

Introduction

The RNBD350 Add On Board is an efficient low-cost development platform to evaluate and demonstrate the features, capabilities and interfaces of Microchip's Bluetooth® Low Energy RF module RNBD350PE, compliant to the mikroBUS™ Add On Bus Standard. It also includes an on-board MCP2200 USB-to-UART converter enabling an out-of-box evaluation with no other hardware requirements.

The RNBD350 Add On Board offers:

1. Easy-to-use platform to speed up design concepts to revenue with the Bluetooth Low Energy RF Module:
 - a. Host board supporting mikroBUS Socket
 - b. Host PC via USB Type-C™ interface
2. No need for external hardware tools
3. Small low-cost form factor

The RNBD350 Add On Board supports a wide range of applications. The following are a few of them:

- Wireless lighting
- Home automation
- Internet of Things (IoT)
- Industrial automation
- General purpose Bluetooth data

Features

- RNBD350PE Bluetooth® Low Energy RF Module
- USB or Host Board-Powered at 3.3V Power Supply
- Host Control Interface Over UART
- USB-to-UART Converter with MCP2200 Enables Fast Evaluation with No External Hardware Requirement
- mikroBUS™ Add On Bus Standard, Enables Support with Host Boards with mikroBUS Socket
- User LEDs for Status/Event Indication
- Power LED (Green)
- PTA Header to Support Bluetooth Low Energy Wi-Fi® Co-Existence Applications
- Fully supported by MPLAB® X Tools and MPLAB Harmony v3 with Example Applications

Table of Contents

Introduction.....	1
Features.....	1
1. Quick References.....	3
1.1. Reference Documentation.....	3
1.2. Hardware Prerequisites.....	3
1.3. Software Prerequisites.....	3
1.4. Acronyms and Abbreviations.....	3
2. Kit Overview.....	4
2.1. Kit Contents	5
3. Hardware.....	6
3.1. Power Supply.....	6
3.2. RNBD350PE Module Control Interface.....	7
3.2.1. Host PC with On-Board MCP2200 USB-to-UART Converter.....	7
3.2.2. Host MCU Board with mikroBUS Socket via mikroBUS Interface.....	8
3.3. LEDs.....	8
3.3.1. Red Event Indication LED (D1).....	8
3.3.2. Blue Bluetooth Status LED (D2).....	8
4. RNBD350 Add On Board Out-of-Box Demo.....	10
5. Appendix A: Reference Circuit.....	11
5.1. RNBD350 Add On Board Reference Schematics.....	11
5.2. RNBD350 Add On Board Bill of Materials.....	13
6. Appendix B: Regulatory Approval.....	14
6.1. United States.....	14
6.2. Canada.....	15
6.3. Europe.....	15
7. Document Revision History.....	16
Microchip Information.....	17
The Microchip Website.....	17
Product Change Notification Service.....	17
Customer Support.....	17
Microchip Devices Code Protection Feature.....	17
Legal Notice.....	17
Trademarks.....	18
Quality Management System.....	19
Worldwide Sales and Service.....	20

1. Quick References

1.1 Reference Documentation

For further details, refer to the following:

- *MCP1727 1.5A, Low Voltage, Low Quiescent Current LDO Regulator Data Sheet (DS21999)*
- *Universal Serial Bus Specification and Associated Documents (www.usb.org)*
- *mikroBUS™ Specification (www.mikroe.com/mikrobus)*
- *PIC32CX-BZ3 and WBZ35x Family Data Sheet (DS70005541)*
- *RNBD350 Bluetooth® Low Energy Module Data Sheet (TBD)*
- *RNBD350 Bluetooth® Low Energy Module User's Guide (TBD)*

1.2 Hardware Prerequisites

- RNBD350 Add On Board
- USB Type-C cable
- Bluetooth-enabled Smartphone:
 - Android™ device
 - iOS® – iPhone®
- Host Board with mikroBUS socket support

1.3 Software Prerequisites

- MPLAB® Integrated Development Environment ([MPLAB X IDE](#)) tool

1.4 Acronyms and Abbreviations

Table 1-1. Acronyms and Abbreviations

Acronyms and Abbreviations	Description
BOM	Bill of Material
GPIO	General Purpose Input Output
IoT	Internet of Things
LDO	Low-Dropout
LED	Light Emitting Diode
MCU	Microcontroller
NC	Not Connected
PTA	Packet Traffic Arbitration
RX	Receiver
TX	Transmitter
UART	Universal Asynchronous Receiver Transmitter
USB	Universal Serial Bus

2. Kit Overview

The RNBD350 Add On Board contains an RNBD350PE Module. The signals required for control interface and other status/event indicators are connected to the on-board features of the Add On Board for flexibility and rapid prototyping.

