



*Introducing High-Performance  
FM RDS Data Receiver ICs*

March 2008

# Silicon Labs Broadcast Audio Division

- ◆ Highly successful product family
  - >100MU units shipped
- ◆ Broad portfolio of pending and granted patents
- ◆ International presence and local support in all major markets
- ◆ Rapidly expanding portfolio of solutions targeting digital and analog audio broadcast markets



**Tune in with Silicon Labs,  
You Can Hear the Difference**

**Single-Chip Broadcast Radio Solutions**  
The Si47xx family of broadcast audio solutions is the industry's first to leverage digital integration and 100% CMOS, resulting in completely integrated, easy-to-use solutions that require only two external components and less than 15 mm<sup>2</sup> of board space. Leveraging Silicon Labs' proven digital low-IF receiver and transmitter architectures and frequency synthesizer technology, the Si47xx family delivers superior RF performance and interference rejection. Digital signal processing is utilized to provide optimum sound quality under varying signal conditions. The Si47xx family provides unmatched design flexibility with a complete footprint-compatible portfolio of AM and FM solutions.

**Footprint Compatible Portfolio**

Part Number	Features
Si4702/03	• FM receiver • RDS (Si4703)
Si4704/05	• FM receiver • RDS (Si4705) • No external antenna required
Si4710/11	• FM transmitter • RDS (Si4711)
Si4712/13	• FM transmitter • RDS (Si4713) • Receive power scan (RPS)
Si4720/21	• FM transceiver • RDS (Si4721) • No external antenna required
Si4730/31	• AM/FM receiver • RDS (Si4731)

**USB FM Radio Reference Design**

- FM Radio Tuner
- C8051F321 USB MCU
- Radio Player for PC

[silabs.com/USBRadio](http://silabs.com/USBRadio)

Product details: [www.silabs.com/Audio](http://www.silabs.com/Audio)

MCUs | TIMING | POWER | BROADCAST | WIRELINE | WIRELESS

**SILICON LABS**  
[www.silabs.com](http://www.silabs.com)

## Broadcast Product Family

Industry leading performance and feature sets for broadcast solutions based on unique RF capability

- ◆ Broadcast Audio Receivers and Transmitters
- ◆ Satellite Radio Tuner
- ◆ Satellite STB Receivers



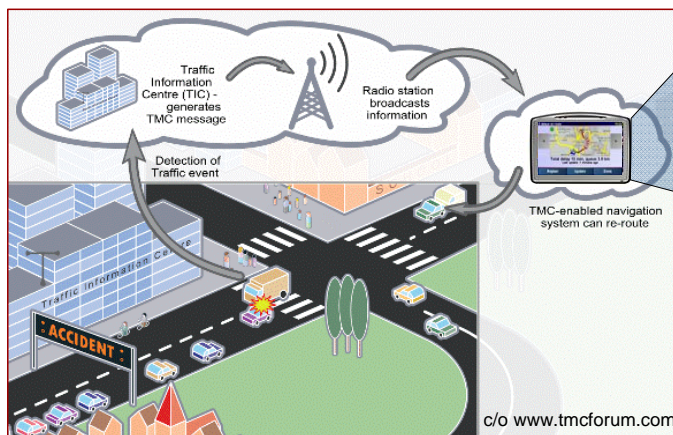
### Common Applications:

Cellular Handsets  
Portable Media Players  
and accessories  
Navigation Devices  
Set-Top Boxes  
XM Satellite Radios



## RDS-TMC Navigation Proliferation

- ◆ Traffic Message Channel (TMC) system provides real-time traffic information over FM RDS
- ◆ RDS-TMC is being bundled with GPS to provide real-time traffic information to consumers
  - Explosive growth in US and Europe in automotive telematics, portable navigation devices (PNDs) and mobile GPS-enabled devices



**RDS**  
RADIO DATA SYSTEM

**TMC**  
TRAFFIC MESSAGE CHANNEL

**SILICON LABS**

## Introducing Si4706/49 RDS Data Receivers

- ◆ High-performance RDS receivers provide industry-leading sensitivity and reliability

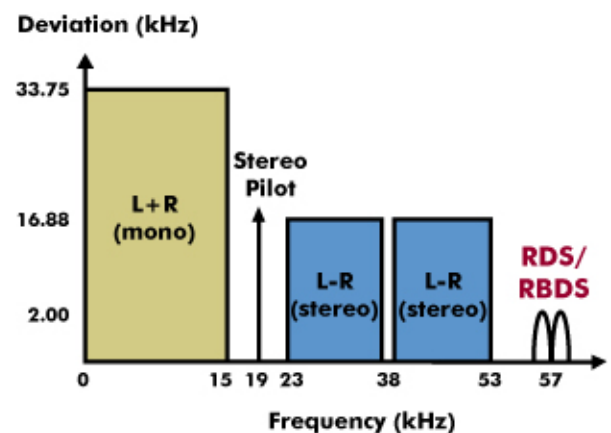
- Results in higher confidence in the traffic data received

