S1C31W74 (rev1.1)

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32-bit Single Chip Microcontroller

- ARM® 32-bit RISC CPU core Cortex®-M0+
- Embedded 72SEG × 32COM LCD driver
- Embedded 512K-byte Flash memory and 128K-byte RAM
- Various interfaces such as UART, QSPI, I²C, and USB that support DMA transfer

■ DESCRIPTIONS

The S1C31W74 is a 32-bit MCU with an ARM® Cortex®-M0+ processor included that features low-power operation. It incorporates an LCD driver capable of driving up to a 2,304-dot LCD panel, a large-capacity Flash memory, and a lot of serial interface circuits. The S1C31W74 is suitable for various kinds of battery-driven controller applications.

■ FEATURES

Model	S1C31W74
CPU	
CPU core	ARM® 32-bit RISC CPU core Cortex®-M0+
Other	Serial-wire debug ports (SW-DP) and a micro trace buffer (MTB) included
Embedded Flash memory	
Capacity	512K bytes (for both instructions and data)
Erase/program count	1,000 times (min.) * When being programmed by the dedicated flash loader
Other	On-board programming function
	Flash programming voltage can be generated internally.
Embedded RAMs	
General-purpose RAM	128K bytes (shared with MTB)
Display RAM	704 bytes
Instruction cache	512 bytes
DMA controller (DMAC)	
Number of channels	4 channels
Data transfer path	Memory to memory, memory to peripheral, and peripheral to memory
Transfer mode	Basic, ping-pong, scatter-gather
DMA trigger source	UART2, SPIA, QSPI, I2C, USB, T16B, SNDA, and software
Clock generator (CLG)	
System clock source	4 sources (IOSC/OSC1/OSC3/EXOSC)
System clock frequency (operating frequency)	V_{D1} voltage mode = mode0: 21 MHz (max.) V_{D1} voltage mode = mode1: 2.1 MHz (max.)
IOSC oscillator circuit (boot clock source)	V_{D1} voltage mode = mode0: 20/16/12/8/2/1 MHz (typ.) software selectable V_{D1} voltage mode = mode1: 2/1 MHz (typ.) software selectable
	10 µs (max.) starting time (time from cancelation of SLEEP state to vector table read by the CPU)
OSC1 oscillator circuit	32.768 kHz (typ.) crystal oscillator
	Oscillation stop detection circuit included
OSC3 oscillator circuit	20.5 MHz (max.) crystal/ceramic oscillator
EXOSC clock input	21 MHz (max.) square or sine wave input
Other	Configurable system clock division ratio
	Configurable system clock used at wake up from SLEEP state
	Operating clock frequency for the CPU and all peripheral circuits is selectable.
I/O port (PPORT)	
Number of general-purpose I/O ports	71 bits (max.)
	Pins are shared with the peripheral I/O.
Number of input interrupt ports	67 bits (max.)
Number of ports that support universal port multiplexer (UPMUX)	24 bits
	A peripheral circuit I/O function selected via software can be assigned to each port.
Timers	
Watchdog timer (WDT2)	Generates NMI or watchdog timer reset.
	Programmable NMI/reset generation cycle
Real-time clock (RTCA)	128–1 Hz counter, second/minute/hour/day/day of the week/month/year counters
	Theoretical regulation function for 1-second correction
	Alarm and stopwatch functions
16-bit timer (T16)	4 channels
	Generates the SPIA and QSPI master clocks.
16-bit PWM timer (T16B)	2 channels
	Event counter/capture function
	PWM waveform generation function
	Number of PWM output or capture input ports: 2 ports/channel

