

## Letter of Volatility

May 8, 2018

This letter shows the memory types included in the stated Icron Technologies products. **Note:** User data is not retained if device power is turned off.

Product	Unit	Storage Type	Size	Volatility	Usage	Access Restrictions
USB 3-2-1 Raven 3104, 3124 and 3100 Core	LEX /REX	IRAM	896kbit	Volatile	Firmware Code	Internal firmware access only
		AHBRAM	640kbit	Volatile	Firmware Code + Firmware Data	Internal firmware access only
		DRAM	256kbit	Volatile	Firmware Data	Internal firmware access only
		Cache	694Kbit	Volatile	User Data	Internal firmware access only
		Code Cache	8kbit	Volatile	Firmware Code	Internal firmware access only
		Data Cache	8kbit	Volatile	Firmware Data	Internal firmware access only
		Flash	260Mbit	Non-volatile	Firmware Code + Configuration Data	Read-only except during firmware upgrade
	LEX	IRAM	384kbit	Volatile	Firmware code	Internal firmware access only
VU/EL 5353 DVI + USB 2.0		DRAM	128kbit	Volatile	Firmware code	Internal firmware access only
		Cache	694kbit	Volatile	User Data	Internal firmware access only
		Flash	4Mbit	Non-volatile	Firmware code	Read-only except during firmware upgrade
		EEPROM	1Mbit	Non-volatile	Firmware code	Read-only except during firmware upgrade
		EEPROM	4kbit	Non-volatile	Configuration	Read-only except during firmware upgrade
	REX	IRAM	384kbit	Volatile	Firmware code	Internal firmware access only
		DRAM	128kbit	Volatile	Firmware code	Internal firmware access only
VU/EL 5363 HDMI + USB2.0		Cache	694kbit	Volatile	User Data	Internal firmware access only
		Flash	4Mbit	Non-volatile	Firmware code	Read-only except during firmware upgrade
		EEPROM	1Mbit	Non-volatile	Firmware code	Read-only except during firmware upgrade
		EEPROM	2kbit	Non-volatile	Firmware code	Read-only except during firmware upgrade
		EEPROM	4kbit	Non-volatile	Configuration	Read-only except during firmware upgrade
		Flash	32kbit	Non-volatile	User Data	Read-only except during firmware upgrade



Internal firmware code   Internal firmware c							
USB 2.0 Ranger/RG 2301   Series		LEX	IRAM	384kbit	Volatile	Firmware code	
USB 2.0 Ranger/RG 2304   Flash   Almbit   Non-volatile   Firmware code   USB 2.0 Ranger/RG 2314   USB 2.0 Ranger/RG 231			DRAM	128kbit	Volatile	Firmware code	
September   Sept			Cache	694kbit	Volatile	User Data	
USB 2.0 Ranger/RG 2312   USB 2.0 Ranger/RG 2313   USB 2.0 Ranger/RG 2314   USB 2.0 Ranger/RG 2210   USB 2.0 Ranger/RG 2211   USB 2.0 Ranger/RG 2214   USB 2.0 Ranger/RG 2210   Flash   1Mbit   Non-volatile   Firmware Code   Internal access only   USB 2.0 Ranger/RG 2210   Flash   1Mbit   Non-volatile   Firmware Code   Internal access only   USB 2.0 Ranger/RG 2101   USB	_		Flash	4Mbit	Non-volatile	Firmware code	during firmware
USB 2.0 Ranger/RG 2312 USB 2.0 Ranger/RG 2344 USB 2.0 Ranger/RG 2304 USB 2.0 Ranger/RG 2201 USB 2.0 Ranger/RG 2201 USB 2.0 Ranger/RG 2201 USB 2.0 Ranger/RG 2211 USB 2.0 Ranger/RG 2211 USB 2.0 Ranger/RG 2212 USB 2.0 Ranger/RG 2224 USB 2.0 Ranger/RG 2224 USB 2.0 Ranger/RG 2244 USB 2.0 Ranger/RG 2245 USB 2.0 Ranger/RG 2245 USB 2.0 Ranger/RG 2246 USB 2.0 Ranger/RG 2101 USB 2.0 Ranger/RG 2104 USB 2.0 Ranger/RG 2204 USB 2.0 Ranger/RG 2204 USB 2.0 Ranger/RG 2204 USB 2.0 Ranger/RG 2204			EEPROM	4kbit	Non-volatile	Configuration	during firmware upgrade
