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#### 1. SCOPE OF THIS DOCUMENT

This Design Guide applies to the Bluetooth development modules PAN1740 Experimenter Kit (PAN1740 EXP). The intention is to enable our customers to easily and quickly integrate Panasonic's PAN1740 module in their product.

This guide describes the Hardware and gives useful hints.

#### 2. KEY BENEFITS WHEN USING PAN1740

- Single-mode Bluetooth Smart System-on-Chip
- ARM CORTEX M0 CPU
- Small 9.0 x 9.5 x 1.8 mm SMD package with antenna
- Includes 16 MHz and 32.768 kHz crystal
- Temperature Range from -40°C to +85°C
- Pre-programmed calibration data and BT-Address
- Peak Power consumption 4.9mA Rx and Tx
- Less than a few  $\mu A$  in low power modes
- Link budget 93dBm (Rx Sensitivity -93, Tx 0 dBm)

#### 3. BLUETOOTH LOW ENERGY

Bluetooth Low Energy (BLE), part of Bluetooth Ver. 4.0, specifies two types of implementation: Single mode and dual mode. Single mode chips implement the low energy specification and consume just a fraction of the power of classic Bluetooth, allowing the short-range wireless standard to extend to coin cell battery applications for the first time. Dual mode chips combine low energy with the power of classic Bluetooth and are likely to become a de facto feature in almost all new Bluetooth enabled cellular phones and computers.

#### Bluetooth marks

According to the new Bluetooth SIG marks "Bluetooth Smart" (single mode  $\rightarrow$  mainly sensors) and "Bluetooth Smart Ready" (dual mode  $\rightarrow$  gateway and hub devices) the PAN1740 fulfills criteria to label a product as a Bluetooth Smart device.



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#### 4. DESCRIPTION PAN1740

PAN1740 is the next generation Bluetooth Low Energy Module from Panasonic with reduced form factor, significantly lower power consumption and embedded Software Stack. The Single mode Bluetooth Smart System-on-Chip module is optimized for low power, small size and low system cost products. It reduces external component count, development effort and time to market.

The Module is manufactured in a very small 9.0\* 9.5\* 1.8 mm SMD package with shielded case and chip antenna. The power consumption of only 4.9mA in Tx and Rx mode makes the use of coin cell batteries possible or reduces the needed battery capacity and cost of existing solution by at least 50%. It is qualified according to Bluetooth 4.0 standard. FCC, IC and CE approvals are under preparation.

The PAN1740 comes with a complete software development platform, which includes a qualified Bluetooth Smart single-mode stack that can be compiled with a number of available BLE profiles, custom application and programmed on the module. Multiple Bluetooth Smart profiles for consumer wellness, sport, fitness, security and proximity applications are supplied as standard, while additional customer profiles can be developed and added as needed.

Please contact your local sales office for further details on additional options and services, by visiting www.panasonic.com/rfmodules for U.S. and http://industrial.panasonic.com/eu/ for Europe or write an e-mail to wireless@eu.panasonic.com

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5. BLOCK DIAGRA	AM PAN1740 MODULE				
UART SPI I2C ↓ GP-ADC Quad-Decoder Wakup Timor	Crystal 32.768kHz Dialog				
waxup- ninei	Crystal 16 MHz PAN1740				



#### 6.1. Functionality

Atmel µC includes Segger USB-to-UART programmer (serial number on the backside) OTP cannot be damaged - Failsafe development Runs with Dialog's Keil compiler projects Runs with "Connection Manager" Can be used for SW development "on the fly"



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### 7. MOTHER BOARD



#### 7.1. Functionality

The details of the mother board are described in the Dialog documentation

Can be used with PAN1740 Adapter Board

OTP can be programmed

Runs with Dialog's Keil compiler projects

Runs with "Connection Manager"

Can be used for SW development "on the fly"

Runs with "Smart Snippets" including Power Profiler





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9. BEACON	PAN1740 iBeacon		
9.1. Schematic			
	MOD1 PAN1740 $MOD1 PAN1740$ $MOD1 PAN1740$ $MOD1 PAN1740$ $MOD1 PAN1740$ $PRS W CK$	VPP SW DIO PT3 PT7 PT7 PT7 PT7 PT7 PT7 PT7 PT7	→ X1-1 → X1-2 → X1-2 → X1-3 → X1-4 → X1-5 → X1-6 → X1-7 → X1-7 → X1-7 → X1-7 → X1-17 → X1-17 → X1-17 → X1-16 → X1-17 → X1-17 → X1-16 → X1-17 → X1
		Document Number: Date: 12.06.2015 09:33:31	REV:

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#### **10. BEACON KIT**

The Beacon-Kit consists of:

- 1 pc. Dialog Motherboard
- 1 pc. Flexible Flat Cable 0.50 mm pitch 18 conductors 50 mm length Type 2
- 1 pc. Beacon Adapter Board
- 5 pcs. Beacon

The Beacons come along pre-configured with Dialog's Beacon Software which makes it easy to start evaluating. Simply power them up by plugging a CR2032 battery and watch out for them using the *Locate Beacon* App which can be downloaded in the Google Play Store. This scenario is depicted below.



