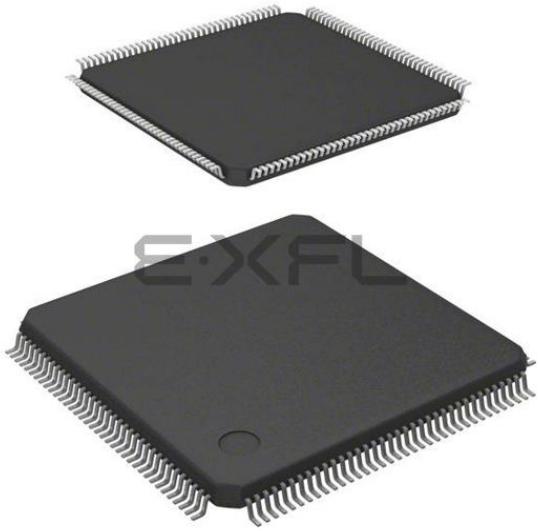

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What is "Embedded - Microcontrollers"?

"Embedded - Microcontrollers" refer to small, integrated circuits designed to perform specific tasks within larger systems. These microcontrollers are essentially compact computers on a single chip, containing a processor core, memory, and programmable input/output peripherals. They are called "embedded" because they are embedded within electronic devices to control various functions, rather than serving as standalone computers. Microcontrollers are crucial in modern electronics, providing the intelligence and control needed for a wide range of applications.

Applications of "Embedded - Microcontrollers"

Details	
Product Status	Obsolete
Core Processor	ARM7®
Core Size	32-Bit Single-Core
Speed	66MHz
Connectivity	CANbus, EBI/EMI, HDLC, I²C, SmartCard, SPI, UART/USART, USB
Peripherals	PWM, WDT
Number of I/O	48
Program Memory Size	128KB (128K x 8 + 16K)
Program Memory Type	FLASH
EEPROM Size	-
RAM Size	32K x 8
Voltage - Supply (Vcc/Vdd)	3V ~ 3.6V
Data Converters	A/D 4x12b
Oscillator Type	Internal
Operating Temperature	-40°C ~ 85°C (TA)
Mounting Type	Surface Mount
Package / Case	144-LQFP
Supplier Device Package	-
Purchase URL	https://www.e-xfl.com/product-detail/stmicroelectronics/str710fz1t6

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1 Introduction

This datasheet provides the STR71x pinout, ordering information, mechanical and electrical device characteristics.

For complete information on the STR71x microcontroller memory, registers and peripherals. please refer to the STR71x reference manual.

For information on programming, erasing and protection of the internal Flash memory please refer to the STR7 Flash programming reference manual.

For information on the ARM7TDMI core please refer to the ARM7TDMI technical reference manual.

Table 2. Device overview

Features	STR710 FZ1	STR710 FZ2	STR710 RZ	STR711 FR0	STR711 FR1	STR711 FR2	STR712 FR0	STR712 FR1	STR712 FR2	STR715 FRx
Flash - Kbytes	128+16	256+16	0	64+16	128+16	256+16	64+16	128+16	256+16	64+16
RAM - Kbytes	32	64	64	16	32	64	16	32	64	16
Peripheral Functions	CAN, EMI, USB, 48 I/Os			USB, 30 I/Os			CAN, 32 I/Os			32 I/Os
Operating Voltage	3.0 to 3.6 V									
Operating Temperature	-40 to +85°C or 0 to 70° C									
Packages	**T**=LQFP144 20 x 20 **H**=LFBGA144 10 x10			**T**=LQFP64 10 x10						

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3.2 Related documentation

Available from www.arm.com:

ARM7TDMI Technical reference manual

Available from http://www.st.com:

STR71x Reference manual

STR7 Flash programming manual

AN1774 - STR71x Software development getting started

AN1775 - STR71x Hardware development getting started

AN1776 - STR71x Enhanced interrupt controller

AN1777 - STR71x memory mapping

AN1780 - Real time clock with STR71x

AN1781 - Four 7 segment display drive using the STR71x

The above is a selected list only, a full list STR71x application notes can be viewed at http://www.st.com.

