/15 0100 ID and news back into talk show, above & below unID. Poor signal with Drake and RS loop. (GH-OR)
  - 630 KFXD ID, Boise maybe not DX, but this is the first time I have been able to null KTKK to get anything else. Tight null and moderately good signal with C&W, "Classic Country AM 630 KFXD" ID at 0021 5/22. (DN-UT)
  - 650 CISL BC, Richmond 5/15 0230 oldies with several "C-Isle" ID's, fair signal 80% over KSTE. Surprisingly not often heard. (GH-OR)
  - 830 KJJR MT, Whitefish 5/18 0000 ID as "KJJR Whitefish, Kalispell, Columbia Falls," news and ad for Midway Motors. Fair on Drake with N-S wire. (GH-OR)
  - CKKY AB, Wainwright 5/16 0100 C&W music strong, like local at times but trading places with KNCO & Spanish unID, Drake with Sanserino loop. (GH-OR)
  - 870 KFLD WA, Pasco 5/19 0020 Fox Sports Net talk program, ID and ad for Enzyte. Fair to poor in & out of the static. Not heard since March. (GH-OR)
  - 950 KJR WA, Seattle 5/20 0000 sports talk with ID and ad for World Series of Poker tournament. Fair to good with Drake and RS loop. (GH-OR)
  - 960 KABL CA, Oakland 5/22 0048 weak with their typical elevator music under CFAC & KOVO. (DN-UT)
  - 980 KFWB CA, Los Angeles 5/17 0011 news reports from FL and CA, heard "KFWB news time is 9:11," traffic update followed. Extremely weak. (RA-NV)
  - 1040 WHO IA, Des Moines 5/11 0241 fair, trucking company ads and call ID. (RA-NV)
  - 1110 KWDB WA, Oak Harbor 5/22 0050-0100 a total surprise here with a completely dominant signal at 11pm local, I show them listed a 500 watt daytime. Possibly a test that sounded like regular programming, but many, many ID's and a several minute "Community Calendar" for local businesses in Oak Harbor and vicinity, ID as "1110 AM KWDB." (DN-UT)
  - 1130 KFAN MN, Minneapolis logged this one with its 6kw temp. system but with terrible QRM from powerhouse CKWX. Heard one slogan "The Fan" and many ESPN slogans, at regular ID time at top of the hour, signal would fade down so no real ID was possible. I sat on the frequency 0300-0500 5/25. New. I would have no trouble logging this one if it wasn't for CKWX. (PM-OR)
  - 1170 KFAQ OK, Tulsa 5/17 0006 fighting through an unID Spanish station and QRM form KSL-1160 with hair growth ad. (RA-NV)
  - 1250 KWSU WA, Pullman 5/22 they were actually rebroadcasting the BBC with English sports, BBC ID's, interviews, etc. Really had me confused and I had to keep checking back again & again until they gave a legal ID on the hour at 0200. (DN-UT)
  - 1330 KWKW CA, Los Angeles 5/22 0045 good signal with sports talk in Spanish about the Dodgers. (DN-UT)
  - 1340 KTSN NV, Elko 5/14 0045 female announcer said "... Nevada's Oldies 1340," oldies format in the pileup. New! Drake with Sanserino loop. (GH-OR)
  - 1560 KKAAs SD, Aberdeen 5/22 heard under very dominant KNZR here. Actually first identifiable station on 1560 other than KNZR since I have been DX'ing in Utah. Poor signal with local weather report at 0205. (DN-UT)
  - 1660 KXOL UT, Brigham City 5/16 2358 ID between two oldies, fair with QRM. First time heard in NV. (RA-NV)

**HELP WITH UNID'S**

- 780 UnID in issue #27 most likely XESS Ensenada, BCN. (MF-CA)
- 910 UnID in issue #27 most likely Oakland, CA. I did a search on the internet and there is a Capitol Honda in San Jose. KNEW was heard here last night from 8:38-9:10pm PDT while listening to KRAK. (MF-CA)