The Beacon software is stored in the SPI Flash (IC2) on the PCB and can be changed by establishing a connection between Dialog's Motherboard and a Beacon via the Beacon Adapter Board and the FFC as shown below.

**Note:** An FFC longer than 5cm can cause transmission errors when using JTAG. Hence, longer cables should use the UART interface to download software to the Beacon.



Simply change Dialog's Beacon code available on their website to your needs with Keil uVision, compile it and download it to the device using Smart Snippets for instance. Please read the following chapters and Dialog's Documentation to be able to download your code into the Beacon.



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#### 12. DEVELOPMENT OF APPLICATIONS

In this and the following chapters, the basic tools and some examples are shown to get the USB-dongles running. All examples use Windows7 OS and iPhone 5G, but also higher versions should work.

Installing and running HW drivers on any system requires time and each step may require rebooting your system. Contact your system administrator if any system related problems appear during the installation phase. Install the drivers step-by-step in the below order and use the latest software releases.

There are two basic approaches for implementation:

#### 1. Full embedded HCI with external host controller

If BLE functionality is being added to a running application -- E.g. for porting the setup GUI from your application into a smart phone -- developing a smart phone "App" and installing either a proprietary BLE profile on the host controller and or a BT-Sig certified profile should be considered. The BT-Developers portal provides guidance for this process - http://developer.bluetooth.org/

#### 2. Standalone sensor application

Applications requiring less than 32KB can reside and execute on the PAN1740 module. There are several examples in the Keil projects. The download link is in chapter 12.1. The profiles are located in the SDK folder (please use the latest release from Dialog website):

 $\label{eq:linear} $$ DA14580_SDK_3.0.4.0\dk_apps\src\ip\ble\hl\src\profiles $$$ 

🐌 include	21.03.2014 07:56	Dateiordner	
鷆 misc	21.03.2014 07:56	Dateiordner	
퉬 src	21.03.2014 07:56	Dateiordner	
鷆 startup	21.03.2014 07:56	Dateiordner	
🖻 580_peripheral_setup.uvproj	17.03.2014 14:14	µVision4 Project	23 KB
DA14580_peripheral_setup.uvproj	17.03.2014 14:14	µVision4 Project	23 KB
💼 sysram.ini	12.02.2014 17:39	Konfigurationsein	1 KB

Smart Snippets is needed to burn the application into the module. If you are working with the PAN1740ETU USB-Dongle applications can be developed and executed in RAM, but for security reasons it is not possible burn the OTP. Panasonic's Experimenters' kit is required to access OTP is accessible. Please contact your local sales distributor for support. The Experimenters' kit may be mandatory for production. For items beyond the scope of this design guide, refer to the Smart Snippets guide on the Dialog's support website. Following is a list of supported profiles.

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	Semiconductor Smar	t{snippe	ets}	
	Software Features List (note 1)	DA14580-00	DA14	580-01
		2.0.4	3.0.2	3.0.4
	"X" = Supported feature	release date:	release date:	release date:
	"NS" = Not Supported Feature	23/12/2014	28/03/2014	30/06/2014
1	Embedded Development Tools			
1.1	Keil project environment	Х	X	X
1.2	JTAG debugger	X	X	X
1.3	GNU / GCC toolset	NS	NS	X
2	Stack		•	
2.1	Protocol features			
2.1.1	Bluetooth Smart 4.1 core stack	x	X	X
2.1.2	MTU size	23	23	23
2.1.3	Large packet support (L2CAP fragmentation)	NS	X	X
2.1.4	Master mode	X	X	X
2.1.5	Slave mode	x	X	X
2.1.6	Master and Slave sequentially	X	X	X
2.1.7	Multilink support (maximum links)	4	6	6
2.1.8	UUID 128bits	X	X	X
2.2	Low Energy features			
2.2.1	BLE timer wakeup	X	X	X
2.2.2	GPIO wakeup	Х	X	X
2.2.3	Quadrature wakeup	Х	X	X
2.2.4	Active mode	X	X	X
2.2.5	Extended Sleep Mode	X	X	X
2.2.6	Deep Sleep	X	X	X
3	Profiles			
3.1	Health Profile			
3.1.1	Blood Pressure Profile	X	X	X
3.1.2	Blood Pressure Service	X	X	X
3.1.3	Glucose Profile	X	X	X
3.1.4	Glucose Service	X	X	X
3.1.5	Health Thermometer Profile	X	X	X
3.1.6	Health Thermometer Service	X	X	X
3.2	Sports and Fitness Profile			
3.2.1	Cycling Power Profile	NS	NS	X
3.2.2	Cycling Power Service	NS	NS	X
3.2.3	Cycling Speed and Cadence Profile	X	X	X
3.2.4	Cycling Speed and Cadence Service	X	X	X
3.2.5	Location and Navigation Profile	NS	NS	X
3.2.6	Location and Navigation Service	NS	NS	X
3.2.7	Heart Rate Profile	X	X	X
3.2.8	Heart Rate Service	X	X	X
3.2.9	Running Speed and Cadence Profile	X	X	X
3.2.10	Running Speed and Cadence Service	X	X	X

