

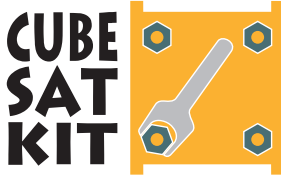
Salvo™ Real-Time Operating System



Part Number	Product	MSRP \$
Salvo RTOS ¹⁴		
709-00239	Salvo 4 Lite for 8051 family	free download
709-00206	Salvo 4 LE for 8051 family	900.00
709-00204	Salvo 4 Pro for 8051 family	1,500.00
709-00232	Salvo Lite for ARClite™ microRISC	free download
709-00233	Salvo LE for ARClite™ microRISC	1,000.00
709-00234	Salvo Pro for ARClite™ microRISC	1,500.00
709-00308	Salvo 4 Lite for ARM®	free download
709-00309	Salvo 4 LE for ARM®	900.00
709-00310	Salvo 4 Pro for ARM®	1,500.00
709-00232	Salvo 4 Lite for AVR and MegaAVR	free download
709-00233	Salvo 4 LE for AVR and MegaAVR	900.00
709-00234	Salvo 4 Pro for AVR and MegaAVR	1,500.00
709-00218	Salvo Lite for M68HCxx	free download
709-00219	Salvo LE for M68HCxx	750.00
709-00220	Salvo Pro for M68HCxx	1,250.00
709-00240	Salvo 4 Lite for TI's MSP430	free download
709-00216	Salvo 4 LE for TI's MSP430	900.00
709-00217	Salvo 4 Pro for TI's MSP430	1,500.00
709-00198	Salvo Lite for PICmicro® MCUs	free download
709-00207	Salvo LE for PICmicro® MCUs	750.00
709-00199	Salvo Pro for PICmicro® MCUs	1,250.00
709-00361	Salvo 4 Lite for PIC24 MCUs and dsPIC® DSCs	free download
709-00362	Salvo 4 LE for PIC24 MCUs and dsPIC® DSCs	900.00
709-00363	Salvo 4 Pro for PIC24 MCUs and dsPIC® DSCs	1,500.00
709-00437	Salvo 4 Lite for PIC32™ MCUs	free download
709-00438	Salvo 4 LE for PIC32™ MCUs	900.00
709-00439	Salvo 4 Pro for PIC32™ MCUs	1,500.00
709-00224	Salvo Lite for TI's TMS320C2000 DSPs	free download
709-00225	Salvo LE for TI's TMS320C2000 DSPs	750.00
709-00226	Salvo Pro for TI's TMS320C2000 DSPs	1,250.00
709-00427	Salvo 4 Lite for EPSON S1C17	free download
709-00428	Salvo 4 LE for EPSON S1C17	900.00
709-00429	Salvo 4 Pro for EPSON S1C17	1,500.00

Salvo Upgrades and Renewals		
713-00210	Salvo LE Renewal	350.00
713-00211	Salvo Pro Renewal	600.00
712-00209	Salvo LE-to-Pro Upgrade	600.00

CubeSat Kits™



A complete CubeSat Kit contains of two groups of components – the *processor-independent* components, and the *processor-specific* components.

The processor-independent components included in each complete CubeSat Kit are:

- A complete CubeSat mechanical structure (i.e., the chassis), consisting of a Base Plate Assembly, a Chassis Wall Assembly (in 0.5U, 1U, 1.5U, 2U or 3U size) and a Cover Plate Assembly. Each kit contains either skeletonized or solid-wall versions of these assemblies. E.g., 711-00282 contains one each of 710-00294, 703-00289 and 710-00296.
- 710-00297 CubeSat Kit Development Board (DB) for in-lab development, debugging and testing. The Development Board implements the current CubeSat Kit electronic architecture, plus two low-power linear power supplies and an RS232 port.
- 710-00484 CubeSat Kit Motherboard (MB) for use inside the CubeSat Kit structure. The Motherboard implements the current CubeSat Kit electronic architecture, without the Development Board's two low-power linear power supplies and its RS232 port.
- 632-00298 external universal +5Vdc 4A switching power supply.
- 632-00413 external universal 6-12Vdc switching power supply.
- 711-00303 Protoboard Kit.
- 615-00364 USB cable.
- Tools:
 - 618-00403: Phillips #1 screwdriver
 - 618-00377: ¼" offset wrench
 - 618-00404: 9/64" Allen wrench
- 710-00300 Remove-Before-Flight Pin and lanyard.
- Miscellaneous fasteners / mounting hardware.

The processor-specific components included in each complete CubeSat Kit are:

- A Pluggable Processor Module (PPM) for use on the Motherboard (MB).
- A Pluggable Socketed Processor Module (PSPM) or equivalent for use on the Development Board (DB), fitted with the appropriate processor.
- A USB programmer / debugger specific compatible with the PPM's processor, with necessary cables.
- A programming adapter to connect the programmer / debugger to the PPM via a Flexible Printed Circuit (FPC) connector.
- Access to the customer download area on the CubeSat Kit website for the following processor-specific software for the CubeSat Kit:
 - Pumpkin Salvo Pro RTOS.¹⁹
 - Pumpkin CubeSat Kit software.⁵
 - HCC-Embedded EFFS-THIN SD Card Library for the CubeSat Kit.²⁰

Additionally, a compatible compiler / IDE / software development toolset is required and is *not* included in each CubeSat Kit. Customers *must* purchase a compatible toolset for the processor family they have chosen for their CubeSat Kit. The following toolsets are compatible with the CubeSat Kit. Educational discounts are often available – contact the tools vendor directly.

For TI's MSP430:

- CrossWorks for MSP430 software development environment (IDE) from Rowley Associates, <http://www.rowley.co.uk/>.

For the 8051 family:

- Keil C51 software development environment (IDE) from Keil, <http://www.keil.com/>.

