OPENSYNERGY

Embedding Bluetooth, Anywhere

January 2025

PUBLIC

Experts in Bluetooth® and Hardware Virtualization

- OpenSynergy is an Independently managed company set up in 2007 and is headquartered in Berlin, Germany, with a global team of 40 employees located in Europe and USA
- With a broad global base of Customers and Partners, we license automotive grade embedded software Bluetooth SDKs and a Radio Tuner SDK for the next generation of vehicles, continuously investing in research, innovation and product development
- Our Bluetooth® stacks, Blue SDK & RapidLaunch SDK, are the reference Bluetooth implementation for many automotive Tier1s and OEMs, now deployed in hundreds of automotive programs and in more than 350 million vehicles around the world
- OpenSynergy also provides engineering services to support the customization of its products

Embedding Bluetooth, Anywhere

OPENSYNERGY

OVER

25 YEARS of Bluetooth®

- Automotive Industry Leader for Bluetooth
- Serving Mobile, Consumer, Industrial, & Automotive Industries
- Android™, Linux®, Windows™ & RTOS Expertise
- ISO9001 Certified

350 MILLION+
BLUE SDK
AUTOMOTIVE SHIPMENTS

1 BILLION +
BLUE SDK
DEVICE SHIPMENTS

EMBEDDING BLUETOOTH, ANYWERE

BLUETOOTH PRODUCTS

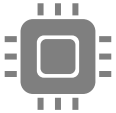
BLUE SDK	DUAL-MODE EMBEDDED BLUETOOTH STACK
BLUE SDK FUSION	REPLACEMENT BLUETOOTH STACK FOR AOSP
BLUE SDK RAPIDLAUNCH	BLUE SDK INTEGRATION FOR LINUX
BLUE SDK MESH	BLUETOOTH MESH STACK

BERLIN MUNICH UTAH MICHIGAN

BLUE SDK

Automotive-Grade, Embedded Bluetooth® Stack

FLEXIBLE, ROBUST, PROVEN



WORKS WITH ANY HARDWARE

EASY INTEGRATION & UPDATES

DECREASES COST & TIME TO MARKET

AUTOMOTIVE READY

WORKS WITH ANY HARDWARE

EASY PORTING — UP AND RUNNING ON NEW HARDWARE PLATFORMS WITHIN HOURS

ANY

BLUETOOTH CHIPSET

HOST PLATFORM

VENDOR

CYPRESS EMBEDDED IN TOMORROW™ · MARVELL · ublox · H&D Wireless

Infineon · NXP · muRata · Panasonic

BROADCOM · MEDIATEK · Laird · LG Innotek

Texas Instruments · Qualcomm · AND MORE

COMPLETE BLUETOOTH SOLUTION FOR LINUX

1

BLUE SDK

INDUSTRY-LEADING BLUETOOTH STACK

Highly Customizable Protocol Stack

Pre-integrated A/V & Telephony Profiles

+

RAPIDLAUNCH

2

LINUX INTEGRATION OF BLUE SDK

Simplified Bluetooth APIs for easy multi-application access to Bluetooth services

3

Works with ANY

BLUETOOTH CHIPSET

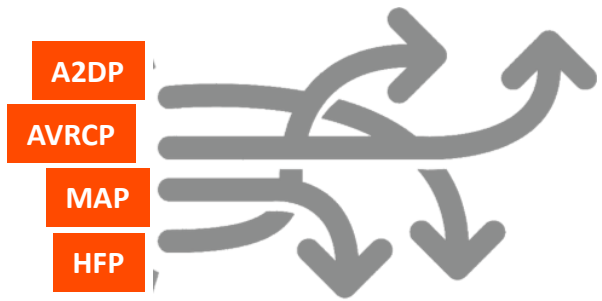
HOST PLATFORM

VENDOR

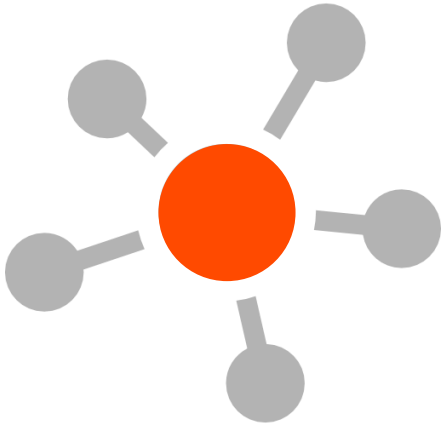
CYPRESS · MARVELL · u-blox · H&D Wireless · infineon · NXP · muRata · Panasonic · BROADCOM · MEDIATEK · Laird · LG Innotek · Texas Instruments · Qualcomm · AND MORE