 $..\DA14580\_SDK\_3.0.4.0\dk\_apps\src\ip\ble\hl\src\profiles$ 

(Please use the latest release from Dialog website)

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#### semiconductorg \_smart{snippets} DA14580-00 DA14580-01 Software Features List (note 1) 3.0.4 2.0.4 3.0.2 "X" = Supported feature release date: release date: release date: 30/06/2014 "NS" = Not Supported Feature 23/12/2014 28/03/2014 3.3 **Proximity Profile** 3.3.1 **Proximity Profile** х Х Х 3.3.2 Find Me Profile х х X 3.4 Alerts and time Profile 3.4.1 Time Profile X X Х 3.4.2 **Current Time Service** X Х Х 3.4.3 Reference Time Update Service х х х 3.4.4 Next DST Change Service Х Х Х 3.4.5 Phone Alert Status Profile X X X 3.4.6 Phone Alert Status Service х Х Х 3.4.7 Alert Notification Profile х х х 3.4.8 Alert Notification Service X Х X 3.4.9 Immediate Alert Service X Х X 3.5 **Peripherals Profile** 3.5.1 HID over GATT Profile х Х Х 3.5.2 **HID Service** X Х X 3.6 **Generic Profile** 3.6.1 Scan Parameters Profile X х X 3.6.2 Scan Parameters Service X Х Х Battery Service 3.6.3 х Х х 3.6.4 Х **Device Information Service** X х 3.6.5 Link Loss Service X X X 3.6.6 Tx Power Service х х Х 3.6.7 X X х Accelerometer Peripheral Device Drivers/HAL 4 4.1 UART driver NS Х X 4.2 **GPIO** driver NS х X 4.3 SPI driver NS х X 4.4 SPI Flash driver NS Х X 4.5 12C EEPROM driver NS Х Х 4.6 ADC driver NS х X 4.7 Battery Level driver NS Х Х 4.8 PWM driver NS Х Х 4.9 Quadrature driver NS Х X 4.10 Wakeup timer driver NS X X

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#### 12.1. Basic Platform Tools

- 1. Windows 7 or higher www.microsoft.com
- 2. Keil Compiler 32K free license www.keil.com/arm/mdk.asp
- 3. Segger J-Link software www.segger.com/jlink-software.html

Use the serial number from the bottom side of the USB-Dongle

- 4. Bluetooth 4.1 www.bluetooth.org
- 12.2. Dialog Specific Tools

Download in the support forum <a href="http://support.dialog-semiconductor.com">http://support.dialog-semiconductor.com</a> under the top menu bar "Software".

1. Connection Manager

Enables basic GATT connections between two BLE devices.

2. Dialogs Projects

Keil Projects with BLE Profiles and examples. These project files are used to implement the customers application. The BLE profiles are already implemented and you can setup the full feature set and I/O capability of the module.

3. Smart Snippets

Smart Snippets is the Tool for reading and writing the OTP. With this tool, the last step in the development chain can be performed by burning the OTP fuses. This tool does not work with the USB-Dongle for security reasons. The programming voltage of 6.8V needed to enable the programming is not supported.

#### 12.3. Bluetooth Address and Crystal Trim Values

1. Main Frequency Calibration up to 1ppm @ 2.4GHz

Panasonic calibrates the 16 MHz crystal and writes this calibration data in the OTP header. This provides best performance and a stable frequency. Customers do not need to take care of this step in their production.

2. Pre-programmed Bluetooth/MAC Address

Each Bluetooth device must have a unique MAC address which is provided from the IEEE. Since this may lead to additional costs and registration effort for customers Panasonic burns a unique address into the OTP header from our database. Customers do not need to take care of this step in their production.

3. Precise High Performance Crystal Sleep clock

Since this is a low energy device and the key functionalities are the sleep functions with just a few  $\mu$ A current draw Panasonic has integrated a 32.768 kHz crystal clock into the PAN1740 module. Therefore no external components are needed and there are no hidden costs.

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12.4. Example for Connection Manager

In the following example two USB-dongles are used. PAN1026-USB works as a peripheral and the PAN1740-USB as central device.

