

Benchmark – FlashPro430

MSP430F1xx, MSP430F4xx - JTAG

Software rev. 5.61

Programming Adapter	MCU	Flash Size	Interface	Autoprogram -GO- Standalone [s]	Erase [s]	Write [s]	Read [s]	Programming speed [kBytes/s]	Read speed [kBytes/s]
XStreamPro-Iso Standalone	MSP430 F413	8 kB	JTAG (10MHz)	1.3	-	-	-	13.3	-
XStreamPro-Iso XStream-Iso	MSP430 F413	8 kB	JTAG (10MHz) BSL (Fast)	1.5 3	0.45 2.5	0.7 1.8	0.25 2	13 16	75 12
USB-FPA	MSP430 F413	8 kB	JTAG (Fast) BSL (Fast)	1.9 3	0.45 2.4	0.9 1.8	0.4 2	10 16	32 12
XStreamPro-Iso Standalone	MSP430 F149	60 kB	JTAG (10MHz)	2.5	-	-	-	32.5	-
XStreamPro-Iso XStream-Iso	MSP430 F149	60 kB	JTAG (10MHz) BSL (Fast)	3.1 7.1	0.42 3.2	2.0 5.2	0.9 6.7	32 17	75 12
USB-FPA	MSP430 F149	60 kB	JTAG (Fast) BSL (Fast)	3.4 7.1	0.42 3	2.3 5.3	2.0 6.8	27.7 17	32 12
XStreamPro-Iso Standalone	MSP430 F47187	116 kB	JTAG (10MHz)	3.8	-	-	-	37	-
XStreamPro-Iso XStream-Iso	MSP430 F47187	116 kB	JTAG (10MHz) BSL (Fast)	4.6 9.4	0.17 2.7	3.2 7.9	1.7 11	36 15	75 12
USB-FPA	MSP430 F47187	116 kB	JTAG (Fast) BSL (Fast)	5.2 9.4	0.22 2.6	3.9 8	5.2 11	30.5 15	23 12

Note:

- Autoprogram (GO in Standalone) time → Interface initialization, Erase, Program and Verify (Flash only)
- Write time → Interface initialization, Program (Flash only)
- Read time → Interface initialization, Read (Flash only)
- Programming speed → Whole flash programming speed without interface initialization. In Standalone – Programming part only.
- Read speed → Flash reading speed without interface initialization

Benchmark – FlashPro430

MSP430F2xx, MSP430G2xx, - JTAG, SBW

Software rev. 5.61

Programming Adapter	MCU	Flash Size	Interface	Autoprogram -GO- Standalone [s]	Erase [s]	Write [s]	Read [s]	Programming speed [kBytes/s]	Read speed [kBytes/s]
XStreamPro-Iso Standalone	MSP430 FE221	4 kB	JTAG (10MHz) SBW (6 MHz)	0.32 1.5	-	-	-	34 8	-
XStreamPro-Iso XStream-Iso	MSP430 FE221	4 kB	JTAG (10MHz) SBW (6 MHz)	0.55 1.0	0.2 0.2	0.3 0.55	0.2 0.55	33 8	70 8
USB-FPA	MSP430 FE221	4 kB	JTAG (Fast) SBW (Fast)	0.55 1.4	0.2 0.2	0.3 0.85	0.3 1.15	30 7	30 4
XStreamPro-Iso Standalone	MSP430 G2955	56 kB	JTAG (10MHz) SBW (6 MHz)	1.9 4.8	-	-	-	37 13	-
XStreamPro-Iso XStream-Iso	MSP430 G2955	56 kB	JTAG (10MHz) SBW (6 MHz) BSL (Fast)	2.5 8.5 5.5	0.2 0.15 1.9	1.7 4.4 4.5	0.9 5.4 5.9	34 13 17	70 10.5 12
USB-FPA	MSP430 G2955	56 kB	JTAG (Fast) SBW (Fast) BSL (Fast)	2.8 11.7 5.6	0.2 0.2 1.8	2.0 7.1 4.5	1.9 13 6.0	30 8 17	31 4.4 12
XStreamPro-Iso Standalone	MSP430 F2619	120 kB	JTAG (10MHz)	3.8	-	-	-	37	-
XStreamPro-Iso XStream-Iso	MSP430 F2619	120 kB	JTAG (10MHz) BSL (Fast)	4.6 11	0.17 2.5	3.2 9	1.7 11.5	36 16	75 12
USB-FPA	MSP430 F2619	120 kB	JTAG (Fast) BSL (Fast)	5.4 11	0.20 2.5	4.1 9	5.4 11.5	30 16	23 12