AUTOMOTIVE READY

EASILY HANDLES COMPLEX AUTOMOTIVE USE CASES



CONCURRENT MULTIPLE PROFILES



MULTIPLE CONNECTIONS

SECURE PHONEBOOK CACHING

AND MORE

FLEXIBLE & ROBUST

EASILY IMPLEMENT HIGHLY COMPLEX REQUIREMENTS

IOP

INTEROPERABILITY

EASILY HANDLES COMPLEX INTEROPERABILITY REQUIREMENTS

STABILITY

PRECISION TO PREVENT CRASHES WHILE MAXIMIZING HARDWARE CAPABILITIES

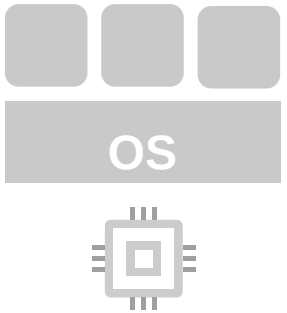
QUALITY

CONFIDENCE FOR CRITICAL SYSTEMS THAT CANNOT FAIL

PROVEN RELIABILITY

#1 BLUETOOTH STACK USED ACROSS A VARIETY OF OPERATING SYSTEMS, COMPILERS, RADIOS, & APPLICATIONS FOR OVER 25 YEARS IN OVER 1 BILLION END-DEVICES

Large range of customers spanning many industries with varying requirements



Supports many different interoperability requirements in many different environments with high stability

Proven results from simple to complex applications, including multi-connection & multi-profile

DIVERSE REQUIREMENTS & WIDESPREAD ADOPTION HAVE DRIVEN BLUE SDK TO BECOME HIGHLY FEATURE-RICH, FLEXIBLE, ROBUST, & STABLE

SUPERB INTEROPERABILITY

EASILY HANDLES COMPLEX INTEROPERABILITY REQUIREMENTS

INTERNAL TESTING

FOR **EVERY** RELEASE

Reference Platform + Common Smartphones

Proprietary Tests

3rd Party Bluetooth Test Tools

including static code analysis & Defensics™ Fuzz testing

EXTERNAL TESTING

Extensive Partner Testing

Invested in latest devices and equipment

Customer Feedback

Blue SDK Deployed on over a Billion Cars & Devices

Bluetooth UnPlugFest

Other implementations and 3rd Party Software

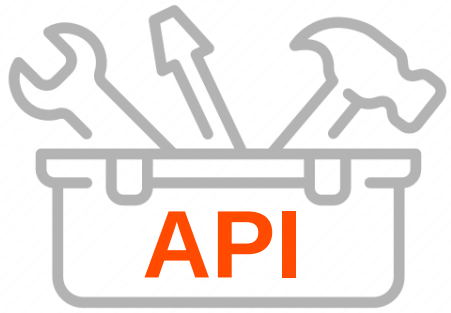
ENDLESS EXTENDABILITY

EXTENDABLE API ALLOWS FOR ADDITIONAL FEATURES AND FUNCTIONALITY

FEATURE	COMMON EXAMPLES
CONNECTION MANAGEMENT	• Control When Profiles Connect • Reject Incoming Connection Requests • Change Behaviors Based on Use (e.g., Apple CarPlay or Android Auto)
MULTI-PROFILE CAPABILITIES	• Pause PBAP Downloads While Streaming Music • Address Specific Use Cases Specified by OEMs
PHONEBOOK ACCESS PROFILE	• Parallel Sessions - Two Phone Book Downloads in Parallel • Pause/Resume Phonebook Download • Limit DB Size to Prevent Crashes
HANDSFREE PROFILE	• Dual SCO Connections (Mixing In-Band Ring-Tones with Ongoing Call) • Multiple Phones Connected to IVI • AT Extensions for Phone/Vendor Specific (E.G., Apple Siri Commands)
A2DP/AVRCP	• Cover Art Support (AVRCP)
ENHANCE EXISTING PROFILES	• SMS/EMAIL Download and Browsing (MAP)

