



HD Radio™ Technology

January 2007

Developed by



What is HD Radio™ Technology?

- HD Radio™ technology allows digital radio signals to ride the same airwaves as today's analog AM/FM (approved by the FCC)
- FM offers 96 kb/s, CD quality sound & will support data services- (e.g. traffic, weather, stock quotes, etc.)
- AM offers 36 kb/s, stereo FM quality sound
- HD Radio™ signals are immune to interference, static, hiss and pops that plague today's analog signals
- HD Radio™ provides the capability for the Program Service Data (PSD) feature on both AM and FM
- A major feature for FM stations is Multicasting capability (the ability to have multiple programming on one station)



Who Developed HD Radio Technology?

→ **iBiquity Digital Corporation**



Key Facts

- **Merger of Lucent Digital Radio and USA Digital Radio**
- **+ 200 Patents**
- **FCC approval 2000 for IBOC broadcast in US**
- **ITU recommendation 2000 for IBOC broadcast worldwide**

Key Technologies / Core Competencies

- **Advanced audio codec expertise and patents**
- **Digital transmission expertise and patents**
- **Audio “recording”/ OSDs / storage patent holder**

iBiquity Key Supporters

- **Blackstone, Pequot, Merrill Lynch, major venture capital firms**
- **Clear Channel, Infinity, ABC, major broadcasters**
- **TI, Ford, Visteon, Gannett Communications, Disney, others**



HD Radio Market Facts

HD Radio technology in a nutshell

- Digital radio signals ride same airwaves as analog AM/FM
- Digital FM offers CD quality sound
- Digital AM offers stereo FM quality sound
- Current radios will still receive analog signals
- New receivers will tune to both HD Radio signals and current analog broadcasts

Broadcast snapshot

- + 3000 stations committed to HD = 90% US coverage
- \$20B in annual revenues
- + 1,200 On-Air today, + 50 per major markets
 - 81% of population currently served
 - 220 M Americans listen to radio every week
 - Average person listens 19.5 hrs / week

Receiver market snapshot

- 70 million radios / receivers sold per year
- + 30 HD models currently available
- 49 HD Automotive OEM Models by 2008MY (fall '07)
- '07 est. units approx. 500k-1M



dio

HD Radio System Capabilities - Current



Program Service Data – First generation HD Radio receivers support text based “ID3 Tag data” such as song title, artist, album, genre and commercial/promotional information.



Multicasting – The second generation of HD Radio receivers, now shipping, support multicasting, the ability to divide a digital broadcast to support more than one broadcast audio service.



Surround Sound – Second generation also supports surround sound encoded audio (ID tag). Many of the most popular surround solution such as Dolby, SRS and Neural Audio have been tested by iBiquity and are receiver compatible and decode encoded signals.



HD Radio Review – Also currently supported in advanced HD Radio ICs, the ability to rewind live audio broadcasts :45 sec. Also could be used to store a fixed :45 sec audio clip.



HD Radio Data – Currently supported in advanced HD Radio ICs, the ability to transmit and received non-audio digital content will enable new and valuable services such as the delivery of real-time traffic information to in-vehicle navigation systems.



HD Radio System Capabilities- Future



Multimedia Support – Currently supported in advanced HD Radio ICs, the ability to receive and render images such as album art, artist image or sponsor logo.



Conditional Access – Encrypted stream to deliver subscription-based audio and data. Provides the ability to offer premium or adult orientated material.



Electronic Program Guide – Station and program information delivered to a radio to support program identification, selection and tuning. Could support features like program reminders and time shifting.



Store & Replay – Ability to time shift broadcast audio programming. Audio programs would be stored in memory within the radio device for later replay. Potential to take protected material off-board to other playback devices.



On-Demand Audio Services – Enable the automatic storage and continuous update of time critical audio services such as traffic, weather, news and sports.



HD Radio Technology Partners



HD Radio™ Station Rollout Status

1,650 Licensees

226 Markets
 94 Top 100 Markets
 51 States Served (incl. DC & PR)
 Population Served 244M (84%)
 Listeners Served 120M (42%)

1,146 On The Air

176 Markets
 90 Top 100 Markets
 50 States Served*
 Population Served 235M (81%)
 Listeners Served 108M (37%)

529 Multicasts

500 Stations
 86 Markets
 47 Top 50 Markets
 89 Broadcast Groups
 Population Served 172M (59%)
 Listeners Served 66M (23%)