USB 2.0 Ranger/RG 2344 USB 2.0 Ranger/RG 2344 USB 2.0 Ranger/RG 2304 USB 2.0 Ranger/RG 2201 USB 2.0 Ranger/RG 2204 USB 2.0 Ranger/RG 2212 USB 2.0 Ranger/RG 2212 USB 2.0 Ranger/RG 2212 USB 2.0 Ranger/RG 2214 USB 2.0 Ranger/RG 2215 USB 2.0 Ranger/RG 2214 USB 2.0 Ranger/RG 2210 USB 2.0 Ranger/RG 2101 USB 2.0 Ranger/RG 2104 USB 2.0 Ranger/RG 2210			IRAM	384kbit	Volatile	Firmware code	
Cache   694kbit   Volatile   User Data   Internal Immune access only			DRAM	128kbit	Volatile	Firmware code	
USB 2.0 RG2310A Core  USB 2.0 RG2310A Core  EEPROM		DEV	Cache	694kbit	Volatile	User Data	
EEPROM		REX	Flash	4 Mbit	Non-volatile	Firmware code	during firmware
USB 2.0 Ranger/RG 2201   USB 2.0 Ranger/RG 2204   USB 2.0 Ranger/RG 2211   USB 2.0 Ranger/RG 2211   USB 2.0 Ranger/RG 2212   USB 2.0 Ranger/RG 2212   USB 2.0 Ranger/RG 2224   USB 2.0 RG2210 Core   USB 2.0 RG2220 Core   USB 2.0 RG2230 Core   USB 2.0 RG2230 Core   USB 2.0 RG2240 Core   USB 2.0 Ranger/RG 2101   USB 2.0 Ranger/RG 2101   USB 2.0 Ranger/RG 2104	USB 2.0 RG2310A Core		EEPROM	4kbit	Non-volatile	Configuration	during firmware
USB 2.0 Ranger/RG 2214   USB 2.0 Ranger/RG 2211   USB 2.0 Ranger/RG 2212   USB 2.0 Ranger/RG 2212   USB 2.0 Ranger/RG 2214   USB 2.0 Ranger/RG 2224   USB 2.0 Ranger/RG 2224   USB 2.0 Ranger/RG 2224   USB 2.0 RG2210 Core			IRAM	8192kbit	Volatile	Firmware code	
USB 2.0 Ranger/RG 2211 USB 2.0 Ranger/RG 2212 USB 2.0 Ranger/RG 2224 USB 2.0 Ranger/RG 2224 USB 2.0 Ranger/RG 2224 USB 2.0 Ranger/RG 2224 USB 2.0 RG2210 Core USB 2.0 RG2220 Core USB 2.0 RG2210 Core USB 2.0 RG2210 Core USB 2.0 RG2210 Core USB 2.0 RG2220 Core USB 2.0 RG2210 Core USB 2.0 RG2220 Core USB 2.0 RG2200 Core USB 2.0			DRAM	4096kbit	Volatile	Firmware data	
USB 2.0 Ranger/RG 2244 USB 2.0 Ranger/RG 2244 USB 2.0 RG2210 Core USB 2.0 RG2220 Core USB 2.0 RG2220 Core USB 2.0 RG2230 Core USB 2.0 RG2230 Core USB 2.0 RG2240 Core USB 2.0 Ranger/RG 2101 USB 2.0 Ranger/RG 2104 USB 2.0 Ranger/RG 2104 USB 2.0 Ranger/RG 2104 USB 2.0 Ranger/RG 2104 USB 2.0 RG2100 Core  EXAMPLEX SPI Flash SPI Flash Albit Non-volatile Volatile User Data Internal Access Only Read-only except during firmware upgrade Internal Access Only Read-only except during firmware upgrade Internal Access Only Read-only except during firmware upgrade USB 2.0 Ranger/RG 2104 USB 2.0 Ranger/RG 2101 USB	· ·	LEX	Cache		Volatile	User Data	
USB 2.0 RG2210 Core USB 2.0 RG2220 Core USB 2.0 RG2230 Core USB 2.0 RG2230 Core USB 2.0 RG2240 Core USB 2.0 Ranger/RG 2101 USB 2.0 Ranger/RG 2101 USB 2.0 Ranger/RG 2104 USB 2.0 Ranger/RG 2104 USB 2.0 RG2100 Core USB 2.0 RG220 Cor	USB 2.0 Ranger/RG 2224		Flash	1Mbit	Non-volatile	Firmware Code	during firmware
