

SPECIFICATION

LG83053F-V3

Keyboard Encoder

Version 1.0

TABLE OF CONTENTS

1. GENERAL DESCRIPTION.....	3
2. FEATURES.....	3
3. APPLICATION.....	3
4. PIN ASSIGMENT.....	4
5. ABSOLUTE MAXIMUM RATINGS.....	4
6. DC CHARACTERISTICS.....	4
7. AC CHARACTERISTICS.....	5
8. BLOCK DIAGRAM.....	5
9. FUNCTION DESCRIPTIONS.....	6
9.1 POWER-ON-RESET AND SELF-TEST.....	6
9.2 KEYBOARD BUFFER.....	6
9.3 LOW VOLTAGE RESET (LVR).....	6
9.4 COMMAND DESCRIPTION.....	7
9.4.1 COMMAND FROM THE SYSTEM.....	7
9.4.2 COMMAND TO THE SYSTEM.....	11
9.4.3 DATA COMMUNICATION VIA SERIAL PORT.....	11
9.5 KEYBOARD SCAN CODE TABLE.....	12
9.6 TURBO FUNCTION.....	22
9.7 INTERNAL-MULTIKEY FUNCTION.....	22
10. TIMING DIAGRAM.....	22
11. APPLICATION CIRCUIT.....	23
12. APPLICATION MATRIX.....	24
13. PAD DIAGRAM.....	25
14. REVISION HISTORY.....	25

1. GENERAL DESCRIPTION

The LG83053F-V3 a single chip keyboard encoder developed for IBM PC AT, IBM PS2 and compatible machine keyboard. The device detects the key press and release activity, sends the scan code to system, and accepts the command from system. A high performance, low cost keyboard can be achieved by using the LG83053F-V3 with the minimal external components.

2. FEATURES

- Support scan code set 1, 2 and 3.
- Support PC AT and PS/2 keyboard.
- 104/107 keys with multi-media or other special application keyboard encoder.
- Support WINDOWS 95, 98, 2000 keys.
- IBM PC AT or compatible machine keyboard.
- IBM PS/2 model 30,50,60,80 or compatible machine keyboard.
- Phantom key detects.
- Built-in RC oscillator with external resistor.
- Internal pull-up resistor for inputs
- Tri-state outputs.
- Low power CMOS device technology.

3. APPLICATION

- IBM PC AT or compatible machine keyboard.
- IBM PS/2 model 30,50,60,80 or compatible keyboard.
- Japanese keyboard.
- Korean keyboard.
- Brazilian keyboard.

4. PIN ASSIGNMENT

PIN No.	PIN NAME	PIN ATTR.	FUNCTION
4	GND	POWER	Negative power supply pin.
5	DATA	I/O	Data line of serial port.
6	CLK	I/O	Clock line of serial port.
7	OSCO	O	Clock output
8,9 12~27	C0~C17	O	Keyboard matrix scanning output pins.
28~35	R0~R7	I	Keyboard matrix scanning input pins.
10,11	NC	-	No connection

36	SCRL	O	Scroll lock indicator
37	NUM	O	Num lock indicator
1	CAPS	O	CAPS lock indicator
2	VDD	POWER	Positive power supply pin.
3	OSCI	I	External oscillator resistor connection pin.

5. ABSOLUTE MAXIMUM RATINGS

Parameter	Sym.	Ratings
Supply Voltage	VCC	-0.5 ~ +6V
Input Voltage	VIN	-0.3V ~ +6V
Output Voltage	VOUT	-0.3V ~ +6V
Operating temperature	TOP	0°C ~ 70°C
Storage temperature	TS	-50°C ~ 150°C

6. DC CHARACTERISTICS

(VDD = 5V, Temperature = 27°C)

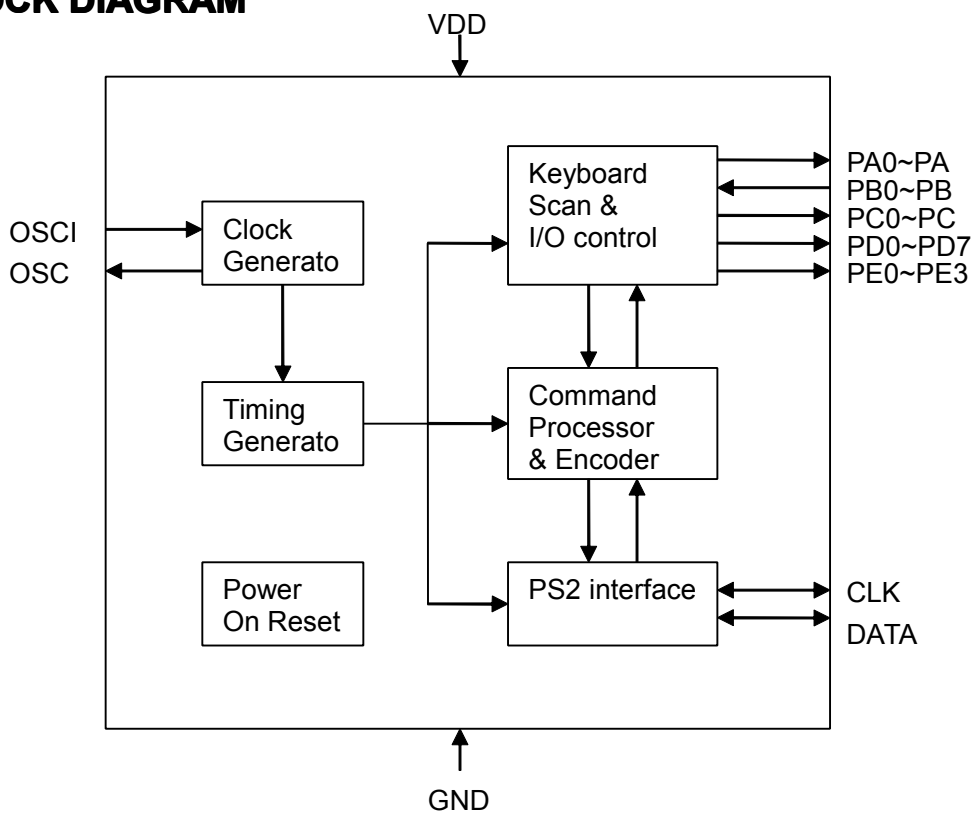
Parameter	Sym.	Min.	Typ.	Max.	Unit	Condition
Operating voltage	VCC	4.5	5	5.5	V	
Operating supply current	ICC	-	-	3	mA	Fosc=1.8MHz
Input leakage	IIN	-	-	2	μA	VIN=VCC,VSS
Input high voltage	VIH	2.0	-	-	V	
Input low voltage	VIL	-	-	0.8	V	
Output low voltage	VOL1	-	-	0.4	V	IOL1=4.4mA
Output low voltage for Leds	VOL2	-	-	3.2	V	IOL2=10mA
Internal Pull-high resistance (PORT B, E)	R _{PH1}	2	-	16	KΩ	V _{PH1} =0
Internal Pull-high resistance for DATA CLK	R _{PH2}	3.5	4.2	5	KΩ	V _{PH2} =0
Output low voltage for DATA CLK	VOL3	-	-	0.4	V	IOL3=5mA