#### 12.4.1. USB Driver

Download and install USB Drivers from Segger www.segger.com/jlink-software.html



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<ol> <li>12.4.2. Start the Connection M</li> <li>1. Make sure you ha</li> <li>2. Wait until the init p</li> <li>3. Press load Firmwa</li> <li>4. Wait until the init p</li> <li>5. Press either "Boot</li> </ol>	Manager ve admin rights and access to the phase is finished are and select "full_emb.hex" phase is finished t as Central" or "Boot as Periphera	program folder I" (Example shows Central)
Image: Sear Interval:       16 <ul> <li>x 0.625 ms = 10 ms</li> <li>Scan Interval:</li> <li>16</li> <li>x 0.625 ms = 10 ms</li> <li>Scan Window:</li> <li>16</li> <li>x 0.625 ms = 10 ms</li> <li>Interval:</li> <li>x 0.625 ms = 10 ms</li> <li>Interval:</li> <li>Scan</li> </ul> <li>Connection Settings</li> <li>Min Connection Interval:</li> <li>128</li> <li>x 1.25 ms = 160 ms</li> <li>Slave latency:</li> <li>Interval:</li> <li>x 1.25 ms = 160 ms</li> <li>Slave latency:</li> <li>Interval:</li> <li>Supervision Timeout:</li> <li>2000</li> <li>x 10 ms = 20 s</li> <li>Get</li> <li>Set</li> <li>Link Control</li> <li>Address:</li> <li>Interval:</li> <li>Interval:</li> <ul> <li>Terminate Link</li> </ul>	Boot as Central       COM4       Hardware Row         Boot as Peripheral       Load Emmware       Boot Iest M         Dat Task       : 0x3d (TASK_GAPM)         Mag Id       : 0x3d04 (GAPM_STI DEV_CONFIG, Role       : 0x3004 (GAPM_STI DEV_CONFIG, Role         IRK       : 0x0 00 00 00 00 00 00 00 00 00         appearance_write_perm       : 0x0 appearance_write_perm       : 0x0 appearance         Payload       : 04 34 04 00 35 00 20 00 03 00 00 00 00 00 00 00 00 00 00 00 00 00	Control: RTS/CTS  Cear Log  de  Save Log  CMD)  Co 00 00 00 00 00 00 00 00 00 00 00 00 00

#### 12.4.3. Make PAN1026 Peripheral visible

EasyBLE Tool and a PAN1026-USB dongle may be used to make a peripheral visible with the heart rate profile. Use this link to download EasyBLE: <a href="http://pideu.panasonic.de/files/Documents/WM%20Documents/PAN1026/EasyBLE.zip">http://pideu.panasonic.de/files/Documents/WM%20Documents/PAN1026/EasyBLE.zip</a>

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12.4.4. Open a Connection		1. Press "Scan"         2. Select PAN1026         amendent Manager         for         reference         som of Correct         Read/Max         Parage/Book         Som Interest:         Image: Address Sam         Image: Address Sam	address and e           bit is (ema)         OM4         Herd           is (construction)         Des (construction)         Des (construction)           is (construction)         Des (construction)         Des (construction)	Average         RISCIS         Inth           verse Row Control:         RISCIS         •           original Mode         •         •           asaDEEC_IND)         00         02         02         02         02         00           00         10         02         02         02         00         02         00           00         10         02         02         02         00         00         10         02         02         00         00         11         02         02         02         00         00         12         02         02         00         00         12         02         02         00         00         12         02         02         00         00         12         02         02         00         00         12         02         02         00         00         12         02         02         00         00         12         02         02         00         00         12         02         02         00         00         12         02         02         00         00         00         00         00         00         00         00         00         <	

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12.4.5. IPhone Demo The PAN1026 used in the exa up) and e.g. "Bluetooth Smart	ample above may be substituted with Scanner" App.	n an iPhone (model 4S ai	nd
•••••• Vodafone.de 3G 10:08     •••••     • Vodafone.de 3G 10:08     •••••     • Pally BLE Scanner Stop     86A2F6F1-7260-7310-8F08-E28055933836     Name : DialogDemo     RSSI : -61 dBm 2014-04-29 10:08:34.697	•••••• Vodafone.de 3G 10:08		
	CHANNEL		
	39		
	Dialog Demo		
	ISCONNECTABLE		
	YES		
	Show RAW data		

"Bluetooth Smart Scanner" may be replaced by other BLE Apps for Android or Windows based smart phones. Depending on the application, a proprietary app may be written or existing certified BLE profile used.

#### 12.4.6. Next Steps

The PAN1026 was chosen to demonstrate sending a heart rate payload data, as Connection Manager cannot send data, since it installs only the central or peripheral functionality on the PAN1740, but not the profile. Two PAN1740 USB dongles can be connected by setting one side to Central and the other to Peripheral. To send data you need to run the Keil project in debug mode together with a profile e.g. peripheral example, chapter 13 describes this process.