For Microchip® PIC24 MCUs and dsPIC33 DSCs:

- Microchip MPLAB IDE software development environment and Microchip MPLAB C30 PIC24/dsPIC C compiler, <http://www.microchip.com/>.

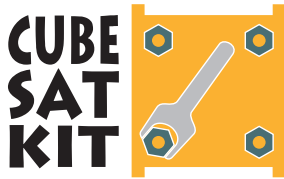
N.B. CubeSat Kit items that contain or interface to programmable electronics (e.g., the Development Board, Motherboard and Pluggable Processor Modules) may only be ordered "a la carte" *once a customer has purchased a complete CubeSat Kit*. This allows Pumpkin to provide CubeSat Kit components, associated software and technical support at low prices.

The purchase of a CubeSat Kit entitles the end-user to direct technical support for hardware and software issues involving the CubeSat Kit for a period of one year.

Unless otherwise noted or identified as being from another company, all items listed herein are designs and products of Pumpkin, Inc. All Rights Reserved.

For more information on the various CubeSat Kit components available from Pumpkin see related datasheets and the CubeSat Kit System Chart available at <http://www.cubesatkit.com/>.

Complete CubeSat Kits™ for use with TI's MSP430

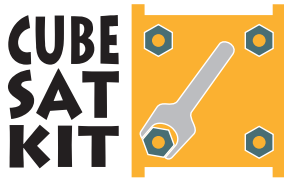


Part Number	Product	MSRP \$
Complete CubeSat Kits for use with TI's MSP430²		
711-00281	CubeSat Kit /MSP430, skeletonized, 0.5 U	7,500.00
711-00282	CubeSat Kit /MSP430, skeletonized, 1 U	7,500.00
711-00283	CubeSat Kit /MSP430, skeletonized, 1.5 U	8,000.00
711-00284	CubeSat Kit /MSP430, skeletonized, 2 U	8,375.00
711-00285	CubeSat Kit /MSP430, skeletonized, 3 U	8,750.00
711-00279	CubeSat Kit ³ /MSP430, solid-wall, 0.5 U	7,500.00
711-00227	CubeSat Kit ³ /MSP430, solid-wall, 1 U	7,500.00
711-00280	CubeSat Kit ³ /MSP430, solid-wall, 1.5 U	8,000.00
711-00241	CubeSat Kit ³ /MSP430, solid-wall, 2 U	8,375.00
711-00242	CubeSat Kit ³ /MSP430, solid-wall, 3 U	8,750.00

Each of the kits above contains all of the processor-independent components of a CubeSat Kit listed on page 2, plus the processor-specific components for use with TI's MSP430 listed below:

- 709-00217 Pumpkin Salvo Pro for TI's MSP430
- 709-00332 Pumpkin MSP430 CubeSat Kit Software
- 709-00371 HCC-Embedded MSP430 EDFS-THIN SD Card Library for the CubeSat Kit
- 634-00334 Pumpkin JFPC-MSP430 Programming Adapter
- 633-00299 TI MSP430 USB Flash Emulation Tool
- 710-00509 Pumpkin MSP-TS430PM64 Adapter with TI MSP-TS430PM64 socketed adapter board, with MSP430F1612 (or optionally, with MSP430F1611 or MSP430F2618)
- 710-00485 Pumpkin Pluggable Processor Module A1 (PPM A1), standard. Optionally, customers can request Pumpkin PPM A2 (710-00486) or Pumpkin PPM A3 (710-00516), subject to availability.

Complete CubeSat Kits™ for use with Silicon Labs' C8051

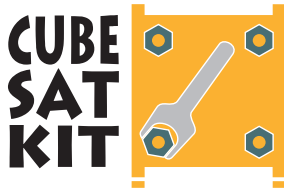


Part Number	Product	MSRP \$
Complete CubeSat Kits for use with Silicon Labs' C8051²		
711-00490	CubeSat Kit /C8051, skeletonized, 0.5 U	7,500.00
711-00491	CubeSat Kit /C8051, skeletonized, 1 U	7,500.00
711-00492	CubeSat Kit /C8051, skeletonized, 1.5 U	8,000.00
711-00493	CubeSat Kit /C8051, skeletonized, 2 U	8,375.00
711-00494	CubeSat Kit /C8051, skeletonized, 3 U	8,750.00
711-00495	CubeSat Kit ³ /C8051, solid-wall, 0.5 U	7,500.00
711-00496	CubeSat Kit ³ /C8051, solid-wall, 1 U	7,500.00
711-00497	CubeSat Kit ³ /C8051, solid-wall, 1.5 U	8,000.00
711-00498	CubeSat Kit ³ /C8051, solid-wall, 2 U	8,375.00
711-00499	CubeSat Kit ³ /C8051, solid-wall, 3 U	8,750.00

Each of the kits above contains all of the processor-independent components of a CubeSat Kit listed on page 2, plus the processor-specific components for use with Silicon Labs' C8051 listed below:

- 709-00204 Pumpkin Salvo Pro for 8051 family
- 709-00500 Pumpkin 8051 CubeSat Kit Software
- 709-00501 HCC-Embedded 8051 EDFS-THIN SD Card Library for the Pumpkin Kit²⁴
- 634-00488 Pumpkin JFPC-C8051 Programming Adapter
- 633-00490 Silicon Labs USB Debug Adapter
- 710-00607 Pumpkin Pluggable Socketed Processor Module B (PSPM B) with C8051F120-GQ
- 710-00487 Pumpkin Pluggable Processor Module B1 (PPM B1)