7. AC CHARACTERISTICS

Parameter	Sym.	Min.	Typ.	Max.	Unit
Time from DATA transition to the falling edge of CLK	T1	5	-	25	μs

Time from rising edge of CLK to DATA transition	T2	5	-	T4-5	μ s
Duration of CLK inactive	T3	30	40	50	μ s
Duration of CLK active	T4	30	40	50	μ s
Time from the falling edge of clock 11 to auxiliary device inhibit to ensure the auxiliary device does not start another transmission	T5	-	-	50	μ s
Time from inactive to active CLK transition, used when auxiliary device samples DATA	T6	5	-	25	μ s
System clock	Fosc	-	1.8	-	MHz

8. BLOCK DIAGRAM



9. FUNCTION DESCRIPTIONS

The LG83053F-V3 's main function is to detect key press and release activity and to transmit the corresponding scan code, as well as make and break codes to the system. The device also accepts commands from the system. The communication between the keyboard and the system is realized via a serial port consists of CLOCK and DATA pins.

9.1 POWER-ON-RESET AND SELF-TEST

The power-on-reset (POR) occurs first when power is applied to the keyboard. The duration of POR is 150ms ~ 2s. After POR, the self-test BAT (Basic Assurance Test) happens, it takes 300ms ~ 500ms.

The following activities take place in BAT:

- 1) Turns on LED indicators at the beginning.
- 2) Test.
- 3) Turns off LED indicators at the end.
- 4) Send the result to the system.

A completion code AA is sent to the system if BAT is successful. An error code is sent if BAT fails. BAT takes 300ms~500ms. The completion codes are sent 450ms~2.5s after POR, and 300ms~500ms after RESET command is acknowledged.

9.2 KEYBOARD BUFFER

An FIFO is used to buffer the received scan code.

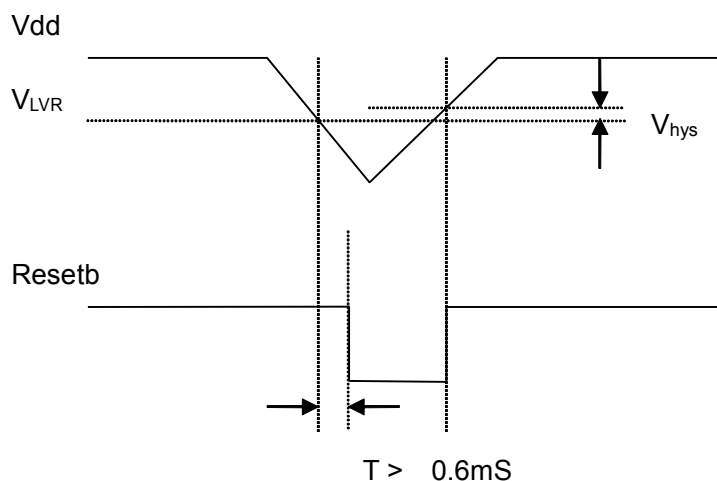
- 1) The buffer is 16-byte.
- 2) Respond codes, i.e FA and repeated codes isn't be buffered.

Additional keystroke is discarded.

9.3 LOW VOLTAGE RESET (LVR)

LG83053F-V3 has a low voltage reset function, which is used to monitor the voltage of power supply or external source. The low voltage reset voltage is 3.0V—3.2V.

$V_{\text{hys}} > 0.1\text{V}$. Low voltage reset will not happen if the period Vdd stays in low voltage is less than T (0.6ms).



9.4 COMMAND DESCRIPTION

9.4.1 COMMAND FROM THE SYSTEM

Reset – FF (hex)

- Send ACK to system.
- Checks clock and data lines-Reset in the high state for at least 500 ms or receives another

command.

- Default to scan code set 2.

Resend – FE (hex)

- Sends the previous code again. If the previous code is RESEND, the last code before RESEND will be sent.

Set Key Type - FB, FC, FD (hex)

- Keyboard responds with ACK.
- Clears output buffer.
- Receives key ID byte
- Responds ACK.
- Sets key ID type (affect only scan code set 3 operation).