- ◆ Advanced RDS processing and decode techniques raise the performance bar

- Digital low-IF architecture provides unmatched flexibility

- ◆ Smallest, most highly integrated solutions for portable and automotive markets

- Integrate the entire receiver from antenna input to RDS output



## Addressing Both Automotive and Portable Markets

### Si4749

- ◆ Automotive companion tuner
- ◆ AEC-Q100 qualified
- ◆ Rapid AF tuning and qualification
- ◆ Unmatched RDS performance
- ◆ 4 x 4 x 0.85 mm 24 pin QFN



### Si4706

- ◆ PND, mobile device RDS tuner
- ◆ Unmatched RDS performance
- ◆ Supports antenna-free enclosures
- ◆ Stereo digital/analog audio out
- ◆ 3 x 3 x 0.55 mm 20 pin QFN

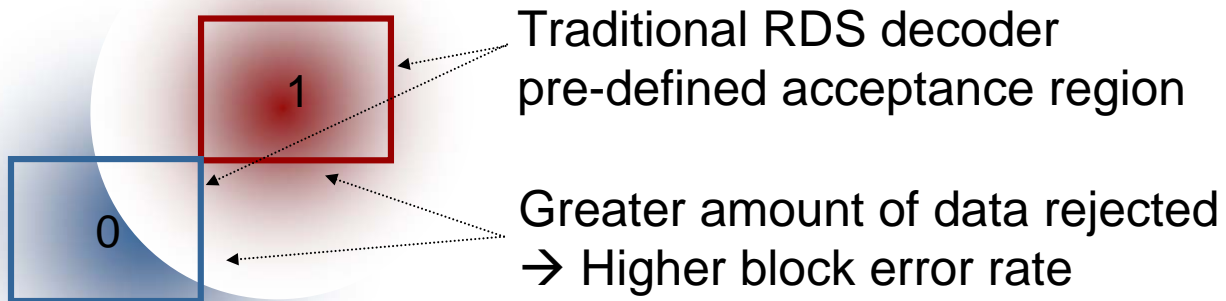


\*\* Devices shown are illustrative of target market and do not imply design wins