Complete CubeSat Kits™ for use with Microchip® PIC24 MCUs

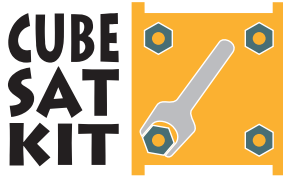


Part Number	Product	MSRP \$
Complete CubeSat Kits for use with Microchip® PIC24 MCUs ²		
711-00556	CubeSat Kit /PIC24, skeletonized, 0.5 U	7,500.00
711-00557	CubeSat Kit /PIC24, skeletonized, 1 U	7,500.00
711-00558	CubeSat Kit /PIC24, skeletonized, 1.5 U	8,000.00
711-00559	CubeSat Kit /PIC24, skeletonized, 2 U	8,375.00
711-00560	CubeSat Kit /PIC24, skeletonized, 3 U	8,750.00
711-00561	CubeSat Kit ³ /PIC24, solid-wall, 0.5 U	7,500.00
711-00562	CubeSat Kit ³ /PIC24, solid-wall, 1 U	7,500.00
711-00563	CubeSat Kit ³ /PIC24, solid-wall, 1.5 U	8,000.00
711-00564	CubeSat Kit ³ /PIC24, solid-wall, 2 U	8,375.00
711-00565	CubeSat Kit ³ /PIC24, solid-wall, 3 U	8,750.00

Each of the kits above contains all of the processor-independent components of a CubeSat Kit listed on page 2, plus the processor-specific components for use with Microchip® PIC24 MCUs listed below:

- 709-00363 Pumpkin Salvo Pro for PIC24 MCUs and dsPIC DSCs
- 709-00541 Pumpkin PIC24 CubeSat Kit Software
- 709-00580 HCC-Embedded PIC24/dsPIC33 EFFS-THIN SD Card Library for the CubeSat Kit ²⁴
- 710-00540 Pumpkin JFPC-PIC24 Programming Adapter
- 633-00543 Microchip® MPLAB-ICD3 USB In-Circuit Debugger
- 710-00608 Pumpkin Pluggable Socketed Processor Module D (PSPM D) with PIC24FJ256GA110
- 710-00527 Pumpkin Pluggable Processor Module D1 (PPM D1)

Complete CubeSat Kits™ for use with Microchip® dsPIC33 DSCs

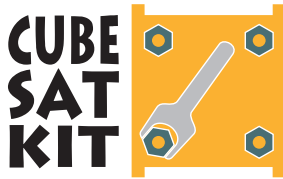


Part Number	Product	MSRP \$
Complete CubeSat Kits for use with Microchip® dsPIC33 DSCs ²		
711-00570	CubeSat Kit /dsPIC33, skeletonized, 0.5 U	7,500.00
711-00571	CubeSat Kit /dsPIC33, skeletonized, 1 U	7,500.00
711-00572	CubeSat Kit /dsPIC33, skeletonized, 1.5 U	8,000.00
711-00573	CubeSat Kit /dsPIC33, skeletonized, 2 U	8,375.00
711-00574	CubeSat Kit /dsPIC33, skeletonized, 3 U	8,750.00
711-00575	CubeSat Kit ³ /dsPIC33, solid-wall, 0.5 U	7,500.00
711-00576	CubeSat Kit ³ /dsPIC33, solid-wall, 1 U	7,500.00
711-00577	CubeSat Kit ³ /dsPIC33, solid-wall, 1.5 U	8,000.00
711-00578	CubeSat Kit ³ /dsPIC33, solid-wall, 2 U	8,375.00
711-00579	CubeSat Kit ³ /dsPIC33, solid-wall, 3 U	8,750.00

Each of the kits above contains all of the processor-independent components of a CubeSat Kit listed on page 2, plus the processor-specific components for use with Microchip® dsPIC33 DSCs listed below:

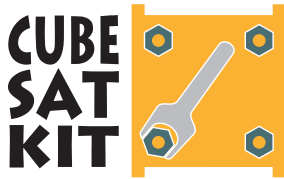
- 709-00363 Pumpkin Salvo Pro for PIC24 MCUs and dsPIC DSCs
- 709-00569 Pumpkin dsPIC33 CubeSat Kit Software
- 709-00740 HCC-Embedded dsPIC33 EDFS-THIN SD Card Library for the CubeSat Kit ²⁴
- 710-00540 Pumpkin JFPC-PIC24 Programming Adapter
- 633-00543 Microchip® MPLAB-ICD3 USB In-Circuit Debugger
- 710-00608 Pumpkin Pluggable Socketed Processor Module D (PSPM D) with dsPIC33FJ256GP710
- 710-00528 Pumpkin Pluggable Processor Module D2 (PPM D2)

CubeSat Kit™ Structural Components



Part Number	Product	MSRP \$
CubeSat Kit Structural Components ⁴		
710-00296	Cover Plate Assembly – skeletonized	375.00
703-00288	Chassis Walls ¹³ – skeletonized, 0.5 U	925.00
703-00289	Chassis Walls ¹³ – skeletonized, 1 U	925.00
703-00290	Chassis Walls ¹³ – skeletonized, 1.5 U	1,450.00
703-00291	Chassis Walls ¹³ – skeletonized, 2 U	1,625.00
703-00292	Chassis Walls ¹³ – skeletonized, 3 U	2,250.00
710-00294	Base Plate Assembly – skeletonized	425.00
710-00794	Base Plate Assembly – skeletonized, dual Separation Switches ³	525.00
710-00295	Cover Plate Assembly – solid-wall	375.00
703-00286	Chassis Walls ¹³ – solid-wall, 0.5 U	925.00
703-00243	Chassis Walls ¹³ – solid-wall, 1 U	925.00
703-00287	Chassis Walls ¹³ – solid-wall, 1.5 U	1,450.00
703-00244	Chassis Walls ¹³ – solid-wall, 2 U	1,625.00
703-00245	Chassis Walls ¹³ – solid-wall, 3 U	2,250.00
710-00293	Base Plate Assembly – solid-wall	425.00
710-00793	Base Plate Assembly – solid-wall, dual Separation Switches ³	525.00
710-00683	Large-aperture Cover Plate Assembly	525.00
710-00713	Large-aperture Cover Plate Assembly, dual Separation Switches	625.00
710-00784	Cover Plate Assembly for ANTS antenna	725.00
710-00783	Base Plate Assembly for ANTS antenna	825.00
711-00782	Solar Panel Clips Set for ANTS antenna – for 0.062"/1.6mm PCBs (set of 4 clips)	300.00
710-00650	Hinge for Deployable Solar Panel ²⁵	2,500.00
711-00330	Remove-Before-Flight Bracket Kit	125.00
711-00331	Midplane Standoff Kit	150.00
711-00335	Motherboard Remote Mount Kit	225.00
703-00398	Payload Adapter Plate	275.00
710-00407	Payload Cover Plate Assembly	375.00