Note:

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- Programming speed → Whole flash programming speed without interface initialization. In Standalone – Programming part only.
- Read speed → Flash reading speed without interface initialization

Benchmark – FlashPro430

MSP430I2xx, - JTAG, SBW

Software rev. 5.61

Programming Adapter	MCU	Flash Size	Interface	Autoprogram -GO- Standalone [s]	Erase [s]	Write [s]	Read [s]	Programming speed [kBytes/s]	Read speed [kBytes/s]
XStreamPro-Iso Standalone	MSP430 I2041	32 kB	JTAG (10MHz) SBW (6 MHz)	1.45 3.7	-	-	-	34 13	-
XStreamPro-Iso XStream-Iso	MSP430 I2041	32 kB	JTAG (10MHz) SBW (6 MHz)	1.6 7.8	0.2 0.2	1.0 2.5	0.6 3.2	33 13	70 10
USB-FPA	MSP430 I2041	32 kB	JTAG (Fast) SBW (Fast)	1.7 13.8	0.2 0.2	1.2 4.0	1.2 7.6	30 7	30 4

Note:

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- Read speed → Flash reading speed without interface initialization

Benchmark – FlashPro430

MSP430F5xx, MSP430F6xx - JTAG, SBW

Software rev. 5.61

Programming Adapter	MCU	Flash Size	Interface	Autoprogram -GO- Standalone [s]	Erase [s]	Write [s]	Read [s]	Programming speed [kBytes/s]	Read speed [kBytes/s]
XStreamPro-Iso Standalone	MSP430 F5172	32 kB	JTAG (10MHz) SBW (Fast)	0.8	-	-	-	75	-
				1.8				24	
XStreamPro-Iso XStream-Iso	MSP430 F5172	32 kB	JTAG (10MHz) SBW (Fast)	1.26	0.33	0.7	0.2	58	460
				2.5	0.45	1.8	1.25	19	27
USB-FPA	MSP430 F5172	32 kB	JTAG (Fast) SBW (Fast)	1.42	0.33	0.9	0.6	40	64
				4.4	0.5	3.4	2.9	10	12
XStreamPro-Iso Standalone	MSP430 F5438A	256 kB	JTAG (10MHz) SBW (Fast)	4.2	-	-	-	73	-
				12				23	
XStreamPro-Iso XStream-Iso	MSP430 F5438A	256 kB	JTAG (10MHz) SBW (Fast) BSL (Fast)	5.5	0.3	4.3	0.52	59	710
				14	0.4	12.5	8.5	20	30
				25	2.9	23	24	12	11
USB-FPA	MSP430 F5438A	256 kB	JTAG (Fast) SBW (Fast) BSL (Fast)	6.7	0.35	5.5	3.8	47	69
				27	0.55	25	22	10	12
				26	2.9	23	25	12	11
XStreamPro-Iso Standalone	MSP430 F67791A	512 kB	JTAG (10MHz) SBW (Fast)	8	-	-	-	75	-
				23				24	
XStreamPro-Iso XStream-Iso	MSP430 F67791A	512 kB	JTAG (10MHz) SBW (Fast) BSL (Fast)	10	0.3	8.3	0.85	63	730
				27	0.4	25	17	21	31
				48	3	43	45	12	11
USB-FPA	MSP430 F67791A	512 kB	JTAG (Fast) SBW (Fast) BSL (Fast)	13.3	0.3	11.7	7.3	44	70
				53	0.5	50	43	10	12
				48	3	44	47	12	11

Note:

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- Read time → Interface initialization, Read (Flash only)
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- Read speed → Flash reading speed without interface initialization