FB: Typematic

FC: Make/Break

FD: Make

- Returns to previous scanning rate.

Set All Keys - F7, F8, F9, FA (hex)

- Sends ACK to the system.
- Clears output buffer.
- Sets all key type to the type specified by the command (affect only scan code set 3 operation).

F7: Typematic

F8: Make/Break

F9: Make

FA: Typematic/Make/Break

- Returns to previous scanning rate.

Set Default - F6 (hex)

- Sends an ACK to the system.
- Resets all conditions to power-on state.
- Clears the output buffer.

- Sets the default key type (scan code set 3 only).
- Set the default typematic rate/delay.

Default Disable - F5 (hex)

- Sends an ACK to the system.
- Resets all conditions to power-on state.
- Clears the output buffer.
- Sets the default key type (scan code set 3 only).
- Set the default typematic rate/delay.
- Clears last typematic key.
- Stops scanning and wait for commands,

Enable - F4 (hex)

- Sends and ACK to the system.
- Clears the output buffer.
- Clears the last typematic key.
- Start scanning.

Set Typematic Rate/Delay - F3 (hex)

- Sends an ACK to the system.
- Receives rate/delay value byte
- Sends and ACK to the system.
- Set rate/delay.
- Returns to previous scanning state.

Note:

1. Repeat period = $(8+A) \times (2B) \times 0.00417 \text{ s}$

A - Binary value of bits 2, 1, and 0

B - Binary value of bits 4 and 3

2. Delay = $(C + 1) \times 250 \text{ ms}$

C - Binary value of bits 6 and 5. Bit 7 is always 0.

B4~b0	Typematic Rate	B4~b0	Typematic Rate
00000	30.0	10000	7.5
00001	26.7	10001	6.7
00010	24.0	10010	6.0
00011	21.8	10011	5.5
00100	20.0	10100	5.0
00101	18.5	10101	4.6
00110	17.1	10110	4.3
00111	16.0	10111	4.0
01000	15.0	11000	3.7
01001	13.3	11001	3.3
01010	12.0	11010	3.0
01011	10.9	11011	2.7
01100	10.0	11100	2.5
01101	9.2	11101	2.3
01110	8.6	11110	2.1
01111	8.0	11111	2.0

3. Default rate = 10.9 chars/sec + 20%

Default delay = 500 ms \pm 20%

Read ID - F2 (hex)

- Sends an ACK to the system.
- Discontinues scanning.
- Sends two ID bytes. The second byte will be sent within 500 us after first byte.
- Resumes scanning.

Select Alternate Scan Codes - F0 (hex)

- Sends an ACK to the system.
- Clears the output buffer.
- Sets the default typematic rate/delay.
- Clears last typematic key.
- Receives option byte.
- Sends an ACK to the system.
- Option byte =

01: scan code set 1

02: scan code set 2

03: scan code set 3

- Returns to previous scanning rate.

Invalid commands – EF, F1 (hex)

- Returns a RESEND command.

- Returns to previous scanning state.

Echo – EE (hex)

- Sends an EE (hex) to the system.

- Returns to previous scanning state.

Set status indicators – ED (hex)

- Sends an ACK to the system.

- Receives option byte.

- Sends an ACK to the system.

- Updates status indicators.

- Returns to previous scanning state.

9.4.2 COMMAND TO THE SYSTEM

Acknowledge - FA (hex)

If the keyboard receives a valid command from the system, an ACK will be sent back to the system, except that the command received is RESEND or ECHO.

BAT Completion Code - AA (hex)

This command is sent to the system after successful completion of keyboard BAT.

Buffer overrun 00, FF (hex)

If keyboard buffer overflows, the last byte in the buffer will be replaced by 00 or FF

Scan code set 1 - FF,

Scan code sets 2 and 3 - 00

Resend - FE (hex)

This command is sent to the system after the keyboard receives an invalid code or any incorrect parity.

Echo - EE (hex)

This command is sent to the system after the keyboard receives an ECHO command.

Keyboards ID - 83AB (hex)

The 2-byte ID is sent to the system after receives READ ID command. The low byte is sent first, then high byte is sent.

9.4.3 DATA COMMUNICATION VIA SERIAL PORT

Data output

The keyboard first checks the CLK and DATA lines. If both of them are high, that means data transmission from keyboard to the system is permitted, then keyboard starts to clock data out. Data will be valid before the trailing edge and after the leading edge. The keyboard checks the clock line at least every 60us. If the clock line is lowered before the leading edge of the 10th clock, the keyboard should stop sending, and set both data line and clock line to high.

Data input

The system checks the CLK line first. If the keyboard is not sending data or it is sending data but has not reached the 10th clock, the system can force the clock line low for more than 60us and prepares to send data.

The keyboard checks clock line status at intervals of no more than 5ms. If a system-request-to-send (RTS) is detected, the keyboard clocks 11 bits in. After the 10th bit, the keyboard checks the data line. If the data line is high, the keyboard pulls it low and clocks one more bit to signal the system that data has been received.

If data is low after the 10th bit, a frame error occurs. When a frame error occurs, the keyboard should continue to count until data line goes high, then pulls it low and sends a RESEND command to the system.

