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Fast and Reliable Production Flash and Gang Programmers for MCUs and MPUs

PM037A03 rev. 1.9
July.28.2023

Programmer Selection

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Programmers for STM32 MP1 MPUs:

GangFlasher-ST

- **STM32MP1xx**

Programmers for ARM MCUs from Multiple Vendors:

FlashPro-ARM, GangPro-ARM

- **CMSIS-DAP Debugger**
- **Texas Instruments**
- **ST Microelectronics**
- **Silicon Labs**
- **Renesas Electronics**
- **NXP / Freescale**
- **Nordic Semiconductors**
- **Maxim Integrated**
- **Microchip / Atmel**
- **Marvell Tech.**
- **Cypress Semiconductor (coming soon)**
- **Active Semi**

- ## Programmers for MCUs from Texas Instruments only:

  FlashPro430, GangPro430, FET-Pro430 - **supports all MSP430 MCUs**

  FlashPro-CC, GangPro-CC - **supports** *all Wireless Solution (Chipcon) MCUs*

  FlashPro-2000 - *supports C*2000 MCUs

Programmers for 8-32b MCUs:

FlashPro-M, GangPro-M

- *Serial Flash via SPI (Adesto, Cypress, ISSI, Macronix, Microchip, Micron, Winbond)*
- *STM-8 from ST Microelectronics,*
- *AVR and PIC from Microchip / Atmel,*
- *RL78 from Renesas*
- *iMOTION from Infineon*

Software Selector Guide

MCU Vendor	MCU Family	Gang Flasher -ST	FlashPro-ARM GangPro-ARM CMSIS-DAP	FlashPro430 GangPro430	FlashPro-CC GangPro-CC	FlashPro-2000	FlashPro-M GangPro-M
Texas Instruments	MSP430, CC430			+			
Texas Instruments	ARM MSP432, MSPM0		+				
Texas Instruments	TMS320F28xx					+	
Texas Instruments	Cxx Wireless Solution 8051 Core				+		
Texas Instruments	Cxx Wireless Solution ARM Core		+				
ST Microelectronics	STM32MP1xx MPU	+					
ST Microelectronics	ARM STM32		+				
ST Microelectronics	STM8						+
Active Semi	ARM PAC5xx		+				
Analog Devices	ARM ADuCM		+				
Infineon / Cypresses	ARM PSoC, FMxx, iMOTION, Traveo		+				+ (iMOTION)
Microchip (Atmel)	ARM AT-SAMxx		+				
Microchip (Atmel)	AVR						+
Microchip	PIC						+
Marvel	ARM 88MC2xx / 88MW3xx		+				
Maxim	ARM MAX 326xx		+				
Nordic Semiconductors	ARM nRFxxx		+				
NXP / Freescale	ARM iMX, Kinetis, LPCxx, S32K, K32W, JNx, QNx		+				
Renesas	ARM Synergy, RA		+				
Renesas	RL78						+
Silergy	ARM MAXxx		+				
Silicon Labs	ARM EFM32, EFR32, Sim3, EM3		+				
Serial Flash via SPI	Adesto, Cypress, ISSI, Macronix, Microchip, Micron, Winbond						+

Programmer Selector Guide

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Package Name	Price [USD]	Target MCUs	Software	USB-FPA	XStream-	XStreamPro-
FlashPro430 – Standard [XS, X2S]	299/419/619	MSP430	FlashPro430	PN: USB-MSP430-FPA-STD	PN: XS-FP-430	PN: X2S-FP-430
FlashPro-MSP [XS, X2S]	--/479/679	MSP430 / MSP432	FlashPro430 / FlashPro-ARM	-	PN: XS-FP-MSP	PN: X2S-FP-MSP
GangPro430 – JTAG / BSL [XS, X2S]	--/659/859	MSP430	GangPro430 / FlashPro430		PN: XS-GP-430	PN: X2S-GP-430
FlashPro-CC – Standard [XS, X2S]	--/419/619	CCxx	FlashPro-CC / FlashPro-ARM		PN: XS-FP-CC	PN: X2S-FP-CC
GangPro-CC [XS, X2S]	--/659/859	CCxx	GangPro-CC / GangPro-ARM		PN: XS-GP-CC	PN: X2S-GP-CC
FlashPro-2000 – Standard [XS, X2S]	299/419/619	TMS320C28xx	FlashPro-2000	PN: FP2000-STD	PN: XS-FP-2000	PN: X2S-FP-2000
FlashPro-ARM – One Vendor [XS, X2S]	--/459/659	ARM Limited to One Vendor(***)	FlashPro-ARM	-	PN: XS-FP-ARM-1V	PN: X2S-FP-ARM-1V (**)
FlashPro-ARM [XS, X2S]	--/569/769	See ARM list in the website	FlashPro-ARM	-	PN: XS-FP-ARM	PN: X2S-FP-ARM (**)
GangPro-ARM – One Vendor [XS, X2S]	--/909/1109	ARM Limited to One Vendor(***)	GangPro-ARM / FlashPro-ARM	-	PN: XS-GP-ARM-1V	PN: X2S-GP-ARM-1V (**)
GangPro-ARM [XS, X2S]	--/1019/1319	See ARM list in the website	GangPro-ARM / FlashPro-ARM	-	PN: XS-GP-ARM	PN: X2S-GP-ARM (**)
FlashPro-M – One Vendor [XS, X2S]	--/419/619	Limited to One Vendor (***)	FlashPro-M	-	PN: XS-FP-M-1V	PN: X2S-FP-M-1V
FlashPro-M [XS, X2S]	--/529/729	Serial Flash, STM-8, PIC, AT	FlashPro-M	-	PN: XS-FP-M	PN: X2S-FP-M
GangPro-M – One Vendor [XS, X2S]	--/759/969	Limited to One Vendor (***)	GangPro-M / FlashPro-M	-	PN: XS-GP-M-1V	PN: X2S-GP-M-1V
GangPro-M [XS, X2S]	--/869/1069	Serial Flash, STM-8	GangPro-M / FlashPro-M	-	PN: XS-GP-M	PN: X2S-GP-M
Universal FlashPro-X Programmer [XS,X2S]	--/719/919	Any above	Any Flash-.. Above	-	PN: XS-FP-X	PN: X2S-FP-X
Universal GangPro-X Programmer [XS,X2S]	--/1119/1319	Any above	Any Flash-.. and Gang-.. Above	-	PN: XS-GP-X	PN: X2S-GP-X