**UNID**

- 910 5/17 0819 ID'ing as "Xtra Sports," into the Wall Street Journal. No 920-KBAD carryover. Which station carries Xtra Sports? (RA-NV)
- 1690 5/17 2357 with Radio Disney jingles, no ID. Where is this Radio Disney station located? (RA-NV)

It looks like the DX season is winding down. Thanks to our reporters. Nancy 5/28 2100

**CENTRAL DX ROUNDUP**

**John C. Johnson – 265 Waterton Wy – Billings, MT 59102-7755**  
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**RIDING GAIN**

- [NJ-MT] **Nancy Johnson**, Billings, MT [NancyJohnson@Prodigy.net](mailto:NancyJohnson@Prodigy.net)  
Drake R8B, Kiwa loop.
- [JJR-WI] **John J. Rieger**, South Milwaukee, WI [JohnJRieger@webtv.net](mailto:JohnJRieger@webtv.net)  
<http://DX-midAMerica.com> <http://DXMW.com>  
Icom IC-R75, Kiwa loop, MFJ959B, GE Superadio III, Terk AM 1000 loop.

**DOWN THE DIAL**

- 1130 KFAN MN, Minneapolis. 5-28 very good with CKWX nulled. 22:58 with local spots, "When you hear Chad Hoffman, you're listening to AM 11-30 KFAN Minneapolis, St. Paul" promo and ID into ESPN programming. Thanks to Pat Martin for the tip. [NJ-MT]
- 1450 WLYV IN, Fort Wayne. 5-26 poor in fade up. 22:30 with legal ID by female announcer. Religious format. [JJR-WI]

**25 YEARS AGO**

June 16, 1979 issue of IRCA's "DX Monitor" ... **Jim Byrnes** of Rochester, NY said he was 31 and worked at Eastman Kodak ... **Mike Sapp** of Woodbridge, VA said he was 29 and a manager of a McDonald's ... **Bill Nittler** of Naturita, CO told about his moving to Naturita ... **Rick Heald** of San Francisco, CA went to Guadalajara for the Memorial Day weekend.

**OPEN MIKE**

It looks like the DX season is over. This column was typed 5-29-04. 73, John

**EASTERN DX ROUNDUP**

**Lee J. Freshwater – 414 SE 3rd St. – Ocala, FL 34471**  
E-mail: [lfreshwater@cox.net](mailto:lfreshwater@cox.net)

Deadlines are: 6/12, 6/26, 7/10, 7/24, 8/7

**STARS OF THE WEEK**

- (RCE-IN) Rick Evans 7416 Hearthstone Way, Indianapolis, IN 46227
- (RW-KY) R.C. Watts 4109 Graf Dr., Louisville, KY 40220  
CC Radio, RS Loop
- (IEN-GA) Ira Elbert New Watkinsville, GA  
AIWA CSD-FD89
- (HN-GA) Herb Newberry 107 Trojan Road, Milledgeville, GA 31061  
Kenwood R-5000, Quan Loop, 700' L.W.

**LOGGINGS**

- 540 WWCS PA Canonsburg, 5/14 2315-2350 fair but mostly poor w/Radio Disney, u/WRRD. (RCE-IN)