9.5 KEYBOARD SCAN CODE TABLE

The keyboard supports 3 scan code sets. When a key is pressed down, its make scan code is sent to the system. When the key is released, its break code is sent. If two or more keys are held down, only

the last key pressed repeats at the typematic rate. Typematic operation stops when the last pressed key is released.

scan code set 1

Key	Make Code	Break Code	Key	Make Code	Break Code
`(~)	29	A9	X	2D	AD
1	02	82	C	2E	AE
2	03	83	V	2F	AF
3	04	84	B	30	B0
4	05	85	N	31	B1
5	06	86	M	32	B2
6	07	87	, (<)	33	B3
7	08	88	. (>)	34	B4
8	09	89	/ (?)	35	B5
9	0A	8A	SHIFT_R	36	B6
0	0B	8B	CTRL_L	1D	9D
-(-)	0C	8C	ALT_L	38	B8
=(+)	0D	8D	SPACE	39	B9
BACKSPACE	0E	8E	ALT_R	E038	E0B8
TAB	0F	8F	CTRL_R	E01D	E09D
Q	10	90	NUM	45	C5
W	11	91	(7)	47	C7
E	12	92	(4)	4B	CB
R	13	93	(1)	4F	CF
T	14	94	(8)	48	C8
Y	15	95	(5)	4C	CC
U	16	96	(2)	50	D0
I	17	97	(q)	52	D2
O	18	98	(*)	37	B7
P	19	99	(9)	49	C9
[({)	1A	9A	(6)	4D	CD
]})	1B	9B	(3)	51	D1
\() (101 key keyboard only)	2B	AB	(DEL)	53	D3
CAPS	3A	BA	(-)	4A	CA
A	1E	9E	(+)	4E	CE
S	1F	9F	(ENTER)	E01C	E09C
D	20	A0	ESC	01	81
F	21	A1	F1	3B	BB
G	22	A2	F2	3C	BC

H	23	A3	F3	3D	BD
J	24	A4	F4	3E	BE
K	25	A5	F5	3F	BF
L	26	A6	F6	40	C0
;(:)	27	A7	F7	41	C1
'(")	28	A8	F8	42	C2
K42 (102 key keyboard only)	2B	AB	F9	43	C3
ENTER	1C	9C	F10	44	C4
SHIFT_L	2A	AA	F11	57	D7
K45 (102 key keyboard only)	56	D6	F12	58	D8
Z	2C	AC	SCROLL	46	C6

Key	Base Case, or Shift + Nun Lock Make/Break	Shift Case * Make/Break	Nun Lock Make/Break
INS	E0 52/E0 D2	E0 AA E0 52 /E0 D2 E0 2A	E0 2A E0 52 /E0 D2 E0 AA
DEL	E0 53/E0 D3	E0 AA E0 53 /E0 D3 E0 2A	E0 2A E0 53 /E0 D3 E0 AA
LEFT	E0 4B/E0 CB	E0 AA E0 4B /E0 CB E0 2A	E0 2A E0 4B /E0 CB E0 AA
HOME	E0 47/E0 C7	E0 AA E0 47 /E0 C7 E0 2A	E0 2A E0 47 /E0 C7 E0 AA
END	E0 4F/E0 CF	E0 AA E0 4F /E0 CF E0 2A	E0 2A E0 4F /E0 CF E0 AA
UP	E0 48/E0 C8	E0 AA E0 48 /E0 C8 E0 2A	E0 2A E0 48 /E0 C8 E0 AA
DOWN	E0 50/E0 D0	E0 AA E0 50 /E0 D0 E0 2A	E0 2A E0 50 /E0 D0 E0 AA
PAGE UP	E0 49/E0 C9	E0 AA E0 49 /E0 C9 E0 2A	E0 2A E0 49 /E0 C9 E0 AA
PAGE DOWN	E0 51/E0 D1	E0 AA E0 51 /E0 D1 E0 2A	E0 2A E0 51 /E0 D1 E0 AA
RIGHT	E0 4D/ED CD	E0 AA E0 4D /E0 CD E0 2A	E0 2A E0 4D /E0 CD E0 AA

Key (/)	Scan Code Make/Break E0 35 / E0 B5	Shift Case Make/Break * E0 AA E0 35 / E0 B5 E0 2A
---------	---------------------------------------	--

Key PRINT	Scan Code Make/Break E0 2A E0 37 /E0 B7 E0 AA	Ctrl Case, Shift Case Make/Break E0 37 / E0 B7	Alt Case Make/Break 54 / D4
--------------	--	--	-----------------------------------

Key Pause (not typematic)	Make Code E1 1D 45 E1 9D C5	Ctrl Key Pressed E0 46 E0 C6
---------------------------------	--------------------------------	---------------------------------

Note * : If the left Shift key is held down, the AA/2A shift make and break is sent with the other scan codes. If the right Shift key is held down, B6/36 is sent. If both Shift keys are down, both sets of codes are sent with the other scan code.

Scan code set 2

Key	Make code	Break code	Key	Make code	Break code
`(~)	0E	F00E	X	22	F022
1	16	F016	C	21	F021
2	1E	F01E	V	2A	F02A
3	26	F026	B	32	F032
4	25	F025	N	31	F031
5	2E	F02E	M	3A	F03A
6	36	F036	,(<)	41	F041
7	3D	F03D	.(>)	49	F049
8	3E	F03E	/(&?)	4A	F04A
9	46	F046	SHIFT_R	59	F059
0	45	F045	CTRL_L	14	F014
-(-)	4E	F04E	ALT_L	11	F011
=(+)	55	F055	SPACE	29	F029
BACKSPACE	66	F066	ALT_R	E011	E0F011
TAB	0D	F00D	CTRL_R	E014	E0F014
Q	15	F015	NUM	77	F077
W	1D	F01D	(7)	6C	F06C
E	24	F024	(4)	6B	F06B
R	2D	F02D	(1)	69	F069
T	2C	F02C	(8)	75	F075
Y	35	F035	(5)	73	F073
U	3C	F03C	(2)	72	F072
I	43	F043	(0)	70	F070
O	44	F044	(*)	7C	F07C
P	4D	F04D	(9)	7D	F07D