Note: (*) Lite version – software without access to **DLL**s, serialization and script files.
(**) Supports Serial Flash programming via JTAG/SWD and MCU using FlashPro-ARM/GangPro-ARM software or via SPI using FlashPro-M/GangPro-M software
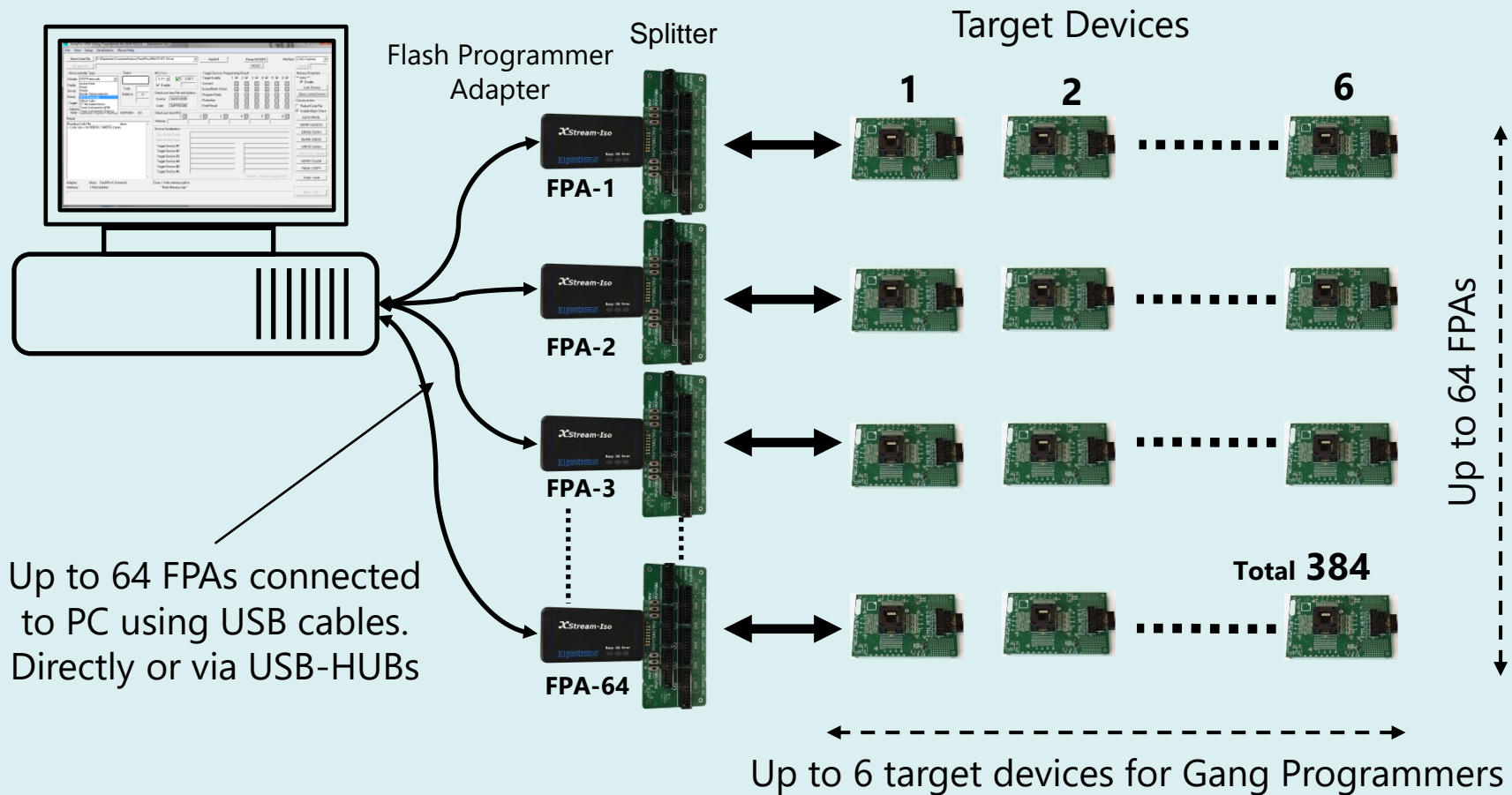(***) Limited to one Vendor e.g. TI only, NXP only etc.

Programming Adapters

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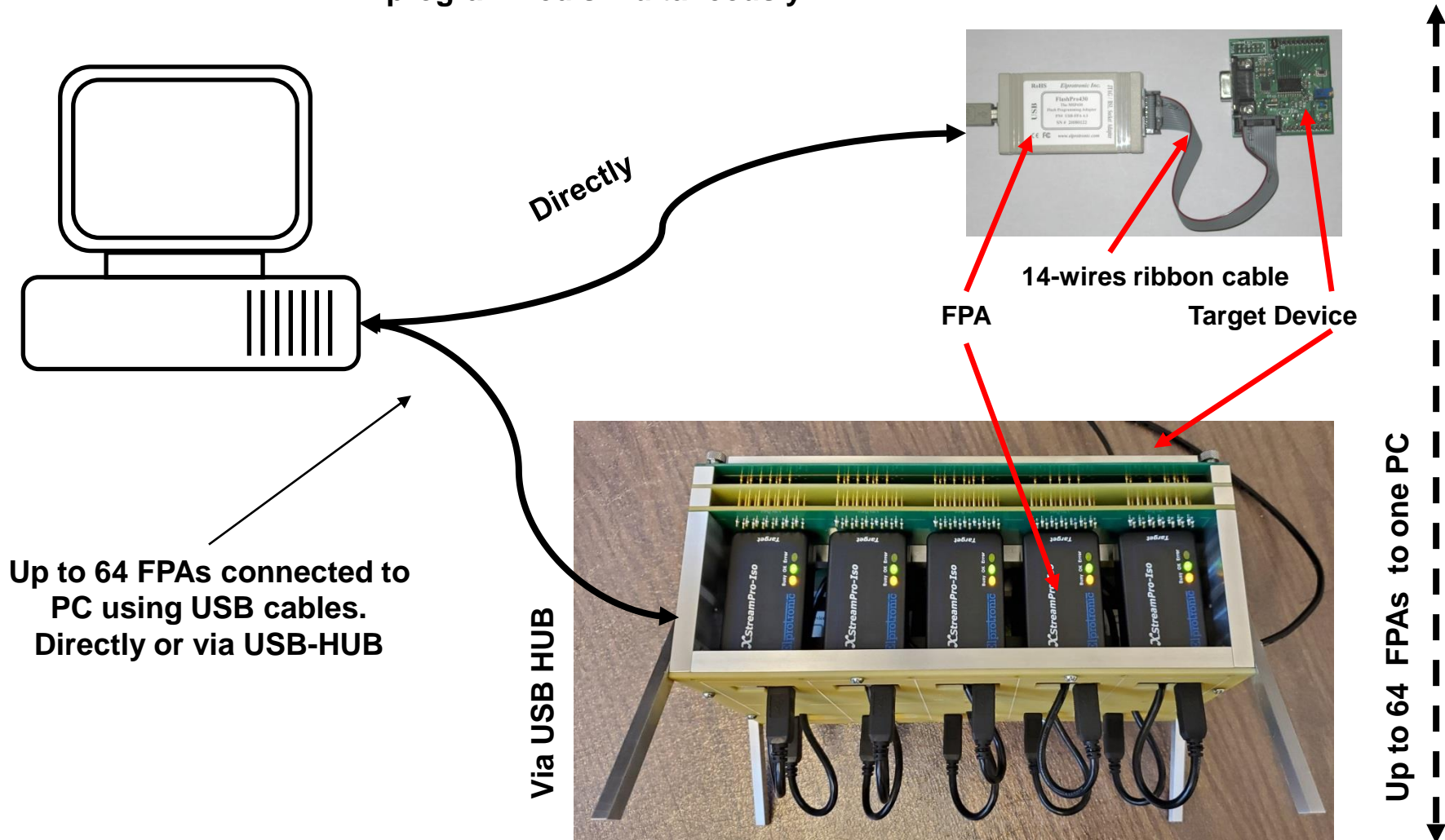| Features	USB-FPA	XStream-Iso	XStreamPro-Iso
Suffix in the Product Part Number	none e.g. FP-ARM	XS- e.g. XS-FP-ARM	X2S- e.g. X2S-FP-ARM
Data transfer speed to / from Target Device	Up to 100 kbytes/s	Up to 1 Mbytes/s	Up to 1 Mbytes/s
JTAG / SWD Hi Speed	Fixed ~ 1.5MHz	Prog. 1-20MHz	Prog. 1-20MHz
JTAG / SWD Med / Low Speed	800kHz / 400kHz	800kHz / 400kHz	800kHz / 400kHz
Supported Comm. Interfaces (vary by software)	JTAG, cJTAG, SWD, SBW, BSL, DD, UART ..	JTAG, cJTAG, SWD, SBW, BSL, DD, SPI, UART ..	JTAG, cJTAG, SWD, SBW, BSL, DD, SPI, UART ..
DLL for debugging	MSP430	MSP430, ARM (CMSIS-DAP IAR/Keil)	MSP430, ARM (CMSIS-DAP IAR/Keil)
Image Memory (for Standalone, Security)	-	-	24 MB Flash
RAM Buffer for real time monitoring (current, voltage)	-	32 kB RAM	32 kB RAM
Galvanic Isolation between PC and Target Device	-	YES	YES
Vcc and I/O range	1.65 - 4.0 V	1.65 - 4.0 V	1.2 - 4.0 V
Vcc supplied from Adapter to Target Device	1.65-4.0 V /up to 200mA	1.65-4.0 V /up to 200mA	1.2-4.0 V /up to 200mA
Icc Current measurements	-	20 uA – 200 mA	5 nA – 200 mA
Communication via USB 2.0 Full Speed	YES	YES	YES
Communication via LAN (Ethernet)	-	-	YES
Adapter powered from	USB +5V	USB +5V	USB +5V or PoE +48V
I/O lines in 3-state	YES. Pullup 1M to Vcc	YES. Pullup 1M to Vcc	YES
Power line in 3-state	-	-	YES
Up to 64 adapters can be connected to one PC	YES	YES	YES
FCC / CE test certification	YES	YES	YES
OS	Windows ™ 32-b applications	Windows ™ 32,64-b applications, Linux	Windows ™ 32,64-b applications, Linux
Size	79 * 42 * 21 mm	79 * 42 * 21 mm	79 * 42 * 21 mm

