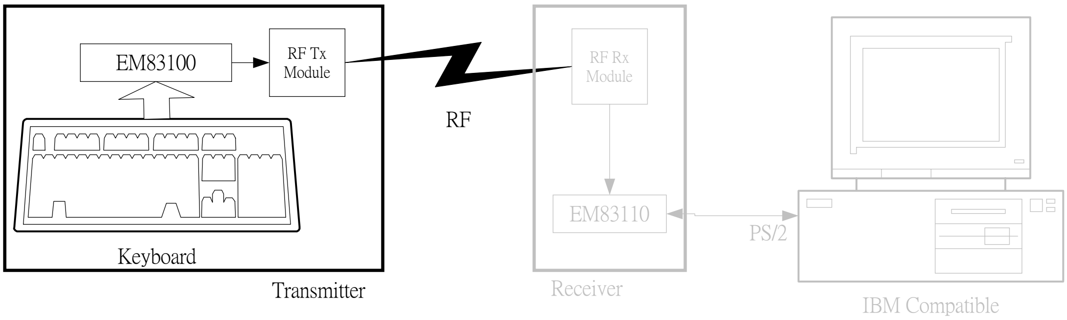
GENERAL DESCRIPTION

In RF keyboard system, that is divided into two parts (the transmitter and the receiver). The EM83100A micro-controller is dedicated to a RF keyboard encoder for single channel RF transmitter module. The EM83100A is scanning keyboard state, encode key data and rely on RF Tx module to transmit data.



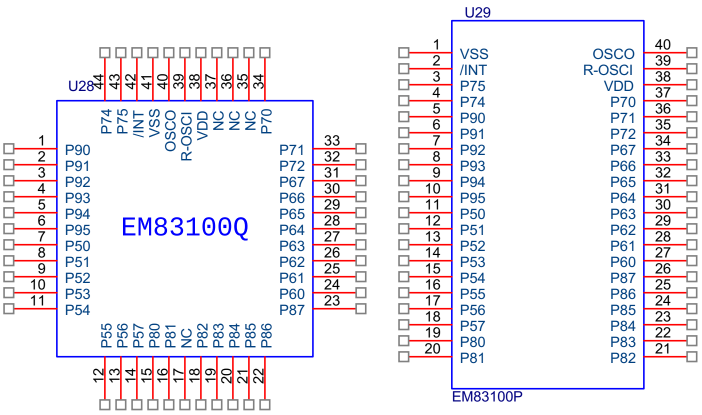
FEATURES

- Low cost – eliminate need external components.
- Phantom key detect.
- Resonator oscillator (2.00 MHz)
- Low power CMOS device technology
- Internal pull-up resistor.
- Tri-state outputs for easy board application.
- Built-in 4K ROM.
- Support WINDOWS™ 95, 98, 2000 keys.
- 104/107 keys with multi-media or other special keyboard encoder.
- Support RF transmit module sleep mode (Sleep current under 10µA).
- Warm-up time of RF Tx modules: 7.2µ sec
- Using the device ID to identify which receiver was connected.
  - DIP switch to select. (8 sets ID)
  - Random generate ID (255 sets ID) and store in EEPROM (93LC46)
- Package: 40-pins PDIP, 44-pins QFP

APPLICATION

- Support the single channel or two channels RF transmitter module.
- IBM PC AT or compatible machine keyboard.
- IBM PS/2 model 30,50,60,80 or compatible machine keyboard.
- Japanese keyboard.
- Korean keyboard.
- Brazilian keyboard.
- European keyboard.

