FT 6050 EVK

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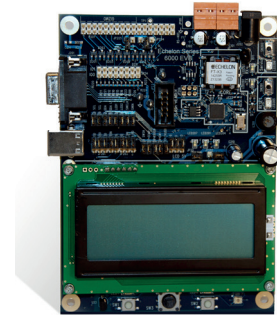

Figure 1. FT 6050 Evaluation Board (kit includes two boards)

Product Description

The FT 6050 EVK is a complete hardware and software platform for creating or evaluating IoT devices based on an Adesto smart transceiver or Neuron® chip.

You can use the FT 6050 EVK to create devices such as VAV controllers, thermostats, card-access readers, lighting ballasts, motor controls and many other devices. These devices can be used in a variety of systems including building and lighting controls, factory automation, energy management, and transportation systems. Whether you're building large or small control network devices, IP-enabled LON® or BACnet devices, the FT 6050 EVK makes your project development faster, easier, and more affordable.

Development Kit for the IzoT Control Platform

Creating control devices and networking them has a unique set of challenges that are quite different from traditional data or computer networking and also quite different from the consumer internet of things (IoT). Most high-value assets, such as electro-mechanical systems within buildings, machines on factory floors, public transportation, infrastructure for the delivery of public utilities and many others, require controlling and monitoring by special devices that are attached at key control and monitoring points and these devices together from the industrial internet of things (IIoT). The control and communication of these devices requires:

- Autonomous control — without the need for human involvement
- Industrial-strength reliability

Features

- Supports the development of LON, LON / IP, BACnet/IP or BACnet MS/TP devices on a common platform
- Includes two FT 6050 EVB hardware platforms for initial application development and testing
- Includes sample I/O hardware with a 4x20 character LCD display for easy I/O prototyping and testing
- Includes the IzoT® NodeBuilder® software for application development and IzoT Commissioning Tool for easy installation and testing of control networks
- Includes one U10 USB FT Network Interface and a set of five FT 6050 Smart Transceiver chips
- Open source Wireshark network protocol analyzer can be used to capture, analyze, characterize, and display network packets so you can pinpoint network or device faults and identify potential solutions

- Co-existence with legacy control protocols and evolution to new IP-based addressing
- Hardened security

The FT 6050 EVK is the easiest way for developers to create control devices and connect them with control networks. The FT 6050 EVK facilitates:

- Creation of autonomous communities of devices
- The ability discover each other
- A rich set of standard and inter-operable device profiles
- Creation of meaningful and functional bindings between devices
- Secure group messaging between devices
- IP addressing down to the device level
- An easy-to-use programming environment

IzoT NodeBuilder Software

The IzoT NodeBuilder software lets you create, debug, test, and maintain applications for LON or IzoT devices based on an Adesto Neuron chip or smart transceiver. Using the IzoT NodeBuilder software, you write your device applications using the Neuron C programming language, a high-level language based on ANSI C with extensions to simplify network communication, hardware I/O, and event-driven processing. The Neuron C language supports up to 254 address table entries, 254 static network variables and 127 network variable aliases per device for devices based on a Series 6000 chip with Neuron Firmware version 21 or newer, subject to available memory.

The IzoT NodeBuilder software supports application-specific interrupt handlers and a hardware semaphore that can be used for interrupt task synchronization. Interrupt sources include signals on any of the 12 I/O pins (rising edge, falling edge, either edge, positive or negative level), the high-performance on-chip timer and counter units, and a dedicated, configurable, high-performance periodic system timer.

The IzoT NodeBuilder software includes the following tools:

IzoT Resource Editor
View standard types and functional profiles, and create user-defined types and profiles if the standard resource files don't include the resources you need.

IzoT NodeBuilder Code Wizard
Use a drag-and-drop interface to create your device's interface, and then automatically generate Neuron C source code that implements the device interface and creates the framework for your device application. The code wizard saves days of development for every new device.

IzoT NodeBuilder Editor
Edit the Neuron C source code generated by the code wizard to create your device's application.

IzoT NodeBuilder Debugger
Debug your application with a source-level view of your application code as it executes.

IzoT NodeBuilder Project Manager
Build and download your application image to your development platform or to your own device hardware.

ISI Developer's Kit
Develop ISI devices that use the Interoperable Self-Installation (ISI) protocol to install and organize themselves into networks automatically or at the push of a button, all without the use of a separate installation tool.

IzoT Commissioning Tool
An integral part of the IzoT NodeBuilder software, the IzoT Commissioning tool is a software package for designing, installing, and maintaining LON and IzoT control networks. This single tool manages all phases of a network's life cycle, from the initial design and commissioning to the ongoing operation. Based on Adesto's IzoT Network Services Server, the IzoT Commissioning Tool combines a powerful client-server architecture with an easy- to-use Microsoft Visio user interface. It is compatible with a number of IzoT and LNS® plug-ins, including the IzoT NodeBuilder Project Manager.

FT 6050 Evaluation Board (EVB)
Two FT 6050 EVB Evaluation Boards are included with the FT 6050 EVK. The FT 6050 EVB is a complete LON and IzoT device that you can use to evaluate and create LON and IzoT devices. The FT 6050 EVB includes an FT 6050 Smart Transceiver with an external 10MHz crystal (you can adjust the internal system clock speed from 5MHz to 80MHz), an FT-X3 communication transformer, 512KB external serial flash memory device, and a 3.3V power source.

FT 6050 EVB Evaluation Board

The FT 6050 EVB's compact design includes the following I/O devices, which you can use to develop prototype and production devices, and to test the FT 6050 EVB example applications:

- 4-line x 20-character LCD display
- 4-way joystick with center push button

- Two push-button inputs
- Two LED outputs
- Light-level sensor
- Temperature sensor

An FT 6050 EVB I/O library, included with the IzoT NodeBuilder software, provides easy-to-use high-level functions for accessing the display, light-level sensor, and temperature sensor.