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13. RUN THE KEIL PROJE	CT EXAMPLE		
For more detailed informatior download page. Recommend	n on project examples, refer to the Pr led is the proximity example as this i	rojects in Dialog's softward s the most common profile	9 9.
Download and install the SDI	K using the following URL:		
http://support.dialog-semicon	ductor.com/software-downloads/inde	<u>ex</u>	
Refer to chapter 12.1 Basic F	Platform Tools to download them.		
Installieren von Gerätetreibersoftware	•		
USB-Verbundgerät J-Link J-Link OB CDC	Verwendung jetzt möglich Treibersoftware wird installiert Verwendung jetzt möglich		
	<u>Schließen</u>		
Open the proximity project ex following SDK folder (please	cample found in the Dialog SDK. The use the latest release from Dialog we	e project is located in the ebsite):	
DA14580_SDK_3.0.2.1\dk_a	pps\keil_projects\proximity\monitor_t	fe_usb	
University of the interesting of the second	1110/044555 50 C - J.0.1110 percipteral acamples (DA14550 percipteral 3 rt.mt • d • Ø Ø • O Ø I • V		



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In the Keil compiler Configure the Flash Target (Flash >> Configure Flash Tools). Choose "Settings".

)evice   Target	Output Listing User C/C++ Asm Linker Debug Utilities
- Configure Flas	h Menu Command
Use Targ	et Driver for Flash Programming
	J-LINK / J-Trace Cortex  Settings    Update Target before Debugging
Init File	JLink Settings ini
Command Arguments	Run Independent

Click the Debug tab. Setup the Port in the J-Flash Settings to "SW". Press "OK".