CubeSat Kit™ Electrical Components & Accessories

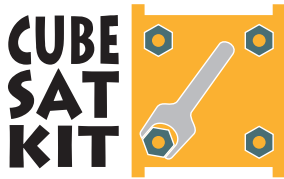


Part Number	Product	MSRP \$
CubeSat Kit Electronic Components		
710-00297	Development Board (DB)	1,300.00
710-00484	Motherboard (MB)	1,200.00
632-00298	External Power Supply 5Vdc, 4A ¹¹	60.00
632-00413	External Power Supply 6-12Vdc ¹¹	60.00
711-00320	Motherboard Mockup	195.00
711-00701	Nexus One® / Li-Ion Battery Carrier Assembly	1,100.00

CubeSat Kit Modules		
711-00303	Protoboard Module Kit	75.00
711-00338	Linear EPS Module	745.00
714-00704	Option for Linear EPS Module: Second Battery (option /01)	125.00
711-00380	Breakout Board Module	195.00
711-00521	IO LED Module (Test Board A)	275.00
711-00651	Load Board (Test Board E)	195.00

Other CubeSat Kit Components		
634-00456	Delkin industrial temperature range 2GB SD Card (-40C to +85C)	180.00
711-00706	Dummy Solar Panel Kit, 1U	275.00

CubeSat Kit™ Solar Panels utilizing PMDSAS Technology



Part Number	Product	MSRP \$
CubeSat Kit Fixed Solar Panels – 0.062"/1.6mm thick		
710-00664	End Panel, 2 large-area triple-junction solar cells	2,500.00
710-00667	Side Panel, 1U, 2 large-area triple-junction solar cells	2,500.00
710-00668	Side Panel, 1.5U, 3 large-area triple-junction solar cells	3,125.00
710-00669	Front/Side Panel, 2U, 4 large-area triple-junction solar cells	3,750.00
710-00670	Front/Side Panel, 3U, 7 large-area triple-junction solar cells	5,650.00

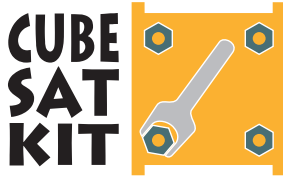
Part Number	Product	MSRP \$
CubeSat Kit Fixed Solar Panels – 0.031"/0.8mm thick		
710-00764	End Panel, 2 large-area triple-junction solar cells	2,500.00
710-00766	Side Panel, 1U, 2 large-area triple-junction solar cells	2,500.00
710-00768	Side Panel, 1.5U, 3 large-area triple-junction solar cells	3,125.00
710-00770	Front/Side Panel, 2U, 4 large-area triple-junction solar cells	3,750.00
710-00772	Front/Side Panel, 3U, 7 large-area triple-junction solar cells	5,650.00

Part Number	Product	MSRP \$
CubeSat Kit Solar Panel Clips		
711-00346	Solar Panel Clips Set – for 0.062"/1.6mm thick solar panels (Set of 8 clips)	450.00
711-00792	Solar Panel Clips Set – for 0.031"/0.8mm thick solar panels (Set of 8 clips)	

N.B. Use P/N 711-00346 to attach 0.062"/1.6mm thick solar panels to up to six sides of a CubeSat Kit structure. Use P/N 711-00792 to attach 0.031"/0.8mm thick solar panels to up to six sides of a CubeSat Kit structure.

N.B. 711-00792 is included with purchases of 0.031"/0.8mm thick PMDSAS solar panels and is not available separately.

Processor-specific CubeSat Kit™ Components for use with TI's MSP430

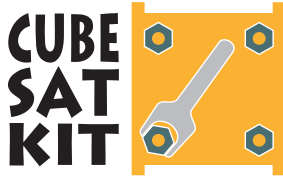


Part Number	Product	MSRP \$
MSP430-specific CubeSat Kit Components ⁴		
709-00332	MSP430 CubeSat Kit Software ⁵	5,500.00
709-00371	HCC-Embedded MSP430 EFFS-THIN SD Card Library for the CubeSat Kit ¹²	750.00
634-00334	JFPC-MSP430 Programming Adapter ⁸	35.00
633-00299	TI MSP430 USB Flash Emulation Tool ⁷	150.00
710-00509	MSP-TS430PM64 Adapter	250.00
710-00485	Pluggable Processor Module A1 (PPM A1), with TI's MSP430F1612IPM	500.00
710-00486	Pluggable Processor Module A2 (PPM A2), with TI's MSP430F1611IPM	500.00
710-00516	Pluggable Processor Module A3 (PPM A3), with TI's MSP430F2618TPM	500.00
711-00716	CubeSat Kit Upgrade to MSP430	4,150.00

CubeSat Kit Upgrade Kit 711-00716 consists of the items listed below, and is intended for those users who already have a CubeSat Kit that is specific to another family of target processors and who wish to use the MSP430 instead.