The FT 6050 EVB Evaluation Board also includes an EIA-232/TIA-232/

RS-232 interface and a USB interface that you can use to connect the board to your development computer and perform application-level debugging (only one of the two serial interfaces can be used at a time).

Each FT 6050 EVB also features a connector for optional in-circuit programming of the external non-volatile memory of the FT 6050 Smart Transceiver on the board. This allows fast application downloads to the external flash memory.

U10 USB FT Network Interface

One U10 USB FT Network Interface is included with the FT 6050 EVK. The U10 is a low-cost, high-performance LON interface for USB-enabled PCs. It connects to a free topology (FT) twisted pair LON channel through a removable connector, and is fully compatible with link powered channels.

SPECIFICATIONS

Operating System
Microsoft Windows 10 (64-bit and 32-bit) or Windows 8.1 (64-bit and 32-bit), Windows Server 2016 (64-bit), or Windows Server 2012 (64-bit).

Minimum Hardware
1 gigahertz (GHz) or faster x86-bit or x64-bit processor with SSE2 instruction set; 2 GB RAM; 1280 x 800 screen resolution display.

Neuron C I/O Objects
Bit, byte, nibble input/output
Bitshift input/output
Dallas Touch input/output
Dual slope input (for low-cost A/D)
Edge divide output
Edgelog input
Frequency output
Infrared input
Infrared pattern output
I_2C input/output
Level detect input
Magcard bitstream input
Magcard track 1 and 2 input (for ISO 7811 input)
Muxbus input/output (multiplexed address/data)
Neurowire input/output (National Semiconductor Microwire and Motorola SPI compatible)
Oneshot output, ontime input, period

input, pulsewidth output
Parallel input/output
Pulsecount input/output
Quadrature input
SCI (UART) serial input/output
SPI serial input/output
Serial input/output
Total count input.
Touch input/output (Maxim/Dallas 1-Wire protocol-compatible)
Triac and stretched triac output
Triggeredcount output
Wiegand input

Neuron C Network Communication Extensions
Functional blocks
Network variables
Configuration properties
Application and foreign-frame messages

Supported BACnet Object Types
Analog Input
Analog Output
Binary Input
Binary Output
Device Object

Supported BACnet Services
Change of Value (COV)
Read Property
Read Property Multiple
Write Property

Application Image Download
Out of Service

Hardware (FT 6050 EVB)
Processor
FT 6050 Smart Transceiver

Processor Input Clock
10MHz (5MHz to 80MHz system clock)

Processor Memory
64KB on-chip RAM, 16KB on-chip ROM, 512KB external serial flash memory, mapped to 64KB Neuron memory space based on IzoT NodeBuilder hardware template definition

Operating Input Voltage
+9 to 12VDC unregulated

External I/O Power
Combined +5V and +3.3V current not to exceed 100mA

External Power Supply
100 to 240VAC; 50 or 60Hz

Operating Temperature
0° to +45°C

Non-operating Temperature
-20° to +70°C

Dimensions
140mm x 105mm x 30mm

EMC Compliance
EN 55022 Class A

DOCUMENTATION

FT 6050 EVK User's Guide
078-0503-01A

Describes how to use the FT 6050 EVK to develop control applications and networks using the IzoT platform.

FT 6050 EVB Hardware Guide
078-0504-01A

Describes how to connect the FT 6050 EVB boards, and it describes the Neuron core, I/O devices, service pin, reset buttons, LEDs, and jumper settings on the FT 6050 EVB hardware.

FT 6050 Examples Guide
078-0505-01A

Describes how to run the example applications included with the Evaluation Kit on an FT 6050 EVB.

Series 6000 Chip Data Book
005-0230-01A

Provides detailed specifications on the electrical interfaces, mechanical interfaces, and operating environment characteristics for the FT 6050 Smart Transceiver and Neuron 6050 Processor.

IzoT BACnet Developer's Guide
078-0507-01

Describes how to use the BACNet library and run the BACnet examples for the FT 6050 EVK.

IzoT Resource Editor's Guide
078-0508-01A

Describes resource files and how to use the IzoT Resource Editor to view, create, and modify them.

IzoT Commissioning Tool User's Guide
078-0509-01A

Describes how to use the this tool to design, install, operate, and maintain IzoT networks.

IzoT Network XML Programmer's Guide
078-0510-01A

This guide describes how to create and modify an IzoT network using the XML Plug-in.

IzoT Plug-in Guide for Wireshark
078-0511-01A

How to plug into the Wireshark packet analyzer to monitor, analyze, and troubleshoot network protocol problems.

I/O Model Reference for Smart Transceivers and Neuron Chips
078-0392-01C

Describes the many different I/O models that are available for use with Smart Transceivers and Neuron Chips. An I/O model provides programmable access to one or more I/O pins.

Neuron Assembly Language Reference Guide
078-0399-01B

Describes the Neuron Assembly Language and how to write assembly language functions.

Neuron C Programmer's Guide
078-0002-02I

Describes how to write programs using the Neuron C programming language.

Neuron C Reference Guide
078-0140-02G

Provides reference info for writing programs using the Neuron C programming language.

Neuron Tools Errors Guide
078-0402-01D

Documents and explains the various warning and error messages that can occur in the Adesto development tools.

LON USB Network Interface User's Guide
078-0296-01

Documentation for U10 USB FT Network Interface.

Model #	Product Name	Product Description
10070R-43-54	FT 6050 EVK	Hardware and software evaluation and development kit for Adesto smart transceivers and Neuron chips

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