- 560 WEBC MN Duluth, 5/15 0305-0312 w/Fox Sports over & mixing with WIND.(RCE-IN)
- 590 CJCL ON Toronto, 5/15 0200-0248 fair with sports mixing w/WKZO/WVLK/ KOMJ. (RCE-IN)
- 590 KOMJ NE Omaha, 5/15 0-200-0248 fair to poor at times w/Magic ID, MYL type music u/even with CJCL/WKZO/WVLK. (RCE-IN)
- 690 WZAP VA Bristol, 5/23 2029 Full Legal ID at BOH "owned by Ram Communications of Bristol, VA" then power change at 2030.(HN-GA)
- 780 WWOL NC Forest City, 5/27 1945 GSPL MX; weak, "this is WWOL Forest City North Carolina". (IEN-GA)
- 810 WHB MO Kansas City, 5/28 2115 decent but not real strong with Royals baseball in WGY null. (RCE-IN)
- 830 KOTC MO Kennett, 5/15 2115-2130 with "Cotton Country" music, good in WCCO null. (RCE-IN)
- 840 WCEO SC Columbia, 5/27 1950 Replay of Neil Bortz; Strong; "AM 840, WCEO". (IEN-GA)
- 850 WRBZ NC Raleigh, 5/15 1300 Local promo "The Buzz" Also hrd ESPN Network ID's. Poor, new. (HN-GA)
- 900 WKDW VA Staunton, 5/23 0021 "Your Home for the Hits and Stars that made Country Music on Classic Hit Country, WKDW", into C&W mx. Good for 127 watts. (HN-GA)
- 910 WLTP OH Marietta, 5/29 0200 w/brief ID and what sounded like talk show, poor, ID said Marietta-Parkersburg. (RCE-IN)
- WEPG TN South Pittsburgh, 5/28 off and on all night, noted with some religion. (RCE-IN)
- WEPG TN South Pittsburgh, 5/27 2040 Classic C&W ; "Your listening to "Swap & Shop on WEPG South Pittsburgh, TN". (IEN-GA)
- 940 WGMY MI South Haven, 5/29 0629 strong for a couple of minutes with oldies, then under WMIX. (RCE-IN)
- 990 WNOX TN Knoxville, 5/26 2233 Savage Nation. Strong sig, but faded. "NewTalk 990 WNOX". (IEN-GA)
- 1090 WHGG TN Kingsport, 5/22 0640-0655 ending with news, coming our of 12 songs in a row, contemporary Christian music. (RCE-IN)
- 1150 WGGH IL Marion, 5/29 0450 fair with gospel music. (RCE-IN)
- WGOW TN Chattanooga, 5/26 2243 Jim Bohannon Show; Strong w/ slight fading. (IEN-GA)
- 1220 WCPH TN Etowah, 5/26 2250 Music of Your Life; Good sig. (IEN-GA)
- 1250 WZOB AL Fort Payne, 5/26 2300 C&W mx; TOH CNN News; Decent sig but deep fades. "A service of Central Broadcasting WZOB." (IEN-GA)
- 1280 WANS SC Anderson, 5/23 1945 Local promos, over WLCG. (HN-GA)
- 1290 WCHK GA Canton, 5/30 0630 C&W mx; and "The New WCHK". (RCW-KY)
- WCHK GA Canton, 5/30 1955 "The New WCHK 1290"; into C&W mx. (HN-GA)
- WCBL KY Benton, 5/14 0710 w/news fair. (RCE-IN)
- 1300 WNQM TN Nashville, 5/23 2029 TOH ID; into USA News. New. (HN-GA)
- 1350 WGAD AL Gadsden, 5/21 0705-0710 fair over/even with WLOU with news/ weather/report. (RCE-IN)
- 1360 WTAQ WI Green Bay, 5/14 0638 w/ID, very poor under WCKY. (RCE-IN)
- 1554 CHIN ON Toronto, 5/22 2225 Alternating SS/EE talk. Local phone # new.(HN-GA)
- 1550 KAPE MO Cape Girardeau, 5/14 0253 fair with oldies. (RCE-IN)

That's it for another EDXR. Nice to hear from Rick this time. Looking forward to more reports from my old stomping ground....FRESH 05/30 1500 .....