General Features
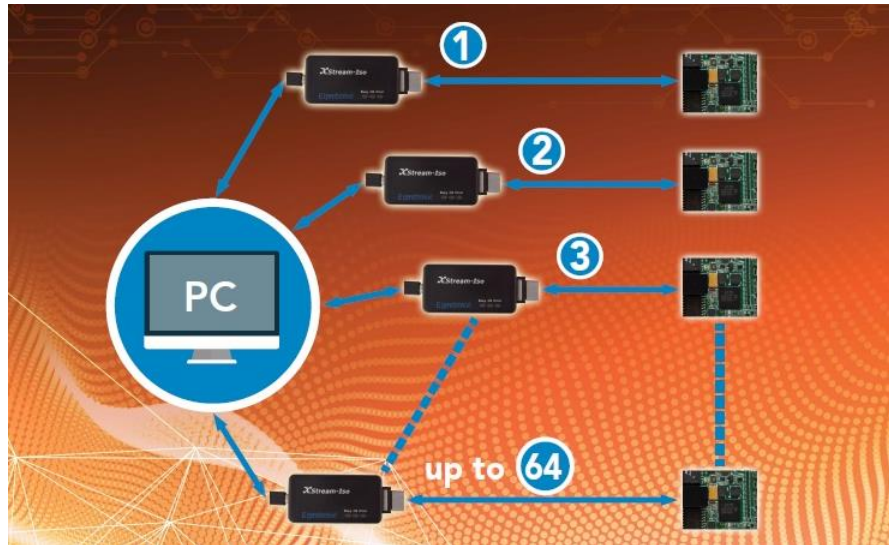
- Up to 64 Flash Programming Adapters (FPAs) can be connected to one PC.
- Supports JTAG, cJTAG, SWD, SBW, BSL, SPI, UART communication interfaces (interface list depends on supported devices)
- Programmable JTAG communication speed (if applicable) up to 20 MHz with *XStream-Iso* and *XStreamPro-Iso* adapters and up to 4 MHz with old *USB-FPA* adapter
- Transfer speed up to 1 MBytes/s with *XStream-Iso* and *XStreamPro-Iso* adapters and up to 50 kBytes/s with *USB-FPA* adapter
- Full memory or page memory erase capability
- Check Sum verification
- No code size limitations
- Target device can be powered from the programming adapter or from external source
- Easy to use Windows™ based software. For *XStream-Iso* and *XStreamPro-Iso* adapters also Debian Linux support (amd64/armhf/arm64) . Also runs on Raspberry Pi.
- Accepts TI (*.txt), Motorola (*.s19, *.s28, *.s37, *.srec) and Intel (*.hex) data files
- Lock setup capability, useful in production
- Software package can assign and automatically increment a serial number, model type and revision. Serial Number with or without an automatically inserted current date can be stored in Flash memory in HEX, BCD or ASCII format
- DLL software package can control up to 64 FPAs from user application
- USB-2.0 Full-Speed to communication between PC and programming adapter. The *XStreamPro-Iso* adapter also provide communication via LAN
- Programming adapter has been fully tested to comply with FCC and CE requirements

Multiple Gang Programmers Setup

Splitter

Flash Programmer Adapter

Target Devices

1   2   6

FPA-1

FPA-2

FPA-3

FPA-64

Up to 64 FPAs connected to PC using USB cables. Directly or via USB-HUBs

Total **384**

Up to 64 FPAs

Up to 6 target devices for Gang Programmers

Flash Programmer

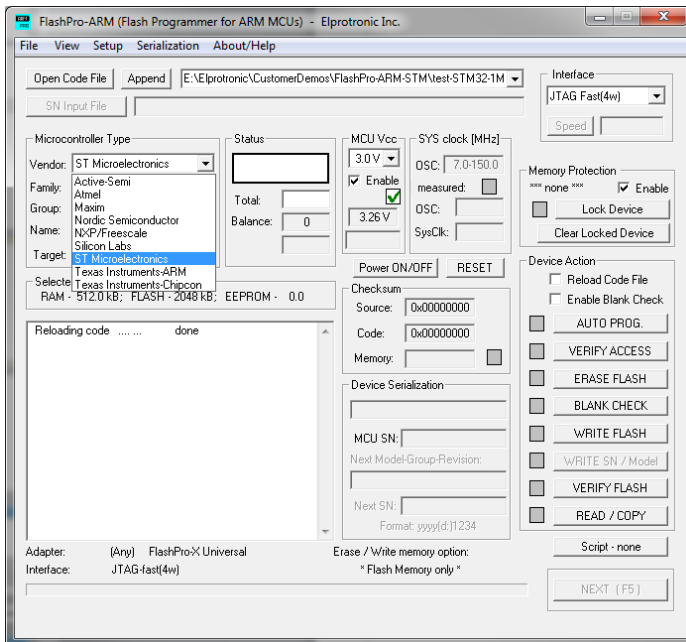**Single Target: Each FPA programs one target. Up to 64 target devices can be programmed simultaneously**

Directly

14-wires ribbon cable

FPA

Target Device

Up to 64 FPAs connected to PC using USB cables. Directly or via USB-HUB

Via USB HUB

Up to 64 FPAs to one PC

Gang Programmer

Multiple Targets: Each FPA programs up to 6 targets. Up to 384 target devices in panel can be programmed simultaneously