Figure 2-1. RNBD350 Add On Board (EV65D15A) – Top View

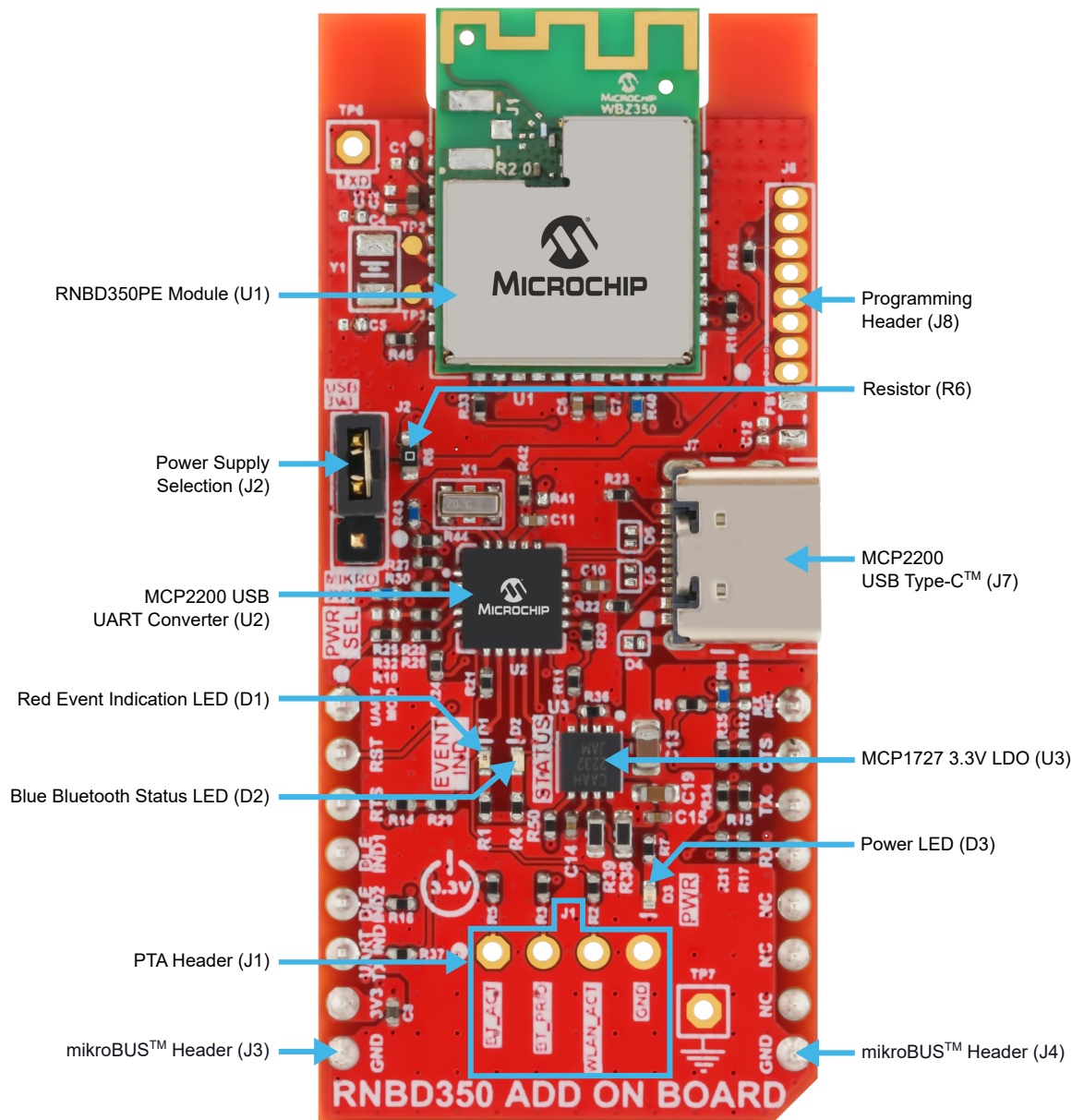
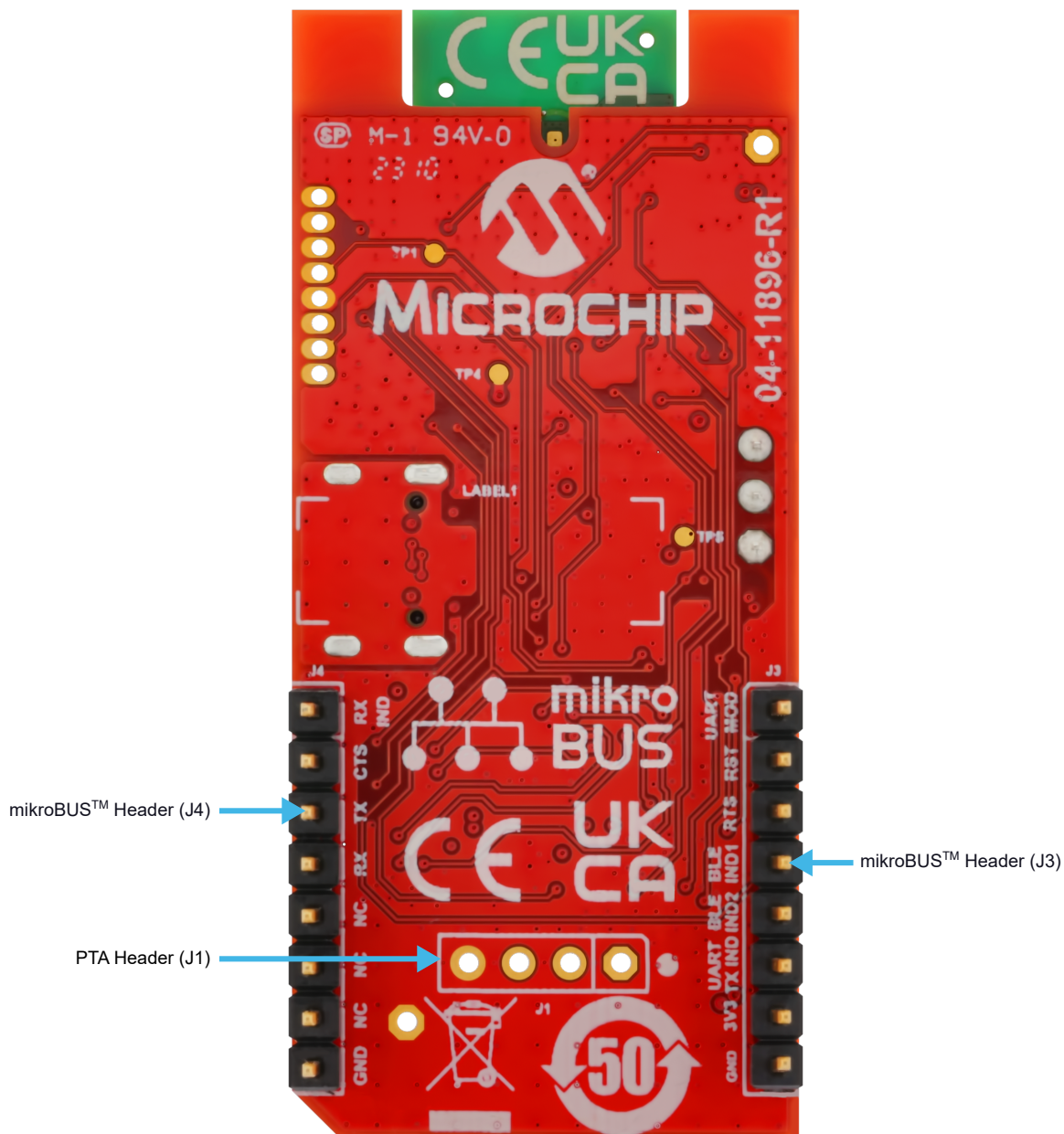