3.3 Pin description for 144-pin packages

Figure 2. STR710 LQFP pinout

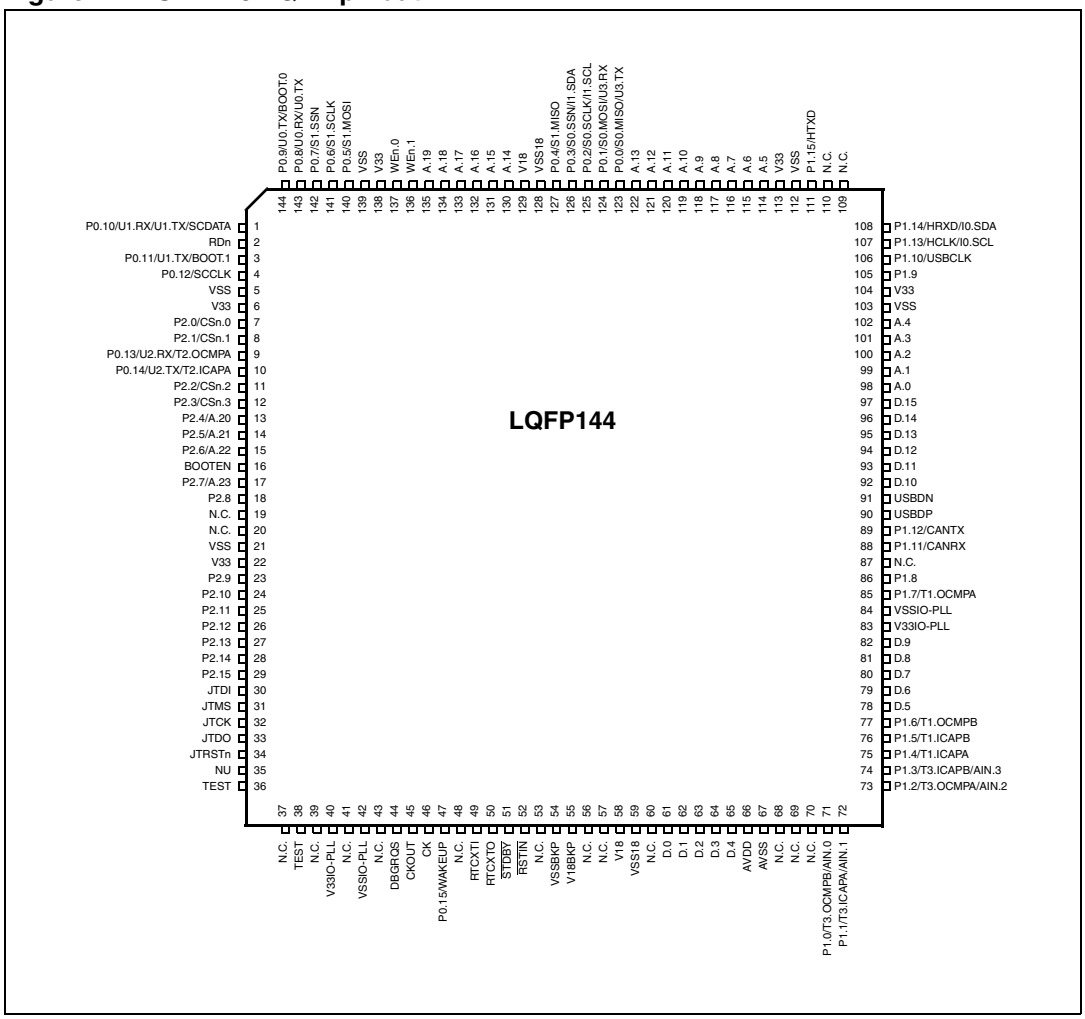


Figure 7. Mapping of Flash memory versions

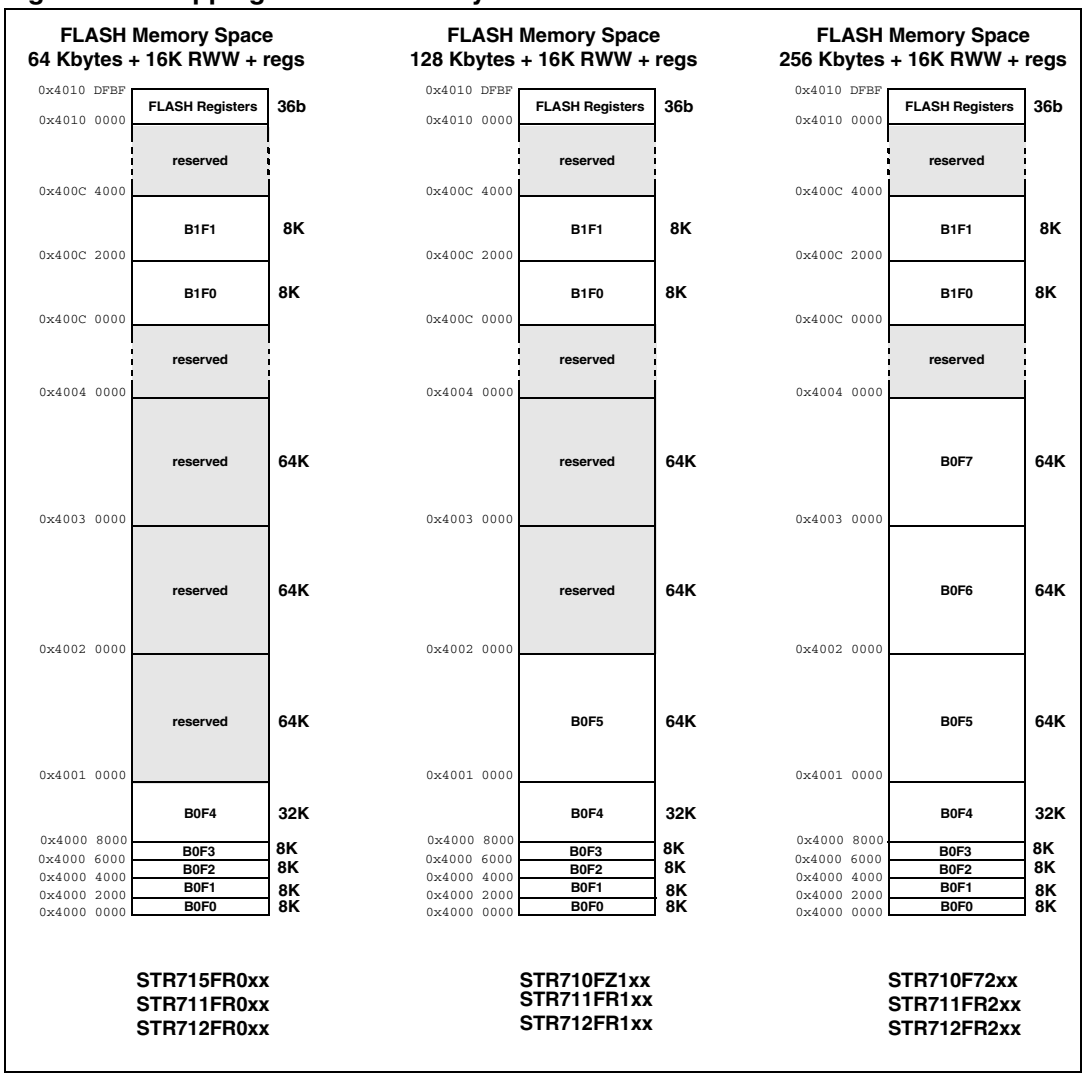


Table 7. RAM memory mapping

Part number	RAM size	Start address	End address
STR715FR0xx STR711FR0xx STR712FR0xx	16 Kbytes	0x2000 0000	0x2000 3FFF
STR710FZ1xx STR711FR1xx STR712FR1xx	32 Kbytes	0x2000 0000	0x2000 7FFF
STR710FR2xx STR710Rxx STR711FR2xx STR712FR2xx	64 Kbytes	0x2000 0000	0x2000 FFFF

Table 9. Current characteristics

Symbol	Ratings	Max.	Unit
I_{V33}	Total current into $V_{33}/V_{33IO-PLL}$ power lines (source) [2]	150	mA
I_{VSS}	Total current out of $V_{SS}/V_{SSIO-PLL}$ ground lines (sink) [2]	150	
I_{IO}	Output current sunk by any I/O and control pin	25	
	Output current source by any I/Os and control pin	- 25	
$I_{INJ(PIN)}$ [1] [3]	Injected current on $\overline{RSTIN}$ pin	± 5	
	Injected current on CK pin	± 5	
	Injected current on any other pin [4]	± 5	
$\Sigma I_{INJ(PIN)}$ [1]	Total injected current (sum of all I/O and control pins) [4]	± 25	

The $I_{INJ(PIN)}$ must never be exceeded. This is implicitly insured if V_{IN} maximum is respected. If V_{IN} maximum cannot be respected, the injection current must be limited externally to the $I_{INJ(PIN)}$ value. A positive injection is induced by $V_{IN}>V_{33}$ while a negative injection is induced by $V_{IN}<V_{SS}$. For true open-drain pads, there is no positive injection current, and the corresponding V_{IN} maximum must always be respected. Data based on T_A = 25 °C.

