CYPRESS CʏFɪ™ LOW-POWER RF SOLUTIONS

RELIABLE. SIMPLE. POWER-EFFICIENT.

CYPRESS

PERFORM

THE CyFi™ LOW-POWER RF SOLUTION

OPTIMIZING WIRELESS RELIABILITY, RANGE, AND BATTERY LIFE

ENABLING WORRY-FREE WIRELESS NETWORKING

The CyFi™ Low-Power RF solution is the highly reliable, easy-to-use 2.4-GHz answer to a wide range of wireless embedded control challenges. It enables designers to create wireless systems without making compromises to overcome the typical risks of unreliable performance, complex implementation, and high power consumption. By combining Cypress's PSoC® programmable system-on-chip, a CyFi Direct Sequence Spread Spectrum (DSSS) transceiver, and a sophisticated yet lightweight network protocol stack, the CyFi solution achieves levels of reliability, simplicity, and power-efficiency unmatched by other embedded wireless technologies.

WHAT IS THE CyFi SOLUTION?
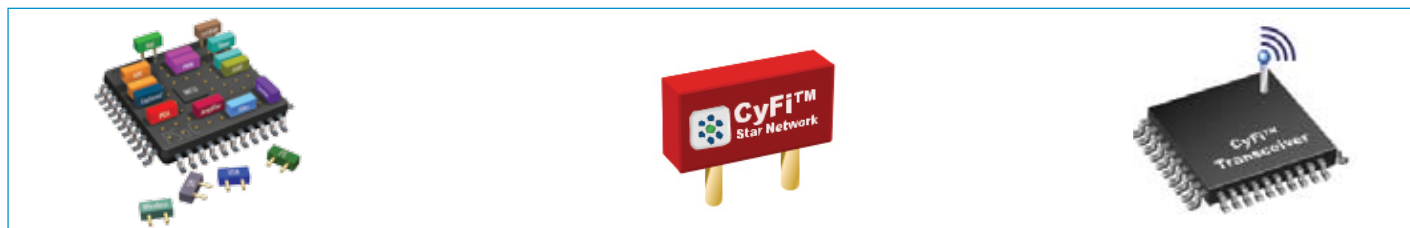
PSoC® PROGRAMMABLE SYSTEM-ON-CHIP

PSoC devices combine dynamic, configurable analog and digital blocks and an 8-bit MCU on a single chip, enabling designers to build complete wireless embedded systems with fewer components and shorter design cycles.

### CyFi STAR NETWORK PROTOCOL STACK

A preconfigured firmware module that manages a robust star-topology wireless network featuring:

- Up to 250 nodes
- Bi-directional communication
- Active link and power management
- Coin-cell operation
- Simple network commissioning

CyFi TRANSCEIVER

- Operation in the 2.4-GHz ISM band
- DSSS modulation for interference immunity, enhanced co-location, and extended range
- 1 Mbps/250 Kbps/125 Kbps data rates
- 80 discrete channels
- Up to +4 dBm output power
- Up to -97 dBm receive sensitivity

THE CyFi SOLUTION POWERS THE WORLD'S LEADING APPLICATIONS
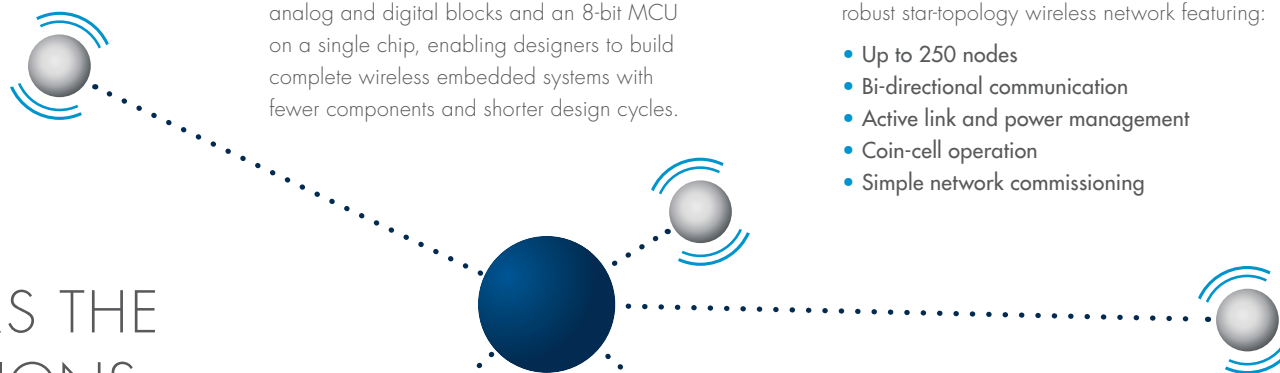
HUMAN INPUT
AND REMOTE CONTROL