Figure 2-2. RNBD350 Add On Board (EV65D15A) – Bottom View



2.1 Kit Contents

The EV65D15A (RNBD350 Add On Board) kit contains the following:

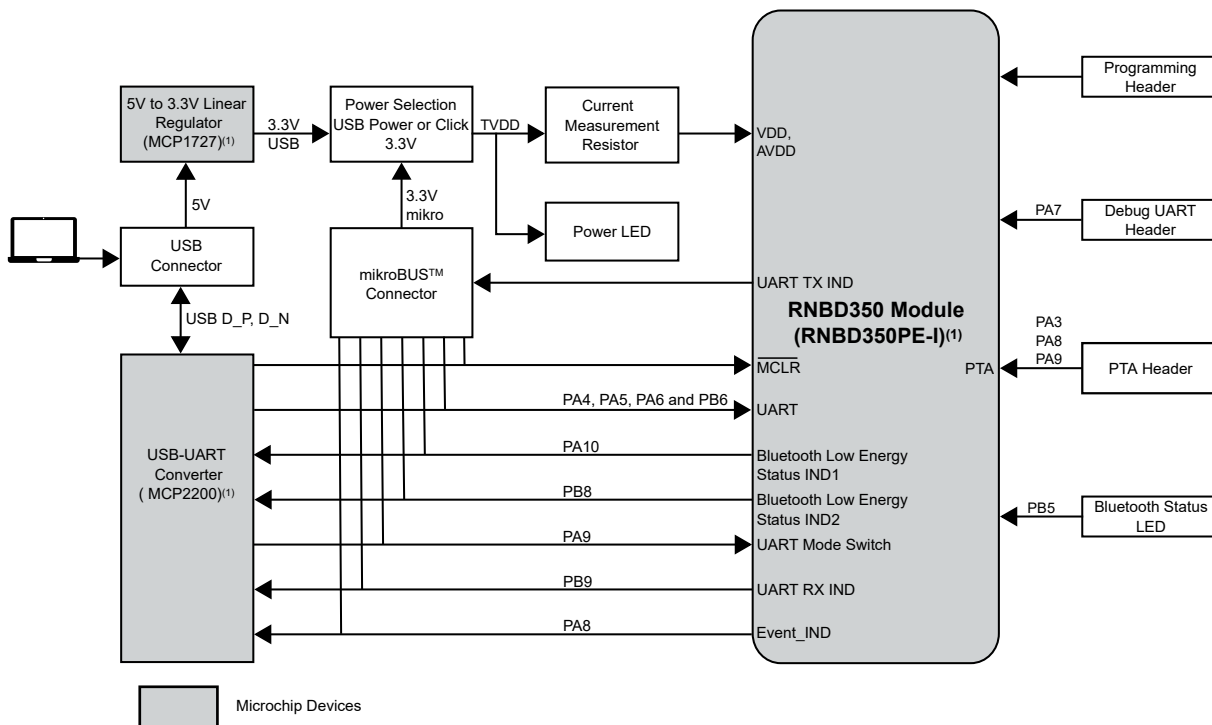
- An RNBD350PE Module mounted on the RNBD350 Add On Board

Note: If any of the above items are missing from the kit, go to support.microchip.com or contact your local Microchip Sales office. In this user guide, there is a list of Microchip offices for sales and services provided on the last page.

3. Hardware

This chapter describes the hardware features of the RNBD350 Add On Board.

Figure 3-1. RNBD350 Add On Board Block Diagram



Note:

- Using Microchip’s total system solution, which includes complementary devices, software drivers and reference designs, is highly recommended to ensure the proven performance of the RNBD350 Add On Board. For more details, go to support.microchip.com or contact your local Microchip Sales office.

Table 3-1. Microchip Components Used in RNBD350 Add On Board

S.No.	Designator	Manufacturer Part Number	Description
1	U1	RNBD350PE-I100	Module RNBD350PE-I100
2	U2	MCP2200-I/MQ	Microchip interface USB UART MCP2200-I/MQ QFN-20
3	U3	MCP1727T-ADJE/MF	Microchip analog LDO 0.8-5V MCP1727T-ADJE/MF DFN-8

3.1 Power Supply

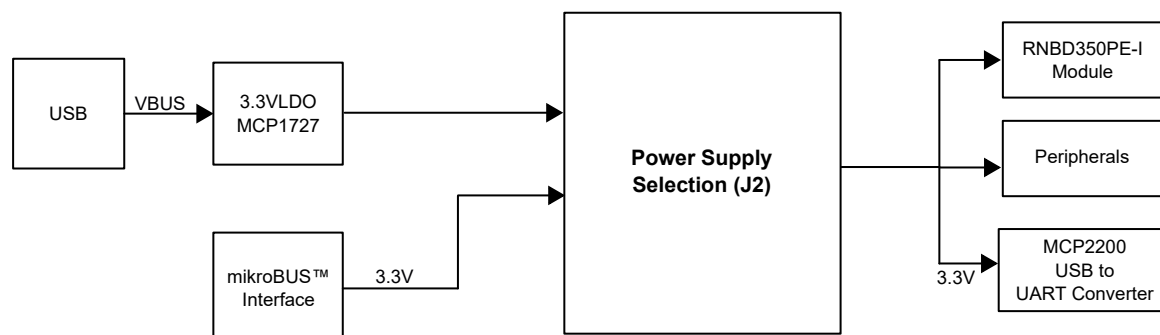
The RNBD350 Add On Board can be powered using any of the following sources depending on the use case scenario:

- The USB supplies power to the RNBD350 Add On Board using a USB Type-C cable connected to the USB Type-C Connector (J7). The module and the peripherals are powered by 3.3V generated from the on-board 3.3V linear regulator.
- The RNBD350PE Module and the peripherals are powered by 3.3V at J3, the mikroBUS interface when plugged into a host board.