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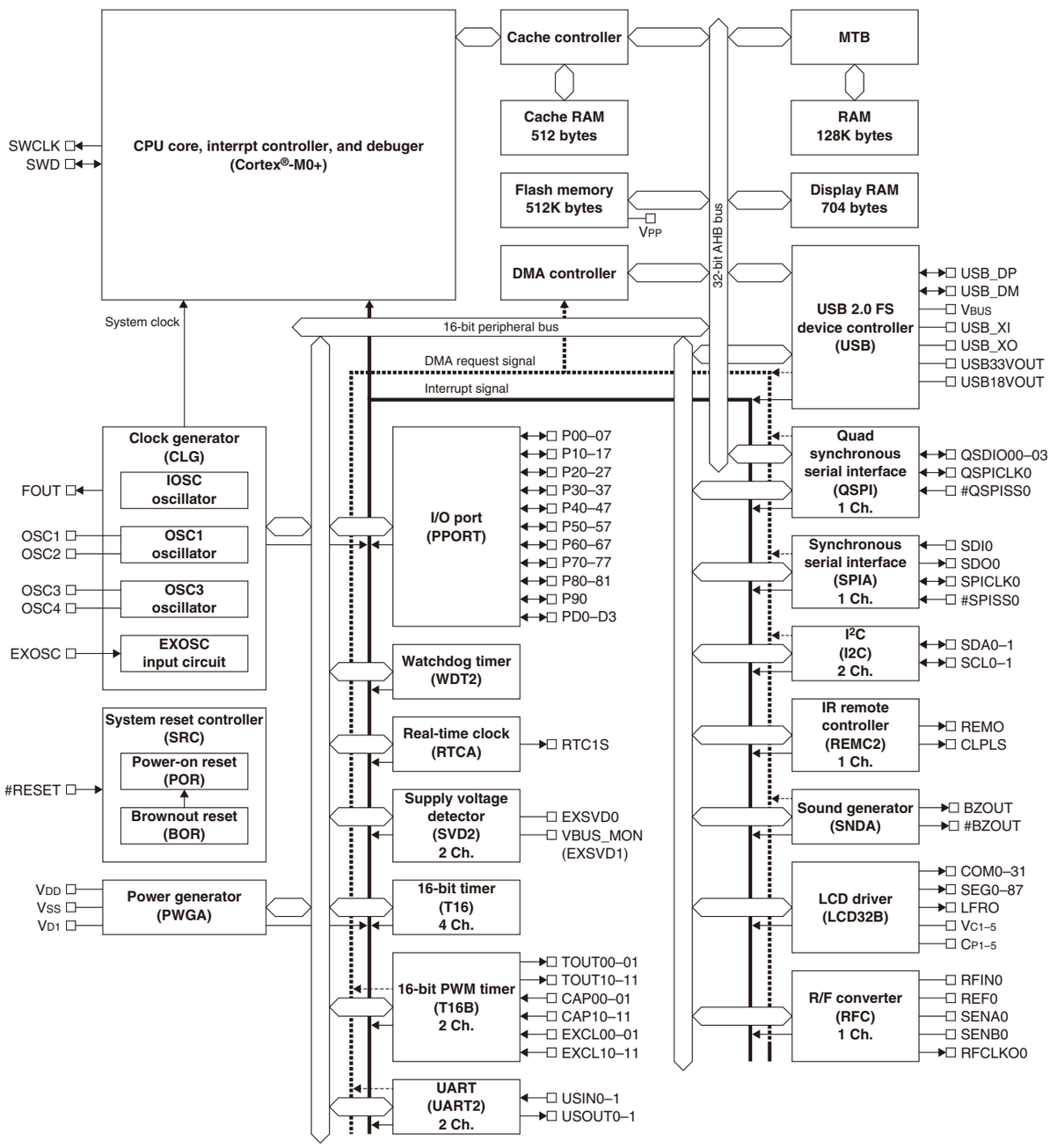
Supply voltage detector (SVD2)	
Number of channels	2 channels
Detection level	32 levels (1.7 to 4.3 V)
Other	Intermittent operation mode
	Generates an interrupt or reset (Ch.0) according to the detection level evaluation.
Serial interfaces	
UART (UART2)	2 channels
	Baud-rate generator included, IrDA1.0 supported
	Open drain output, signal polarity, and baud rate division ratio are configurable.
Synchronous serial interface (SPIA)	1 channel
	2 to 16-bit variable data length
	The 16-bit timer (T16) can be used for the baud-rate generator in master mode.
Quad synchronous serial interface (QSPI)	1 channel
	Supports single, dual, and quad transfer modes.
	Low CPU overhead memory mapped access mode that can directly read data from the external flash memory with XIP (eXecute-In-Place) mode.
I^2C (I2C)	2 channels
	Baud-rate generator included
USB 2.0 FS device controller (USB)	
Number of transceiver/receiver channels	1 channel
Transfer rate	FS (12 Mbps)
Clock source	48 MHz crystal oscillator or OSC3 (12 MHz) + PLL selectable
Number of endpoints	4 endpoints (3 general-purpose endpoints and endpoint 0)
Power supply	Voltage regulators for USB included
Sound generator (SNDA)	
Buzzer output function	512 Hz to 16 kHz output frequencies
	One-shot output function
Melody generation function	Pitch: 128 Hz to 16 kHz ≈ C3 to C6
	Duration: 7 notes/rests (Half note/rest to thirty-second note/rest)
	Tempo: 16 tempos (30 to 480)
	Tie/slur may be specified.
IR remote controller (REMC2)	
Number of transmitter channels	1 channel
Other	EL lamp drive waveform can be generated (by the hardware) for an application example.
LCD driver (LCD32B)	
LCD output	88SEG × 1–16COM (max.), 80SEG × 17–24COM (max.), 72SEG × 25–32COM (max.)
LCD contrast	16 levels
Other	1/5 or 1/4 bias power supply included, external voltage can be applied.
R/F converter (RFC)	
Conversion method	CR oscillation type with 24-bit counters
Number of conversion channels	1 channel (Up to two sensors can be connected.)
Supported sensors	DC-bias resistive sensors, AC-bias resistive sensors
Reset	
#RESET pin	Reset when the reset pin is set to low.
Power-on reset	Reset at power on.
Brownout reset	Reset when the power supply voltage drops (when $V_{DD} \leq 1.45$ V (typ.) is detected).
Key entry reset	Reset when the P00 to P01/P02/P03 keys are pressed simultaneously (can be enabled/disabled using a register).
Watchdog timer reset	Reset when the watchdog timer overflows (can be enabled/disabled using a register).
Supply voltage detector reset	Reset when the supply voltage detector detects the set voltage level (can be enabled/disabled using a register).
Interrupt	
Non-maskable interrupt	6 systems (Reset, NMI, HardFault, SVCall, PendSV, SysTic)
Programmable interrupt	External interrupt: 1 system
	Internal interrupt: 23 systems
Power supply voltage	
V_{DD} operating voltage	1.8 to 3.6 V
V_{DD} operating voltage for Flash programming	2.7 to 3.6 V (when the internal voltage booster is used)
V_{DD} operating voltage when LCD driver is used	2.5 to 3.6 V
Operating temperature	
Operating temperature range	-40 to 85 °C
Current consumption (Typ. value)	
SLEEP mode *1	0.4 µA IOSC = OFF, OSC1 = OFF, OSC3 = OFF
	0.9 µA IOSC = OFF, OSC1 = ON, OSC3 = OFF, RTC = ON