- 709-00217 Pumpkin Salvo Pro for TI's MSP430
- 709-00332 Pumpkin MSP430 CubeSat Kit Software
- 709-00371 HCC-Embedded MSP430 EFFS-THIN SD Card Library for the CubeSat Kit
- 634-00334 Pumpkin JFPC-MSP430 Programming Adapter
- 633-00299 TI MSP430 USB Flash Emulation Tool
- 710-00509 Pumpkin MSP-TS430PM64 Adapter with TI MSP-TS430PM64 socketed adapter board, with MSP430F1612 (or optionally, with MSP430F1611 or MSP430F2618)
- 710-00485 Pumpkin Pluggable Processor Module A1 (PPM A1), standard. Optionally, customers can request Pumpkin PPM A2 (710-00486) or Pumpkin PPM A3 (710-00516), subject to availability.

Processor-specific CubeSat Kit™ Components for use with Silicon Labs' C8051

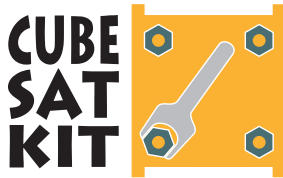


Part Number	Product	MSRP \$
8051-specific CubeSat Kit Components ⁴		
709-00500	8051 CubeSat Kit Software ⁵	5,500.00
709-00501	HCC-Embedded 8051 EDFS-THIN SD Card Library for the CubeSat Kit ¹⁸	750.00
710-00488	JFPC-C8051 Programming Adapter ¹⁶	35.00
633-00490	Silicon Labs USB Debug Adapter ¹⁷	75.00
710-00607	Pluggable Socketed Processor Module B (PSPM B), with 256KB SRAM + 100-pin ZIF socket for Silicon Labs C8051F120-GQ	650.00
710-00487	Pluggable Processor Module B1 (PPM B1), with Silicon Labs C8051F120-GQ + 256KB SRAM	500.00
711-00717	CubeSat Kit Upgrade to C8051	4,150.00

CubeSat Kit Upgrade Kit 711-00717 consists of the items listed below, and is intended for those users who already have a CubeSat Kit that is specific to another family of target processors and who wish to use the C8051 instead.

- 709-00204 Pumpkin Salvo Pro for 8051 family
- 709-00500 Pumpkin 8051 CubeSat Kit Software
- 709-00501 HCC-Embedded 8051 EDFS-THIN SD Card Library for the Pumpkin Kit ²⁴
- 634-00488 Pumpkin JFPC-C8051 Programming Adapter
- 633-00490 Silicon Labs USB Debug Adapter
- 710-00607 Pumpkin Pluggable Socketed Processor Module B (PSPM B) with C8051F120-GQ
- 710-00487 Pumpkin Pluggable Processor Module B1 (PPM B1)

Processor-specific CubeSat Kit™ Components for use with Microchip® PIC24 MCUs



Part Number	Product	MSRP \$
PIC24-specific CubeSat Kit Components ⁴		
709-00541	PIC24 CubeSat Kit Software ⁵	5,500.00
709-00569	HCC-Embedded PIC24 EFFS-THIN SD Card Library for the CubeSat Kit ²²	750.00
710-00540	JFPC-PIC24 Programming Adapter ²¹	35.00
633-00543	Microchip MPLAB ICD3 USB Debug Adapter ²³	275.00
710-00608	Pluggable Socketed Processor Module D (PSPM D), with 64Mbit serial Flash memory + 100-pin ZIF socket for Microchip® PIC24FJ256GA110 or dsPIC33FJ256GP710	650.00
710-00711	Pluggable Socketed Processor Module E (PSPM E), with 64Mbit serial Flash memory + 100-pin ZIF socket for Microchip® PIC24FJ256GB210	650.00
710-00527	Pluggable Processor Module D1 (PPM D1), with Microchip® PIC24FJ256GA110 + 64Mbit serial Flash memory	500.00
710-00748	Pluggable Processor Module E1 (PPM E1), with Microchip® PIC24FJ256GB210 + 64Mbit serial Flash memory	500.00
711-00718	CubeSat Kit Upgrade to PIC24 (PIC24FJ256GA110)	4,150.00
711-00795	CubeSat Kit Upgrade to PIC24 (PIC24FJ256GB210)	4,150.00

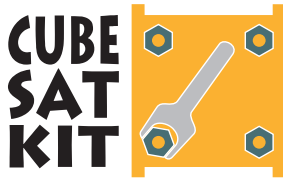
CubeSat Kit Upgrade Kit 711-00718 consists of the items listed below, and is intended for those users who already have a CubeSat Kit that is specific to another family of target processors and who wish to use the PIC24FJ256GA110 instead.

- 709-00363 Pumpkin Salvo Pro for PIC24 MCUs and dsPIC DSCs
- 709-00541 Pumpkin PIC24 CubeSat Kit Software
- 709-00580 HCC-Embedded PIC24 EFFS-THIN SD Card Library for the CubeSat Kit ²⁴
- 710-00540 Pumpkin JFPC-PIC24 Programming Adapter
- 633-00543 Microchip® MPLAB-ICD3 USB In-Circuit Debugger
- 710-00608 Pumpkin Pluggable Socketed Processor Module D (PSPM D) with PIC24FJ256GA110
- 710-00527 Pumpkin Pluggable Processor Module D1 (PPM D1)

CubeSat Kit Upgrade Kit 711-00795 consists of the items listed below, and is intended for those users who already have a CubeSat Kit that is specific to another family of target processors and who wish to use the PIC24FJ256GB210 instead.