All 3.3V power (V_{33}, AV_{DD}, $V_{33IO-PLL}$) and ground (V_{SS}, AV_{SS}, $V_{SSIO-PLL}$) pins must always be connected to the external 3.3V supply.

Negative injection disturbs the analog performance of the device. See note in *Section 4.3.11: ADC characteristics on page 66*.

When several inputs are submitted to a current injection, the maximum $\Sigma I_{INJ(PIN)}$ is the absolute sum of the positive and negative injected currents (instantaneous values). These results are based on characterization with $\Sigma I_{INJ(PIN)}$ maximum current injection on four I/O port pins of the device.

Only when using external 1.8V power supply. All the power (V_{18}, V_{18BKP}) and ground (V_{SS18}, V_{SSBKP}) pins must always be connected to the external 1.8V supply.

Table 10. Thermal characteristics

Symbol	Ratings	Value	Unit
T_{STG}	Storage temperature range	-65 to +150	°C
T_J	Maximum junction temperature (see *Section 5.2: Thermal characteristics on page 73*)		

Figure 11. STOP I_{DD} vs. V_{33}

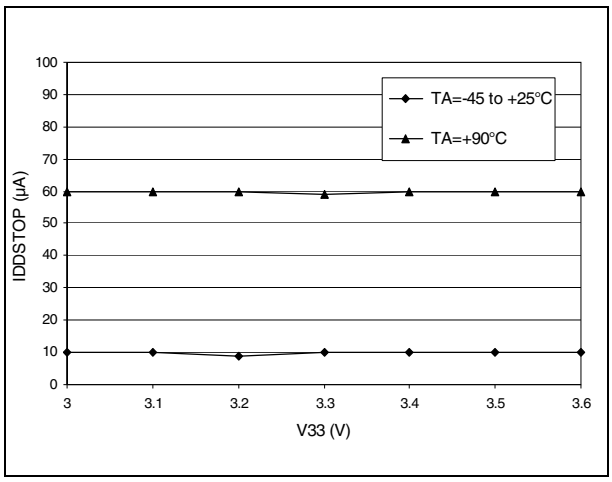


Figure 12. STANDBY I_{DD} vs. V_{33}

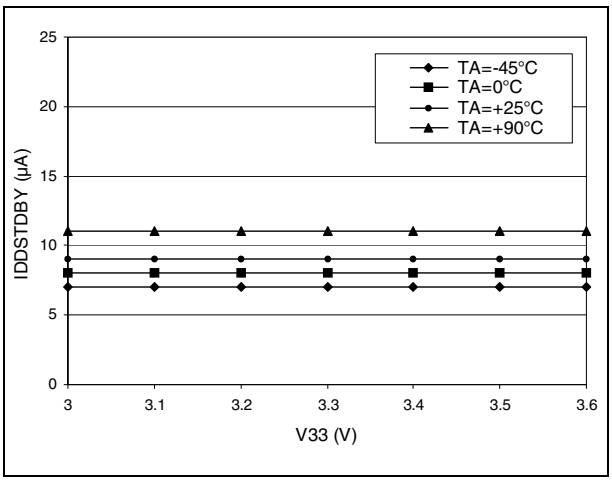
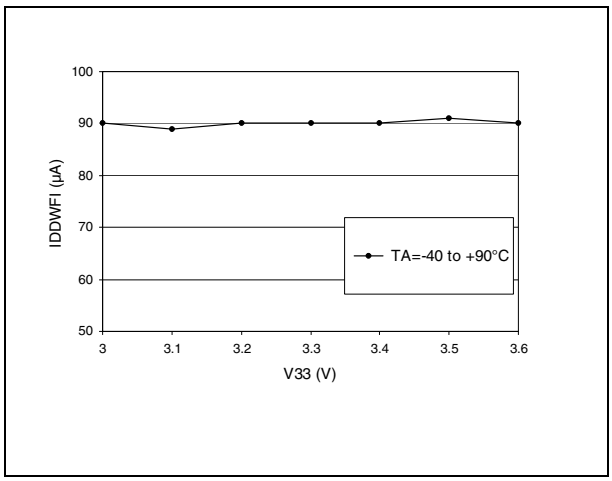


Figure 13. WFI I_{DD} vs. V_{33}



4.3.2 Clock and timing characteristics

External clock sources

Subject to general operating conditions for V_{33}, and T_A.