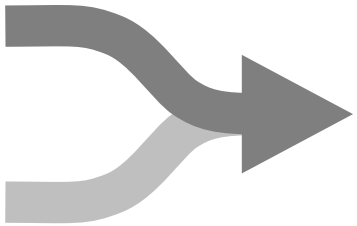
EASY INTEGRATION & UPDATES

MINIMAL EFFORT, ROBUST PERFORMANCE



COMPLETE, FLEXIBLE, & ROBUST

Rich set of flexible APIs with over 25 years' worth of helper APIs, macros, and utilities



SIMPLE TO UPDATE & MAINTAIN

Clear abstraction of platform-specific code and between integration code and the stack

PRE-INTEGRATED PROFILES

Profiles can be compiled with the stack into a single self-contained task or multi-threaded

BLUETOOTH 5.4

LE GATT SECURITY LEVELS CHARACTERISTIC

Adds two optional characteristics in GAP that contain the required security level(s) of a BR/EDR or LE connection that allows a connecting device to use all supported GATT functionality

ENCRYPTED ADVERTISING DATA

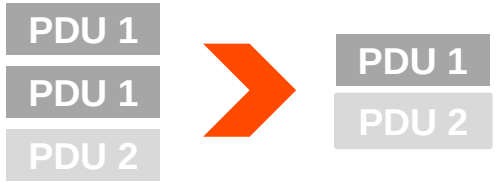
The ability to encrypt Advertising data

CODING SCHEME SELECTION ON ADVERTISING

Allows the Host to select the LE Coded PHY coding scheme for LE Advertising Extensions.

BLUETOOTH 5.3

NEW



PERIODIC ADVERTISING ADI

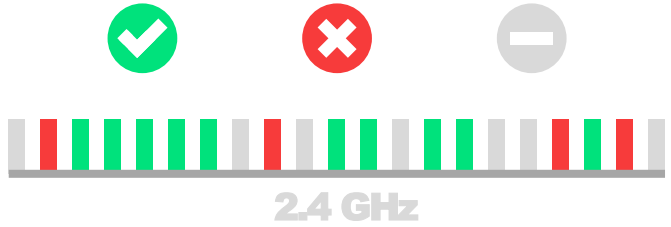
Enables filtering of duplicate periodic advertising reports before sending to the Host

ENCRYPTION KEY SIZE CONTROL

Provides the Host the ability to program the minimum encryption key size in a BR/EDR Controller

LE CONNECTION SUBRATING

Allows the connection interval of existing connections to be rapidly modified, adjusting duty cycle based on use case



LE CHANNEL CLASSICATION

Reports radio channel as good or bad to help avoid channels with interference during adaptive frequency hopping

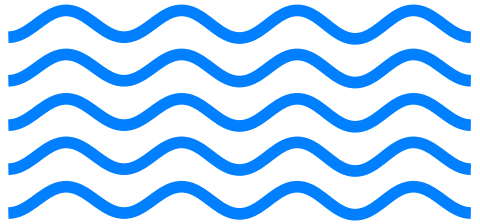
BLUETOOTH 5.2

ENHANCED ATTRIBUTE PROTOCOL

ATT and GATT-based profiles can now handle concurrent transactions

DYNAMIC LE POWER CONTROL

Reduces transmitter power consumption and optimizes signal strength

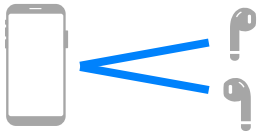


LE ISOCHRONOUS CHANNELS

Enables LE Audio, new topologies, and new use cases

LE AUDIO

WIRELESS AUDIO STREAMING VIA AN LE RADIO



MULTI-STREAM AUDIO

AURACAST™ BROADCAST AUDIO

~~A2DP~~
~~AVRCP~~
~~HFP~~
~~HSP~~
→ TMAP

NEW PROFILES

LC3

NEW CODEC

AND MORE

OPTIMIZED SINGLE-MODE LE

OPTIMIZED FOR AUDIO STEAMING & DATA TRANSFER OVER A SINGLE-MODE LE RADIO

Removes unneeded Classic components to better support resource-constrained systems