- 709-00363 Pumpkin Salvo Pro for PIC24 MCUs and dsPIC DSCs
- 709-00541 Pumpkin PIC24 CubeSat Kit Software
- 709-00580 HCC-Embedded PIC24 EFFS-THIN SD Card Library for the CubeSat Kit ²⁴
- 710-00540 Pumpkin JFPC-PIC24 Programming Adapter
- 633-00543 Microchip® MPLAB-ICD3 USB In-Circuit Debugger
- 710-00711 Pumpkin Pluggable Socketed Processor Module E (PSPM E) with PIC24FJ256GB210
- 710-00748 Pumpkin Pluggable Processor Module E1 (PPM E1)

Processor-specific CubeSat Kit™ Components for use with Microchip® dsPIC33 DSCs

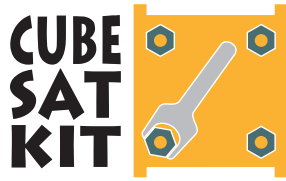


Part Number	Product	MSRP \$
dsPIC33-specific CubeSat Kit Components ⁴		
709-00568	dsPIC33 CubeSat Kit Software ⁵	5,500.00
709-00740	HCC-Embedded dsPIC33 EFFS-THIN SD Card Library for the CubeSat Kit ²²	750.00
710-00540	JFPC-PIC24 Programming Adapter ²¹	35.00
633-00543	Microchip MPLAB ICD3 USB Debug Adapter ²³	275.00
710-00608	Pluggable Socketed Processor Module D (PSPM D), with 64Mbit serial Flash memory + 100-pin ZIF socket for Microchip® PIC24FJ256GA110 or dsPIC33FJ256GP710	650.00
710-00528	Pluggable Processor Module D2 (PPM D2), with Microchip® dsPIC33FJ256GP710 + 64Mbit serial Flash memory	500.00
711-00719	CubeSat Kit Upgrade to dsPIC33	4,150.00

CubeSat Kit Upgrade Kit 711-00719 consists of the items listed below, and is intended for those users who already have a CubeSat Kit that is specific to another family of target processors and who wish to use the dsPIC33 instead.

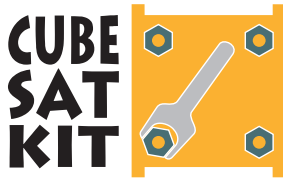
- 709-00363 Pumpkin Salvo Pro for PIC24 MCUs and dsPIC DSCs
- 709-00569 Pumpkin dsPIC33 CubeSat Kit Software
- 709-00740 HCC-Embedded dsPIC33 EFFS-THIN SD Card Library for the CubeSat Kit ²⁴
- 710-00540 Pumpkin JFPC-PIC24 Programming Adapter
- 633-00543 Microchip® MPLAB-ICD3 USB In-Circuit Debugger
- 710-00608 Pumpkin Pluggable Socketed Processor Module D (PSPM D) with dsPIC33FJ256GP710
- 710-00528 Pumpkin Pluggable Processor Module D2 (PPM D2)

CubeSat Kit™ Accessories & Training



Part Number	Product	MSRP \$
CubeSat Kit Accessories		
710-00300	Remove-Before-Flight Pin	50.00
711-00307	MaxStream Serial Adapter Kit	45.00
632-00372	Pelican® Ruggedized Transport Case ¹⁰	200.00
634-00522	Total Phase™ Beagle I2C/SPI Protocol Analyzer	375.00
CubeSat Kit Training		
713-00373	Personalized Training (per hour)	350.00

Solar Panel Arrays utilizing PMDSAS™ Technology ²⁶



Part Number	Product	MSRP \$
For NGC Mayflower CubeSat Flight Testbed (3U size)		
710-00785	7-panel, 56-cell (8S7P) Solar Panel Array in "Turkey Tail" configuration, utilizing TJ solar cells, 56W BOL	95,000.00
710-00786	Engineering Model (EM) for 710-00785	14,000.00
710-00787	9-panel, 72-cell (8S9P) Solar Panel Array in "Turkey Tail" configuration, utilizing TJ solar cells, 72W BOL	130,000.00
710-00788	Engineering Model (EM) for 710-00787	18,000.00
710-00789	11-panel, 88-cell (8S11P) Solar Panel Array in "Turkey Tail" configuration, utilizing TJ solar cells, 88W BOL	155,000.00
710-00790	Engineering Model (EM) for 710-00789	22,000.00

In the event that these Solar Panel Arrays are controlled under 22 CFR 121.1, Category XV (ITAR), all sales to customers outside the United States must conform to United States export regulations.

All of these Solar Panel Arrays utilizes the Pumpkin Modular Deployable Solar Array System (PMDSAS).

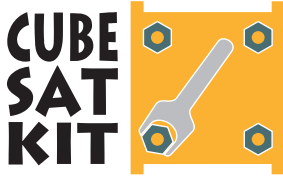
Engineering models are mechanically similar to the actual Solar Panel Arrays, and utilize dummy solar panels with simulated solar cells and without PMDSAS construction and interconnect technologies.

SpectroLab UTJ triple junction cells (CIC, 28.2% efficiency) are standard. Other space-qualified cells may be available at extra cost – please contact the factory.

"Turkey Tail configuration" refers to a configuration utilizing a single central PMDSAS panel hinged along the short edge of a CubeSat via a CubeSat Hinge, deployed to a customer-specified angle between 0 and 187 degrees, with equal numbers of PMDSAS winglet panels attached to each of its long edges. The entire array wraps around three of four long edges of the CubeSat when in the stowed position, and has additional mechanical components for compatibility with the Mayflower CubeSat Flight Testbed.

The 8S7P configuration is compatible with the Cal-Poly P-POD™. The larger configurations require a CubeSat deployer with a greater internal volume.

CubeSat Kit™ Satellite Assemblies



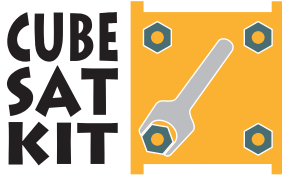
Part Number	Product	MSRP \$	
MISC Family			
715-00508	MISC 2 3U nanosatellite payload carrier with 165mm Basic Payload, Bus Extension, MAI-100 ADACS Kit, 20W DEPS, 30Wh energy storage, fixed & end-deployable solar panels with TJ cells, MB+PPM, test & validation software	294,000.00	
715-00509	MISC 2 3U Engineering Model (EM)	20,000.00	
715-00553	MISC 3 3U nanosatellite payload carrier with 165mm Basic Payload, MAI-100 ADACS Kit, 48W XEPS, 30Wh energy storage, fixed & side-deployable solar panels with TJ cells, MB+PPM, test & validation software	294,000.00	
715-00554	MISC 3 3U Engineering Model (EM)	20,000.00	
PPM options	Option /01	PPM delete	n/c
	Option /02	fitted with PPM A1	n/c
	Option /03	fitted with PPM A2	n/c
	Option /04	fitted with PPM A3	n/c
	Option /05	fitted with PPM B1	n/c
	Option /07	fitted with PPM D1	n/c
	Option /08	fitted with PPM D2	n/c

Satellites assemblies are controlled under 22 CFR 121.1, Category XV (ITAR). All sales to customers outside the United States must conform to United States export regulations.