SPORTS AND LEISURE

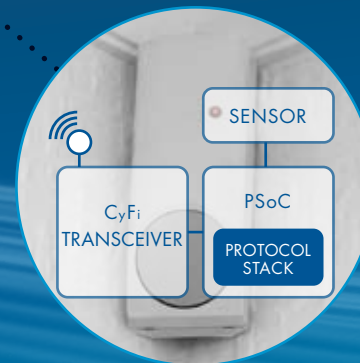LOW-POWER SENSOR NETWORKS

HOME/BUILDING AUTOMATION
AND SECURITY

INDUSTRIAL MONITORING
AND CONTROL

MEDICAL AND
WELL-BEING EQUIPMENT

SENSOR

CyFi
TRANSCEIVER

PSoC

PROTOCOL
STACK

ASSET MANAGEMENT

RELIABILITY
POWER-EFFICIENCY
POWERED BY PSoC
SIMPLICITY

PROVEN RF EXPERTISE

Cypress's award-winning 2.4-GHz radio transceivers are designed into hundreds of products by some of the world's largest OEMs, and Cypress has shipped more than 30 million units.

Our success reflects a philosophy of providing customers with complete, easy-to-use solutions that aid in every phase of product development, from concept to production. This philosophy is the foundation of the CyFi Low-Power RF solution.

AWARDS

2007 EE Times ACE Award Finalist

2006 EEPW Magazine's Editor's Choice Award

2005 EDN China Innovation of the Year Award

2005 EEPW Magazine's Best New Embedded System Technology

2004 EE Times Ultimate Products Award Finalist

2004 Electronic Industry Design Awards: Most Innovative Product

2003 Electronic Products Magazine Product of the Year

2003 Electron D'Or Winner: Electronique Magazine

CʏFɪ ADVANTAGES

RELIABLE
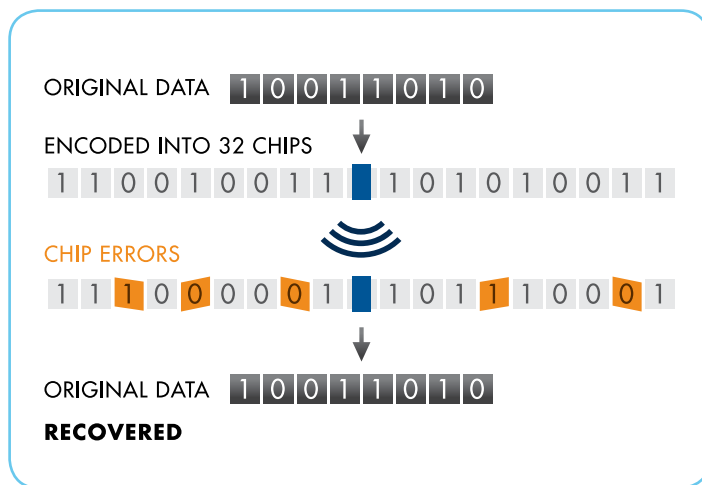
ENSURE A WORRY-FREE LINK IN THE 2.4-GHz BAND

Reliable transmission is a key challenge in any wireless system. CyFi networks dynamically vary operating channel, data rate, and output power in real-time to maintain reliable communication in the presence of interference. This provides the designer with the benefits of using the 2.4-GHz ISM band (such as worldwide acceptance) without the reliability pitfalls commonly associated with other RF technologies in this congested band.