[({)	54	F054	(6)	74	F074
]})	5B	F05B	(3)	7A	F07A
\() (101 key keyboard only)	5D	F05D	(DEL)	71	F071
CAPS	58	F058	(-)	7B	F07B
A	1C	F01C	(+)	79	F079
S	1B	F01B	(ENTER)	E05A	E0F05A
D	23	F023	ESC	76	F076
F	2B	F02B	F1	05	F005
G	34	F034	F2	06	F006
H	33	F033	F3	04	F004
J	3B	F03B	F4	0C	F00C
K	42	F042	F5	03	F003
L	4B	F04B	F6	0B	F00B
;(:)	4C	F04C	F7	83	F083
'(")	52	F052	F8	0A	F00A
K42 (102 key keyboard only)	5D	F05D	F9	01	F001
ENTER	5A	F05A	F10	09	F009
SHIFFT_L	12	F012	F11	78	F078
K45 (102 key keyboard only)	61	F061	F12	07	F007
Z	1A	F01A	SCROLL	7E	F07E

Key	Base Case, or Shift + Nun Lock Make/Break	Shift Case * Make/Break	Num Lock Make/Break
INS	E0 70 / E0 F0 70	E0 F0 12 E0 70 /E0 F0 70 E0 12	E0 12 E0 70 /E0 F0 70 E0 F0 12
DEL	E0 71 / E0 F0 71	E0 F0 12 E0 71 /E0 F0 71 E0 12	E0 12 E0 71 /E0 F0 71 E0 F0 12
LEFT	E0 6B / E0 F0 6B	E0 F0 12 E0 6B /E0 F0 6B E0 12	E0 12 E0 6B /E0 F0 6B E0 F0 12
HOME	E0 6C /E0 F0 6C	E0 F0 12 E0 6C /E0 F0 6C E0 12	E0 12 E0 6C /E0 F0 6C E0 F0 12

END	E0 69 / E0 F0 69	E0 F0 12 E0 69 /E0 F0 69 E0 12	E0 12 E0 69 /E0 F0 69 E0 F0 12
UP	E0 75 / E0 F0 75	E0 F0 12 E0 75 /E0 F0 75 E0 12	E0 12 E0 75 /E0 F0 75 E0 F0 12
DOWN	E0 72 / E0 F0 72	E0 F0 12 E0 72 /E0 F0 72 E0 12	E0 12 E0 72 /E0 F0 72 E0 F0 12
PAGE UP	E0 7D / E0 F0 7D	E0 F0 12 E0 7D /E0 F0 7D E0 12	E0 12 E0 7D /E0 F0 7D E0 F0 12
PAGE DOWN	E0 7A / E0 F0 7A	E0 F0 12 E0 7A /E0 F0 7A E0 12	E0 12 E0 7A /E0 F0 7A E0 F0 12
RIGHT	E0 74 E0 F0 74	E0 F0 12 E0 74 /E0 F0 74 E0 12	E0 12 E0 74 /E0 F0 74 E0 F0 12

Key	Scan Code Make/Break	Shift Case Make/Break *
(/)	E0 4A / E0 F0 4A	E0 F0 12 E0 4A / E0 F0 4A E0 12

Key	Scan Code Make/Break	Ctrl Case, Shift Case Make/Break	Alt Case Make/Break
PRINT	E0 12 E0 7C /E0 F0 7C E0 F0 12	E0 7C / E0 F0 7C	84 / F0 84

Key	Make Code	Ctrl Key Pressed
PAUSE (Not typematic)	E1 14 77 E1 F0 14 F0 77	E0 7E E0 F0 7E

Note * : If the left Shift key is held down, the F0 12/12 shift make and break is sent with the other scan codes. If the right Shift key is held down, F0 59/59 is sent. If both Shift keys are down, both sets of codes are sent with the other scan code.

Scan code set 3

Key	Make Code	Break Code	Default Key State
`(~)	0E	F00E	Typematic
1	16	F016	Typematic
2	1E	F01E	Typematic
3	26	F026	Typematic
4	25	F025	Typematic
5	2E	F02E	Typematic
6	36	F036	Typematic
7	3D	F03D	Typematic
8	3E	F03E	Typematic

9	46	F046	Typematic
0	45	F045	Typematic
-(_)	4E	F04E	Typematic
=(+)	55	F055	Typematic
BACKSPACE	66	F066	Typematic
TAB	0D	F00D	Typematic
Q	15	F015	Typematic
W	1D	F01D	Typematic
E	24	F024	Typematic
R	2D	F02D	Typematic
T	2C	F02C	Typematic
Y	35	F035	Typematic
U	3C	F03C	Typematic
I	43	F043	Typematic
O	44	F044	Typematic
P	4D	F04D	Typematic
[({)	54	F054	Typematic
]})	5B	F05B	Typematic
\() (101 key keyboard only)	5C	F05C	Typematic
CAPS	14	F014	Make/Break
A	1C	F01C	Typematic
S	1B	F01B	Typematic
D	23	F023	Typematic
F	2B	F02B	Typematic
G	34	F034	Typematic
H	33	F033	Typematic
J	3B	F03B	Typematic
K	42	F042	Typematic
L	4B	F04B	Typematic
;(:	4C	F04C	Typematic
'(")	52	F052	Typematic
K42 (102 key keyboard only)	53	F053	Typematic
ENTER	5A	F05A	Typematic
SHIFT_L	12	F012	Make/Break
K45 (102 key keyboard only)	13	F013	Typematic
Z	1A	F01A	Typematic
X	22	F022	Typematic