PIN ASSIGNMENT



PIN DESCRIPTIONS

Symbol	I / O	Function
P50	O	Column 3 Low output scan line, 3-state
P51	O	Column 4 Low output scan line, 3-state
P52	O	Column 5 Low output scan line, 3-state
P53	O	Column 6 Low output scan line, 3-state
P54	O	Column 7 Low output scan line, 3-state
P55	O	Column 14 Low output scan line, 3-state
P56	O	Column 13 Low output scan line, 3-state
P57	O	Column 12 Low output scan line, 3-state
P80	O	Column 11 Low output scan line, 3-state
P81	O	Column 15 Low output scan line, 3-state
P82	O	Column 10 Low output scan line, 3-state
P83	O	Column 8 Low output scan line, 3-state
P84	O	Column 9 Low output scan line, 3-state
P85	O	Column 0 Low output scan line, 3-state
P86	O	Column 16 Low output scan line, 3-state
P87	O	Column 17 Low output scan line, 3-state
P91	O	Switch DIP control line or Random ID connect bottom
P90	I	Switch DIP for Device ID bit 2 or connect with DO pin of EEPROM
P70	O	Connect with CS pin of EEPROM
P74	I / O	Switch DIP for Device ID bit 1 or connect with SK pin of EEPROM
P75	I / O	Switch DIP for Device ID bit 0 or connect with DI pin of EEPROM
P92	O	Channel Control line for RF Transmitter Module
P93	O	Data Output for RF Transmitter Module connection
P94	O	Column 1 Low output scan line, 3-state
P95	O	Column 2 Low output scan line, 3-state
VSS	I	Ground
P60	I	Row 0 Input Scan line, internal pull high (17KΩ)
P61	I	Row 1 Input Scan line, internal pull high (17KΩ)
P62	I	Row 2 Input Scan line, internal pull high (17KΩ)
P63	I	Row 3 Input Scan line, internal pull high (17KΩ)
P64	I	Row 4 Input Scan line, internal pull high (17KΩ)
P65	I	Row 5 Input Scan line, internal pull high (17KΩ)
P66	I	Row 6 Input Scan line, internal pull high (17KΩ)
P67	I	Row 7 Input Scan line, internal pull high (17KΩ)

VDD	I	+3V Battery power supply
OSCO	O	CLOCK output
OSCI	I	Connect with 2.00MHz Resonator Oscillation

FUNCTION DESCRIPTION

Encoder buffer

The EM83100A will buffer 24 bytes first-in-first-out order when the system is able to receive scan codes from the keyboard. The EM83100A generate RF data frame according to FIFO and keyboard status. Then, modulation the data frame into serial signal to RF Tx module. When key pressed, the EM83100A will generate a make code into FIFO. If key not released, EM83100A will generate a make code into FIFO every 200ms. When key released, the EM83100A will generate a break code into FIFO.

Device ID

The EM83100A has support two device ID mode:

1. Controllable ID mode: Using the 3 bits DIP switch to control the device ID.
2. Random generate ID mode: Using the push bottom to generates a random device ID (255 sets) and restores in EEPROM (93LC46). The EM83100A will broadcast 10 seconds the new device ID after push bottom released. When battery exchange or reset, the device ID will recovery from EEPROM.

ABSOLUTE MAXIMUM RATINGS

Parameter	Sym.	Ratings
Temperature under bias	T_{OPR}	0℃ to 70℃
Storage temperature	T_{STR}	-65℃ to 150℃
Input Voltage	V_{IN}	-0.3V to +6V
Output Voltage	V_{OUT}	-0.3V to +6V