715-00509 is identical to 715-00508 in external dimensions, with mockup solar panels (fixed & deployable). Contains no ADACS, EPS, processors, other electronics or components inside. Built from variants of standard CubeSat Kit components (e.g., Base Plate, Chassis Walls, hinges, ADACS enclosure, etc.) and variants of MISC-specific components. For display, fitment, modeling and similar purposes. EMs may be upgraded to flight-worthy MISC nanosatellites at the factory's discretion, based on EM condition.

715-00554 is identical to 715-00553 in external dimensions, with mockup solar panels (fixed & deployable). Contains no ADACS, EPS, processors, other electronics or components inside. Built from variants of standard CubeSat Kit components (e.g., Payload Cover Plate, Payload Adapter Plate, Chassis Walls, hinges, ADACS enclosure, etc.) and variants of MISC-specific components. For display, fitment, modeling and similar purposes. EMs may be upgraded to flight-worthy MISC nanosatellites at the factory's discretion, based on EM condition.

CubeSat Kit™-compatible Products



Part Number	Product	MSRP \$
Attitude Determination and Control System (ADACS) Kits		
711-00416	MAI-100 ADACS Kit	57,000.00
711-00700	MAI-200 ADACS Kit	60,000.00

A complete MAI ADACS Kit contains:

- 634-00412 (MAI-100) or 634-00458 (MAI-200) ADACS & external magnetometer.
- 703-00398 Payload Adapter Plate (x2).
- 703-00397 ADACS Payload Walls.
- 711-00408 ADACS Interface Module.
- Access to the customer download area on the CubeSat Kit website for the following software for the CubeSat Kit:
 - 709-00417 ADACS Software
- Tools:
 - 618-00405: 2mm Allen wrench
- Miscellaneous fasteners / mounting hardware.

The purchase of an ADACS Kit entitles the end-user to direct technical support for hardware and software issues involving the CubeSat Kit for a period of one year. Support will be provided by Pumpkin and/or IMI based on the particular support issue(s).

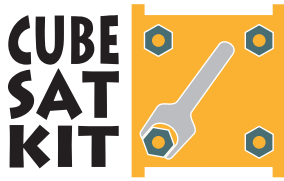
In October of 2010 the United States government determined that the MAI-100 and MAI-200 are controlled by 22 CFR 121.1, Category XV (ITAR). Therefore all sales to customers outside the United States must conform to United States export regulations.

For more information please visit <http://www.cubesatkit.com/>

Microhard® MHX Series Frequency-Hopping Spread-Spectrum Modem / Transceivers⁹		
634-00383	MHX-920A Transceiver Module (Microhard P/N MHS102125)	570.00
634-00312	MHX-920A Development Platform (Microhard P/N MHS102210)	1,645.00
634-00708	MHX-920A-SL Transceiver Module (Microhard P/N MHS102125 + opt. 120)	670.00
634-00709	MHX-920A-SL Development Platform (Microhard P/N MHS102210 + opt. 120)	1,745.00
634-00384	MHX-2400 Transceiver Module obsolete (Microhard P/N MHS103100)	695.00
634-00302	MHX-2400 Development Platform obsolete (Microhard P/N MHS103200)	1,595.00
634-00385	MHX-2420 Transceiver Module (Microhard P/N MHS141500)	570.00
634-00386	MHX-2420 Development Platform (Microhard P/N MHS142000)	1,645.00
634-00430	MHX-2420-SL Transceiver Module (Microhard P/N MHS141500 + opt. 120)	670.00
634-00431	MHX-2420-SL Development Platform (Microhard P/N MHS142000 + opt. 120)	1,745.00

AES-256 encryption is included in each Microhard model listed above. Due to export control issues, Pumpkin offers these units only to users inside the U.S.A.

CubeSat Kit™-compatible Products (cont'd)



Part Number	Product	MSRP \$
Clyde Space Electrical Power System (EPS) Components ¹⁵		
634-00450	1U CubeSat Power Board (CS P/N C1-EPS-0000-CS)	price on request
634-00451	1U CubeSat Battery, 1.25Ah, 8.2V (CS P/N C1-BATT-0003-CS-xS)	price on request
634-00452	1U Solar Arrays (6 panels, using SpectroLab® cells) (CS P/Ns SP-L-T1U-0017-CS (x2) & SP-L-S1U-0002-CS (x4))	price on request
634-00453	CS documentation per complete EPS order, including: user manual, telemetry calibration spreadsheets, production test summary, SP inspection & test reports	0.00

Pumpkin is a reseller of Clyde Space EPS components and solar panels. These items are built to order by Clyde Space in the UK. Due to delivery times and exchange rate fluctuations between the US Dollar and the UK Pound Sterling, all inquiries for pricing on these items are quoted on a per-inquiry basis. Please contact Pumpkin for a custom quote for the above listed or any other Clyde Space items.