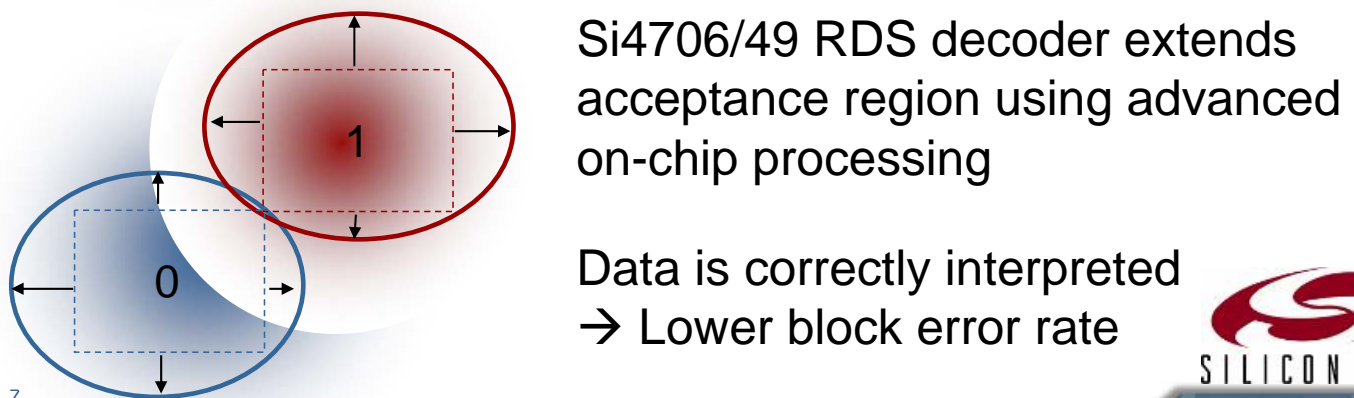


## Higher Quality Data Received

### Traditional RDS decoder

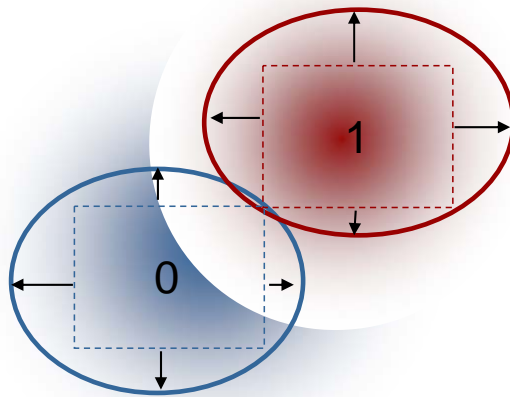


### Si4706/49 RDS Decoder



## High Performance Benefits End Users

Feature	Benefit
◆ Increased sensitivity in low signal environments	◆ Receives better data, farther from RDS transmitter during users' commute
◆ More persistent RDS synchronization	◆ Fewer dropped connections requiring re-synchronization and data recovery
◆ Reduced RDS synchronization times	◆ Faster synchronization if lost in variable signal environment
◆ Better data decode reliability	◆ More reliable data received





## Industry-Leading Sensitivity



Newest competition  
(15  $\mu\text{Vemf}$ )



Market-leading  
Si4703-B17  
(12  $\mu\text{Vemf}$ )



**Si4706/49**  
(8  $\mu\text{Vemf}$ )



◆ The industry's best RDS sensitivity

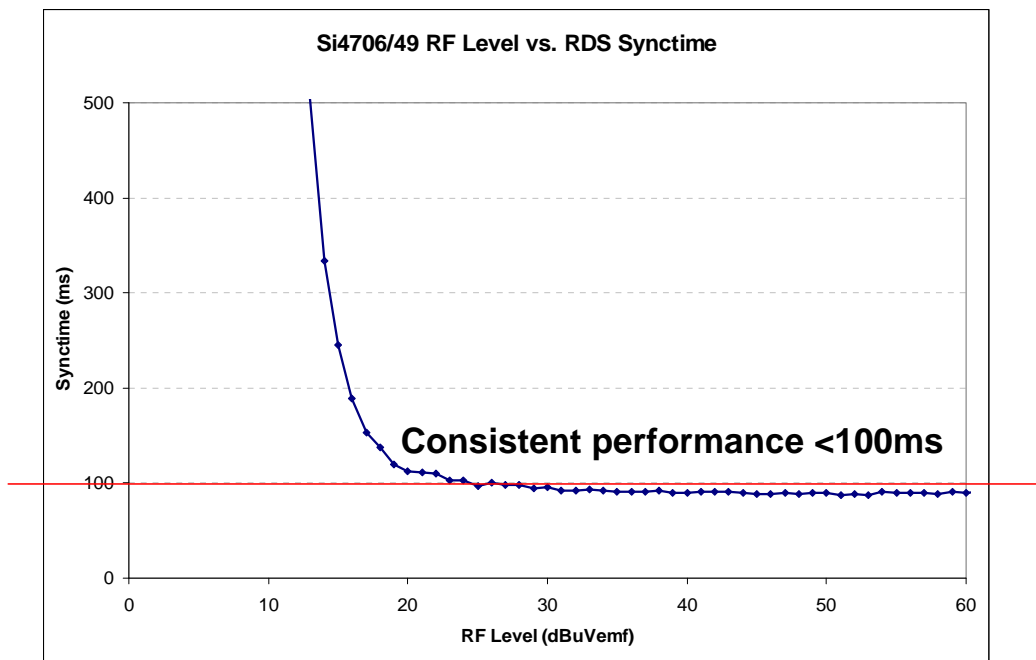
➤ Si4706 and Si4749 receive data farther from transmitter