DC ELECTRICAL CHARACTERISTICS

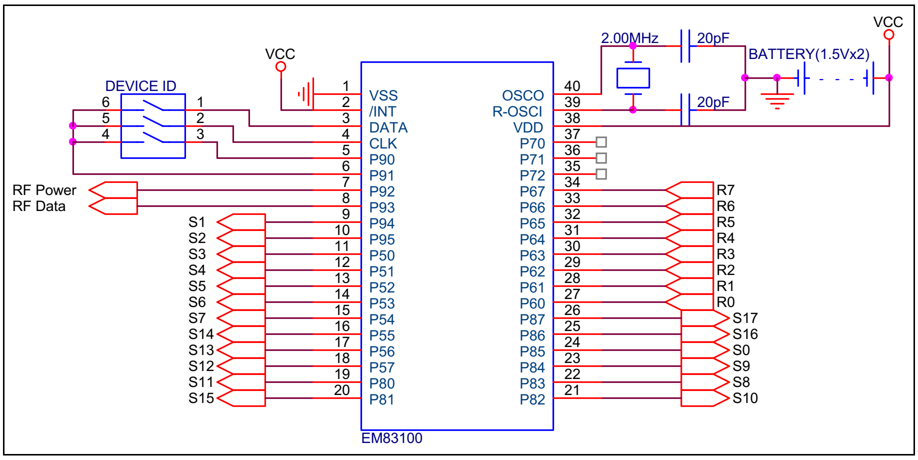
Symbol	Parameter	Condition	Min.	Typ.	Max.	Unit
I_{IL}	Input Leakage current	$V_{IN}=V_{DD}$, V_{SS}			±1	mA
V_{IH}	Input High Voltage		2.0			V
V_{IL}	Input Low Voltage				0.8	V
V_{IHX}	Clock Input High voltage	OSCI	3.5			V
V_{ILX}	Clock Input Low voltage	OSCI			1.5	V
V_{OH1}	Output High voltage (Ports 5,6,8,9 and P74,P75)	I_{OH}=-12.0mA	2.4			V
V_{OH2}	Output High voltage (P70~P72)(S7=0)	I_{OH}=-10.0mA		2		V
V_{OH3}	Output High Voltage (P70~P72)(S7=0)	I_{OH}=-10.0mA	2.4			V
V_{OL1}	Output Low Voltage (ports 5,6,8,9 and P74~P75)	I_{OL}=5.0mA			0.4	V
V_{OL2}	Output Low voltage (P70~P72)(S7=0)	I_{OL}=12.0mA			0.4	V
V_{OL3}	Output Low Voltage (P70~P72)(S7=1)(P76~P77)	I_{OL}=10.0mA		3		V
I_{PH}	Pull-high current	Pull-high active, input pin at V_{SS}	-250	-400	-500	μA
I_{SB}	Power-down current	All input and I/O pin at V_{DD}, output pin floating, WDT enabled			10	mA

I_{CC1}	Operating supply current (V_{DD}=5.0V) at two cycles/two clocks	/RESET=High Fosc=2.00Mhz(CK2="0"), output pin floating			3	mA

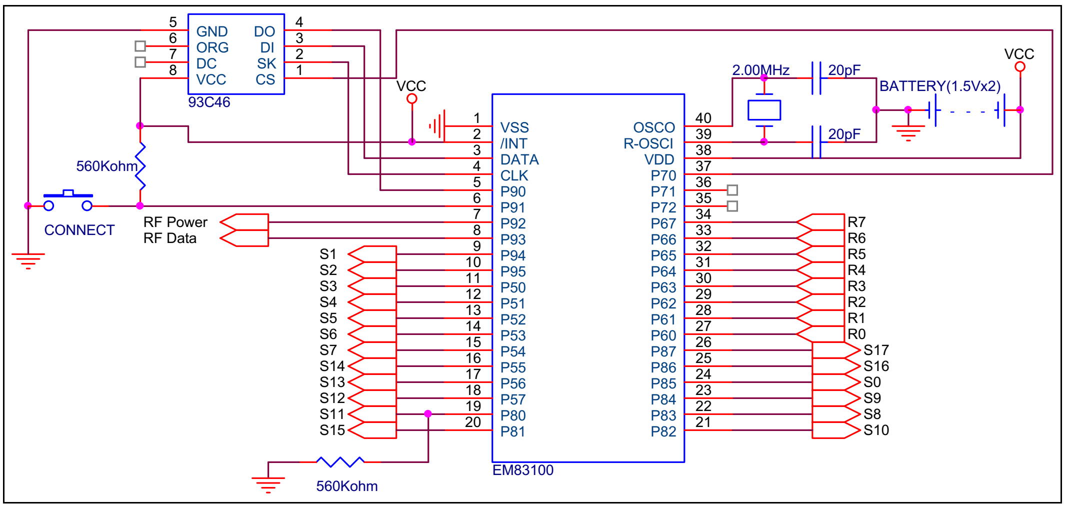
AC ELECTRICAL CHARACTERISTIC(Ta=0℃~70℃, VDD=5V, VSS=0V)