Current consumption (Typ. value)	
HALT mode *2	1.7 µA OSC1 = 32 kHz
	7.7 µA OSC1 = 32 kHz, LCD = ON (no panel load)
RUN mode	250 µA/MHz V_{D1} voltage mode = mode0, CPU = IOSC
	150 µA/MHz V_{D1} voltage mode = mode1, CPU = IOSC
Shipping form	
1	VFBGA8HX-181 (size: 8 × 8 mm, ball pitch: 0.5 mm)
2	Die form (pad pitch: 80 µm (min.))

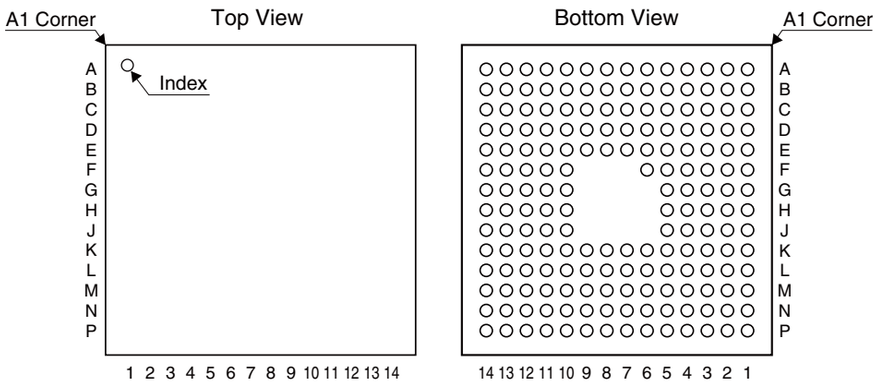
*1 SLEEP mode refers to deep sleep mode in the Cortex®-M0+ processor.
*2 HALT mode refers to sleep mode in the Cortex®-M0+ processor.