Rnk	Market	Lic	On	HD2
1	New York	28	24	13
2	Los Angeles	41	38	18
3	Chicago	39	33	21
4	San Francisco	28	23	15
5	Dallas	33	27	14
6	Philadelphia	26	22	14
7	Houston	25	21	10
8	Washington, DC	23	22	12
9	Detroit	26	26	15
10	Atlanta	30	25	16
11	Boston	26	23	13
12	Miami	29	24	12
13	Puerto Rico	8	1	0
14	Seattle	28	22	15
15	Phoenix	12	11	5
16	Minneapolis	16	14	11
17	San Diego	9	9	6
18	Nassau-Suffolk	4	3	2
19	Tampa	19	14	10
20	St. Louis	20	19	7
21	Baltimore	10	8	6
22	Denver	32	28	12
23	Pittsburgh	11	9	8
24	Portland, OR	16	14	9
25	Cleveland	17	12	7

Rnk	Market	Lic	On	HD2
26	Sacramento	15	12	6
27	Riverside, CA	5	3	1
28	Cincinnati	17	15	8
29	Kansas City	7	7	0
30	San Antonio	18	14	3
31	Salt Lake City	15	13	4
32	Las Vegas	12	7	5
33	Milwaukee	16	13	7
34	San Jose	5	5	2
35	Charlotte	14	10	6
36	Providence	9	6	3
37	Orlando	18	11	3
38	Columbus, OH	12	9	3
39	Middlesex, NJ	4	1	1
40	Norfolk, VA	11	10	4
41	Indianapolis	18	18	10
42	Austin	10	10	8
43	Raleigh-Durham	8	6	2
44	Nashville	11	10	5
45	Winston Salem	9	7	4
46	West Palm Beach	11	8	4
47	New Orleans	7	3	0
48	Jacksonville	11	8	3
49	Memphis	10	9	6
50	Hartford	12	10	7

* Data for primary market stations only.



HD Digital Radio Alliance



Unprecedented Radio-Industry Alliance Will Advance Rollout of HD Digital Radio

December 6, 2005

Member companies will also devote more than \$200 million in commercial inventory on their own stations in 2006 to promote HD digital radio and the new HD2 multicast channels. More than 200 million people listen to radio each week.

HD Digital Radio Alliance Pumps Up the Volume in 2007; New Ad Campaign Will Top \$250 Million

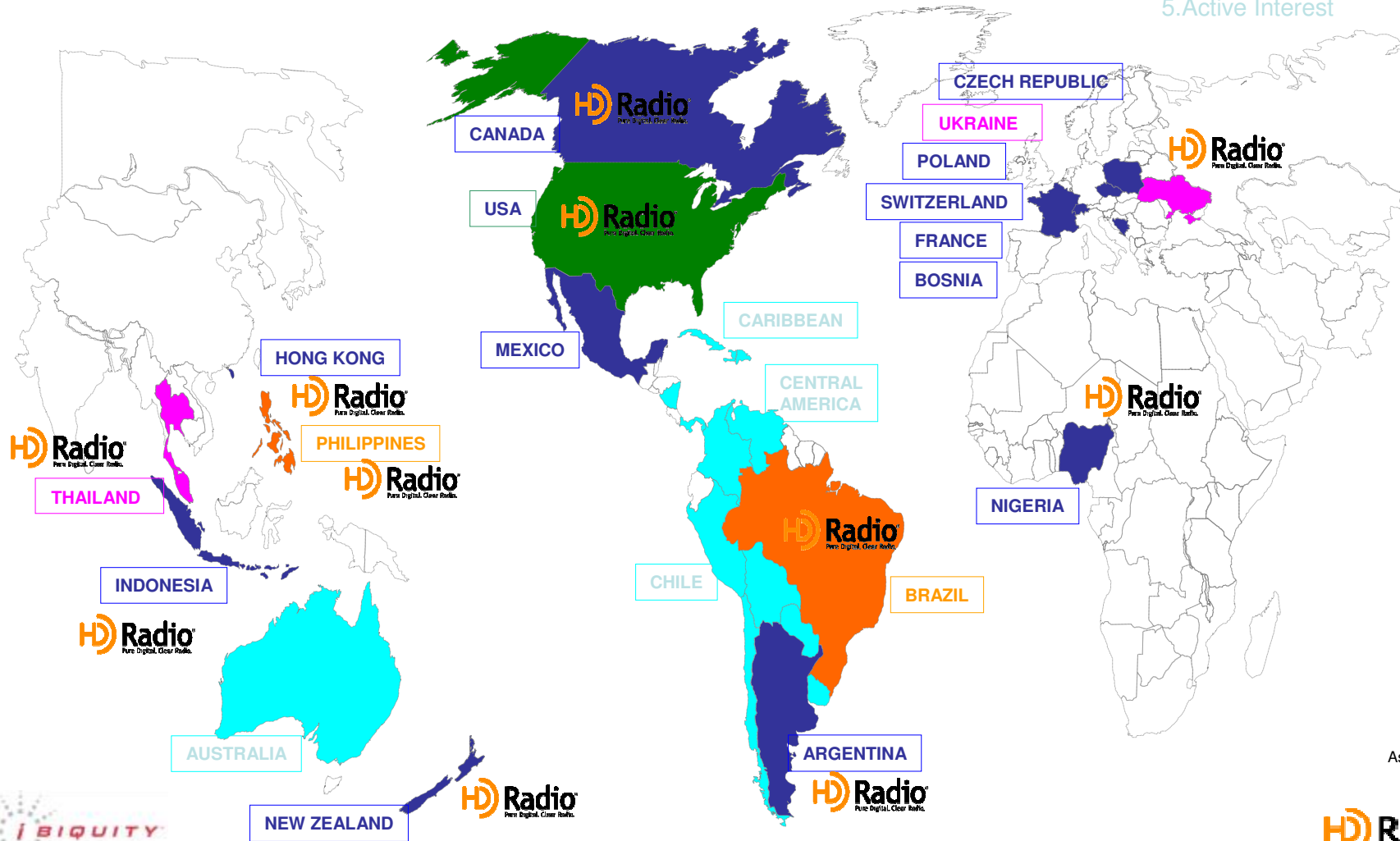
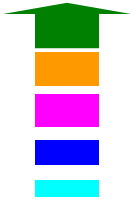
December 4, 2006