Directly

Via USB HUB

PCB Panel

Access to boards via nails
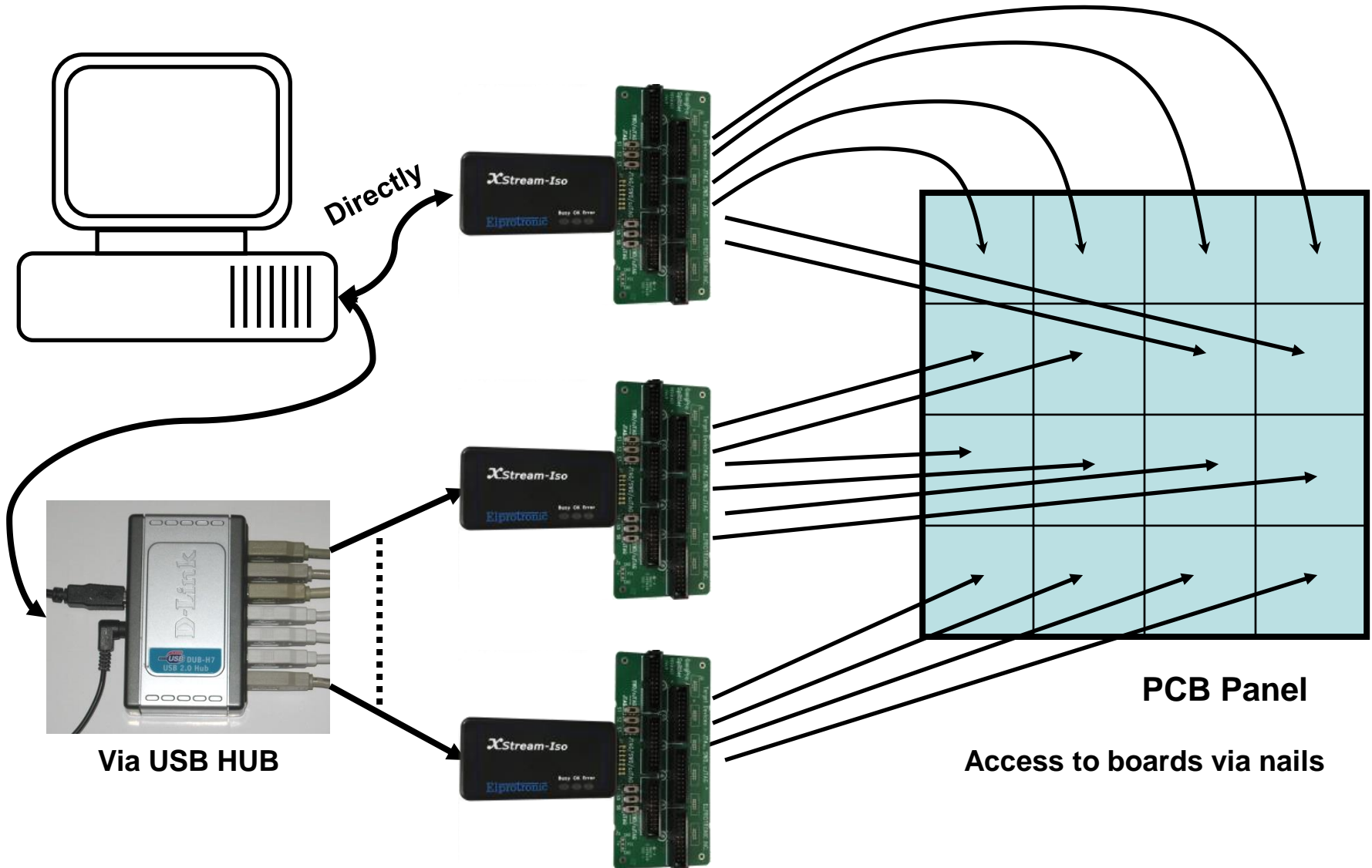
GUI – Main Screen

* Software package contains ready to use GUI for FlashPro-xx and GangPro-xx.

* One GUI controls one adapter only.

* Easy to use setup, serialization, MCU protection and more.
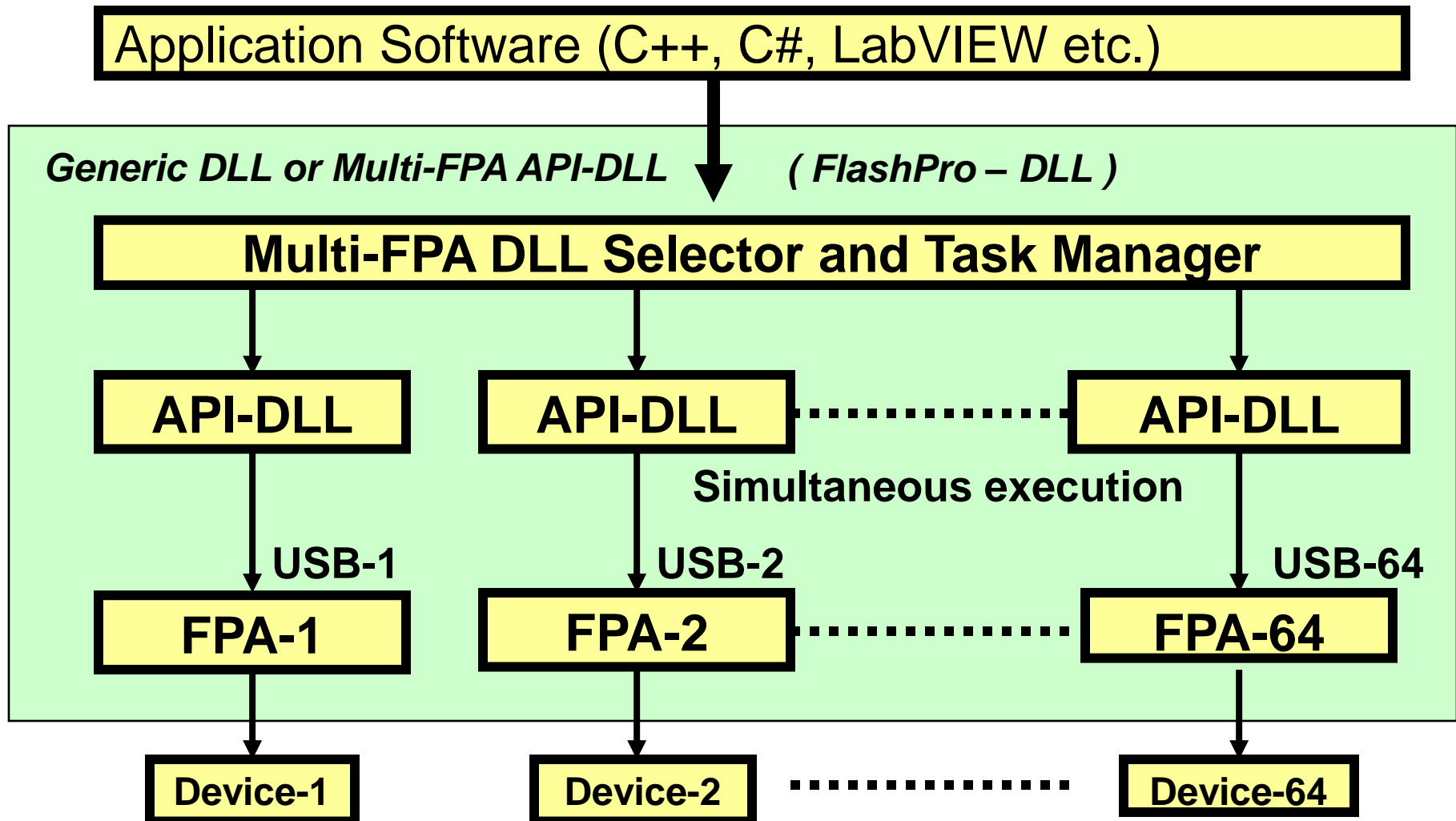
FlashPro-ARM GUI

GangPro-ARM GUI

GUI - Serialization
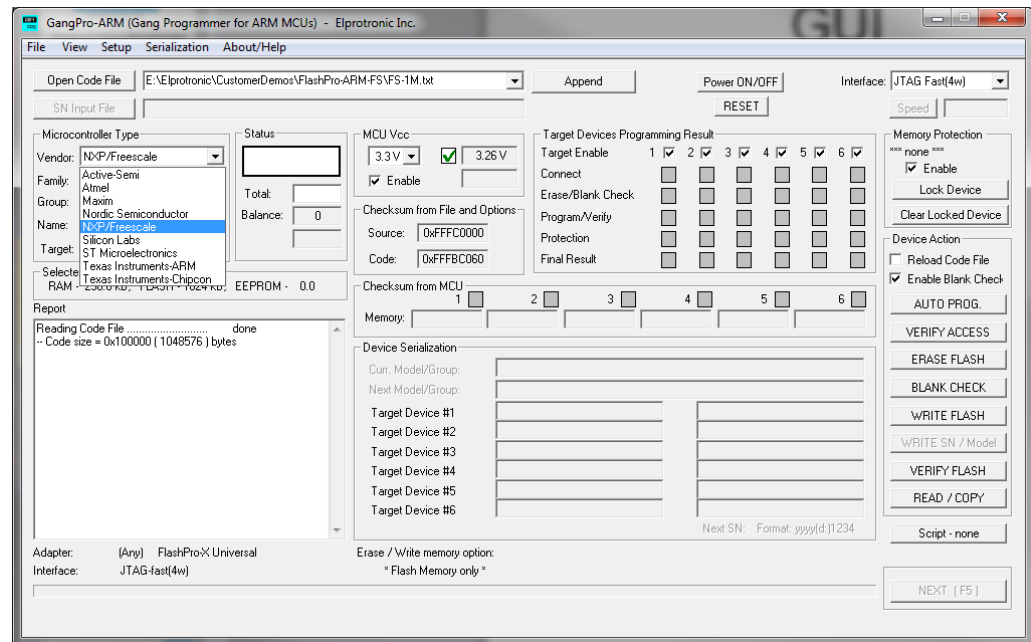
- **7 fixed serialization formats**
- **Custom defined format**
- **Programmable serialization location**
- **Serialization log file**
- **Supported Bar Code Scanner**