◆ Si4706/49 sensitivity is 8  $\mu\text{Vemf}$  at 5% BLER

➤ Nearly 2x better than competition



## Fastest RDS Synchronization Time



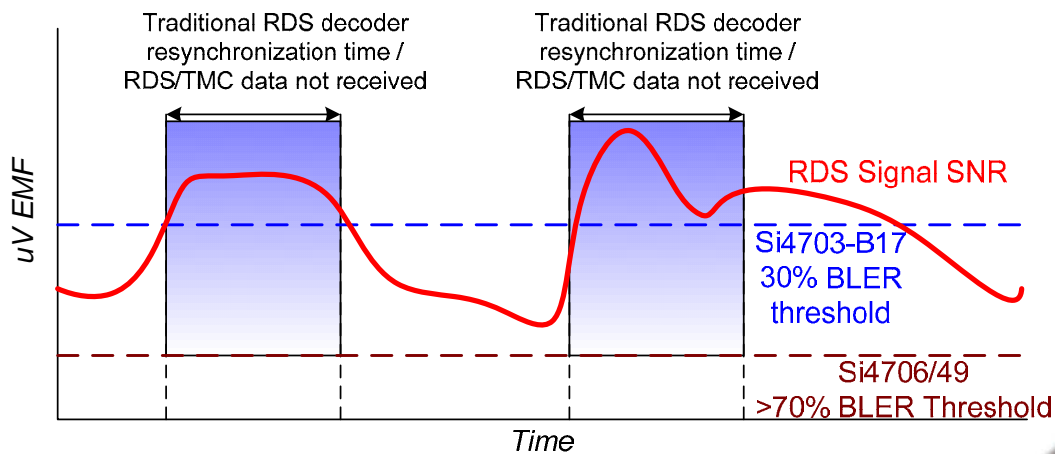
RDS deviation = 2kHz

- ◆ Rapid synchronization in weak and varying signal level environments
  - Quicker synchronization with transmitter if signal is lost



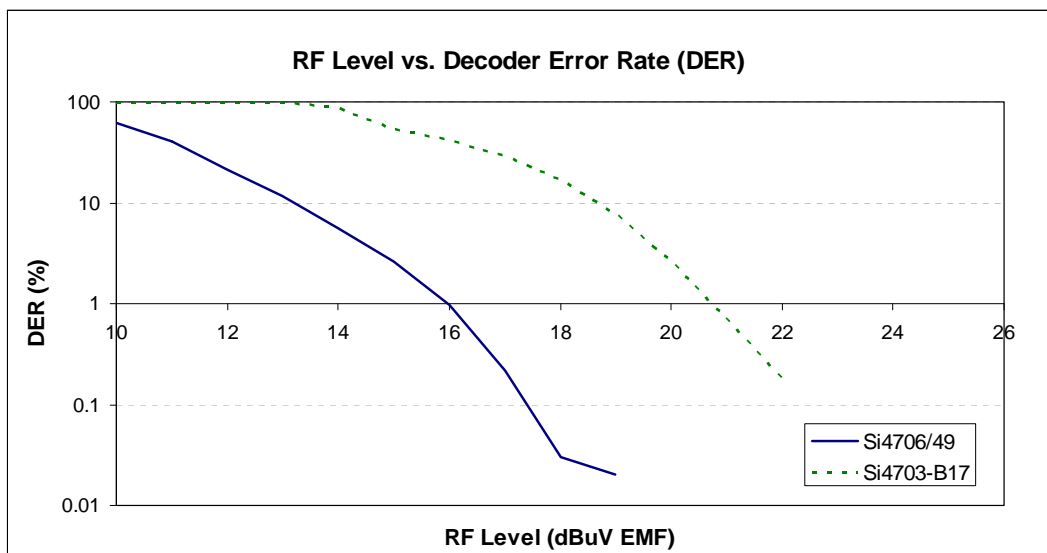
## Superior RDS Synch Persistence

- ◆ Si4706/49 RDS synchronization persistence is 2x improvement over market-leader
  - Si4706/49 maintain synch to 4uV EMF @ 70% BLER
  - Si4703-B17 maintains synch to 8uV EMF @ 30% BLER
- ◆ Si4706/49 does not lose synchronization in illustration
  - RDS data is immediately received upon improved SNR conditions



## Excellent Decoder Reliability

- ◆ Decoder reduces incorrect/undecipherable RDS data
  - Improves TMC and RDS song meta data integrity
  - More accurate information leads to better user experience



## Si4706/49 Unmatched Programmability

Feature	Benefit
◆ Interrupts on change in block A and / or block B	◆ RDS block A almost never changes and block B changes with programming content. Interrupts likely indicate change or similarity in broadcaster or content
◆ Full granularity with all blocks and BLER	◆ Allows host processor to post-process if user desires ◆ User can also select interrupts by BLER level, conserving host processor cycles
◆ Interrupts by block-specific BLER	◆ Allows error-thresholds, content-specific or application-specific interrupts to save host power
◆ On-chip buffer up to 25 RDS groups with associated BLER by block (100 blocks)	◆ Reduces interrupts and therefore power consumption load of host processor ◆ Especially useful in decoding ODA information with large groups of data ◆ Greater than 50 times more data than competition provides



## Summary

- ◆ Advanced RDS decode engine offers industry-leading performance, directly benefiting end-users
- ◆ Digital low-IF architecture proven industry-wide as mature, reliable, proven
- ◆ High integration and simple programming make adding companion / data receiver easy and cost-effective





*[www.silabs.com/broadcast](http://www.silabs.com/broadcast)*