IDCODE     Device Name     Move       SWD     Ox0BB11477     ARM CoreSight SW-DP     Up       Down     Down       © Automatic Detection     ID CODE:       © Manual Configuration     Device Name:       Add     Delete     Update       IR len:     Download Options       mal     Image: Cache Options     Download options       Image: Cache Code     Verify Code Download       Image: Cache Memory     Verify Code Download	SN:       180040323       ▼         Device:       J-Link OB-SAM3U128         HW:       V1.00       dll:       V4.78f         FW:       J-Link OB-SAM3U128 V1 corr       ©       0x0BB11477       ARM CoreSight SW-DP       Up         Port:       Max Clock:       2MHz       ▼       Auto Clk       ID CODE       Device Name       Down         Auto Clk       2MHz       ✓       Add       Delete       Update       IR len:       Download Options         Connect:       Normal       Reset:       Normal       ✓       Cache Options       Download Options         Connect:       Normal       ▼       Reset:       Normal       ✓       Cache Qode       Verify Code Download         Interface       TCP/IP       Network Settings       Pat (Auto: 0)       Autodetect       JLink Info	IDCODE         Device Name           vice:         J-Link OB-SAM3U128           V:         V1.00           dll:         V4.78f           /:         J-Link OB-SAM3U128 V1 corr           Port:         Max Clock:	Move Up Down
SWD       Ox0BB11477       ARM Core Sight SW-DP       Up         Down       Down         C       Automatic Detection       ID CDDE:         Manual Configuration       Device Name:         Add       Delete       Update         IR len:       IR len:         Cache Options       Download Options         mal       Image: Cache Code       Verify Code Download         Image: Cache Code       Download to Bash       Image: Cache Code	Device:       J-Link OB-SAM3U128         HW :       V1.00       dll :       V4.78f         FW :       J-Link OB-SAM3U128 V1 corr	Vice:         J-Link OB-SAM3U128         SWD         Ox0BB11477         ARM CoreSight SW-DP           V:         V1.00         dll :         V4.78f	Up Down
Cache Options     Download Options       Manual Configuration     Device Name:       Add     Delete       Update     IR Ien:         Download Options       Main       Cache Options       Download to Flash	HW :       V1.00       dll :       V4.78f       Down         FW :       J-Link OB-SAM3U128 V1 corr	V : V1.00 dll : V4.78f /: J-Link OB-SAM3U128 V1 corr Port: Max Clock: C Automatic Detection ID CODE:	Down
Automatic Detection ID CODE:     Manual Configuration Device Name:     Add Delete Update IR Ien:     Add Delete Update IR Ien:     Cache Options     For Cache Code     Cache Code     Cache Memory     Download to Eash	FW :       J-Link OB-SAM3U128 V1 corr         Port:       Max Clock:         SW       2MHz         Auto Clk       Manual Configuration         Auto Clk       Delete         Update       IR len:         Connect & Reset Options       Add         Connect:       Normal         Reset:       Normal         Image: Reset after Connect       Normal         Interface       TCP/IP         Network Settings       Pat (Adds: 0)         Autodetect       JLink Info	J-Link OB-SAM3U128 V1 corr           Port:         Max Clock:         © Automatic Detection         ID CODE:	1
Automatic Detection ID CODE:     Manual Configuration Device Name:     Add Delete Update IR len:     Cache Options     Cache Options     Cache Code     Cache Code     Cache Memory	Port:       Max Clock:         SW       2MHz         Auto Clk       Manual Configuration         Auto Clk       Add         Delete       Update         IR len:       Add         Connect & Reset Options       Cache Options         Connect:       Normal         Reset:       Normal         Reset:       Normal         Cache Options       Download Options         Connect:       Normal         Reset:       Normal         Cache Code       Verify Code Download         Cache Memory       Verify Code Download to Flash         Interface       Network Settings         Network Settings       Autodetect         JLink Info       JLink Info	Port: Max Clock: CAutomatic Detection ID CODE:	and the second se
Manual Configuration Device Name:     Add Delete Update IR Ien:     Cache Options     Cache Options     Cache Code     Cache Code     Cache Memory     Verify Code Download     Download to Bash	SW       2MHz       Manual Configuration       Device Name:         Auto Clk       Add       Delete       Update       IR len:         Connect & Reset Options       Add       Delete       Update       IR len:         Connect: Normal       Reset: Normal       Image: Cache Options       Download Options         Image: Reset after Connect       Reset: Normal       Image: Cache Code       Verify Code Download         Interface       TCP/IP       Network Settings       Misc       Misc         Interface       Verify Code Settings       Autodetect       JLink Info		
Add Delete Update IR Ien:	Auto Clk     Add     Delete     Update     IR Ien:       Connect & Reset Options     Cache Options     Download Options       Connect: Normal     Reset: Normal     Image: Cache Options     Download Options       Image: Reset after Connect     Image: Cache Options     Image: Cache Options     Image: Cache Options       Interface     TCP/IP     TCP/IP     Network Settings     Misc       Image: Options     Image: Cache Options     Image: Cache Options     Image: Cache Options       Interface     TCP/IP     Network Settings     Misc       Image: Options     Image: Cache Options     Image: Cache Options     Image: Cache Options	SW - 2MHz - C Manual Configuration Device Name:	
mal Cache Options Cache Options Cache Code Cache Memory Cache Memory Download Options Verify Code Download Download to Elash	Connect & Reset Options     Cache Options     Download Options       Connect: Normal     ▼     Reset: Normal     ▼       Image: Reset after Connect     Image: Reset after Connect     Image: Reset after Connect     Download Options       Interface     TCP/IP     TCP/IP     Misc       Image: Network Settings     Network Settings     Autodetect     JLink Info	Auto City Add Delete Update Blen	
mal	Connect & Reset Options Connect: Normal ▼ Reset: Normal ▼ Cache Options © Cache Code © Cache Memory ○ Cache Memory ○ Verify Code Download to Flash Interface © USB C TCP/IP ○ Network Settings Part (Autor 0)  Autodetect  JLink Info		
mal	Connect & Reset Options       Cache Options       Download Options         Connect:       Normal       ▼       Cache Options       Download Options         Image: Cache Code       ▼       Cache Code       ▼       Verify Code Download         Interface       TCP/IP       TCP/IP       Misc         Interface       Network Settings       Autodetect       JLink Info		
mal Cache Code Code Verify Code Download	Connect: Normal       Reset: Normal       Cache Code       Verify Code Download         Image: Reset after Connect       Cache Memory       Download to Bash         Interface       TCP/IP       Network Settings       Misc         Image: USB C TCP/IP       Network Settings       Autodetect       JLink Info	Connect & Reset Options	
Cache Memory Download to Bash	Interface     TCP/IP     TCP/IP     Misc       Interface     VSB C TCP/IP     Network Settings     Autodetect     JLink Info	onnect: Nomal 👻 Reset: Nomal 👻 🔽 Cache Code 🗌 🔽 Verify Code Dov	vnload
	Interface     TCP/IP     Network Settings     DSB C TCP/IP     Network Settings     DB Address     Pat (Auto. 0)     Autodetect     JLink Info	Reset after Connect	ish
	USB C TCP/IP     TCP/IP     Network Settings     Det (Auto. 0)     Autodetect     JLink Info		
Misc	USB C TCP/IP     Network Settings     Det (Autor)     Autodetect     JLink Info	erface	
ttings	Det fitte fit	USB C TCP/IP Network Settings	c Info
Port (Auto: U)	Scan	IP-Address Port (Auto: 0)	
		Scan Liter o o it	Cmd
0 . 0 . 1 : 0 Ping JLink Cmd	Ping JLink Cmd	Scan 127 . 0 . 0 . 1 : 0 Ping JLink	Cinu
ttings Port (Auto: 0)Autodetect JLink Info	Scan 127 0 0 1 0	erface TCP/IP Network Settings Disc JLink IP-Address Port (Auto: 0) Autodetect JLink	: Info
Port (Auto: 0) Autodetect	Scan 1727 0 0 1 0	IP-Address Port (Auto: 0) Autodetect	JLink
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0.0.1:0 Ding Units Cond	127 . U . U . 1 . U Disc. Uliek Cod	Scan 127 . 0 . 0 . 1 : 0 Direct Uted	