Benchmark – FlashPro430

MSP430FRxx - JTAG, SBW

Software rev. 5.61

Programming Adapter	MCU	Flash Size	Interface	Autoprogram -GO- Standalone [s]	Erase [s]	Write [s]	Read [s]	Programming speed [kBytes/s]	Read speed [kBytes/s]
XStreamPro-Iso Standalone	MSP430 FR5739	16 kB	JTAG (10MHz) SBW (Fast)	0.25 0.7	-	-	-	820 35	-
XStreamPro-Iso XStream-Iso	MSP430 FR5739	16 kB	JTAG (10MHz) SBW (Fast) BSL (Fast)	0.36 0.9 3.6	0.2 0.25 2.5	0.2 0.7 3.3	0.2 0.7 3.7	730 33 17	510 30 12
USB-FPA	MSP430 FR5739	16 kB	JTAG (Fast) SBW (Fast) BSL (Fast)	0.5 1.65 3.6	0.25 0.35 2.5	0.3 1.4 3.4	0.36 1.5 3.7	100 13 17	70 11 12
XStreamPro-Iso Standalone	MSP430 FR2676	64 kB	JTAG (10MHz) SBW (Fast)	1.0 2.8	-	-	-	820 35	-
XStreamPro-Iso XStream-Iso	MSP430 FR2676	64 kB	JTAG (10MHz) SBW (Fast) BSL (Fast)	1.1 3.3 8.3	0.4 0.5 2.9	0.25 2.4 6.8	0.27 2.7 7.8	730 31 15	540 24 12
USB-FPA	MSP430 FR2676	64 kB	JTAG (Fast) SBW (Fast) BSL (Fast)	1.7 7 8.7	0.45 0.60 2.9	0.8 5.7 7.1	1.25 6.4 8.0	110 12 11	60 11 10
XStreamPro-Iso Standalone	MSP430 FR5994	256 kB	JTAG (10MHz) SBW (Fast)	0.67 7.9	-	-	-	1280 34	-
XStreamPro-Iso XStream-Iso	MSP430 FR5994	256 kB	JTAG (16MHz) SBW (Fast) BSL (Fast)	1 8.5 21	0.3 0.4 4.0	0.45 7.8 18	0.6 8.3 24	900 33 16	780 31 12
USB-FPA	MSP430 FR5994	256 kB	JTAG (Fast) SBW (Fast) BSL (Fast)	2.7 21 21	0.3 0.6 4.0	2.2 19.5 18	3.8 22 24	130 13 16	70 12 12

Note:

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- Programming speed → Whole flash programming speed without interface initialization. In Standalone – Programming part only.
- Read speed → Flash reading speed without interface initialization

Benchmark – GangPro430

MSP430F1xx, MSP430F4xx - JTAG

Software rev. 5.61

Programming Adapter	MCU	Flash Size	Interface	Autoprogram [s]	Erase [s]	Write [s]	Read [s]	Programming speed [kBytes/s]	Read speed [kBytes/s]
XStreamPro-Iso XStream-Iso	MSP430 F413	8 kB	JTAG (6MHz) BSL (Fast)	1.9	0.5	0.8	0.5	11	29
				3.8	3.0	2.2	2.2	8	8
USB-FPA	MSP430 F413	8 kB	JTAG (Fast) BSL (Fast)	4.1	0.5	1.6	1.2	5.6	8
				4.0	3.0	2.1	2.5	8	7
XStreamPro-Iso XStream-Iso	MSP430 F149	60 kB	JTAG (6MHz) BSL (Fast)	4.8	0.5	2.9	2.2	22	30
				11	2.6	9.5	8	8	10
USB-FPA	MSP430 F149	60 kB	JTAG (Fast) BSL (Fast)	6.3	0.5	3.9	7.3	16	8.5
				10.5	2.6	8.5	10.5	9	7
XStreamPro-Iso XStream-Iso	MSP430 F47187	116 kB	JTAG (6MHz) BSL (Fast)	8.0	0.2	3.2	1.7	24	24
				19	3.0	16	14	8.5	10
USB-FPA	MSP430 F47187	116 kB	JTAG (Fast) BSL (Fast)	10.6	0.2	6.8	14.3	17	8.2
				18	3.0	15	19	9	7