Symbol	Parameter	Condition	Min.	Typ.	Max.	Unit
D_{CLK}	Input CLK duty cycle		45	50	55	%
T_{TCC}	TCC input period		(Tins+20)/N			ns
T_{WDT}	Watchdog timer period	Ta=25℃		18		ns
T_{DRH}	Device reset hold period	Ta=25℃		18		ns

APPLICATION CIRCUIT



Controllable ID mode

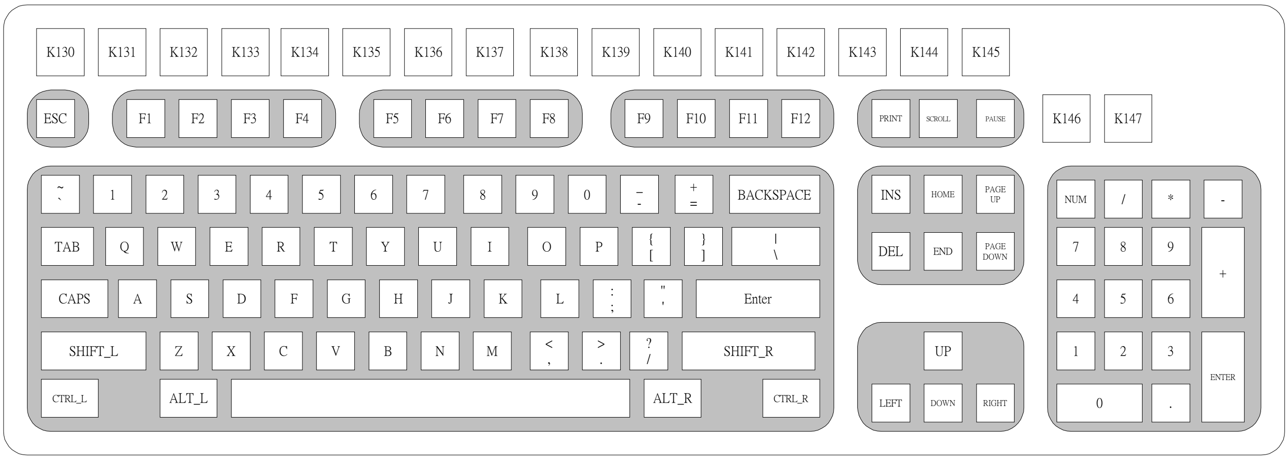


Random generate ID mode

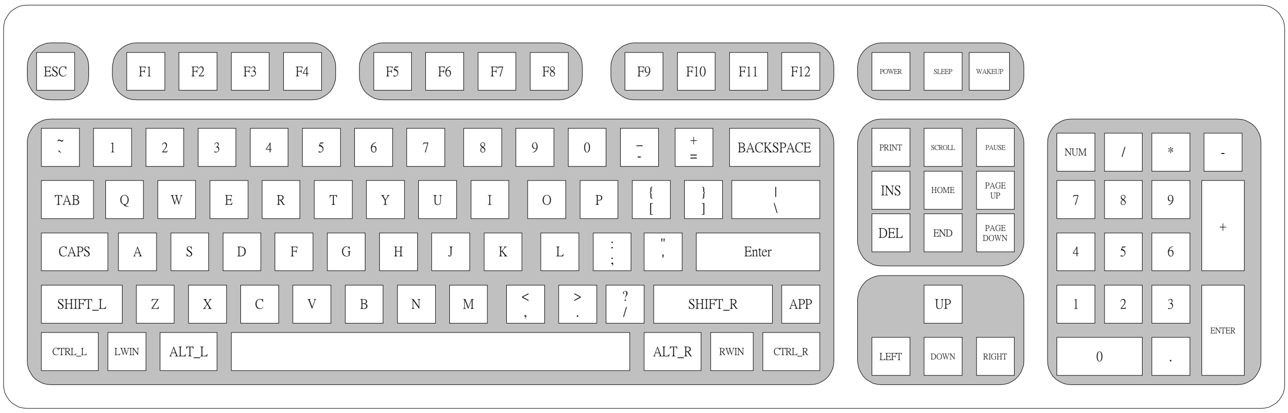
KEYBOARD ARRANGE MAP

	R0	R1	R2	R3	R4	R5	R6	R7
C0	PAUSE 126	POWER		SLEEP	CTRL-R 064	WAKE UP	CTRL-L 058	F5 116
C1	Q 017	TAB 016	A 031	ESC 110	Z 046	N-CHG 131	` (~) 001	1 (!) 002
C2	W 018	CAP 030	S 032	K45 045	X 047	CHG 132	F1 112	2 (@) 003
C3	E 019	F3 114	D 033	F4 115	C 048	ROMA 133	F2 113	3 (#) 004
C4	R 020	T 021	F 034	G 035	V 049	B 050	5 (%) 006	4 ($) 005
C5	U 023	Y 022	J 037	H 036	M 052	N 051	6 (^) 007	7 (&) 008
C6	I 024	] (}) 028	K 038	F6 117	, (<) 052	K56 056	+' (=) 013	8 (*) 009
C7	O 025	F7 118	L 039		. (>) 054	APP APP	F8 119	9 ('(') 010