RADIO TUNER SDK

Automotive Radio Integration is a Complex Challenge

Analog Radio Standards
DAB/DAB+
HD Radio
FM
DRM30
CDR
DRM+
AM
Digital Radio Standards

Seamless Linking
Service / AF Following
RDS strategy
Announcements
Co-Channel
Background Scan

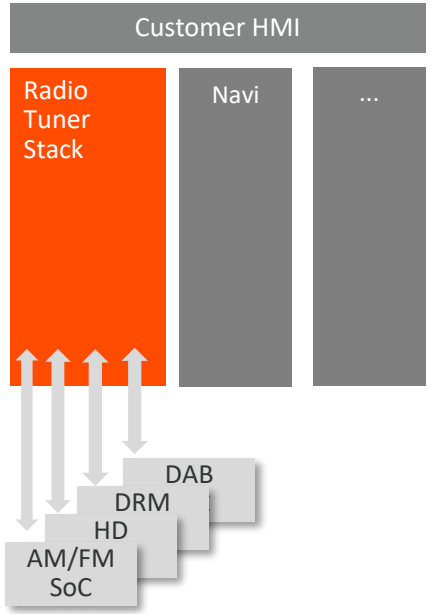
ETSI Standard Compliance
Certification
Regionalization (REG)
Hybrid Radio
Learn Memory

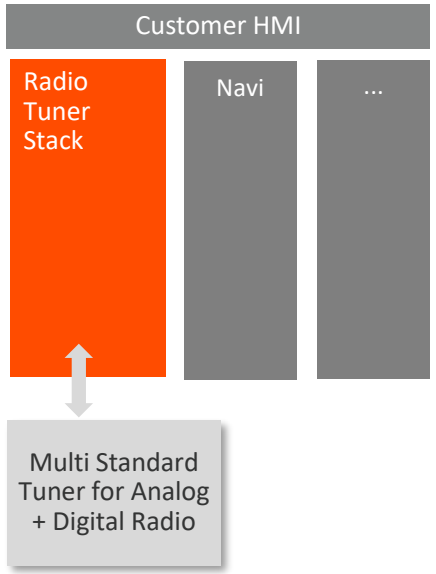
Chipmaker diversity
Firmware Update
Market Diversity
Chipset diversity
Chipset generations

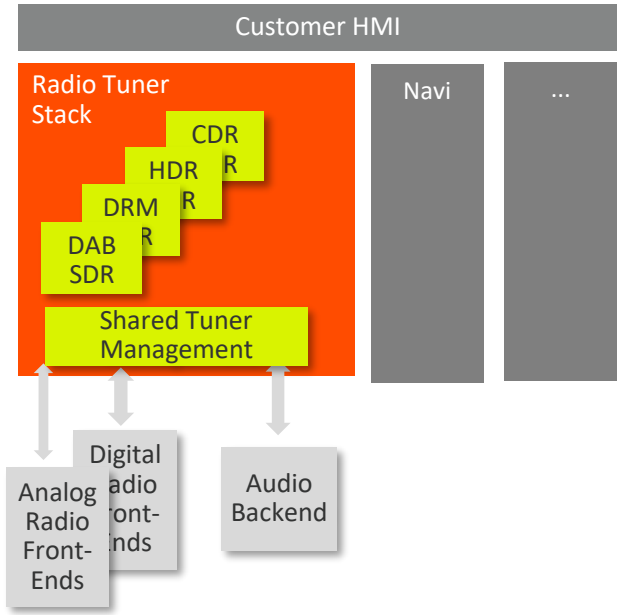
TMC
EPG SPI
TPEG
Radio Data System (RDS/RBDS)
TII
Slideshow
Meta Data
Artist Experience

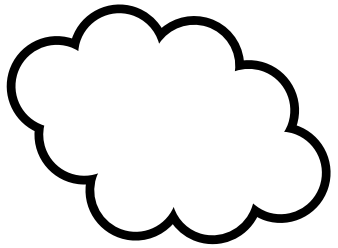
Designed for the Software Defined Radio

1st Generation | 2nd Generation | 3rd Generation | Next Generation









- Dedicated Tuner SoCs
- Multi-standard tuner hardware
- Software Defined Radio
- Wideband multi-tuner systems
- Shared tuner management