## IRCA TECHNICAL COLUMN

Nick Hall-Patch – 1538 Amphion St – Victoria, BC, Canada V8R 4Z6

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### An Evaluation of Commercially Available Signal Splitters

by Bill Bowers and John Bryant - May 2004

In recent years, increasing numbers of radio hobbyists have wished to attach multiple receivers to the same antenna. This need may stem from a group wishing to share a single antenna on a DXpedition to a remote site, or it may be a single hobbyist wishing to operate two or more receivers simultaneously. In any case, many of us have found out that simply using a stub of wire to hook the antenna ports of two or more receivers to the same antenna is an invitation to all sorts of problems. One of the funnier problems can occur if one of several receivers hooked together presents significantly lower impedance to the antenna than the average antenna, Kirk and John spent a frustrating half-night wondering why Mitch's old receiver was so much superior to their more modern gear: they eventually realized that Mitch's old receiver was literally sucking up all of their DX! A second common occurrence when hooking multiple receivers together is that spurious radiations/local oscillator signals from one receiver can use the common antenna lead as a pathway to enter the other receivers sharing the antenna; this can cause serious but difficult to recognize interference or partial loss of signal. For all of these reasons and more, if you wish to operate two or more receivers, simultaneously, you will need to use a device called variously, an antenna splitter, a signal splitter or a power splitter: when referring to a receiving antenna device, most people use these three terms interchangeably.

Most signal splitters are based on a fundamental building block which is a transformer-like device that accepts a single signal stream and splits it into two identical parts that are each (by the laws of physics) diminished in strength by about 3 dB, minimum. Usually, these transformer-like devices consist of a ferrite core and windings of fine wire and this building block may be diagrammed as an upside-down capital letter "Y." Antenna splitters that offer four output ports are usually simply three "building blocks" arranged in a cascade fashion, where the first unit splits the signal into two halves, which are then fed into a second rank of two splitters; those second rank splitters divide the half signals into halves again, creating four identical signals of further diminished strength. Since each transformation/splitting incurs about 3 dB of loss, it is easy to see why most splitters of four output ports or more also include RF amplification.

The first antenna splitters that many of us saw were rather expensive and complex devices built with vacuum tube technology. These devices, usually purchased used from government surplus property outlets, often support 8 or 16 receivers simultaneously and contained sophisticated RF amplifiers, as well. In more recent times, smaller-scale solid-state splitters have become available commercially, intended for both the professional and serious hobbyist markets. The most commonly available splitters are 2-port, unamplified units. However, 4-port units, either with or without internal amplification are also currently available and two of the three splitter manufacturers produce a bewildering array of splitters suited for many professional communications uses.

To our knowledge no technical comparisons of these rather costly devices have been published. Since both of us were interested in either purchasing splitters or building them from scratch, we recently undertook to evaluate what was available on the market. Happily, Bill Bowers owns a highly sophisticated array of test equipment and possesses the professional knowledge to operate it. John Bryant served as cheerleader and scribe of the project.

#### THE SPLITTERS

Ideally, we would all be using antennas that have 50 ohms impedance, which would couple to feed lines having 50 ohm impedance that would, in turn, match the 50 ohm input impedance of our receivers. We recently published a study similar to this one which outlined tests of the impedance transformers necessary to match several forms of wire antennas (often from 200 to 2000 ohm impedance according to type and size) to feed lines that are nominally at 50 ohm impedance. All of the splitters evaluated in this study are meant to be used within 50-ohm antenna systems.

Since the internal circuitry of most large splitter units are simply multiple two-port circuits which are cascaded to make, 4, 8 or 16 port units, we chose to concentrate our effort on three commercially available two-port units. We also included one home-built two-port unit that was based on a design originally received from Sam Dellitt in Australia that has been published rather widely in the hobby press. In the initial testing, Bill also included one passive four-port splitter (Mini-Circuits Model ZSC-4-3B) and one six-port splitter, Model MCL, which appears to actually be a Mini-Circuits Model ZFSC-6-110. These latter two were obtained in used condition from an on-line auction.

Model MC-102 was purchased directly from Stridsberg Engineering, 345 Albert



Stridsberg MC-102

Avenue, Shreveport, LA 71105, (318) 861-0660, FAX: (318) 861-7068 ([www.stridsberg.com](http://www.stridsberg.com)). The current retail price (2004) is \$65 plus S&H. Frequency coverage, as listed by the manufacturer is 100 kHz to 500 MHz. The Stridsberg unit is exceptionally well finished and is the largest of the three commercial splitters, measuring about 5"W x 3"D x 1.5"H, counting the ports. The company welcomes telephone orders, for even a single unit, and does ship overseas.