ORIGINAL DATA `1 0 0 1 1 0 1 0`

ENCODED INTO 32 CHIPS
`1 1 0 0 1 0 0 1 1` `1 0 1 0 1 0 0 1 1`

CHIP ERRORS
`1 1 1 0 0 0 0 0 1` `1 0 1 1 1 0 0 0 1`

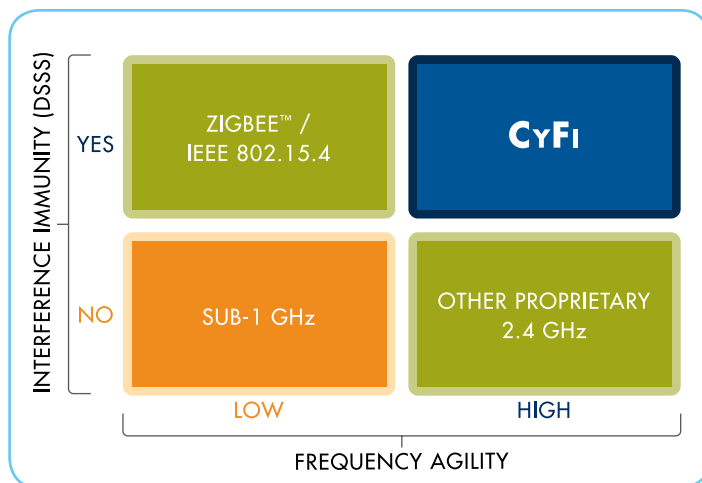ORIGINAL DATA `1 0 0 1 1 0 1 0`
RECOVERED

DIRECT SEQUENCE SPREAD SPECTRUM (DSSS)
CyFi networks can utilize DSSS to encode data into "chips" before transmission. Data can then be recovered even if some of these chips are corrupted due to interference.

FREQUENCY (GHz)
2.396 2.400 2.404 2.408 2.412 2.416 2.420 2.424 2.428 2.432
Wi-Fi®   CʏFɪ
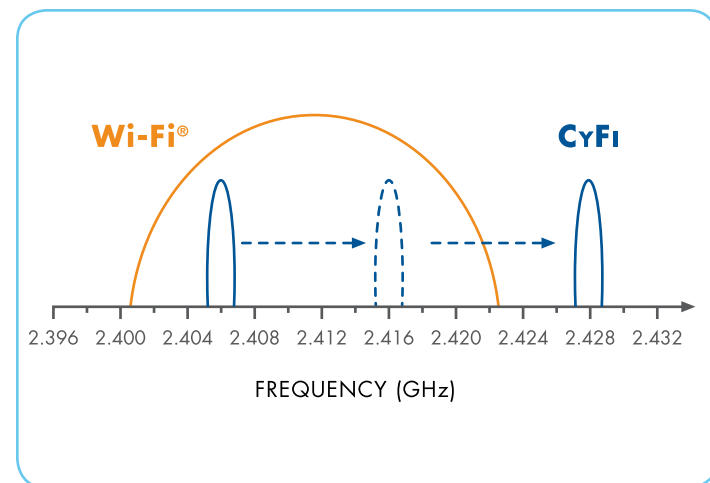
FREQUENCY AGILITY
CyFi networks automatically switch channels if overwhelmed by common sources of interference, such as Wi-Fi®. And because CyFi signals occupy only 1-MHz of bandwidth, there are five times as many channels to choose from compared to other technologies like IEEE 802.15.4.