Unprecedented momentum includes largest-ever radio campaign and fastest consumer technology rollout in history



Worldwide HD Radio Implementation Status

1. Adoption and Nationwide Operation
2. Adoption and Regional Operation
3. Limited Operation
4. Testing and Advanced Interest
5. Active Interest



As of 12/06



HD Radio Receiver Rollout Update

+ 30 Models available by 1Q 2007

Car Receivers

- Alpine (DVA-9965)
- Fujitsu/Eclipse (HDR-105 HD)
- JVC (KD-SHX900), (KD-HR1)
- Kenwood (KTC-HR100TR), (900)
- Panasonic (CQ-CB8901U)
- Sanyo (ECD HD 1990M)



Alpine



Fujitsu/Eclipse



Kenwood



JVC



Polk Audio



Panasonic

Home Receivers

- Boston Acoustics (Recepter Radio® HD)
- Polk Audio (i-Sonic Entertainment System)
- Radiosophy™ (Multistream™)
- Yamaha (RX-V4600)
- Cambridge Soundworks 820HD
- Denon DRA-697CI
- Niles
- Radio Shack Accurian HDX3
- Sangean America HDT-1
- Integra DTR-10.5, TUN-3.7 and RDC-7.1
- Onkyo TX-NR1000 and T-4555P



Rotel



Recepter Radio®



Sanyo



Onkyo



Audio Design Associates



Yamaha

Custom Receivers

- Audio Design Associates (Quadri-tune)
- Day Sequerra – (Models 2, 4)
- Rotel (RT-1084 HD)



Denon



DaySequerra



HD Radio Retail Status

Specialty/ Online	Major Regional Electronics Retailers	National Electronics Retailers	General Big Box Retail
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• Available Now!



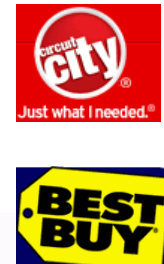
• Available Now!
• Added 500+ stores since Alliance launched



• Available Now!



• Coming Soon!



• Coming Soon!



HD Radio OEM Automotive Update



- All BMW models will offer HD Radio
- Current ongoing discussions with major car brands

Next 2 years:
9 Brands/49 Models
with HD Radio



Summary

- Broadcast
 - Well ahead of plan for broadcaster deployment of basic and multicast services

- Radio
 - Large and growing base of radio manufacturing licensees,
 - Immediate need for volume based product introductions

- Cost / Manufacturing
 - Costs coming down
 - Ease of integration going up with available Reference Designs and iBiquity support

- Growing interest in international community
 - IBOC solution seen as viable for virtually all “Commercial Broadcasting” worldwide



- **Better Sound**
- **Improved Reception**
- **More Content**

**A Revolution
in Choice, Sound, Radio.**

With more formats
than ever before.

No fees. No subscription.

JOIN THE REVOLUTION.

**HD Digital
Radio™**

www.hdradio.com

AM and FM Radio is FREE