C	21	F021	Typematic
V	2A	F02A	Typematic
B	32	F032	Typematic
N	31	F031	Typematic
M	3A	F03A	Typematic
, (<)	41	F041	Typematic
. (>)	49	F049	Typematic
/ (?)	4A	F04A	Typematic
SHIFT_R	59	F059	Make/Break
CTRL_L	11	F011	Make/Break
ALT_L	19	F019	Make/Break
SPACE	29	F029	Typematic
ALT_R	39	F039	Make only
CTRL_R	58	F058	Make only
INS	67	F067	Make only
DEL	64	F064	Typematic
LEFT	61	F061	Typematic
HOME	6E	F06E	Make only
END	65	F065	Make only
UP	63	F063	Typematic
DOWN	60	F060	Typematic
PAGEUP	6F	F06F	Make only
PAGEDOWN	6D	F06D	Make only
RIGHT	6A	F06A	Typematic
NUM	76	F076	Make only
(7)	6C	F06C	Make only
(4)	6B	F06B	Make only
(1)	69	F069	Make only
(/)	77	F077	Make only
(8)	75	F075	Make only
(5)	73	F073	Make only
(2)	72	F072	Make only
(0)	70	F070	Make only
(*)	7E	F07E	Make only
(9)	7D	F07D	Make only
(6)	74	F074	Make only
(3)	7A	F07A	Make only
(DEL)	71	F071	Make only
(-)	84	F084	Make only
(+)	7C	F07C	Typematic

(ENTER)	79	F079	Make only
ESC	08	F008	Make only
F1	07	F007	Make only
F2	0F	F00F	Make only
F3	17	F017	Make only
F4	1F	F01F	Make only
F5	27	F027	Make only
F6	2F	F02F	Make only
F7	37	F037	Make only
F8	3F	F03F	Make only
F9	47	F047	Make only
F10	4F	F04F	Make only
F11	56	F056	Make only
F12	5E	F05E	Make only
PRINT	57	F057	Make only
SCROLL	5F	F05F	Make only
PAUSE	62	F062	Make only

New key codes for scan set 1:

New key	Make	Break
LWIN	E05B	E0DB
RWIN	E05C	E0DC
APP	E05D	E0DD
N-CHG (131)	7B	FB
CHG (132)	79	F9
ROMA (133)	70	F0
K14	7D	FD
K56	73	F3
K107	7E	FE
KL	F1	X
KR	F0	X
POWER	E05E	E0DE
SLEEP	E05F	E0DF
WAKE UP	E063	E0E3

New key codes for scan set 2:

New key	Make		Break		
LWIN	E0	1F	E0	F0	1F
RWIN	E0	27	E0	F0	27
APP	E0	2F	E0	F0	2F
N-CHG (131)		67		F0	67
CHG (132)		64		F0	64
ROMA (133)		13		F0	13
K14		6A		F0	6A
K56		51		F0	51
K107		6D		F0	6D
KL		F1			X
KR		F2			X
POWER	E0	37	E0	F0	37
SLEEP	E0	3F	E0	F0	3F
WAKE UP	E0	5E	E0	F0	5E

New key codes for scan set 3:

New key	Make	Break		Note
LWIN	8B	F0	8B	MAKE/BREAK
RWIN	8C'	F0	8C	MAKE/BREAK
APP	8D	F0	8D	MAKE/BREAK
N-CHG (131)	85	F0	85	MAKE
CHG (132)	86	F0	86	MAKE
ROMA (133)	87	F0	87	MAKE
K14	5D	F0	5D	TYPEMATIC
K56	51	F0	51	TYPEMATIC
K107	7B	F0	7B	TYPEMATIC
KL	F1		X	
KR	F2		X	
POWER	X		X	
SLEEP	X		X	
WAKE UP	X		X	

Windows 2000 Multi-Media key Code.

		SET1		SET2	
		MAKE	BREAK	MAKE	BREAK
K130	WWW Back	E06A	E0EA	E038	E0F038
K131	WWWForward	E069	E0E9	E030	E0F030
K132	WWWstop	E068	E0E8	E028	E0F028
K133	WWWRefresh	E067	E0E7	E020	E0F020
K134	WWWSearch	E065	E0E5	E010	E0F010
K135	WWWFavorites	E066	E0E6	E018	E0F018
K136	WWWWeb/Home	E032	E0B2	E03A	E0F03A
K137	Mail	E06C	E0EC	E048	E0F048
K138	Mute	E020	E0A0	E023	E0F023
K139	Volume-	E02E	E0AE	E021	E0F021
K140	Volume+	E030	E0B0	E032	E0F032
K141	Play/Pause	E022	E0A2	E034	E0F034
K142	Stop	E024	E0A4	E03B	E0F03B
K143	PreTrack	E010	E090	E015	E0F015
K144	Nexttrack	E019	E099	E04D	E0F04D
K145	Media Select	E06D	E0ED	E050	E0F050
K146	MyComputer	E06B	E0EB	E040	E0F040
K147	Calculator	E021	E0A1	E02B	E0F02B