The power selection between the USB power supply or the 3.3V from the mikroBUS interface is done by mounting a jumper cap JP1 on the power supply selection (J2).

Table 3-2. Jumper Cap JP1 Position to Select Power Supply Using J2 Power Supply Selection Header

3.3V Generated from USB Power Supply	3.3V from mikroBUS™ Interface
JP1 on J2-3, J2-2	JP1 on J2-1, J2-2

Figure 3-2. RNBD350 Add On Board Power Supply Block Diagram

To measure the current consumed by the RNBD350PE Module alone, remove resistor (R6) and connect an ammeter across it.

3.2 RNBD350PE Module Control Interface

The RNBD350PE Add On Board supports two modes of operation:

1. Using a host PC with on-board MCP2200 USB-to-UART converter
2. Using a host MCU board with mikroBUS socket via mikroBUS interface

3.2.1 Host PC with On-Board MCP2200 USB-to-UART Converter

The simplest method to use the RNBD350 Add On Board is to connect it to a PC host that supports USB CDC virtual COM (serial) ports using the on-board MCP2200 USB-to-UART Converter. The user can send simple ASCII commands to the RNBD350 Module by using a terminal emulator application. In this situation, the PC acts as the host device. In addition to UART, status and other control GPIOs from the RNBD350PE Module are also connected to MCP2200 GPIO pins.

The MCP2200 is configured in the Reset condition until the USB supply is plugged in.

Table 3-3. RNBD350PE Connection to MCP2200 USB-to-UART Converter

Pin on MCP2200	Pin on the RNBD350PE Module	Description
TX	PB6, UART RXD	RNBD350PE Module UART RXD
RX	PA5, UART TXD	RNBD350PE Module UART TXD
RTS	PA6, UART CTS	RNBD350PE Module UART CTS
CTS	PA4, UART RTS	RNBD350PE Module UART RTS
GP0	PB4, UART TX INDICATION	UART TX indication
GP1	PB5, Bluetooth® Low Energy Status LED	Bluetooth Low Energy Status LED
GP2	NMCLR	RNBD350PE Module Reset pin
GP3	PA8, EVENT INDICATION	Event indication
GP4	PA10, BT_STATUS_IND1	Bluetooth Low Energy status indication 1
GP5	PB8, BT_STATUS_IND2	Bluetooth Low Energy status indication 2
GP6	PA9, UART MODE SWITCH	UART mode switch
GP7	PB9, UART RX INDICATION	UART RX indication

3.2.2 Host MCU Board with mikroBUS Socket via mikroBUS Interface

The RNBD350 Add On Board can also be used by host MCU boards with mikroBUS sockets using the control interface. The following table shows how the pinout on the RNBD350 Add On Board mikroBUS interface corresponds to the pinout on the mikroBUS socket.

Table 3-4. RNBD350PE Connection to mikroBUS™ Interface

Pin No on mikroBUS™	Standard Pin on mikroBUS	Pin on RNBD350PE Module	Description
1	AN	PA9, UART MODE SWITCH	UART mode switch
2	RST	NMCLR	RNBD350PE Module reset pin
3	CS	PA4, UART RTS	RNBD350PE Module UART RTS
4	SCK	PA10, BT_STATUS_IND1	Bluetooth® Low Energy status indication 1
5	MISO	PB8, BT_STATUS_IND2	Bluetooth Low Energy status indication 2
6	MOSI	PB4, UART_TX_IND	UART transmit indication from the RNBD350PE Module
7	3.3V	—	3.3V from host MCU socket
8	GND	GND	GND
9	GND	GND	GND
10	5V	—	NC
11	SDA	—	NC
12	SCL	—	NC
13	RX	PB6, UART RXD	RNBD350PE Module UART RXD
14	TX	PA5, UART TXD	RNBD350PE Module UART TXD
15	INT	PA6, UART CTS	RNBD350PE Module UART CTS
16	PWM	PB9, UART RX INDICATION	UART RX indication to the RNBD350PE Module

3.3 LEDs

3.3.1 Red Event Indication LED (D1)

Use the Red Event Indication LED (D1) to indicate the changes in the monitoring indicators.

For more details, refer to the *RNBD350 Bluetooth® Low Energy Module User's Guide* (TBD).

3.3.2 Blue Bluetooth Status LED (D2)

The Blue Bluetooth Status LED (D2) indicates the Bluetooth Low Energy connection status by specific LED Flash pattern.

Standby mode:

- No Bluetooth Low Energy connection
- RNBD350 is in Advertisement or Scan state
- Flash one time for every three seconds
- ON: 50 ms, OFF: 2950 ms

Linked mode:

- Bluetooth Low Energy ACL link is connected whether central or peripheral role
- Flash two times for every 1.5 seconds
- ON: 50 ms, OFF: 150 ms, ON: 50 ms, OFF: 1250 ms

Note: By default, the Bluetooth status LED is turned OFF. The user can enable this feature by using the `SR` command. For more details, refer to the *RNBD350 Bluetooth Low Energy Module User's Guide* (DS50003684).

4. RNBD350 Add On Board Out-of-Box Demo

The RNBD350PE Module provides the control interface based on ASCII commands sent over UART. Using the on-board USB-to-UART converter, MCP2200, users can quickly get started with the board and evaluate the Bluetooth Low Energy connectivity capability of the wireless module with minimal effort.

For more details for the Out-of-Box (OOB) demo and demo guide, refer to the *RNBD350 Bluetooth Low Energy Module User's Guide* (DS50003684).