USB 2.0 RG2230 Core USB 2.0 RG2230 Core USB 2.0 RG2240 Core USB 2.0 RG2240 Core USB 2.0 RG2240 Core  Flash  IMbit  Non-volatile  Firmware Code USB 2.0 Ranger/RG 2101 USB 2.0 Ranger/RG 2104 USB 2.0 Ranger/RG 2104 USB 2.0 Ranger/RG 2104 USB 2.0 Ranger/RG 2104 USB 2.0 Rog2100 Core  FPGA  A86kbit  Volatile  Volatile  Volatile  Volatile  User Data  Internal access only Read-only except during firmware upgrade Internal Access Only Read-only except during firmware upgrade Internal Access Only Read-only except during firmware upgrade Internal Access Only Internal Access Only Internal Access Only Internal Access Only SPI Flash  AMbit  Volatile  User Data Internal Access Only Read-only except during firmware upgrade Internal Access Only Internal Access Only Read-only except during firmware upgrade Internal Access Only Internal	_		IRAM	8192kbit	Volatile	Firmware code	
USB 2.0 RG2240 Core  Flash  IMbit  Non-volatile  Firmware Code  User Data  Internal Access Only  Read-only except during firmware upgrade  Internal Access Only  Internal Access Only  REX  SPI Flash  4Mbit  Non- Volatile  User Data  Internal Access Only  Internal Access Only  Read-only except during firmware upgrade  Internal Access Only  Firmware Code  Internal Access Only  Firmware Code  Internal Access Only  Firmware Code  Internal Access O		REX	DRAM	4096kbit	Volatile	Firmware data	
Flash 1Mbit Non-volatile Firmware Code during firmware upgrade  USB 2.0 Ranger/RG 2101  USB 2.0 Ranger/RG 2104  USB 2.0 RG2100 Core  FPGA 486kbit Volatile User Data Internal Access Only Read-only except during firmware upgrade  CryptoAuthentication Chip 2kbit Non-Volatile User Data Uniternal Access Only  FPGA 486kbit Volatile User Data Internal Access Only  REX  SPI Flash 4Mbit Non-Volatile User Data Unternal Access Only  REX  SPI Flash 4Mbit Non-Volatile Firmware Code User Data Unternal Access Only  REX  SPI Flash 16kbit Non-Volatile Firmware Code Unternal Access Only  REX Flash 16kbit Non-Volatile Firmware Code Unternal Access Only  USB 3.0 Spectra/SP 3001-  IEX Flash 512Byte Non-Volatile Firmware Code Read Only  Flash 512Byte Non-Volatile Firmware Code Read Only			Cache		Volatile	User Data	
USB 2.0 Ranger/RG 2101 USB 2.0 Ranger/RG 2104 USB 2.0 Ranger/RG 2104 USB 2.0 Ranger/RG 2104 USB 2.0 Ranger/RG 2104 USB 3.0 Ranger/RG 2104 USB 3.0 Spectra/SP 3022 USB 3.0 Spectra/SP 3001- 15  FPGA  4Mbit Non-Volatile Non-Volatile Non-Volatile Volatile User Data Non-Volatile User Data Internal Access Only Read-only except during firmware upgrade Internal Access Only Read-only Firmware Code Internal Access Only Internal Access Only Firmware Code Internal Access Only Firmware Code Read Only REX Flash Flash Flash Flash Firmware Code Read Only REX FERROM REX FIRSH F	USB 2.0 RG2240 Core		Flash	1Mbit	Non-volatile	Firmware Code	during firmware
USB 2.0 Ranger/RG 2104 USB 2.0 Ranger/RG 2104 USB 2.0 RG2100 Core  FPGA REX SPI Flash  4Mbit Son-Volatile Volatile Volatile Volatile User Data Internal Access Only Internal Access Only Read-only except during firmware upgrade Internal Access Only Read-only except during firmware upgrade Internal Access Only Read-only except during firmware upgrade  LEX Flash I6kbit Non- Volatile Firmware Code Internal Access Only Read-only except during firmware upgrade Internal Access Only Read-only except