Control all FPAs using one DLL via Application

Use only one DLL: Thread-safe Generic DLL or broadcast-style Multi-FPA DLL

Application Software (C++, C#, LabVIEW etc.)

Generic DLL or Multi-FPA API-DLL (*FlashPro – DLL*)

Multi-FPA DLL Selector and Task Manager

| **API-DLL** | **API-DLL** | · · · · · · · | **API-DLL** |

Simultaneous execution

USB-1 **USB-2** **USB-64**

| **FPA-1** | **FPA-2** | · · · · · · · | **FPA-64** |

| **Device-1** | **Device-2** | · · · · · · · | **Device-64** |
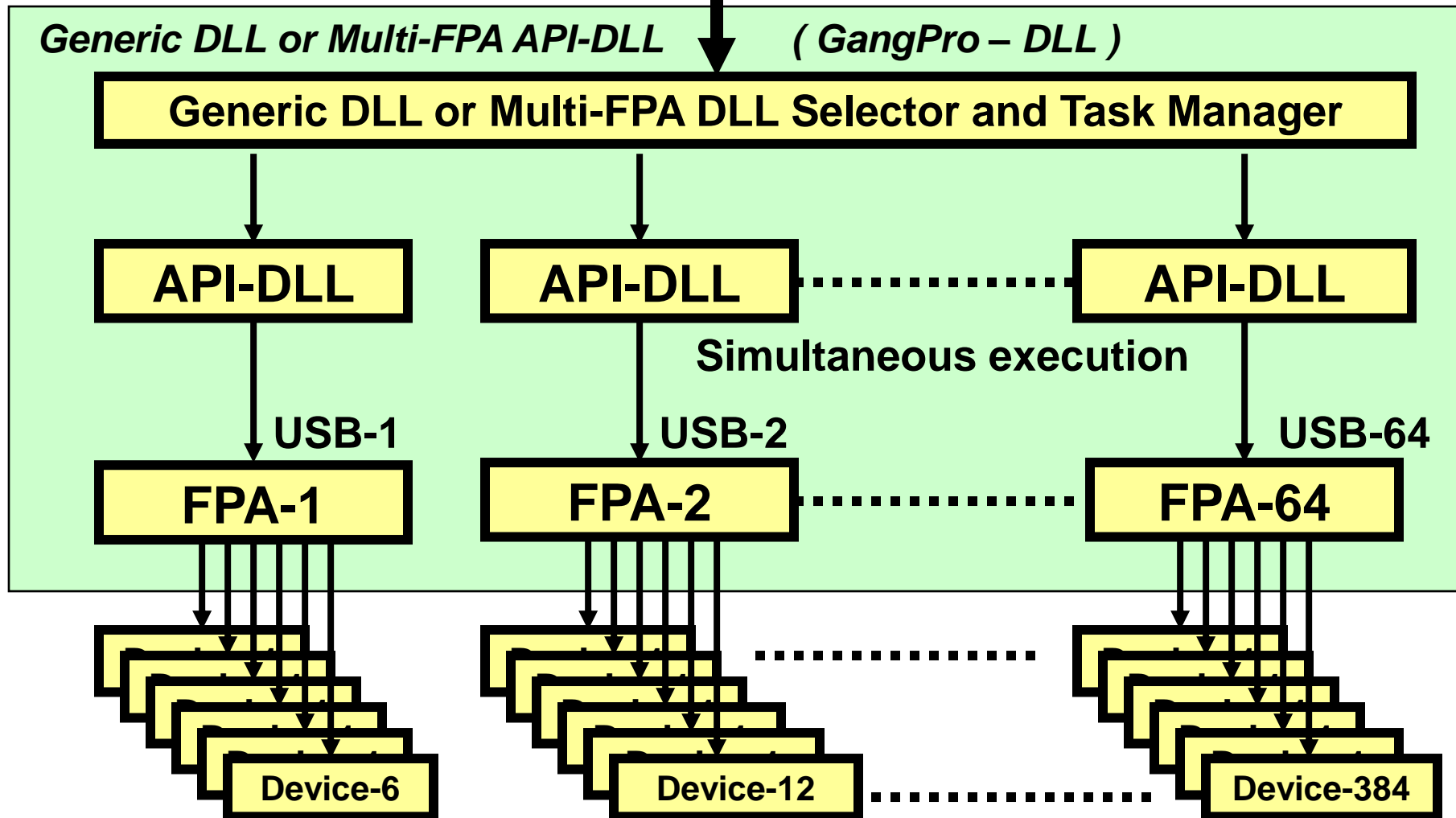
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Use only one DLL: Thread-safe Generic DLL or broadcast-style Multi-FPA DLL
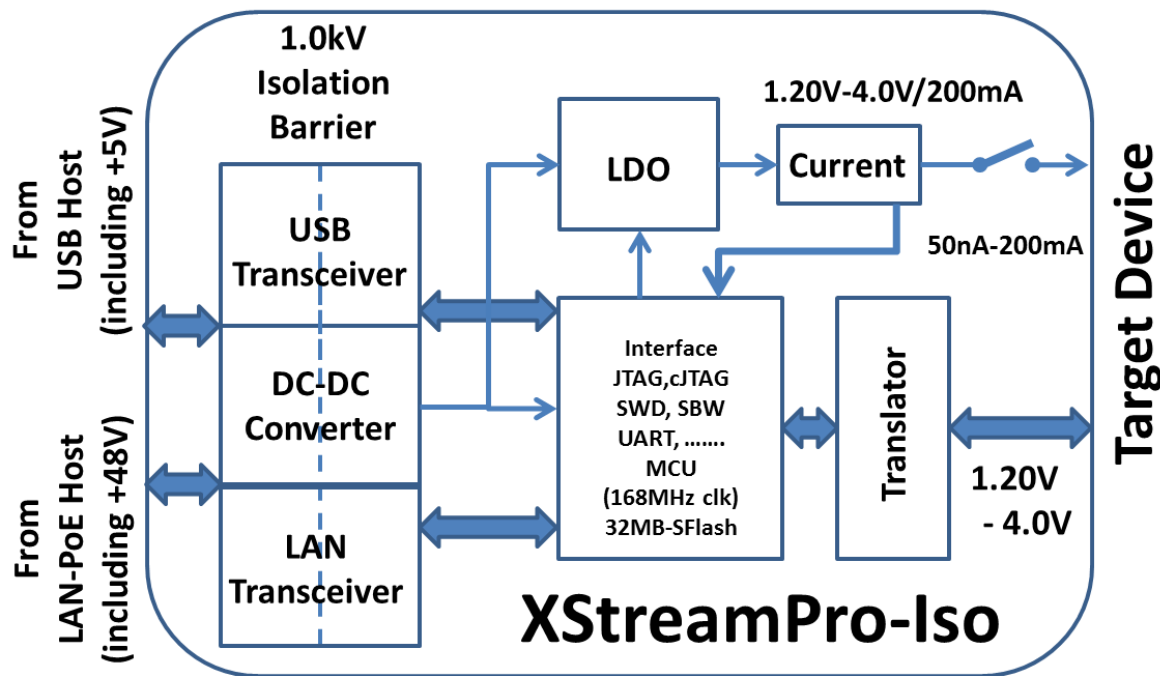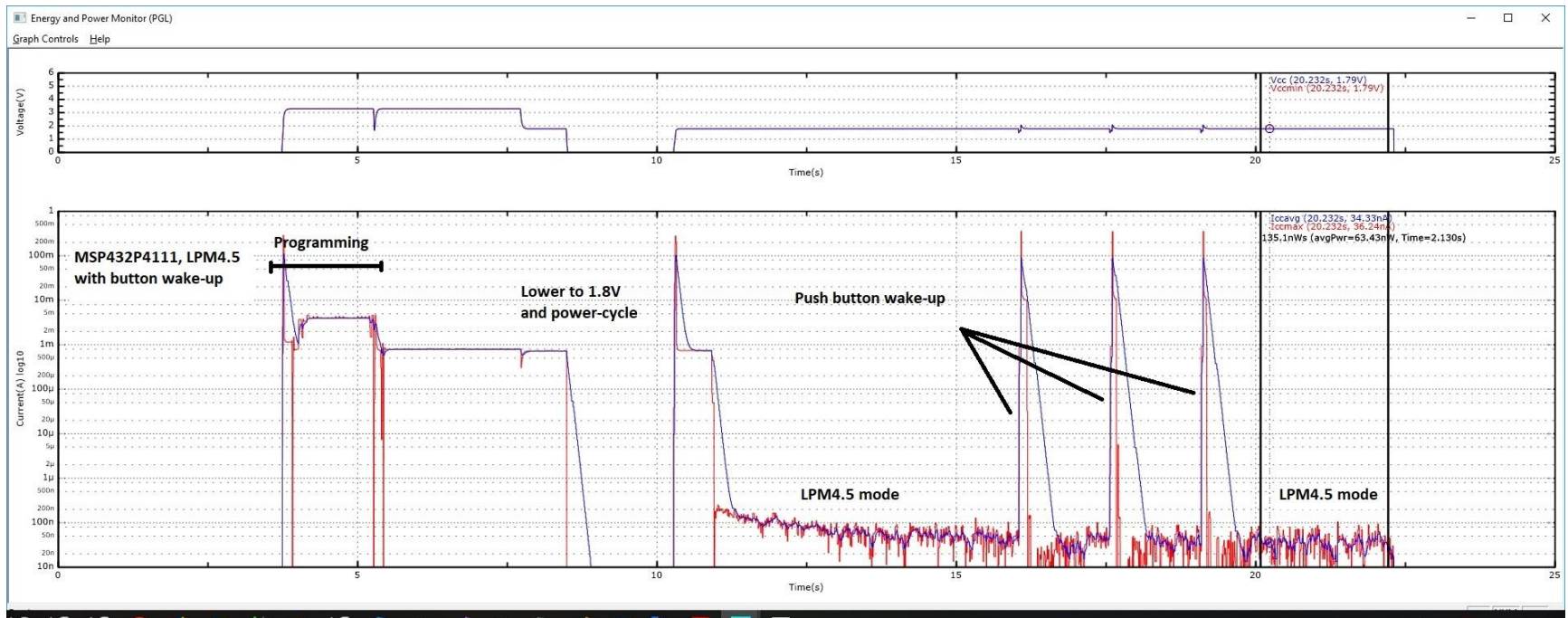
XStreamPro-Iso Programming Adapter