C8	P 026	[({) 027	; (:) 040	' (") 041	K42 042	/ (?) 055	_ (-) 012	0 (')') 011
C9	SCROLL 125			ALT-L 060		ALT-R 062		PRINT 124
C10	K14 014	BACK 015	\ (|) 029	F11 122	ENTER 043	F12 123	F9 120	F10 121
C11	7 (K) 091	4 (K) 092	1 (K) 093	SPACE 061	NUM 090	↓ 084	DEL 076	POWER
C12	8 (K) 096	5 (K) 097	2 (K) 098	0 (K) 099	/ (K) 095	→	INS	SLEEP
C13	9 (K) 101	6 (K) 102	3 (K) 103	. (K) 104	* (K) 100	- (K) 105	PageUp 085	PageDown 086
C14	+(K) 106	K107	ENTER(K) 108	↑ 083	Play/Pause	← 079	HOME 080	END 081
C15	WAKEUP	SHIFT-L 004	SHIFT-R 057	Volume-	Volume+	NextTrack	PrevTrack	Media
C16	Mail	WIN-L	WWWForward	WWWStop	WWWBack	WWWRefresh	Mute	WWWSearch
C17	K150 (KC-L)	WWWFavorites	WIN-R	MyComputer	Stop	Calculator	Web/Home	K151 (KC-R)

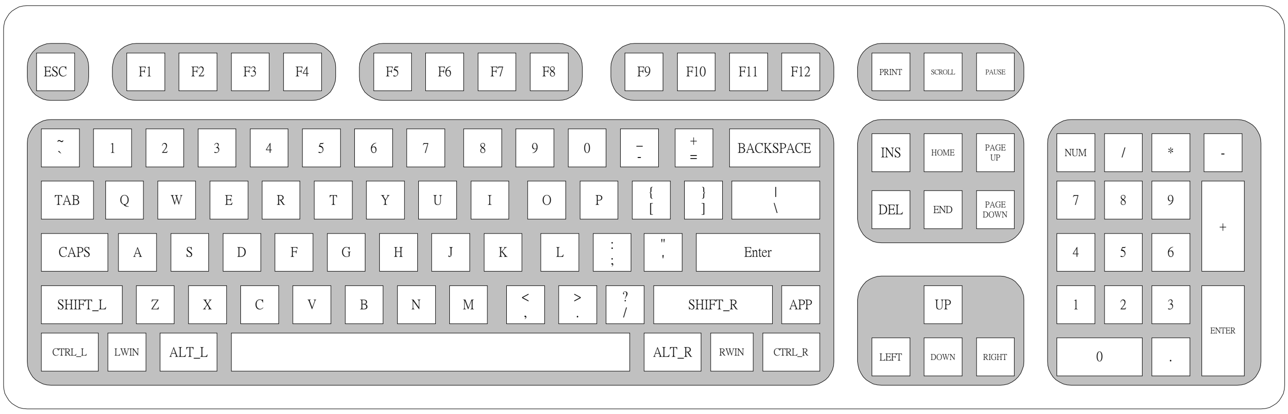
KEYBOARD LAYOUT



The Windows 2000 keyboard layout.



The 107-key keyboard layout



The 104-key keyboard layout