during firmware upgrade Internal Access Only REX Flash I6kbit Non- Volatile Firmware Code Internal Access Only Internal Access Only Internal Access Only Internal Access Only Firmware Code Internal Access Only Firmware Code Read Only  Firmware Code Read Only Firmware Code Read Only Firmware Code Read Only Firmware Code Read Only Firmware Code Read Only Firmware Code Read Only Firmware Code Read Only Firmware Code Read Only Firmware Code Read Only Firmware Code Read Only Firmware Code Read Only Firmware Code Read Only Firmware Code Read Only Firmware Code Read Only Firmware Code Read Only Firmware Code Read Only Firmware Code Read Only Firmware Code Read Only Firmware Code Read Only Firmware Code Read Only Firmware Code Read Only		LEX	FPGA	486kbit	Volatile	User Data	
USB 2.0 Ranger/RG 2104 USB 2.0 RG2100 Core  FPGA  REX  SPI Flash  4Mbit  Non- Volatile  Non- Volatile  Firmware Code  Internal Access Only  Read-only except during firmware upgrade  LEX  Flash  16kbit  Non- Volatile  Firmware Code  Internal Access Only  Read-only except during firmware upgrade  Internal Access Only  REX  Flash  16kbit  Non- Volatile  Firmware Code  Internal Access Only  Internal Access Only  REX  Flash  16kbit  Non- Volatile  USB 3.0 Spectra/SP 3001- 15  Firmware Code  Read Only  Firmware Code  Read Only  REX  Flash  512Byte  Non- Volatile  Non- Volatile  Firmware Code  Read Only  REX  Flash  S12Byte  Non- Volatile  Firmware Code  Read Only  Rex  Flash  S12Byte  Non- Volatile  Firmware Code  Read Only  Rex  Flash  S12Byte  Non- Volatile  Firmware Code  Read Only  Rex  Flash  S12Byte  Non- Volatile  Firmware Code  Read Only  Rex  Flash  Flash  S12Byte  Non- Volatile  Firmware Code  Read Only  Rex  Flash  Flash  S12Byte  Non- Volatile  Firmware Code  Read Only  Rex  Flash  Flash  S12Byte  Non- Volatile  Firmware Code  Read Only  Read Only  Rex  Flash  Flas	USB 2.0 Ranger/RG 2101		SPI Flash	4Mbit		Firmware Code	
REX SPI Flash 4Mbit Non- Volatile USB 3.0 Spectra/SP 3022  LEX Flash 16kbit Non- Volatile Non- Volatile Firmware Code USB 3.0 Spectra/SP 3001- 15  FPGA 486kbit Volatile USB 70 datile U	USB 2.0 Ranger/RG 2104		7.1	2kbit		Authentication	
USB 3.0 Spectra/SP 3022  LEX Flash 16kbit Non-Volatile Firmware Code during firmware upgrade  REX Flash 16kbit Non-Volatile Firmware Code Only  REX Flash 16kbit Non-Volatile Firmware Code Internal Access Only  LEX Flash 16kbit Non-Volatile Firmware Code Only  LEX Flash 512Byte Non-Volatile Firmware Code Read Only  Flash 512Byte Non-Volatile Firmware Code Read Only  REX Flash 512Byte Non-Volatile Firmware Code Read Only  REX Flash 512Byte Non-Volatile Firmware Code Read Only	USB 2.0 RG2100 Core	REX	FPGA	486kbit	Volatile	User Data	
USB 3.0 Spectra/SP 3022  REX Flash 16kbit Volatile Firmware Code Only  REX Flash 16kbit Non- Volatile Firmware Code Only  Internal Access Only  USB 3.0 Spectra/SP 3001- 15  LEX Flash 512Byte Non- Volatile Firmware Code Read Only  Flash 512Byte Non- Volatile Firmware Code Read Only  Non- Volatile Firmware Code Read Only  REX Flash 512Byte Non- Volatile Non- Volatile Firmware Code Read Only  REX Flash S12Byte Non- Volatile Firmware Code Read Only			SPI Flash	4Mbit		Firmware Code	during firmware