RF SYSTEMS SP-1

The RF Systems Model SP-1 is available from several hobby sources around the world. Our test unit was purchased for \$89.95 plus S&H from our friends at Universal Radio in Reynoldsberg, OH. They accept web orders at <http://www.universal-radio.com/catalog/preamps.html> or sell to hobbyists by phone at 1-800-431-3939 (Orders & Prices Only) and also ship overseas. RF Systems lists frequency coverage as 50 kHz to 30 MHz. As you will note from the photograph, the SP-1 comes with SO-239 ports, so adapters were used to fit the unit to Bill's BNC-equipped test gear. The box itself is about 1" square and 4" long. However, with adapters to BNC fittings, it occupies about 4"x 4"x1" of space.

The Mini-Circuits Model ZSC-2-2 was purchased directly from the Mini-Circuit sales office in Missouri (phone: 718-934-4500, fax: 718-332-4661) for \$52.95 plus shipping and handling. Mini-Circuits lists frequency coverage as 2 kHz to 60 MHz. Despite being the largest of the three organizations and being primarily committed to the governmental and commercial markets, they specifically welcome small orders from hobbyists. They do ship overseas. They also provide excellent technical information about their products, but no ordering capability, at [www.minicircuits.com](http://www.minicircuits.com). The Mini-Circuits splitter is the most compact of the three, measuring 2.25"W x 1.5"D x 1.6"D, including the ports.



Mini-Circuits ZSC-2-2

**THE TESTS**

The following characteristics were measured over a range of frequencies<sup>1</sup> from 150 kHz to 13 MHz.

**ANTENNA IMPEDANCE MATCH:** This is the impedance that will terminate the coax lead in cable from the antenna. The RG-58 has a characteristic impedance of 50 Ohms and if the antenna port of the splitter has an impedance other than 50 Ohms, part of the signal will be reflected back to the antenna. The greater the impedance of the antenna port differs from 50 Ohms, the greater will be the signal loss. The amount of loss is rather complex and the total loss also depends on the length and attenuation of the coax. This impedance was measured at the antenna port with all receiver ports terminated in 50 ohms, resistive. *The ideal splitter would present 50 Ohms at the antenna port.*

**Antenna Impedance Match**

	MC-102	SP-1	ZSC-2-2	ZSC-4-3B	ZFSC-6	Home brew
F	Z	Z	Z	Z	Z	Z
MHz	Ohms	Ohms	Ohms	Ohms	Ohms	Ohms
0.15	25.02	24.97	55.22	43.83	37.85	57.05
0.25	25.01	24.97	54.73	45.87	42.50	57.28
0.5	25.02	24.98	54.77	46.97	44.89	57.79
1.0	25.04	25.00	54.86	47.43	45.76	58.99
1.5	25.05	25.01	54.97	47.92	46.25	60.23
2.0	25.06	25.01	55.08	48.22	46.61	61.45
2.5	25.06	25.01	55.19	48.43	46.88	62.71
3.0	25.06	25.00	55.28	48.57	47.07	64.03
5.0	25.01	24.95	55.58	48.83	47.44	70.28
10.0	24.72	24.65	55.63	48.44	47.27	91.37
13.0	24.40	24.33	55.23	47.88	46.80	107.0

**RECEIVER IMPEDANCE MATCH:** *This impedance, in an ideal splitter, should also be 50 Ohms to match the 50 Ohm impedance of the receiver antenna terminal.* The mismatch here is not quite as important as there is usually a very short cable between the splitter and the receiver. This measurement was made at a receiver port when the other receiver port and the antenna port terminated in 50 Ohms, resistive.