Radio Tuner SDK now with USB support

A software radio component for automotive infotainment systems

- Supports different broadcast standards worldwide
- Supports chipsets from major makers
- Supports Android Broadcast HAL, Linux and QNX
- Comes with integration and optimization tools (e.g. Radio GUI and Service Tool)
- Enables hybrid radio
- Rapid prototyping with USB tuner NEW

RADIO TUNER SDK

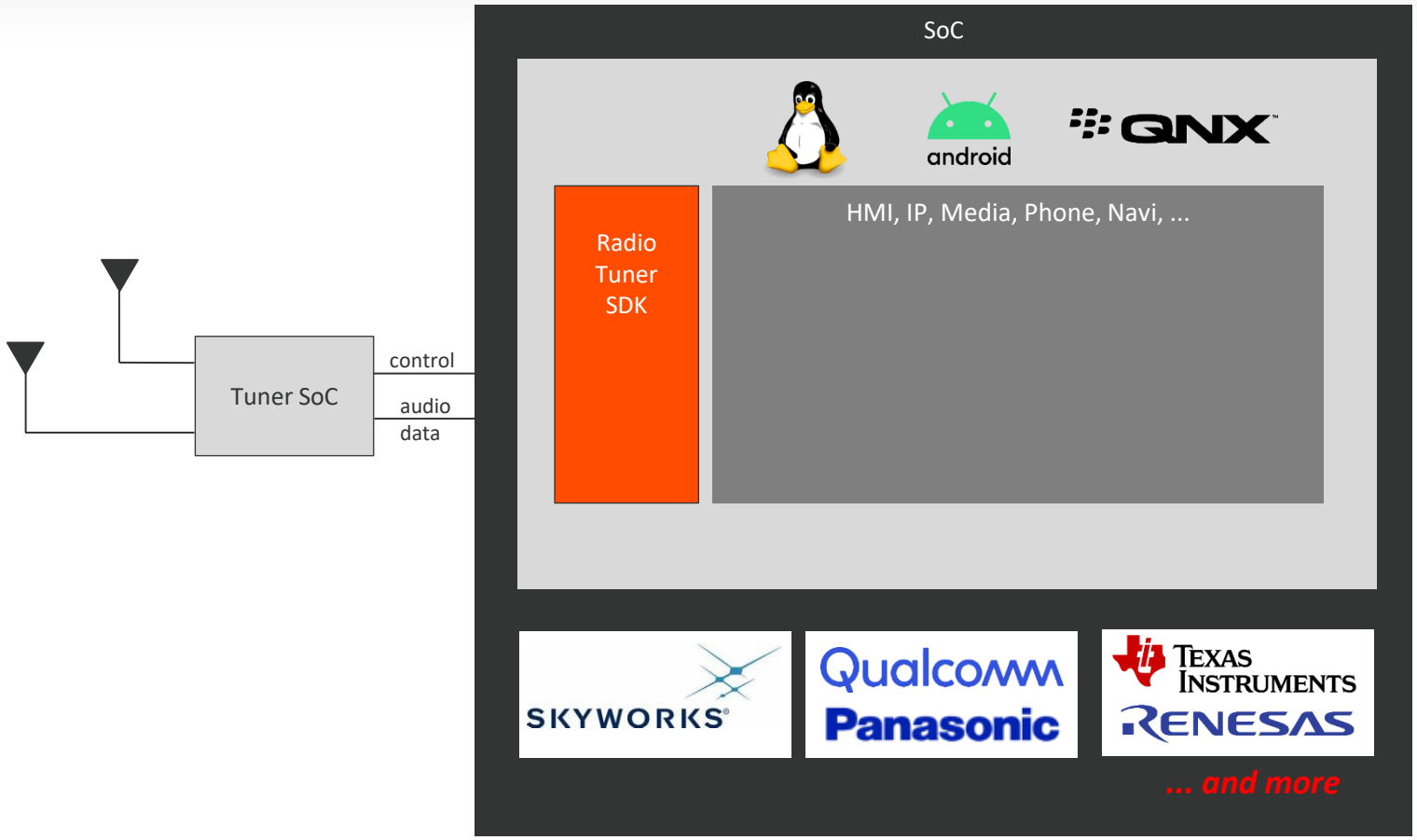
It's **hardware agnostic:**

- it supports most popular car radio tuner SoCs and tuner chips
- It's portable on various OEM-specific hardware, easy adaptable to new BSP and OS due to abstraction layers
- supports of distributed HW/SW architectures (e.g. remote tuner)