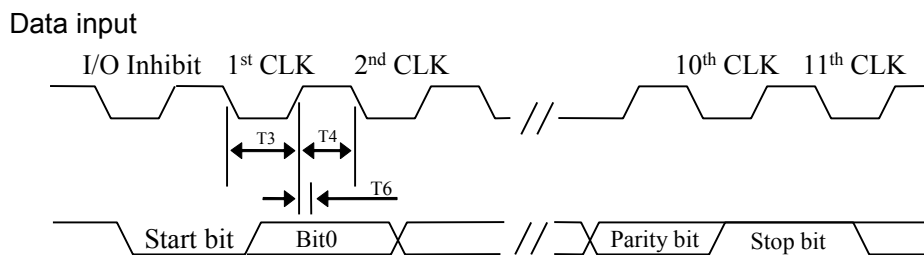
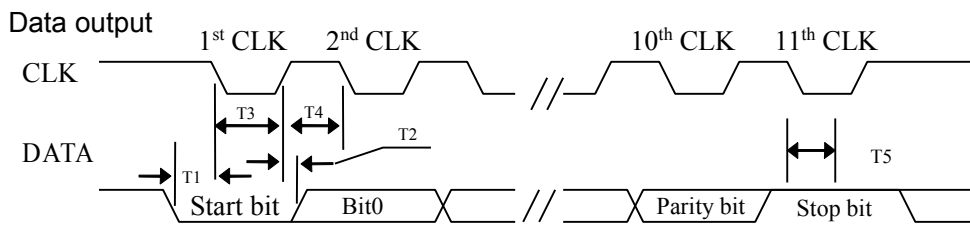
9.6 TURBO FUNCTION

Fn+	F1	2.1hz	F6	30hz
	F2	4.2hz	F7	46hz
	F3	7.2hz	F11	keyLock
	F4	16.3hz		
	F5	21hz		

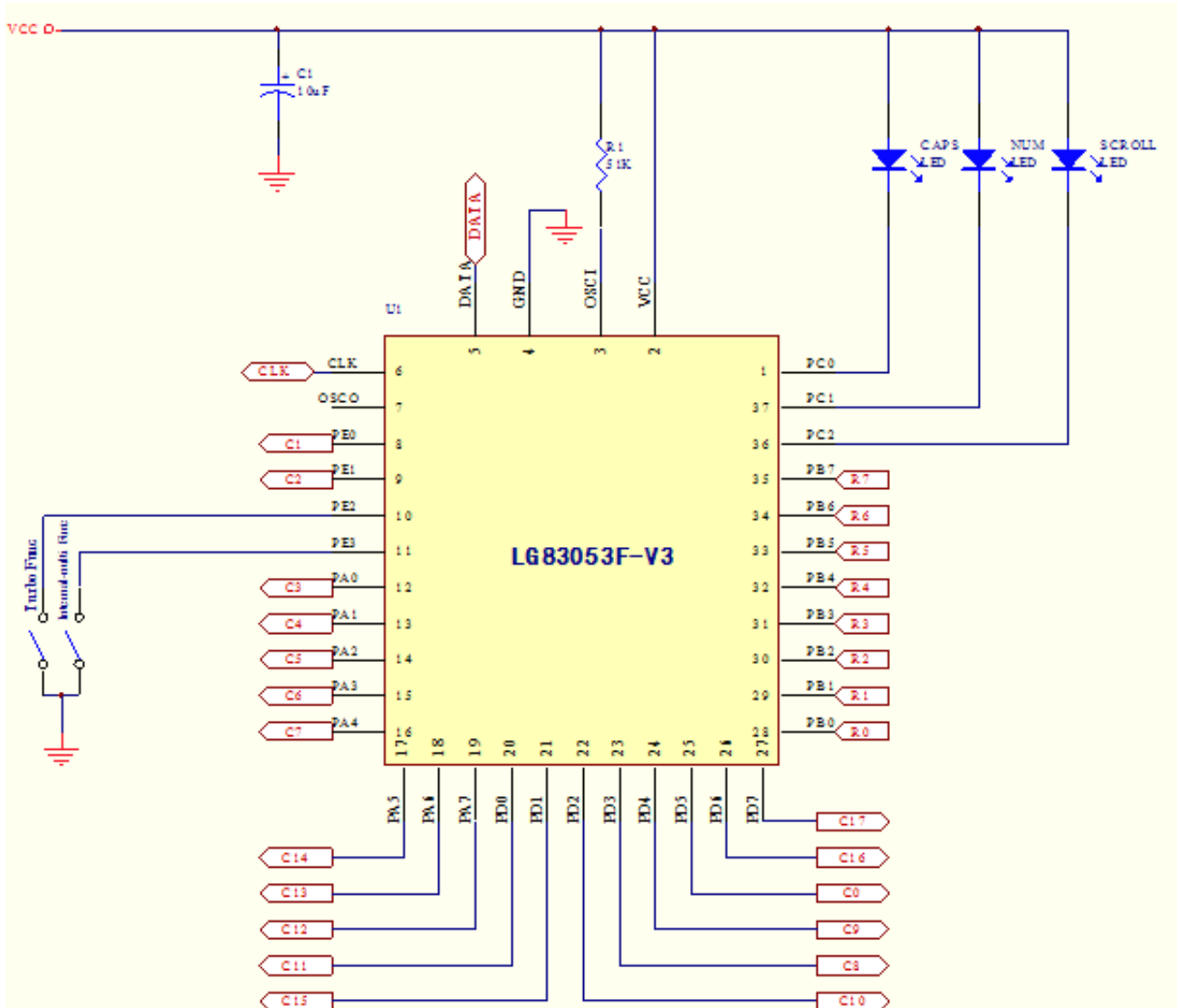
9.7 INTERNAL-MULTIKEY FUNCTION

	Multi-Meida Function	Internal Function	O.S.Function
Fn+ (M/Mode)	Pad_2 Volume-	Pad_Enter Web/Home	Pad_0 Mycomputer
	Pad_3 Play/Pause	Pad_+ Mail	Pad_1 Calculator
	Pad_4 PreTrack	Pad_- Favorites	
	Pad_5 Media	Pad_. Search	
	Pad_6 NextTrack	Right Arrow Forward	E Eurkey
	Pad_7 Mute	Left Arrow Back	
	Pad_8 Volume+	Down Arrow Stop	
	Pad_9 Stop	Up Arrow Refresh	