Note:

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- Read time → Interface initialization, Read (Flash only)
- Programming speed → Whole flash programming speed without interface initialization.
- Read speed → Flash reading speed without interface initialization
- SBW with Xstream-Iso and XStreamPro-Iso → JTAG CLK set to 6 MHz, Capacitor on SBWDAT – 1nF

Benchmark – GangPro430

MSP430F2xx, MSP430G2xx, - JTAG, SBW

Software rev. 5.61

Programming Adapter	MCU	Flash Size	Interface	Autoprogram [s]	Erase [s]	Write [s]	Read [s]	Programming speed [kBytes/s]	Read speed [kBytes/s]
XStreamPro-Iso XStream-Iso	MSP430 FE221	4 kB	JTAG (6 MHz)	0.7	0.2	0.4	0.3	16	22
			SBW (6 MHz)	1.3	0.2	0.6	0.6	10	10
USB-FPA	MSP430 FE221	4 kB	JTAG (Fast)	0.9	0.2	0.5	0.7	12	8
			SBW (Fast)	1.5	0.2	0.9	1.3	5.5	4
XStreamPro-Iso XStream-Iso	MSP430 G2955	56 kB	JTAG (6 MHz)	4	0.2	2.4	2.1	25	29
			SBW (6 MHz)	9	0.2	4.8	6.3	12	9
			BSL (Fast)	10	2	8.7	7.6	9	10
USB-FPA	MSP430 G2955	56 kB	JTAG (Fast)	5.4	0.2	3.4	6.8	17	8.5
			SBW (Fast)	13.0	0.2	7.6	16	7.5	3.6
			BSL (Fast)	9.5	2	8.0	9.6	9.5	8
XStreamPro-Iso XStream-Iso	MSP430 F2619	120 kB	JTAG (6 MHz)	8.1	0.2	5.0	5.2	25	24
			BSL (Fast)	19	2	17	14	8	10
USB-FPA	MSP430 F2619	120 kB	JTAG (Fast)	11	0.20	7.1	14.8	17	8
			BSL (Fast)	18	2	15.5	19.5	9	7

Note:

- Autoprogram time → Interface initialization, Erase, Program and Verify (Flash only)
- Write time → Interface initialization, Program (Flash only)
- Read time → Interface initialization, Read (Flash only)
- Programming speed → Whole flash programming speed without interface initialization.
- Read speed → Flash reading speed without interface initialization
- SBW with Xstream-Iso and XStreamPro-Iso → JTAG CLK set to 6 MHz, Capacitor on SBWDAT – 1nF

Benchmark – GangPro430

MSP430I2xx, - JTAG, SBW

Software rev. 5.61

Programming Adapter	MCU	Flash Size	Interface	Autoprogram [s]	Erase [s]	Write [s]	Read [s]	Programming speed [kBytes/s]	Read speed [kBytes/s]
XStreamPro-Iso XStream-Iso	MSP430 I2041	32 kB	JTAG (10MHz) SBW (Fast)	2.2 10	0.2 0.2	1.4 8	1.3 3.6	25 4	27 10
USB-FPA	MSP430 I2041	32 kB	JTAG (Fast) SBW (Fast)	3.0 7.7	0.2 0.2	1.9 4.2	4.1 9.4	18 8	8 3.5

Note:

- Autoprogram time → Interface initialization, Erase, Program and Verify (Flash only)
- Write time → Interface initialization, Program (Flash only)
- Read time → Interface initialization, Read (Flash only)
- Programming speed → Whole flash programming speed without interface initialization.
- Read speed → Flash reading speed without interface initialization
- SBW with Xstream-Iso and XStreamPro-Iso → JTAG CLK set to 6 MHz, Capacitor on SBWDAT – 1nF