**Receiver Impedance Match**

	MC-102	SP-1	ZSC-2-2	ZSC-4-3B	ZFSC=6	Home brew
F	Z	Z	Z	Z	Z	Z
MHz	Ohms	Ohms	Ohms	Ohms	Ohms	Ohms
0.15	71.45	70.33	48.52	39.15	25.35	44.74
0.25	80.42	81.20	48.52	42.44	32.71	44.84
0.5	85.53	90.31	48.54	44.24	38.66	48.24
1.0	89.03	94.43	48.60	45.05	40.82	45.73
1.5	91.12	95.69	48.65	45.57	41.73	46.37
2.0	92.35	96.18	48.17	45.97	42.42	46.98
2.5	93.11	96.43	48.75	46.27	42.95	47.60
3.0	93.57	96.58	48.80	46.46	43.36	48.24
5.0	94.20	96.69	48.92	46.78	44.15	51.17
10.0	93.34	95.41	48.78	46.34	44.10	60.35
13.0	92.46	93.94	48.42	45.71	43.59	66.36

<sup>1</sup> Bill's test instrumentation covered the frequency ranges, 150 kHz to 13 MHz, so our 11 test points fell within that range. We believe that it is safe to extrapolate the results up to 15 or 20 MHz. to cover most of the bands of interest to our readers. The equipment: HP-4192A, HP-11048C, AG-04192-61001, HP-3456A, and a Fluke-8922A. Test voltage = 0.10Volt.

**SIGNAL ATTENUATION:** The attenuation of a signal, from a 50 Ohm source, as it passes from the antenna port to one of the splitter receiver ports. The other receiver port(s) are terminated in 50 Ohms, resistive. *The attenuation of a signal, when it is split 2 ways, in an ideal splitter would be 3db, when split 4 ways is 6 db, etc.*

**Signal Attenuation**

	MC-102	SP-1	ZSC-2-2	ZSC-4-3B	ZFSC-6	Home brew
F	$\alpha$	$\alpha$	$\alpha$	$\alpha$	$\alpha$	$\alpha$
MHz	-db	-db	-db	-db	-db	-db
0.15	3.52	3.52	3.10	6.39	8.76	3.10
0.25	3.51	3.53	3.10	6.31	8.41	3.11
0.5	3.52	3.53	3.10	6.29	8.26	3.14
1.0	3.52	3.53	3.11	6.27	8.22	3.23
1.5	3.52	3.53	3.12	6.25	8.18	3.31
2.0	3.53	3.53	3.13	6.22	8.15	3.39
2.5	3.53	3.54	3.14	6.21	8.13	3.46
3.0	3.53	3.54	3.15	6.20	8.11	3.53
5.0	3.54	3.55	3.18	6.19	8.08	3.86
10.0	3.55	3.57	3.24	6.18	8.07	4.88
13.0	3.56	3.58	3.27	6.18	8.07	5.58

**SIGNAL ISOLATION:** The local oscillator of a receiver radiates back out the antenna connection and thus into the splitter. To prevent one receiver's oscillator from interfering with the signal going into the other receiver connected to the splitter, it is desirable to have as much signal isolation as possible. *The larger the signal isolation the better.* For this test, the attenuation, from a 50 Ohm source connected to a receiver port, was measured at another receiver port. All receiver ports and the antenna port were terminated in 50 Ohms, resistive.

**Signal Isolation**

	MC-102	SP-1	ZSC-2-2	ZSC-4-3B	ZFSC=6	Home brew
F	$\alpha$	$\alpha$	$\alpha$	$\alpha$	$\alpha$	$\alpha$
MHz	-db	-db	-db	-db	-db	-db
0.15	11.58	11.29	39.85	53.90	20.26	32.43
0.25	15.06	14.55	39.89	57.44	22.09	33.75
0.5	18.93	19.40	39.89	60.71	26.25	32.75
1.0	22.01	24.46	39.56	60.54	29.73	29.55
1.5	24.10	27.38	39.15	58.90	30.96	27.25
2.0	25.64	29.37	38.62	57.38	31.75	25.50
2.5	26.85	30.85	38.02	56.03	32.33	24.09
3.0	27.85	32.01	37.42	54.83	32.85	22.88
5.0	30.25	35.24	35.13	51.28	34.20	19.47
10.0	32.09	37.55	31.05	46.00	35.19	15.10
13.0	32.05	36.43	29.40	43.96	35.32	13.72