5. Appendix A: Reference Circuit

5.1 RNBD350 Add On Board Reference Schematics

Figure 5-1. Power Supply Selection

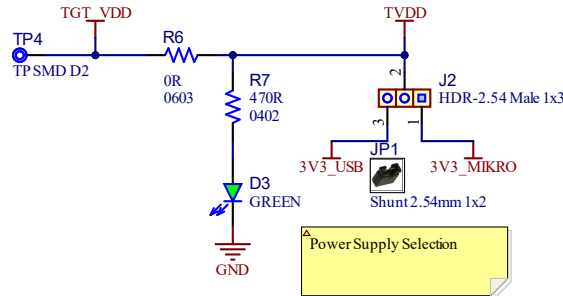


Figure 5-2. PTA Header

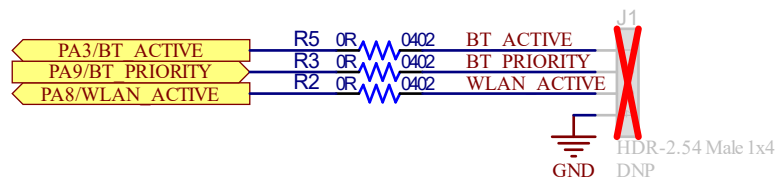


Figure 5-3. Target 3.3V Regulator

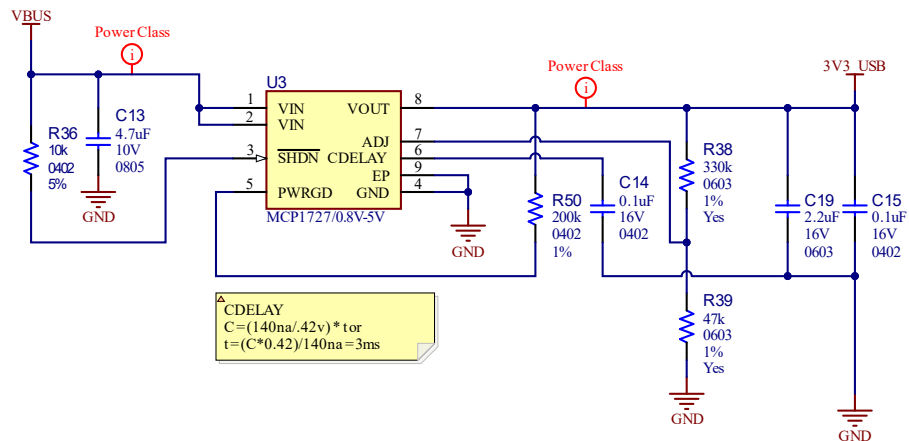


Figure 5-4. MCP2200 USB UART Converter

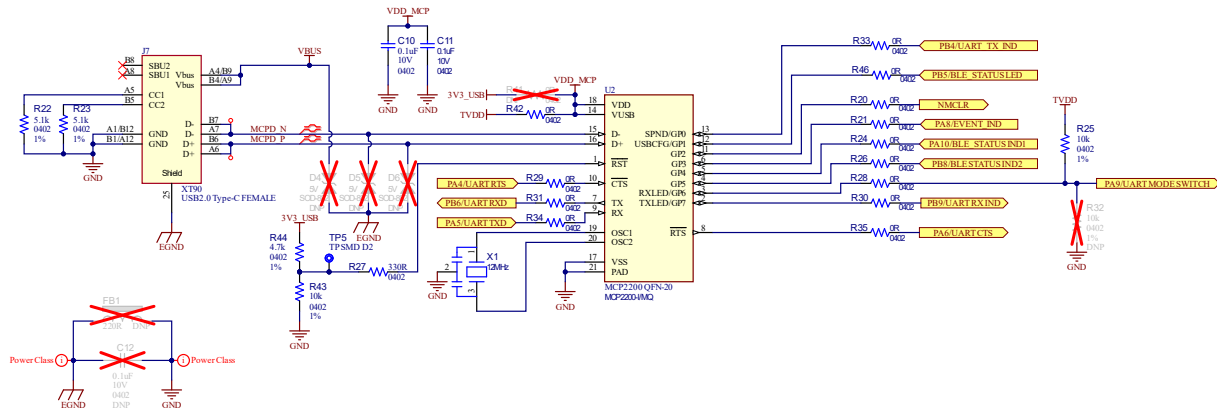


Figure 5-5. Universal Mini JTAG Programming Header

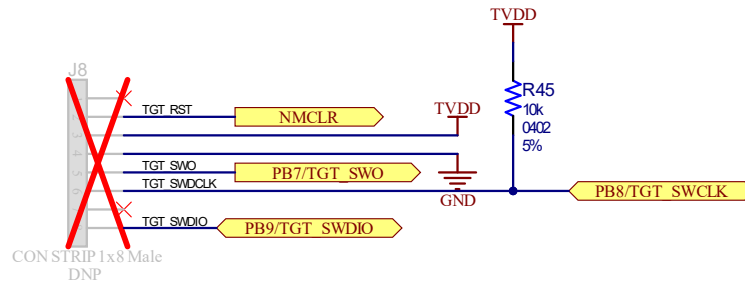


Figure 5-6. mikroBUS™

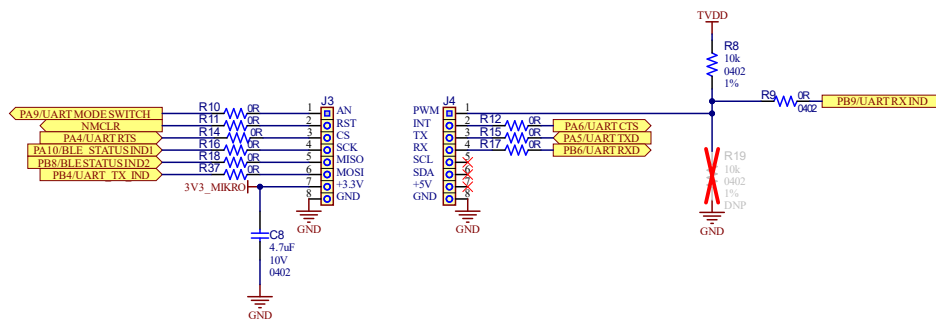
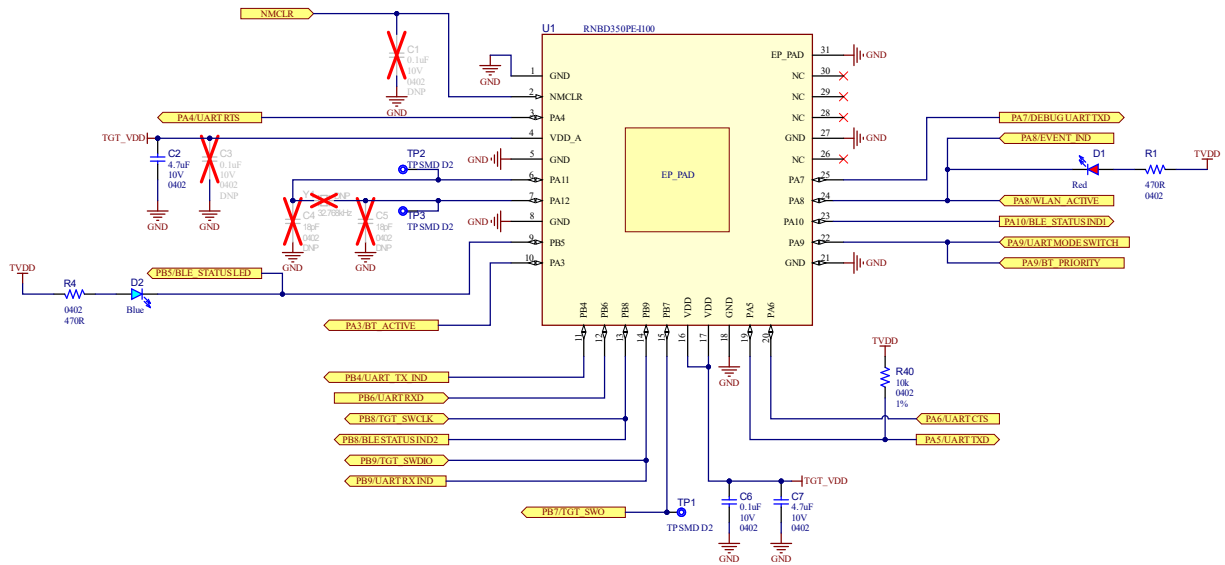