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Build Target files (Press F7 or click on the build button) and run the debug session (Press "Ctrl"+F5 or click on the "Debug" button).





Build

Debug

<pre># UP per P</pre>	ELMOQUIES VANT 140-ENMOYOG	BAIK-Uslog W, Sothware Software and Tools/UR14500_DK_v_3.01116/JEnpheral_examples/UR14500_perpheral_s
<pre>     We way way way way way way way way way way</pre>	bile Edit View Project Flast	b Depug Pelibiherala Toola 2VCS Window Help
R: Color (0 = 0 = 0 - 1 = 1 = 1 = 1 = 1 = 1 = 1 = 1 = 1 = 1		
upper         Image: Second Secon	👫 🗄 🔘 🕅 🕅 🖓 👘	
Upper         Upper <th< td=""><td>Registers 🛛 🗣 🛛</td><td>2 Disassembly</td></th<>	Registers 🛛 🗣 🛛	2 Disassembly
Output       Description 2000 Month       Description 2000 Month       Description 2000 Month         P = Normal       Description 2000 Month       Description 2000 Month       Description 2000 Month       Description 2000 Month         P = Normal       Description 2000 Month       Des	Register Value	0x0000211E BD10 POF (r4,pc)
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<pre>int text works text work text w</pre>	R1 0x20008580	154: short int index = 0;
<pre>int control interval inte</pre>	R2 0x20008580	155: ctar monology 156:
<pre>v voorder v voorder voord</pre>	R4 0x00007594	N0x0002122 2000 N0V3 r0.≢0x00
<pre>v vool vool vool vool vool vool vool vo</pre>	R5 0x20008420	
<pre>improve improve i</pre>	R7 0x0000000	i startup_MNDK_CN0.3 i system_CMNDK.4 i DA14980 examples.
<pre>1 distance in the set of the</pre>	R8 QuFFFFFFFF	<ul> <li>Additional margare (sk), Larvaw boars) or margare modification may needed to fone tor the tasts.</li> <li>143 * More information in the file periph setup. A gaplication Notes, and User Guide for BaltS80</li> </ul>
<pre>int downood in the set of th</pre>	R10 0x00007594	144 • - UART only ( No HN modifications on rev C2 motherboard, No additional hardware)
<pre>int int int int int int int int int int</pre>	R11 0x00007594	195 SPI Fissh with GARI (NW ROGIFICATIONS & additional margoware needed, SPI DU_MIA on the additional SPI / EFROM daughterBoard) 146 - Boot From SPI Fissh with UART (NW modifications & additional Hardware needed, (UART NX))
<pre>inst://</pre>	R12 0xFFFFFFF R13 (SP) 0x20008780	147 • - Boot From SPI Flash without UART (Additional Hardware needed)
<pre>by definition of the set of</pre>	R14 (LR) 0x00000137	148 * - Boot From EEFROM with UART (Additional Hardware needed) 149 *
<pre>idead in the set is index = 0; idead if is index = 0; idead if</pre>	R15 (PC) 0x00002120 EI-vESR 0x81000000	150
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Mode       Tread       Side MSP         Side       MSP       Side for the sproprise priphersh before choosing each testinirin';         Side       MSP       Side       Side         Side       MSP       Side       Side       Side         Side       MSP       Side       Side       Side         Side       MSP       Side       Side       Side         Side       Side       Side       Side       Side         Side       Side       Side       Side       Side         Side       Side       Side       Side       Side       Side         Side       Side       Side       Side       Side       Side       Side         Side       Side       Side       Side       Side       Side       Side       Side         Side	System     Internal	D 153 🕀 (
Back       HSP         Back       HSP         State       Print [sting]         Print [sting]       Print [sting]	Mode Thread	154 short into index = 0; 155 cher mohane
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Stop     printf_mering ("Kefer to Engineering Examples Deer Guide\nk1h\rh\r");       Stop     printf_mering();       Stop     if (Index==); break;       Stop     if (Index==); break;       Stop     case 'if : spi_ces/;       Stop     case 'if : spi_ces/; <td></td> <td><pre>isis printf_string("Connect the appropriate peripheral before choosing each test\n\r\n\r");</pre></td>		<pre>isis printf_string("Connect the appropriate peripheral before choosing each test\n\r\n\r");</pre>
and print_menu();         and print_print_menu();		160 printf_string("Refer to Engineering Examples User Guide\n\r\n\r");
100     100       1100     1100		161 print menu();
Image:		163
Beginter		169Mile(1)( 165Index=1) break:
angle:     Beginer       angle:     The set ():		166 mchoice = uart_receive_byte();
369       Cose **: pi_res(); endess_pridge(index); break;         0.000       Cose **: 10; endess_pridge(index); break;         173       Cose **: 10; endess_pridge(index); break;         174       Fond for the pi_res(); endess_pridge(index); break;         175       Cose **: 10; endess_pridge(index); break;         176       **: Restricted Vacuum to the pi_restricted vacuum to the pi_restristricted vacuum to the pi_restricted vacuum to the pi_restricted		167 switch (mchoice) { 168 see 'u'i uart test/); endtest bridge(sindex); break;
300     comes "1: spilange(); endlest pridge(index); break;       313     comes "1: spilange(); endlest pridge(index); break;       314     comes "1: spilange(); endlest pridge(index); break;       315     comes "1: spilange(); endlest pridge(index); break;       316     comes "1: spilange(); endlest pridge(index); break;       317     comes "1: spilange(); endlest pridge(index); break;       318     comes "1: spilange(); endlest pridge(index); break;       319     comes "1: spilange(); endlest pridge(index); break;       311     comes "1: spilange(); endlest pridge(index); break;       312     comes "1: spilange(); endlest pridge(index); break;       3132     break(); spilange(); endlest pridge(); endles		169 case 'f': spi_test(); endtest_bridge(&index); break;
372     cose 'd': 122_inage(): entest_bridge(index): break: 174 \$fide(index): break: 174 \$fide(		170 case 11: spi image(): endtest bridge(sindex): break: 171 case 1: 27 teat bridge(sindex): break:
127     /// Case "ti"; priject (); endtest_bridge (Lindsk); break;       127     // Case [time]; priject (); endtest_bridge (Lindsk); break;       127     Pristed (2000c; Tablid)       128     Pristed (2000c; Tablid)       129     Pristed (2000c; Tablid)       129     Pristed (2000c; Tablid)       129     Pristed (2000c; Tablid)       129     Pristed (2000c; Tablid)       120     Pristed (		172 case 'd': 12c image(); endtest bridge(&index); break;
Content y used; S0132 Bytes (31)     Code Size Limit     Code		173 /// case 't': swt_test(); endtest_bridge(&index); break;
276       Fondif //QCARCE_ENABLED       >         Despite       278       Call Stack - Incold       >         03D %L       0       Call Stack - Incold       >         04D %L       0       0       Call Stack - Incold       0         05D %L       0       0       Call Stack - Incold       0       0         04D %L       0       0       0       0       0       0         05D %L       0		<pre>175 case 'q': quad decoder test(); endtest bridge(sindex); break;</pre>
Bregister     0     Cdd Stack - Local     0       Bregister     0     Cdd Stack - Local     0       Call Stack - Local     0     0       Call Stack - Local     0       Call Stack - Local     0       Name     Location/Value     Type       ** Description with 32766 Bype Code Size Limit     1       ** Currently used: 30132 Bytes (213)     **       **     *		176 - #endif //QUARCE EMALLD
An offic and and offic and and offic and an offic and and		date to: classic_est() endest_crage(allocat_s) block:
All AL Control All All All All All All All All All A	m Project ) E Registers	
Name     Locidov/Male     Type       ** Restlicted Varian vith 32766 Byre Code Sire Limit     ** Mare     Locidov/Male     Type       ** Currently used: 30132 Byres (913)     ** Mare     Locidov/Male     Type       ** make     ** Outer Antiper Antipe	Command	0 M Calibratic Locals
** RestLicited Version sith 32768 Byte Code Size Limit ** Currently used; 30132 Bytes (314) ** Currently used; 30132 Bytes (314) ** main ** Ownow: ** ** Ownow:	TOND AT	Name Location/Value Type
mmute	*** Restricted Version v	with 32768 Byte Code Size Limit
n , , , , , , , , , , , , , , , , , , ,	one currently used: 3013	→ dubt 00.354 auto-shirt
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SSIGN BreakDisable BreakEnable BreakKill BreakKilt BreakLets COVERAGE DEFINE DIR Display Enter EVALuate 🕼 Kenoyi	>	
	ASSIGN BreakDisable Brea	skEnable BreakKill BreakList BreakList BreakList BreakAccess COVERAGE DEFINE DIR Display Enter EVALuate 🛛 💭 Cali Stadt - Locak; 🔲 Memory 1

The proximity project has now been compiled and downloaded into the RAM of the PAN1740ETU.