Provides the **same quality level in every vehicle**

- in different car lines (entry, mid, high)
- worldwide (supports all relevant reception standards, such as AM/FM, DAB, HD Radio, DRM, CDR)

SOFTWARE DEFINED RADIO



NXP Tuners

- SAF400x (Mercury Family)
- TEF7100 (Merlin)
- TEF3200 (Radion)
- And dlder products

Skyworks Tuners

- SI47X (Dual Eagle Tuner)
- SI46X (Dual Falcon Digital Decoder)

Panasonic Tuners

- Panasonic's Cubit Family (Amigo3.5)

EXPERT SERVICE & SUPPORT

Bluetooth®

25 YEARS

INDUSTRY LEADER

AVERAGE

24 HOUR RESPONSE TIME

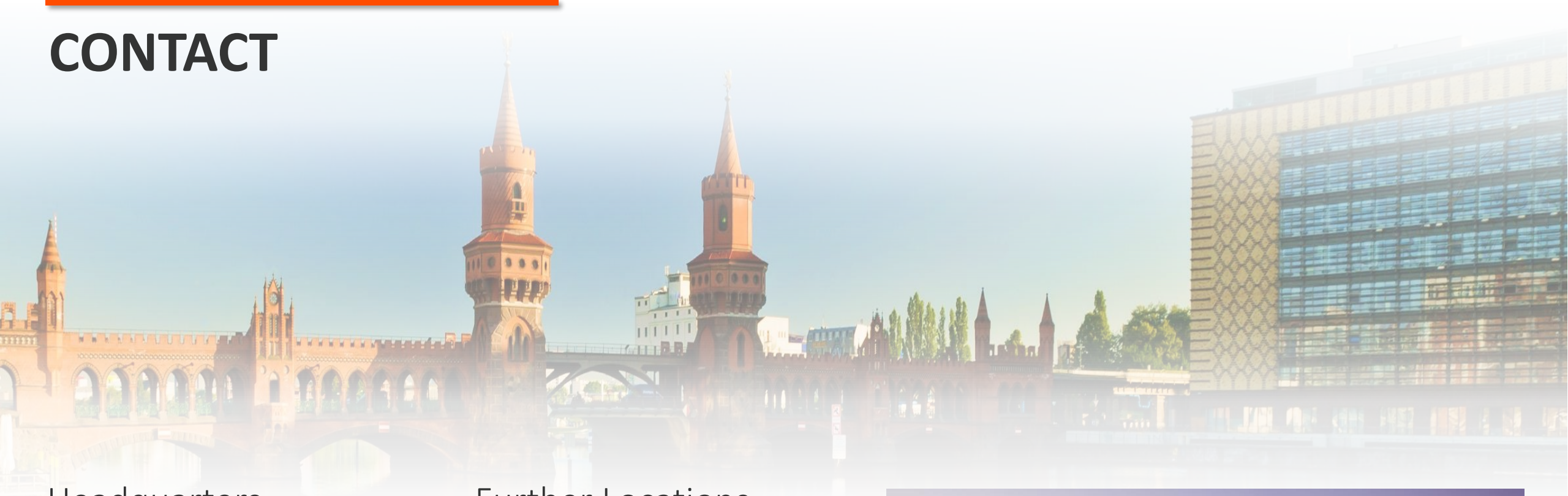
FAST, DETAILED RESPONSES

BLUETOOTH AND RADIO TUNER EXPERTS

PORTING AND INTEGRATION SERVICES AVAILABLE UPON REQUEST

OPENSYNERGY

CONTACT



Headquarters

OpenSynergy GmbH

Rotherstraße 20
D-10245 Berlin
Germany
Phone +49 30 6098 540 - 0

Further Locations

OpenSynergy, Inc. (USA)

765 East 340 South
Suite 106
American Fork, UT 84003
Phone +1 (801) 692-1653

E-Mail info@opensynergy.com
Web www.opensynergy.com