Figure 5-7. RNBD350PE Module Connection



5.2 RNBD350 Add On Board Bill of Materials

For the Bill of Materials (BOM) of the RNBD350 Add On Board, go to EV65D15A product web page.

6. Appendix B: Regulatory Approval

This equipment (RNBD350 Add On Board/EV65D15A) is an evaluation kit and not a finished product. It is intended for laboratory evaluation purposes only. It is not directly marketed or sold to the general public through retail; it is only sold through authorized distributors or through Microchip. Using this requires a significant engineering expertise towards understanding of the tools and relevant technology, which can be expected only from a person who is professionally trained in the technology.

Regulatory compliance settings have to follow the RNBD350PE module certifications. The following regulatory notices are to cover the requirements under the regulatory approval.

6.1 United States

The RNBD350 Add On Board (EV65D15A) contains the RNBD350PE module, which has received Federal Communications Commission (FCC) CFR47 Telecommunications, Part 15 Subpart C "Intentional Radiators" single-modular approval in accordance with Part 15.212 Modular Transmitter approval.

Contains FCC ID: 2ADHKWBZ350

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.



Important: FCC Radiation Exposure Statement

This equipment complies with FCC radiation exposure limits set forth for uncontrolled environment. The antenna(s) used for this transmitter must be installed to provide a separation distance of at least 8 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter. This transmitter is restricted for use with the specific antenna(s) tested in this application for certification.



Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

6.2 Canada

The RNBD350 Add On Board (EV65D15A) contains the RNBD350PE module, which has been certified for use in Canada under Innovation, Science and Economic Development Canada (ISED, formerly Industry Canada) Radio Standards Procedure (RSP) RSP-100, Radio Standards Specification (RSS) RSS-Gen and RSS-247.

Contains IC: 20266-WBZ350

This device contains license-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's license-exempt RSS(s). Operation is subject to the following two conditions:

1. This device may not cause interference;
2. This device must accept any interference, including interference that may cause undesired operation of the device.

L'émetteur/récepteur exempt de licence contenu dans le présent appareil est conforme aux CNR d'Innovation, Sciences et Développement économique Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes:

1. L'appareil ne doit pas produire de brouillage;
2. L'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.



This equipment complies with radio frequency exposure limits set forth by Innovation, Science and Economic Development Canada for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20 cm between the device and the user or bystanders.

Cet équipement est conforme aux limites d'exposition aux radiofréquences définies par d'Innovation, Sciences et Développement économique Canada pour un environnement non contrôlé. Cet équipement doit être installé et utilisé avec un minimum de 20 cm de distance entre le dispositif et l'utilisateur ou des tiers.

6.3 Europe

This equipment (EV65D15A) has been assessed under the Radio Equipment Directive (RED) for use in European Union countries. The product does not exceed the specified power ratings, antenna specifications and/or installation requirements as specified in the user manual. A Declaration of Conformity is issued for each of these standards and kept on file as described in Radio Equipment Directive (RED).

Simplified EU Declaration of Conformity

Hereby, Microchip Technology Inc. declares that the radio equipment type [EV65D15A] is in compliance with Directive 2014/53/EU.

The full text of the EU declaration of conformity is available at EV65D15A (See *Conformity Documents*).

7. Document Revision History

The revision history describes the changes that were implemented in the document. The changes are listed by revision, starting with the most current publication.

Table 7-1. Document Revision History

Revision	Date	Section	Description
A	04/2024	Document	Initial Revision

Microchip Information

The Microchip Website

Microchip provides online support via our website at www.microchip.com/. This website is used to make files and information easily available to customers. Some of the content available includes:

- **Product Support** – Data sheets and errata, application notes and sample programs, design resources, user's guides and hardware support documents, latest software releases and archived software
- **General Technical Support** – Frequently Asked Questions (FAQs), technical support requests, online discussion groups, Microchip design partner program member listing
- **Business of Microchip** – Product selector and ordering guides, latest Microchip press releases, listing of seminars and events, listings of Microchip sales offices, distributors and factory representatives

Product Change Notification Service

Microchip's product change notification service helps keep customers current on Microchip products. Subscribers will receive email notification whenever there are changes, updates, revisions or errata related to a specified product family or development tool of interest.

To register, go to www.microchip.com/pcn and follow the registration instructions.

Customer Support

Users of Microchip products can receive assistance through several channels:

- Distributor or Representative
- Local Sales Office
- Embedded Solutions Engineer (ESE)
- Technical Support

Customers should contact their distributor, representative or ESE for support. Local sales offices are also available to help customers. A listing of sales offices and locations is included in this document.