Benchmark – GangPro430

MSP430F5xx, MSP430F6xx - JTAG, SBW

Software rev. 5.61

Programming Adapter	MCU	Flash Size	Interface	Autoprogram [s]	Erase [s]	Write [s]	Read [s]	Programming speed [kBytes/s]	Read speed [kBytes/s]
XStreamPro-Iso XStream-Iso	MSP430 F5172	32 kB	JTAG (6MHz)	1.3	0.4	0.9	0.5	51	135
			SBW (Fast)	2.5	0.5	1.9	1.5	20	24
USB-FPA	MSP430 F5172	32 kB	JTAG (Fast)	3.9	0.6	2.6	2.5	13.5	14
			SBW (Fast)	6.4	0.9	4.8	4.6	7	8
XStreamPro-Iso XStream-Iso	MSP430 F5438A	256 kB	JTAG (6MHz)	6.6	0.4	4.8	2.1	57	135
			SBW (Fast)	14	0.8	12	10	8	27
			BSL (Fast)	42	3.5	38	32	7	9
USB-FPA	MSP430 F5438A	256 kB	JTAG (Fast)	25	0.6	17.7	18.5	15	14.5
			SBW (Fast)	42	0.9	33	34	8	8
			BSL (Fast)	39	3.5	36	43	7.5	6.3
XStreamPro-Iso XStream-Iso	MSP430 F67791A	512 kB	JTAG (6MHz)	12	0.4	9.3	3.9	57	140
			SBW (Fast)	29	0.5	23	19	24	27
			BSL (Fast)	81	3.5	74	61	7	9
USB-FPA	MSP430 F67791A	512 kB	JTAG (Fast)	46	0.6	33	36	16	14.5
			SBW (Fast)	80	0.9	65	67	8	8
			BSL (Fast)	75	3.5	68	83	7.5	6.3

Note:

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- Read time → Interface initialization, Read (Flash only)
- Programming speed → Whole flash programming speed without interface initialization.
- Read speed → Flash reading speed without interface initialization
- SBW with Xstream-Iso and XStreamPro-Iso → JTAG CLK set to 6 MHz, Capacitor on SBWDAT – 1nF

Benchmark – GangPro430

MSP430FRxx - JTAG, SBW

Software rev. 5.61

Programming Adapter	MCU	Flash Size	Interface	Autoprogram [s]	Erase [s]	Write [s]	Read [s]	Programming speed [kBytes/s]	Read speed [kBytes/s]
XStreamPro-Iso XStream-Iso	MSP430 FR5739	16 kB	JTAG (6MHz) SBW (Fast)	0.7	0.3	0.3	0.3	320	145
				1.2	0.3	0.7	0.8	36	26
				5.3	3	5	4.8	7	7
USB-FPA	MSP430 FR5739	16 kB	JTAG (Fast) SBW (Fast) BSL (Fast)	1.5	0.4	0.6	1.3	40	14.5
				2.6	0.5	1.6	2.3	11	8
				5.0	2.8	4.6	5.1	8	6.5
XStreamPro-Iso XStream-Iso	MSP430 FR2676	64 kB	JTAG (6MHz) SBW (Fast) BSL (Fast)	1.6	0.5	0.5	1.3	330	60
				3.6	0.6	2.4	3.1	30	22
				14	3.0	12	11	6.5	7
USB-FPA	MSP430 FR2676	64 kB	JTAG (Fast) SBW (Fast) BSL (Fast)	3.4	0.7	1.8	5.1	40	13.5
				8	0.9	6.0	9.5	11	7
				13	3.0	11	15	7	5
XStreamPro-Iso XStream-Iso	MSP430 FR5994	256 kB	JTAG (6MHz) SBW (Fast) BSL (Fast)	2.1	0.4	1.0	2.1	335	145
				8.8	0.5	7.5	10	36	26
				39	3	37	32	7.3	8.5
USB-FPA	MSP430 FR5994	256 kB	JTAG (Fast) SBW (Fast) BSL (Fast)	10.5	1.5	5.3	18.5	50	14.5
				21	0.6	19.5	22	13	12
				36	3	34	43	8	6.2

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- Programming speed → Whole flash programming speed without interface initialization.
- Read speed → Flash reading speed without interface initialization
- SBW with Xstream-Iso and XStreamPro-Iso → JTAG CLK set to 6 MHz, Capacitor on SBWDAT – 1nF