**IMPEDANCE ISOLATION:** The antenna input impedance of a receiver with a "coax connection" is nominally 50 ohms when it is tuned to the incoming signal. Some receivers show an impedance as low as 10 ohms at frequencies other than the one to which the receiver is tuned. This 10 Ohm load at one receiver port of the splitter can upset the impedance seen at the other port. *Here again the ideal splitter would continue to present 50 Ohms impedance even when the other port is loaded with 10 Ohms.* This measurement was made at one receiver port as the impedance at one of the other receiver ports was reduced from 50 to 10 Ohms, resistive.

### Impedance Isolation

	MC-102	SP-1	ZSC-2-2	ZSC-4-3B	ZFSC-6	Home brew
F	Z	Z	Z	Z	Z	Z
MHz	Ohms	Ohms	Ohms	Ohms	Ohms	Ohms
0.15	73.88	72.89	48.51	39.10	25.17	44.96
0.25	81.58	83.18	48.51	42.48	32.66	47.86
0.5	85.76	91.98	48.53	44.25	38.66	45.28
1.0	89.12	94.83	48.58	45.05	40.81	45.93
1.5	91.19	95.83	48.64	45.58	41.71	46.58
2.0	92.39	96.25	48.70	45.98	42.41	47.22
2.5	93.12	96.47	48.75	46.28	42.94	47.85
3.0	93.56	96.60	48.80	46.46	43.34	45.51
5.0	94.17	96.69	48.92	46.78	44.14	51.44
10.0	93.28	95.35	48.82	46.33	44.09	59.68
13.0	91.99	93.89	48.49	45.70	43.57	64.56

**TOTAL LOSS:** This is the total loss of signal as it passes from the antenna through 100 feet of RG-58A/U coax and a signal splitter. A measured signal, (-20dbm) is fed into the coax at the antenna end and the strength of the signal at the receiver end was measured with a Fluke 8922A RF voltmeter. *This is a comparison of the quality of the splitters under typical conditions.*

### Total Loss (6)

	MC-102	SP-1	ZSC-2-2	Home brew
F	Loss	Loss	Loss	Loss
MHz	-db	-db	-db	-db
0.15	3.55	3.53	3.35	3.29
0.25	3.58	3.59	3.32	3.37
0.5	3.84	3.74	3.40	3.50
1.0	4.09	4.10	3.50	3.68
1.5	4.27	4.27	3.59	3.78
2.0	4.23	4.23	3.70	3.91
2.5	4.13	4.14	3.79	4.13
3.0	4.14	4.17	3.88	4.34
5.0	4.56	4.60	4.14	4.68
10.0	5.06	5.08	4.62	6.11
13.0	5.26	5.29	4.88	6.92

### DISCUSSION<sup>2</sup>

One area of some concern was noted in the Signal Isolation tests: the relatively poor performance of the Stridsberg and RF Systems units at the lower end of medium and long wave frequencies. While this would be of little concern to shortwave DXers and most radio amateurs, people with interests in the regions below 1 MHz. should take note. We were both also surprised at the impedance mismatches exhibited by both the MC-102 and the SP-1 in tests 1, 2, and 5. In some cases, these mismatches reached 100%. However, *the measured signal losses of all three units are very nearly equal*, reminding us again how forgiving receiving-only devices are of mismatches.

<sup>2</sup> The measured values of Z were actually complex, not purely resistive. The impedance phase angles were, however, very small in most cases, and we feel that including those angles would have been more confusing than helpful. For instance, the largest impedance phase angle for the Mini-Circuit ZSC-2-2 was less than 2 degrees over the entire frequency range. For all practical purposes, the tabulated values of Z can be considered resistive.