Technical support is available through the website at: www.microchip.com/support

Microchip Devices Code Protection Feature

Note the following details of the code protection feature on Microchip products:

- Microchip products meet the specifications contained in their particular Microchip Data Sheet.
- Microchip believes that its family of products is secure when used in the intended manner, within operating specifications, and under normal conditions.
- Microchip values and aggressively protects its intellectual property rights. Attempts to breach the code protection features of Microchip product is strictly prohibited and may violate the Digital Millennium Copyright Act.
- Neither Microchip nor any other semiconductor manufacturer can guarantee the security of its code. Code protection does not mean that we are guaranteeing the product is "unbreakable". Code protection is constantly evolving. Microchip is committed to continuously improving the code protection features of our products.

Legal Notice

This publication and the information herein may be used only with Microchip products, including to design, test, and integrate Microchip products with your application. Use of this information in any other manner violates these terms. Information regarding device applications is provided only for your convenience and may be superseded by updates. It is your responsibility to ensure

that your application meets with your specifications. Contact your local Microchip sales office for additional support or, obtain additional support at www.microchip.com/en-us/support/design-help/client-support-services.

THIS INFORMATION IS PROVIDED BY MICROCHIP "AS IS". MICROCHIP MAKES NO REPRESENTATIONS OR WARRANTIES OF ANY KIND WHETHER EXPRESS OR IMPLIED, WRITTEN OR ORAL, STATUTORY OR OTHERWISE, RELATED TO THE INFORMATION INCLUDING BUT NOT LIMITED TO ANY IMPLIED WARRANTIES OF NON-INFRINGEMENT, MERCHANTABILITY, AND FITNESS FOR A PARTICULAR PURPOSE, OR WARRANTIES RELATED TO ITS CONDITION, QUALITY, OR PERFORMANCE.

IN NO EVENT WILL MICROCHIP BE LIABLE FOR ANY INDIRECT, SPECIAL, PUNITIVE, INCIDENTAL, OR CONSEQUENTIAL LOSS, DAMAGE, COST, OR EXPENSE OF ANY KIND WHATSOEVER RELATED TO THE INFORMATION OR ITS USE, HOWEVER CAUSED, EVEN IF MICROCHIP HAS BEEN ADVISED OF THE POSSIBILITY OR THE DAMAGES ARE FORESEEABLE. TO THE FULLEST EXTENT ALLOWED BY LAW, MICROCHIP'S TOTAL LIABILITY ON ALL CLAIMS IN ANY WAY RELATED TO THE INFORMATION OR ITS USE WILL NOT EXCEED THE AMOUNT OF FEES, IF ANY, THAT YOU HAVE PAID DIRECTLY TO MICROCHIP FOR THE INFORMATION.

Use of Microchip devices in life support and/or safety applications is entirely at the buyer's risk, and the buyer agrees to defend, indemnify and hold harmless Microchip from any and all damages, claims, suits, or expenses resulting from such use. No licenses are conveyed, implicitly or otherwise, under any Microchip intellectual property rights unless otherwise stated.

Trademarks

The Microchip name and logo, the Microchip logo, Adaptec, AVR, AVR logo, AVR Freaks, BesTime, BitCloud, CryptoMemory, CryptoRF, dsPIC, flexPWR, HELDO, IGLOO, JukeBlox, KeeLoq, Kleer, LANCheck, LinkMD, maXStylus, maXTouch, MediaLB, megaAVR, Microsemi, Microsemi logo, MOST, MOST logo, MPLAB, OptoLyzer, PIC, picoPower, PICSTART, PIC32 logo, PolarFire, Prochip Designer, QTouch, SAM-BA, SenGenuity, SpyNIC, SST, SST Logo, SuperFlash, Symmetricom, SyncServer, Tachyon, TimeSource, tinyAVR, UNI/O, Vectron, and XMEGA are registered trademarks of Microchip Technology Incorporated in the U.S.A. and other countries.

AgileSwitch, ClockWorks, The Embedded Control Solutions Company, EtherSynch, Flashtec, Hyper Speed Control, HyperLight Load, Libero, motorBench, mTouch, Powermite 3, Precision Edge, ProASIC, ProASIC Plus, ProASIC Plus logo, Quiet-Wire, SmartFusion, SyncWorld, TimeCesium, TimeHub, TimePictra, TimeProvider, and ZL are registered trademarks of Microchip Technology Incorporated in the U.S.A.

Adjacent Key Suppression, AKS, Analog-for-the-Digital Age, Any Capacitor, AnyIn, AnyOut, Augmented Switching, BlueSky, BodyCom, Clockstudio, CodeGuard, CryptoAuthentication, CryptoAutomotive, CryptoCompanion, CryptoController, dsPICDEM, dsPICDEM.net, Dynamic Average Matching, DAM, ECAN, Espresso T1S, EtherGREEN, EyeOpen, GridTime, IdealBridge, IGaT, In-Circuit Serial Programming, ICSP, INICnet, Intelligent Paralleling, IntelliMOS, Inter-Chip Connectivity, JitterBlocker, Knob-on-Display, MarginLink, maxCrypto, maxView, memBrain, Mindi, MiWi, MPASM, MPF, MPLAB Certified logo, MPLIB, MPLINK, mSiC, MultiTRAK, NetDetach, Omniscient Code Generation, PICDEM, PICDEM.net, PICkit, PICtail, Power MOS IV, Power MOS 7, PowerSmart, PureSilicon, QMatrix, REAL ICE, Ripple Blocker, RTAX, RTG4, SAM-ICE, Serial Quad I/O, simpleMAP, SimpliPHY, SmartBuffer, SmartHLS, SMART-I.S., storClad, SQI, SuperSwitcher, SuperSwitcher II, Switchtec, SynchroPHY, Total Endurance, Trusted Time, TSHARC, Turing, USBCheck, VariSense, VectorBlox, VeriPHY, ViewSpan, WiperLock, XpressConnect, and ZENA are trademarks of Microchip Technology Incorporated in the U.S.A. and other countries.

SQTP is a service mark of Microchip Technology Incorporated in the U.S.A.