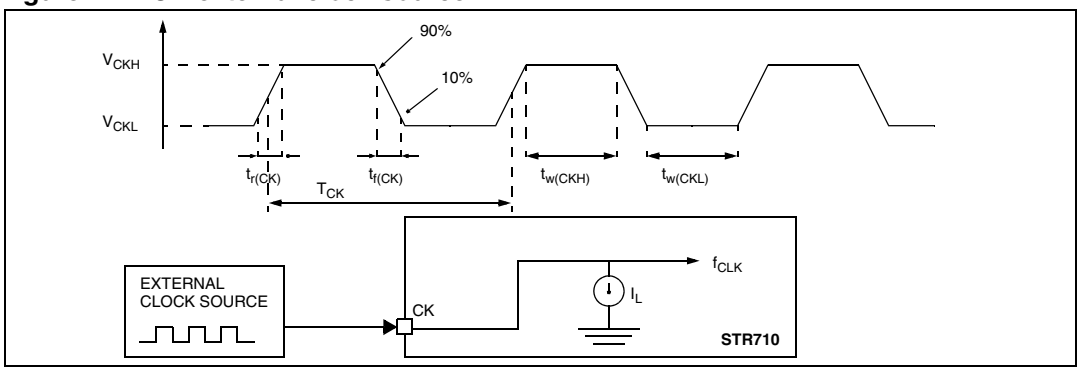
Table 16. CK external clock characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
f_{CK}	External clock source frequency		0		16.5	MHz
V_{CKH}	CK input pin high level voltage		$0.7xV_{33}$		V_{33}	V
V_{CKL}	CK input pin low level voltage		V_{SS}		$0.3xV_{33}$	
$t_{w(CK)}$ $t_{w(CK)}$	CK high or low time 1)		25			ns
$t_{r(CK)}$ $t_{f(CK)}$	CK rise or fall time 1)				20	
$C_{IN(CK)}$	CK input capacitance 1)			5		pF
DuCy(XT1)	Duty cycle		40		60	%
I_L	CK Input leakage current	$V_{SS} \leq V_{IN} \leq V_{33}$			±1	µA

Notes:

1. Data based on design simulation and/or technology characteristics, not tested in production.

Figure 14. CK external clock source



4.3.3 Memory characteristics

Flash memory

V_{33} = 3.0 to 3.6V, T_A = -40 to 85 °C unless otherwise specified.

Table 22. Flash memory characteristics

Symbol	Parameter	Test conditions	Value			Unit
			Min.	Typ	Max[1]	
t_{PW}	Word Program			40		µs
t_{PDW}	Double Word Program			60		µs
t_{PB0}	Bank 0 Program (256K)	Double Word Program		1.6	2.1	s
t_{PB1}	Bank 1 Program (16K)	Double Word Program		130	170	ms
t_{ES}	Sector Erase (64K)	Not preprogrammed Preprogrammed		2.3 1.9	4.0 3.3	s
t_{ES}	Sector Erase (8K)	Not preprogrammed Preprogrammed		0.7 0.6	1.1 1.0	s
t_{ES}	Bank 0 Erase (256K)	Not preprogrammed Preprogrammed		8.0 6.6	13.7 11.2	s
t_{ES}	Bank 1 Erase (16K)	Not preprogrammed Preprogrammed		0.9 0.8	1.5 1.3	s
t_{RPD}[2]	Recovery when disabled				20	µs
t_{PSL}[2]	Program Suspend Latency				10	µs
t_{ESL}[2]	Erase Suspend Latency				300	µs
N_{END_B0}	Endurance (Bank 0 sectors)		10			kcycles
N_{END_B1}	Endurance (Bank 1 sectors)		100			kcycles
t_{RET}	Data Retention (Bank 0 and Bank 1)	T_A=85°	20			Years
t_{ESR}	Erase Suspend Rate	Min time from Erase Resume to next Erase Suspend	20			ms

Notes:

1. T_A=45°C after 0 cycles. Guaranteed by characterization, not tested in production.
2. Guaranteed by design, not tested in production