REX Flash 16kbit Non-Volatile Firmware Code Internal Access Only  LEX Flash 512Byte Non-Volatile Firmware Code Read Only  USB 3.0 Spectra/SP 3001- 15 Flash 512Byte Non-Volatile Firmware Code Read Only  Flash S12Byte Non-Volatile Firmware Code Read Only  REX Flash S12Byte Non-Volatile Firmware Code Read Only  REX Flash S12Byte Non-Volatile Non-Firmware Code Read Only	USB 3.0 Spectra/SP 3022	LEX	Flash	16kbit		Firmware Code	
USB 3.0 Spectra/SP 3001- 15  Flash  Flash  S12Byte  Volatile  Firmware Code  Read Only  Flash  Flash  S12Byte  Non- Volatile  Non- Volatile  Non- Volatile  Firmware Code  Read Only  Read Only  Read Only  Read Only		REX	Flash	16kbit		Firmware Code	
REX ST2Byte Volatile Firmware Code Read Only Non- Firmware Code Read Only		LEX	Flash	512Byte		Firmware Code	Read Only
EEDROM 2khit Non- Eirmware Code Read Only		DEV	Flash	512Byte		Firmware Code	Read Only
		KEX	EEPROM	2kbit		Firmware Code	Read Only



## Icron Technologies - Letter of Volatility

Product	Unit	Storage Type	Size	Volatility	Usage	Access Restrictions
		SPI Flash	8Mbit	Non-Volatile	Firmware Code + User Data	Read-only except during firmware upgrade; Internal Access Only
	LEX	IC NAND Flash	1GBit	Non-Volatile	Firmware Code + User Data	Read-only except during firmware upgrade; Internal Access Only
		SDRAM	1GB	Volatile	User Data	Internal Access Only
EL3500		SRAM	2Mbit	Volatile	User Data	Internal Access Only
		Flash	16kBit	Non-Volatile	Firmware Code	Internal Access Only
EL4500	REX	SPI Flash	8Mbit	Non-Volatile	Firmware Code + User Data	Read-only except during firmware upgrade; Internal Access Only
		IC NAND Flash	1GBit	Non-Volatile	Firmware Code + User Data	Read-only except during firmware upgrade; Internal Access Only
		SDRAM	1GB	Volatile	User Data	Internal Access Only
		SRAM	2Mbit	Volatile	User Data	Internal Access Only
		IRAM	8192kbit	Volatile	Firmware code	Internal access only
		DRAM	4096kbit	Volatile	Firmware data	Internal access only
	LEX	Cache	8-1024 bytes	Volatile	User Data	Internal access only
		Flash	1Mbit	Non-Volatile	Firmware Code	Read-only except during firmware upgrade
		EEPROM	1Mbit	Non-Volatile	Firmware Code	Read-only except during firmware upgrade
	REX	IRAM	8192kbit	Volatile	Firmware code	Internal access only
EL5100 EL5200		DRAM	4096kbit	Volatile	Firmware data	Internal access only
		Cache	8-1024 bytes	Volatile	User Data	Internal access only
		Flash	1Mbit	Non-Volatile	Firmware Code	Read-only except during firmware upgrade
		EEPROM	1Mbit	Non-Volatile	Firmware Code	Read-only except during firmware upgrade
		EEPROM	2kbit	Non-Volatile	Firmware Code	Read-only except during firmware upgrade
		Flash	32kbit	Non-Volatile	User Data	Internal Access Only
USB 1.1 Rover	LEX	CPLD	2kbit	Non-Volatile	Firmware Code	Internal Access Only
1650/2650	REX	CPLD	2kbit	Non-Volatile	Firmware Code	Internal Access Only
USB 1.1 Rover	LEX	CPLD	8kbit	Non-Volatile	Firmware Code	Internal Access Only
1850/2850	REX	CPLD	8kbit	Non-Volatile	Firmware Code	Internal Access Only