Features:

- Data transfer up to 1 Mbytes/s
- JTAG/SWD speed up to 20 MHz
- Galvanic Isolation 1.0 kV
- Vcc: 1.2 – 4.0 V, current up to 200 mA
- Current measurements 5nA – 200 mA
- Communication via USB 2.0 or LAN. Power from USB (5V) or from LAN PoE (48V)
- I/O lines and Power line are isolated from target device if XStreamPro-Iso is in idle mode
- Up to 64 adapters can be connected to one PC
- Image Memory for project storage (in the future) – 24 MB
- Size 79 * 42 * 21 mm
- Software compatible with the old USB-FPA (FlashPro430, FlashPro-ARM……)
- FCC / CE test certification

NEW

XStreamPro-Iso Programming Adapter

Features:

- **Vcc measurement – up to 6V.**
- **Current measurements 50nA – 200 mA**
- **Time resolution – up to 1ms for Vcc and up to 10ms for current measurements**
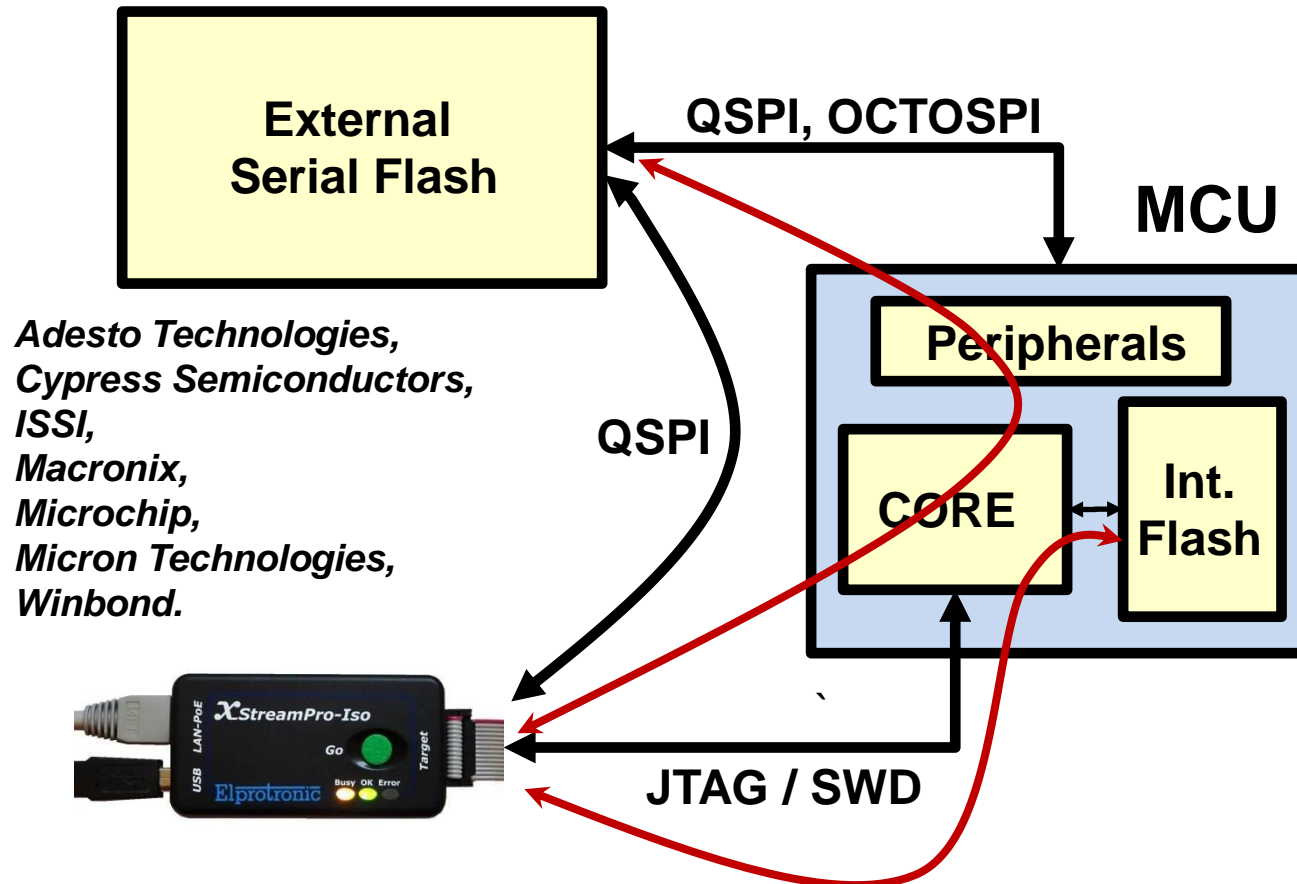
XStreamPro-Iso Programming Adapter