The last test, Total Loss, is really the bottom line. It indicates that, for most uses, there is really no significant difference between the three commercial products and that a selection could be made based on price and availability. However, for the "extreme DXer" who may be unwilling to give up even half a decibel of signal, or for some technical applications, the Mini-Circuits ZSC-2-2 was clearly the best in all measured characteristics. The home-brew splitter was the second best in most tests below 5 MHz. Its performance encourages us to undertake a second project, in the very near future, to develop further the homebrew design.

### VERIFICATION SIGNERS

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My deadline is the last Monday of the month.

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### FREQ CALL NAME, TITLE; ADDRESS; WHAT; WHEN; WHO

610 CKYL Jody Broome, Administration; Bag 300, Peace River AB T8S 1T5; LB+; 30; DN  
730 KBSU [None]; Boise State Radio, 1910 University Dr, Boise ID 83725-1915; B+; 30; DN  
830 KXME Kent Kramer, DirEng; 15301 Ventura Blvd, Suite 210, Sherman Oaks CA 91403; LBbc; 60; DN  
1188 JOKP\* [None]; Kitami, Japan; Q; 14; DN  
1220 KSFB [None]; 39138 Fremont Blvd, 3<sup>rd</sup> Floor, Fremont CA 94538; L; 50; DN  
1240 KEVA Michael J. Richard, QSL/DX Test Coord; P O Box 190, 568 Airport Rd, Evanston WY 82930; Q; 45; PM  
1240 KEVA Michael J. Richard, QSL/DX Test Coord; P O Box 190, 568 Airport Rd, Evanston WY 82930; Q; 32; MS  
1300 KKOL\*\* Richard Harris, Contract Eng; Salem Radio Seattle, 2815 Second Ave, Seattle WA 98121; LM; 31; PM  
1360 KPXQ [None]; 2425 E Camelback Rd, Suite 570, Phoenix AZ 85016; MB; 55; DN  
1470 KIID [Illegible]; 8842 Quail Lane, Granite Bay CA 95746; MB; 25; DN  
1490 WFKY David Blankenship [KE4UKG], News and Public Affairs Dir; 115 West Main St, Frankfort KY 40601; Q; 5; RCW  
1590 KLFE\*\* Richard B Harris, Corporate Projects Eng; Inspiration Media, Inc., 2815 Second Ave, Suite 550, Seattle WA 98121; LM; 25; DN  
1650 KCNZ Janelle Rench, OffMgr; 721 Shirley St, Cedar Falls IA 50613-0768; LM; 45; DN

WHAT was received: L = Letter with personalized statement; F = Form letter; Q = QSL card, commercially printed; C = Postcard or similar card supplied by station; P = Prepared card or form supplied by DXer; R = DXer's report returned with statement; cf = Certificate; E = Verification by e-mail; fx = Verification by FAX; M = Coverage map; B = Bumper or other sticker; bc = Business card; + = Extra goodies

WHEN the reply came: Number of days elapsed; f = Follow-up, by mail, FAX, e-mail, or visit; n = Return postage not used; r = Return postage returned

NOTES: \* [For this column] = See comment below; \*\* [For this column] = See comment below

Doug's reception report for JOKP-1188 was sent to the NHK address in the WRTH, and that office forwarded it to NHK Kitami; the return address was entirely in Japanese. Patrick received his second verification from KKOL-1300, this one confirming reception of their broadcast from their ship. This signer is the same for Doug's verie from KLFE-1590, as well

\*\*\*\*\*

The IRCA is a non-profit organization devoted to the hobby of hearing distant stations on the Broadcast Band (510-1720 kHz). **DX Monitor**, the official publication of the IRCA, is published in "soft" form 35 times a year (weekly from November through March, twice monthly from April to November) and in printed form 30 times a year (weekly November through March, monthly April to November). **DX Monitor** contains members' loggings, articles on radio stations, receiver reviews, technical articles, DX tips, and other material of interest to Broadcast Band DX hobbyists. IRCA is a member of ANARC, the Association of North American Radio Clubs.



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