Obsolete Pumpkin Products

Part Number	Product	MSRP \$
Miscellaneous		
711-00203	PIC17C75X Protoboard obsolete	395.00
710-00252	CubeSat Kit Flight Module (FM430) obsolete	1,200.00

Notes:

1. All prices are in US \$ and are subject to change without notice. Standard terms are Prepaid in Advance. Credit Cards are accepted on most orders. Orders of five or more identical items ordered at the same time enjoy a 15% discount. On smaller orders, Pumpkin will accept Net 30 orders from qualifying organizations within the United States. Some items may not be in stock and may incur a substantial delay between placement of order and order shipping. F.O.B. is San Francisco, California USA. Taxes, fees, customs, shipping, export, certification and other charges are not included.
United States export laws prohibit Pumpkin (a California corporation) from providing CubeSat Kit components to end-users in the following countries: Cuba, Libya, Iran, Iraq, Sudan, Syria and North Korea. Resellers, freight forwarders, etc. are also prohibited from exporting CubeSat Kit components to these countries.
© Copyright 2001-2010 Pumpkin, Inc. All Rights Reserved. All prices and specifications subject to change without notice.
2. CubeSat Kit sizes: 0.5/1/1.5/2/3 U correspond to 5/10/15/20/30cm x 10cm x 10cm CubeSat bodies, respectively.
3. Base Plates with two Separation Switches are interchangeable with the standard Base Plates that have one Separation Switch. Both Separation Switches are identical, and independent. Base Plates with two Separation Switches require Rev E or later Motherboards (MBs).
4. Availability of individual components is subject to stock on hand. Please contact Pumpkin for details.
5. CubeSat Kit software includes CubeSat-specific code modules and projects for a particular processor family (e.g., MSP430, C8051, PIC24/dsPIC33, etc.).
6. Minor CubeSat Kit components (e.g., M3 fasteners, feet) are not listed – please contact Pumpkin for your specific needs and pricing.
7. The supplied Flash Emulation Tool (MSP430FET) is used when debugging and programming the MSP430 microcontroller on the CubeSat Kit's Development Board and MSP430-based Pluggable Processor Modules (PPMs). It requires a PC and a USB port.
8. This adapter provides a standard 2x7 0.100" grid header for use with MSP430 FETs.
9. Pumpkin is an authorized Microhard reseller. Small quantity (1-5) unit pricing. Contact Pumpkin for quotes for larger quantities. Microhard MHX transceiver modules are plug-in compatible with the CubeSat Kit's Motherboard. Transceivers can be ordered individually or as part of a Development Kit, which includes 2 transceivers, 2 antennas, 2 development / test / serial interface boards, 2 desktop power supplies, cables and documentation. Development Kits are recommended as they allow CubeSat Kit end-users to create a simple ground station via a PC with a serial port. 900MHz and 2.4GHz MHX modules are freely available to customers throughout the world. Customers wishing to use MHX320 (310-390 MHz), MHX425 (400-450 MHz) and MHX1320 (1.30-1.45GHz) transceivers should contact Microhard directly at <http://www.microhardcorp.com>, as these cover restricted frequencies and require export licenses. Option 250 (128-AES Encryption) is available on x20 transceivers at no additional charge. Transceivers with 128-AES are export-controlled items and may not be exported beyond the USA and/or Canada with U.S. Government permission.
10. Can hold up to a 3U CubeSat Kit structure.
11. Supplied with a USA-specific IEC power cord to US customers. No IEC power cord is supplied to international customers. Power supply is 100-240VAC, 50-60Hz.
12. Includes precompiled libraries, header and source files for exclusive use with Rowley CrossWorks for MSP430.
13. A Chassis Walls must be combined with a Base Plate Assembly and a Cover Plate Assembly in order to create a complete CubeSat Kit structure. For example, a complete 2U CubeSat Kit skeletonized structure consists of 703-00291, 710-00294 and 710-00296.
14. Prices shown are for single-user Salvo licenses. For group / site / corporate licensing, please contact Pumpkin directly.
15. Pumpkin is an authorized Clyde Space reseller. 4-8 week typical lead time. Contact Pumpkin or Clyde Space for more information and full warranty terms.
16. This adapter provides a standard 2x5 0.100" grid header for use with Silicon Labs C8051 programming/debugging adapters.
17. The supplied USB Debug Adapter (DEBUGADPTR1-USB) is used when debugging and programming the Silicon Labs C8051 microcontroller on the CubeSat Kit's 8051-based Pluggable Processor Module. It requires a PC and a USB port.
18. Includes precompiled libraries, header and source files for exclusive use with Keil C51.
19. The Salvo Pro software included in each complete CubeSat Kit is licensed for exclusive use on any number of the customer's CubeSat Kits.

20. The EFFS-THIN that is supplied with each CubeSat Kit (where applicable) is supplied as one or more libraries – in object-module form – for use with the specified compiler(s). EFFS-THIN source code is *not* supplied. EFFS-THIN source code can be obtained directly from the manufacturer if so desired, at a price considerably higher than that of the libraries offered by Pumpkin.
21. This adapter provides a standard RJ11 6x6 connector for use with Microchip® MPLAB ICD3-style programming/debugging adapters, and a 1x6 0.100" grid header for use with Microchip® PICKit-style programming/debugging adapters.
22. Includes precompiled libraries, header and source files for exclusive use with Microchip® MPLAB C30.
23. The supplied Microchip® MPLAB ICD3 USB debug adapter is used when debugging and programming the Microchip® PIC24 or dsPIC33 microcontroller on the CubeSat Kit's PIC24- or dsPIC33-based Pluggable Processor Module. It requires a PC and a USB port.
24. Some software may not yet be available at time of initial first sale.
25. This item includes all the components to hinge one deployable panel on one edge of a Pumpkin CubeSat-class structure. Some hinge components may replace existing components already on customer's CubeSat. Deployment angle is user-selectable between 45 and 190 degrees. Parts included will vary, based on desired configuration. Consult the factory for more information.
26. Pumpkin Modular Deployable Solar Array System. Pumpkin's fixed and deployable solar panels utilize various aspects of Pumpkin's PMDSAS technology.