Press GO button to start Auto Program from internal memory

NEW

Features:

- **Standalone programming feature (code and configuration in internal flash. Auto Program with GO button).**
- **Up to 96 distinct images, or 24 MB total in size.**
- **Images support production quota (maximum units programmed per image).**
- **Images support serialization features.**
- **Configurable GO feature: from button or when detected Vcc on target device.**

XStreamPro-Iso Programming Adapter

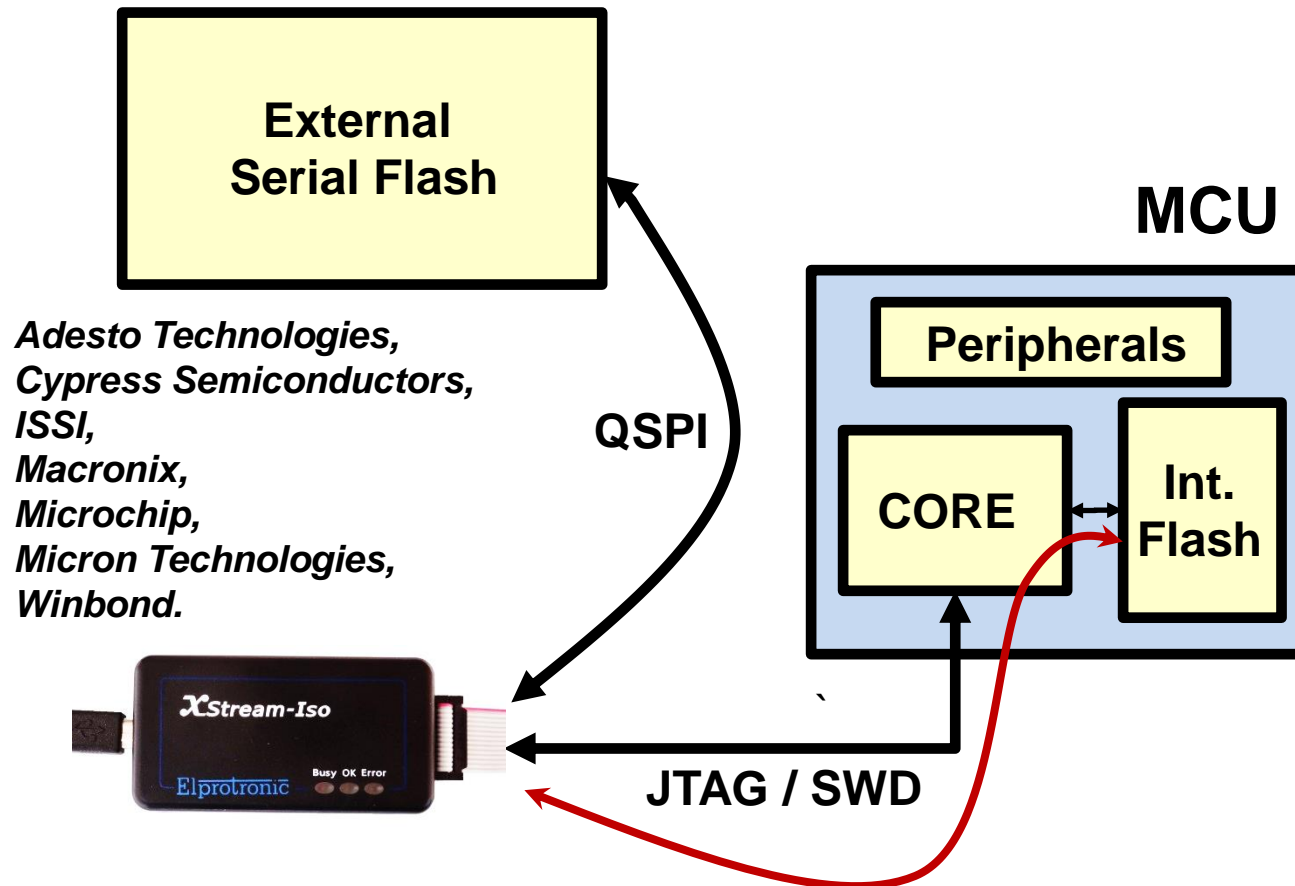External and Internal Flash Programming via JTAG/SWD
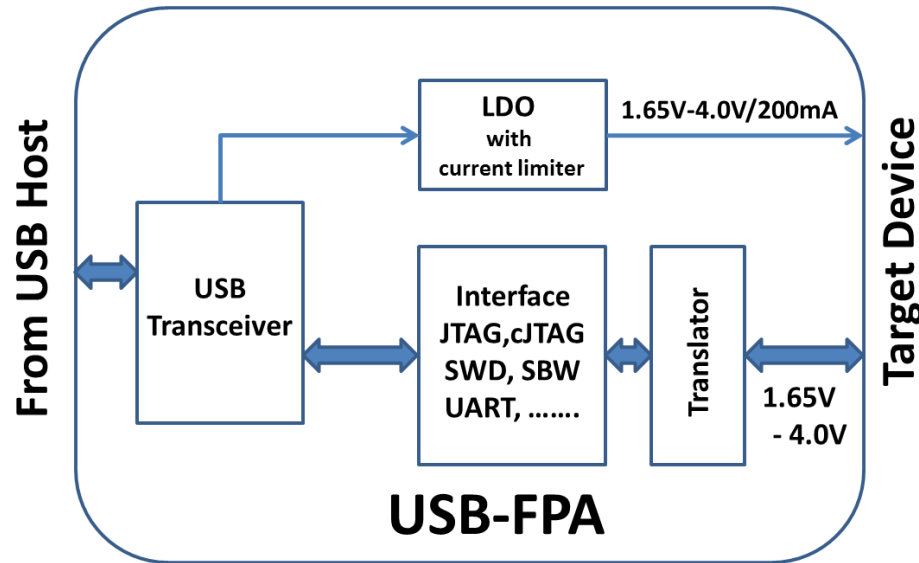
XStream-Iso Programming Adapter
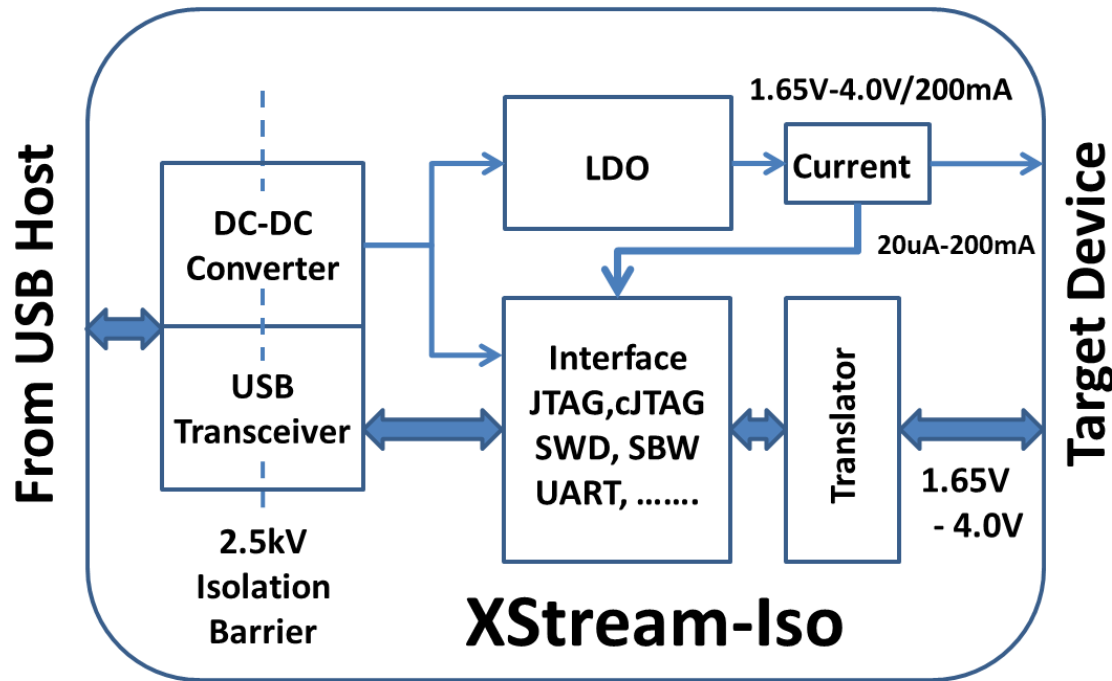
Features:

- Data transfer up to 1 Mbytes/s
- JTAG/SWD speed up to 20 MHz
- Galvanic Isolation 2.5 kV
- Vcc: 1.65 – 4.0 V, current up to 200 mA
- Current measurements 20uA – 500 mA
- Up to 64 adapters can be connected to one PC
- Size 79 * 42 * 21 mm
- Software compatible with the old USB-FPA (FlashPro430, FlashPro-ARM......)
- FCC / CE test certification

XStream-Iso Programming Adapter

External Serial Flash

MCU

Adesto Technologies,
Cypress Semiconductors,
ISSI,
Macronix,
Microchip,
Micron Technologies,
Winbond.

QSPI

Peripherals

CORE

Int. Flash

XStream-Iso

Busy OK Error

Elprotronic

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JTAG / SWD

**External and Internal Flash Programming
via SPI or JTAG/SWD**
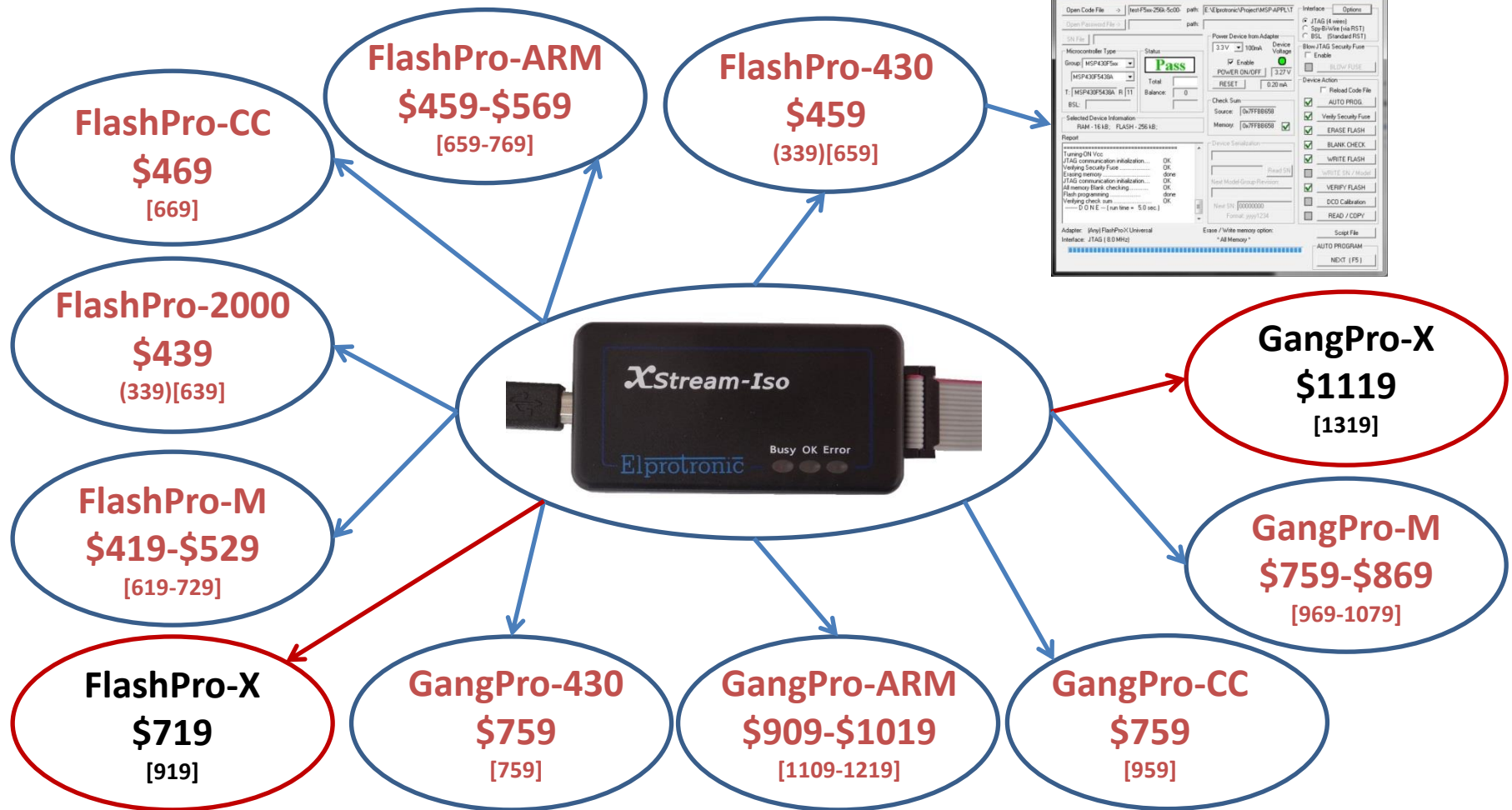
USB-FPA Programming Adapter

Features:

- Data transfer up to 50 kbytes/s
- JTAG speed up to 4 MHz. SWD speed up to 1.5 MHz
- Vcc: 1.65 – 4.0 V, current up to 200 mA
- Up to 64 adapters can be connected to one PC
- Size 79 * 42 * 21 mm
- FCC / CE test certification

XStream-Iso Package

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FlashPro-CC
$469
[669]

FlashPro-ARM
$459-$569
[659-769]

FlashPro-430
$459
(339)[659]

FlashPro-2000
$439
(339)[639]

GangPro-X
$1119
[1319]

FlashPro-M
$419-$529
[619-729]

GangPro-M
$759-$869
[969-1079]

FlashPro-X
$719
[919]

GangPro-430
$759
[759]

GangPro-ARM
$909-$1019
[1109-1219]

GangPro-CC
$759
[959]

Note: Price of package with *USB-FPA* adapter is **($120)** lower than with *XStream-Iso*.
Price of package with *XStreamPro-Iso* adapter is **[$200]** higher than with *XStream-Iso*.

Other Products

USB Full Speed Isolator
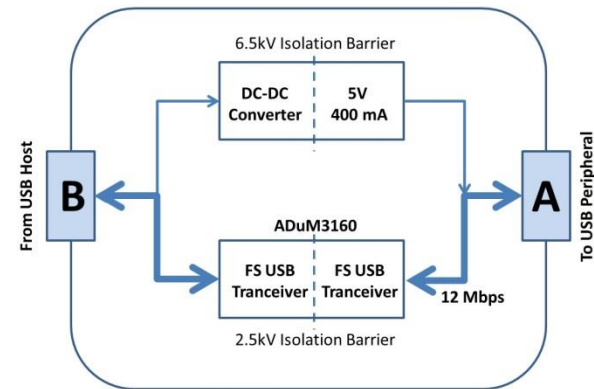
Universal Socket Boards:

QFN-32, QFN-48, QFN-64, QFP-32, QFP-48, QFP-64, QFP-80, QFP-100, QFP-144