10. TIMING DIAGRAM



11. APPLICATION CIRCUIT

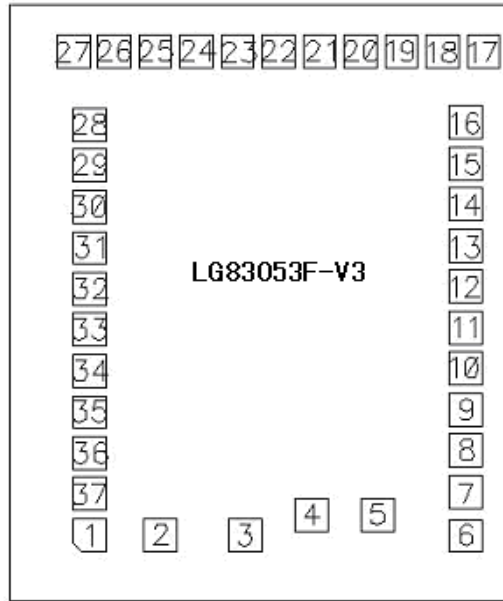


12. APPLICATION MATRIX

	R0	R1	R2	R3	R4	R5	R6	R7
C0	Pause	Power	€	Sleep	Ctrl-R	Wake up	Ctrl-L	F5
	126				064		058	116
C1	Q	Tab	A	ESC	Z	N-CHG	`(~)	1(!)
	017	016	031	110	046	131	001	002
C2	W	Cap	S	K45	X	CHG	F1	2(@)
	018	030	032	045	047	132	112	003
C3	E	F3	D	F4	C	ROMA	F2	3(#)
	019	114	033	115	048	133	113	004
C4	R	T	F	G	V	B	5(%)	4(\$)
	020	021	034	035	049	050	006	005
C5	U	Y	J	H	M	N	6(^)	7(&)
	023	022	037	036	052	051	007	008
C6	I]({)	K	F6	,(<)	K56	+(@=)	8(*)
	024	028	038	117	053	056	013	009
C7	O	F7	L		.(>)	APP	F8	9(())
	025	118	039	E045	054	APP	119	010
C8	P	[({)	;(:	'(")	K42	/(@?)	_(-)	0(())
	026	027	040	041	042	055	012	011
C9	SCROLL		Fn	ALT-L	M/Mode	ALT-R		Print
	125			060		062	124	
C10	K14	Back	\()	F11	Enter	F12	F9	F10
	014	015	029	122	043	123	120	121
C11	7	4	1	Space	Num	↓	Del	Power
	(K) 091	(K) 092	(K) 093	061	090	084	076	
C12	8	5	2	0	/	→	Ins	Sleep
	(K) 096	(K) 097	(K) 098	(K) 099	(K) 095	089	075	
C13	9	6	3	. (Del)	*	-	Page up	Page down
	(K) 101	(K) 102	(K) 103	(K) 104	(K) 100	105	085	086
C14	+	K107	Enter	↑	Play/Pause	←	Home	END
	(K) 106		(K) 108	083		079	080	081
C15	Wake up	Shift-L	Shift-R	Volumn-	Volumn+	NextTrack	PrevTrack	Media
		044	057					
C16	Mail	WIN-L	www Forward	www Stop	www Back	www Refresh	Mute	www Search
C17	K150	www Favorite	Win-R	MyComputer	Stop	Calcuator	Web/Home	K151 (KC-R)
	(KC-L)							

NOTE: ALL DATA AND SPECIFICATIONS ARE SUBJECT TO CHANGE WITHOUT NOTICE.

13. PAD DIAGRAM



Substrate Size:1700 um×2000 um

Substrate Connect GND

PIN NO	PIN NAME	X	Y	PIN NO	PIN NAME	X	Y
1	P7<0>	195.61	159.51	20	P8<0>	854.95	1339.21
2	vdd!	366.16	159.06	21	P8<1>	754.81	1339.21
3	OSCI	575.20	159.06	22	P8<2>	654.67	1339.21
4	gnd!	735.81	207.31	23	P8<3>	554.53	1339.21
5	DATAIO	896.41	207.31	24	P8<4>	454.39	1339.21
6	CLKIO	1112.37	156.40	25	P8<5>	354.25	1339.21
7	OSCO	1112.37	262.94	26	P8<6>	254.57	1339.21
8	P9<0>	1112.37	364.72	27	P8<7>	154.41	1339.21
9	P9<1>	1112.37	464.86	28	P6<0>	195.61	1160.91
10	P9<2>	1112.37	565.00	29	P6<1>	195.61	1060.77
11	P9<3>	1112.37	665.14	30	P6<2>	195.61	960.17
12	P5<0>	1112.37	765.74	31	P6<3>	195.61	860.03
13	P5<1>	1112.37	865.88	32	P6<4>	195.61	760.35
14	P5<2>	1112.37	966.02	33	P6<5>	195.61	660.21
15	P5<3>	1112.37	1066.16	34	P6<6>	195.61	559.61
16	P5<4>	1112.37	1166.30	35	P6<7>	195.61	459.47
17	P5<5>	1155.37	1339.21	36	P7<2>	195.61	359.79
18	P5<6>	1055.23	1339.21	37	P7<1>	195.61	259.65
19	P5<7>	955.09	1339.21				

14. REVISION HISTORY

Version	Update date	Revised Content	Revised By	Confirmed by
V1.0	2008-5-16	original	JACKE	JACKE