INTERFERENCE IMMUNITY (DSSS)

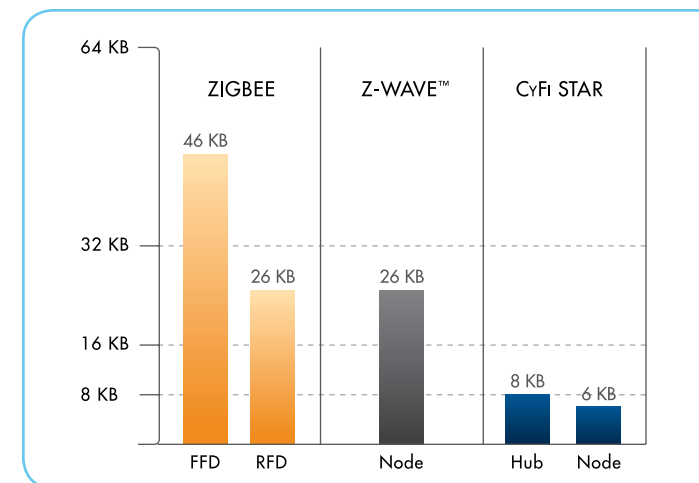|	LOW	HIGH
YES	ZIGBEE™ / IEEE 802.15.4	CʏFɪ
NO	SUB-1 GHz	OTHER PROPRIETARY 2.4 GHz

FREQUENCY AGILITY

ULTIMATE RELIABILITY
The combination of DSSS modulation, frequency agility, and sophisticated link management algorithms means CyFi Low-Power RF delivers reliability that is simply unmatched by any other 2.4-GHz wireless technology.

SIMPLE

DESIGN EFFORTLESSLY AND GET TO MARKET FASTER

The CyFi solution offers a revolutionary level of simplicity to RF design. The CyFi Star Network Protocol stack is encapsulated in a firmware user module, which is literally dragged and dropped into any PSoC design in the PSoC Designer™ IDE. Setting up the network, and reliably transmitting and receiving data, is then a matter of a few simple API calls. See how easy it is at www.cypress.com/firsttouch.

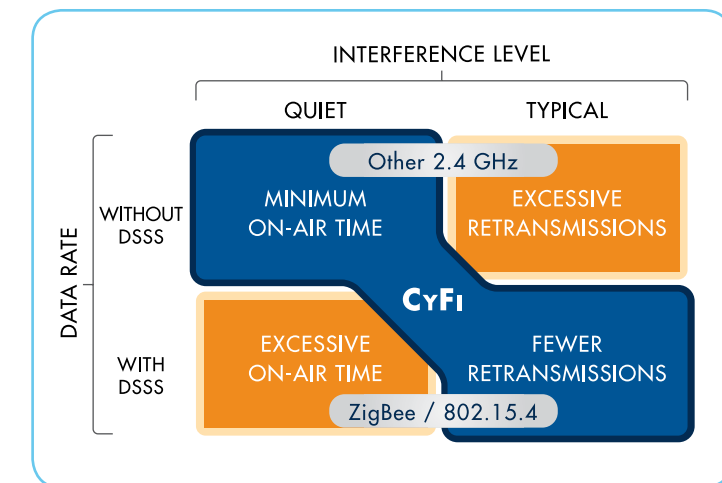|	ZIGBEE		Z-WAVE™	CʏFɪ STAR	
64 KB					
46 KB	●				
32 KB					
26 KB		●	●		
16 KB					
8 KB				● 8 KB	● 6 KB
	FFD	RFD	Node	Hub	Node

POWERFUL YET LIGHTWEIGHT
The CyFi Star Network Protocol stack is surprisingly light weight, occupying less than 6KB of code space for a node. This frees up more room for building the complete embedded wireless system in a single PSoC device.

POWER-EFFICIENT

INTELLIGENT LOW POWER CONSUMPTION

Besides very low active and sleep currents, the CyFi Low-Power RF solution takes a system approach to power efficiency. The CyFi networks minimize periods of peak current consumption and maximize sleep. In some cases that means transmitting data as fast as possible. In others, it means enabling DSSS modulation, and possibly increasing RF output power to eliminate the need for retransmission. CyFi networks automatically make such decisions in real-time—the only low-power RF technology to do so.