The Adaptec logo, Frequency on Demand, Silicon Storage Technology, and Symmcom are registered trademarks of Microchip Technology Inc. in other countries.

GestIC is a registered trademark of Microchip Technology Germany II GmbH & Co. KG, a subsidiary of Microchip Technology Inc., in other countries.

All other trademarks mentioned herein are property of their respective companies.

© 2024, Microchip Technology Incorporated and its subsidiaries. All Rights Reserved.

ISBN: 978-1-6683-4353-1

Quality Management System

For information regarding Microchip's Quality Management Systems, please visit www.microchip.com/quality.

Worldwide Sales and Service

AMERICAS	ASIA/PACIFIC	ASIA/PACIFIC	EUROPE
<p>Corporate Office 2355 West Chandler Blvd. Chandler, AZ 85224-6199 Tel: 480-792-7200 Fax: 480-792-7277 Technical Support: www.microchip.com/support Web Address: www.microchip.com</p> <p>Atlanta Duluth, GA Tel: 678-957-9614 Fax: 678-957-1455</p> <p>Austin, TX Tel: 512-257-3370</p> <p>Boston Westborough, MA Tel: 774-760-0087 Fax: 774-760-0088</p> <p>Chicago Itasca, IL Tel: 630-285-0071 Fax: 630-285-0075</p> <p>Dallas Addison, TX Tel: 972-818-7423 Fax: 972-818-2924</p> <p>Detroit Novi, MI Tel: 248-848-4000</p> <p>Houston, TX Tel: 281-894-5983</p> <p>Indianapolis Noblesville, IN Tel: 317-773-8323 Fax: 317-773-5453 Tel: 317-536-2380</p> <p>Los Angeles Mission Viejo, CA Tel: 949-462-9523 Fax: 949-462-9608 Tel: 951-273-7800</p> <p>Raleigh, NC Tel: 919-844-7510</p> <p>New York, NY Tel: 631-435-6000</p> <p>San Jose, CA Tel: 408-735-9110 Tel: 408-436-4270</p> <p>Canada - Toronto Tel: 905-695-1980 Fax: 905-695-2078</p>	<p>Australia - Sydney Tel: 61-2-9868-6733</p> <p>China - Beijing Tel: 86-10-8569-7000</p> <p>China - Chengdu Tel: 86-28-8665-5511</p> <p>China - Chongqing Tel: 86-23-8980-9588</p> <p>China - Dongguan Tel: 86-769-8702-9880</p> <p>China - Guangzhou Tel: 86-20-8755-8029</p> <p>China - Hangzhou Tel: 86-571-8792-8115</p> <p>China - Hong Kong SAR Tel: 852-2943-5100</p> <p>China - Nanjing Tel: 86-25-8473-2460</p> <p>China - Qingdao Tel: 86-532-8502-7355</p> <p>China - Shanghai Tel: 86-21-3326-8000</p> <p>China - Shenyang Tel: 86-24-2334-2829</p> <p>China - Shenzhen Tel: 86-755-8864-2200</p> <p>China - Suzhou Tel: 86-186-6233-1526</p> <p>China - Wuhan Tel: 86-27-5980-5300</p> <p>China - Xian Tel: 86-29-8833-7252</p> <p>China - Xiamen Tel: 86-592-2388138</p> <p>China - Zhuhai Tel: 86-756-3210040</p>	<p>India - Bangalore Tel: 91-80-3090-4444</p> <p>India - New Delhi Tel: 91-11-4160-8631</p> <p>India - Pune Tel: 91-20-4121-0141</p> <p>Japan - Osaka Tel: 81-6-6152-7160</p> <p>Japan - Tokyo Tel: 81-3-6880-3770</p> <p>Korea - Daegu Tel: 82-53-744-4301</p> <p>Korea - Seoul Tel: 82-2-554-7200</p> <p>Malaysia - Kuala Lumpur Tel: 60-3-7651-7906</p> <p>Malaysia - Penang Tel: 60-4-227-8870</p> <p>Philippines - Manila Tel: 63-2-634-9065</p> <p>Singapore Tel: 65-6334-8870</p> <p>Taiwan - Hsin Chu Tel: 886-3-577-8366</p> <p>Taiwan - Kaohsiung Tel: 886-7-213-7830</p> <p>Taiwan - Taipei Tel: 886-2-2508-8600</p> <p>Thailand - Bangkok Tel: 66-2-694-1351</p> <p>Vietnam - Ho Chi Minh Tel: 84-28-5448-2100</p>	<p>Austria - Wels Tel: 43-7242-2244-39 Fax: 43-7242-2244-393</p> <p>Denmark - Copenhagen Tel: 45-4485-5910 Fax: 45-4485-2829</p> <p>Finland - Espoo Tel: 358-9-4520-820</p> <p>France - Paris Tel: 33-1-69-53-63-20 Fax: 33-1-69-30-90-79</p> <p>Germany - Garching Tel: 49-8931-9700</p> <p>Germany - Haan Tel: 49-2129-3766400</p> <p>Germany - Heilbronn Tel: 49-7131-72400</p> <p>Germany - Karlsruhe Tel: 49-721-625370</p> <p>Germany - Munich Tel: 49-89-627-144-0 Fax: 49-89-627-144-44</p> <p>Germany - Rosenheim Tel: 49-8031-354-560</p> <p>Israel - Hod Hasharon Tel: 972-9-775-5100</p> <p>Italy - Milan Tel: 39-0331-742611 Fax: 39-0331-466781</p> <p>Italy - Padova Tel: 39-049-7625286</p> <p>Netherlands - Drunen Tel: 31-416-690399 Fax: 31-416-690340</p> <p>Norway - Trondheim Tel: 47-72884388</p> <p>Poland - Warsaw Tel: 48-22-3325737</p> <p>Romania - Bucharest Tel: 40-21-407-87-50</p> <p>Spain - Madrid Tel: 34-91-708-08-90 Fax: 34-91-708-08-91</p> <p>Sweden - Gothenberg Tel: 46-31-704-60-40</p> <p>Sweden - Stockholm Tel: 46-8-5090-4654</p> <p>UK - Wokingham Tel: 44-118-921-5800 Fax: 44-118-921-5820</p>