INTERFERENCE LEVEL

DATA RATE	QUIET	TYPICAL
WITHOUT DSSS	MINIMUM ON-AIR TIME (Other 2.4 GHz)	EXCESSIVE RETRANSMISSIONS
WITH DSSS	EXCESSIVE ON-AIR TIME (ZigBee / 802.15.4)	CʏFɪ — FEWER RETRANSMISSIONS

A UNIQUE CONSERVATION STRATEGY
The CyFi solution is the only low-power RF technology that dynamically switches data rates and output power to minimize power consumption based on its operating environment.

MEASURE BATTERY LIFE IN YEARS, NOT WEEKS OR MONTHS

As a battery-powered CyFi node moves closer to the network hub, it reduces its RF output power to minimize current consumption. This ensures that it will always use exactly as much current as needed to successfully transmit its data, and no more.

GETTING STARTED WITH CYFI LOW-POWER RF SOLUTIONS:

EVERYTHING YOU NEED IS HERE

STARTER KIT

#### PSoC FIRSTTOUCH™ KIT WITH CYFI LOW-POWER RF (CY3271)

This intuitive starter kit allows you to evaluate the PSoC programmable system-on-chip and CyFi low-power RF in CapSense™ touch-sensing, proximity-sensing, temperature-sensing, and light-sensing applications. It includes a PC dongle with RF, an RF expansion card with power amplification for long-range applications, a multifunction expansion card, and two battery packs (2xAAA and CR2032). It also features the PSoC Designer IDE and Cypress's sense and control dashboard software.

DEVELOPMENT KIT

CYFI LOW-POWER RF DEVELOPMENT KIT (CY3210-CYFI)

This full-featured development kit enables you to prototype and debug your complete wireless application based on PSoC programmable system-on-chip devices, CyFi protocol stacks, and CyFi transceivers. This kit comes with two base boards, two PSoC evaluation pods, and three CyFi RF modules, as well as helpful tutorials and demos to get you up and running quickly.
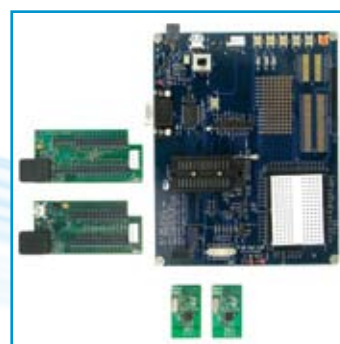
INTEGRATED DEVELOPMENT ENVIRONMENT

PSoC DESIGNER™

The PSoC Designer™ IDE (shown below) enables the rapid development of advanced embedded solutions, rich in analog features, powered by PSoC devices. It features a large library of preconfigured firmware user modules (including the CyFi Star Network Protocol stack user module) for drag-and-drop convenience, with the ability to add sophisticated C or Assembly language code on-the-fly.

SENSOR NETWORK SOFTWARE

SENSE AND CONTROL DASHBOARD

Quickly setup and monitor a wired or wireless sensor network through this intuitive visual dashboard. Take advantage of features such as data logging, data aggregation, alarms, and sensor calibration for nearly any type of sensor.

PRODUCTS

PSoC	
For the most up-to-date information on Cypress's PSoC programmable system-on-chip, please visit cypress.com/psoc	
CYFI TRANSCEIVER	
PART	CYRF7936
TEMP	0 to +70 degrees C
DATA RATE	1 Mbps (GFSK) / 250 Kbps (DSSS) / 125 Kbps (DSSS)
PACKAGE	40 QFN
OPERATING VOLTAGE	1.8V to 3.6V
CYFI PROTOCOL STACK	
TOPOLOGY	Star
NETWORK CAPACITY	250 Nodes per hub
STACK SIZE	Node: 4.5 to 7.5K, Hub: 8K
UNIQUE FEATURES	• Asynchronous, bidirectional communication • Support for high-latency (battery-powered) and low-latency (wall-powered) nodes • Active Link Management for optimum reliability • Active Power Management for lowest system power

GET STARTED TODAY—PURCHASE YOUR PSoC FIRSTTOUCH™ KIT WITH CYFI LOW-POWER RF SOLUTIONS NOW AT:
CYPRESS.COM/FIRSTTOUCH

CONTACT US AND INTEGRATE RELIABLE, CY-FI LOW-POWER RF TODAY!

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