■ BLOCK DIAGRAM



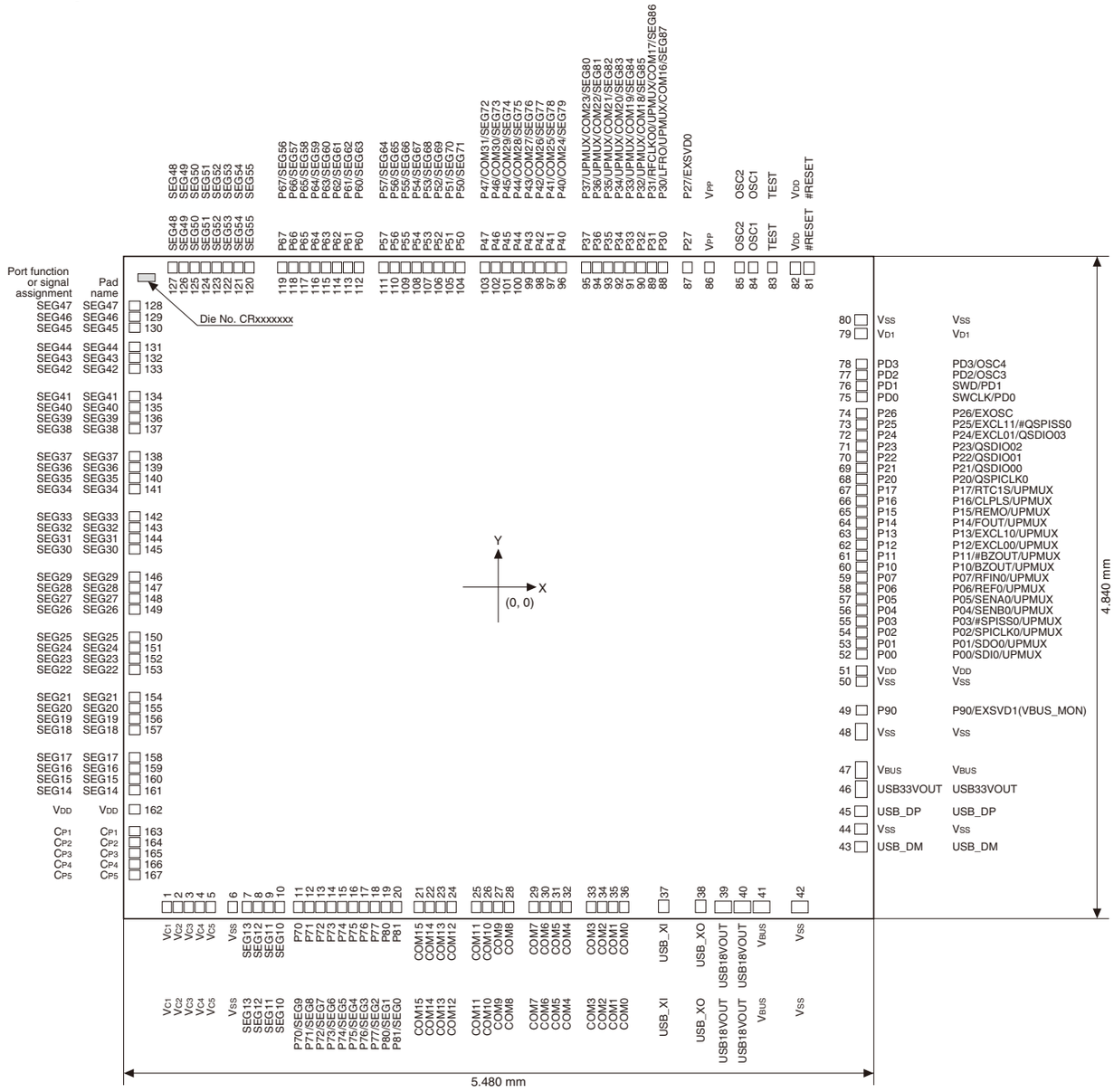
■ PIN CONFIGURATION DIAGRAMS

VFBGA8HX-181



	1	2	3	4	5	6	7	8	9	10	11	12	13	14
A	**N.C.**	**CP5**	**CP4**	**SEG14**	**SEG19**	**SEG23**	**SEG27**	**SEG31**	**SEG35**	**SEG39**	**SEG44**	**SEG45**	**SEG47**	**N.C.**
B	**VC3**	**VC1**	**CP3**	**SEG15**	**SEG18**	**SEG22**	**SEG26**	**SEG30**	**SEG34**	**SEG38**	**SEG43**	**SEG46**	**SEG48**	**SEG50**
C	**SEG13**	**VC4**	**VC2**	**CP1**	**SEG17**	**SEG21**	**SEG25**	**SEG29**	**SEG33**	**SEG37**	**SEG42**	**SEG49**	**SEG51**	**SEG52**
D	**SEG10**	**P70** SEG9	**SEG12**	**CP2**	**SEG16**	**SEG20**	**SEG24**	**SEG28**	**SEG32**	**SEG36**	**SEG53**	**SEG54**	**SEG55**	**P67** SEG56
E	**P75** SEG4	**P73** SEG6	**P71** SEG8	**SEG11**	**VC5**	**VDD**	**VDD**	**VSS**	**SEG40**	**SEG41**	**P66** SEG57	**P65** SEG58	**P64** SEG59	**P63** SEG60
F	**P81** SEG0	**P76** SEG3	**P77** SEG2	**P72** SEG7	**VSS**	**VSS**	Top View			**P56** SEG65	**P62** SEG61	**P61** SEG62	**P60** SEG63	**P57** SEG64
G	**COM12**	**COM15**	**COM14**	**P80** SEG1	**P74** SEG5					**P51** SEG70	**P55** SEG66	**P54** SEG67	**P53** SEG68	**P52** SEG69
H	**COM8**	**COM11**	**COM10**	**COM13**	**VSS**					**VDD**	**P50** SEG71	**P47** COM31 SEG72	**P46** COM30 SEG73	**P45** COM29 SEG74
J	**COM4**	**COM7**	**COM6**	**COM9**	**VSS**					**P40** COM24 SEG79	**P44** COM28 SEG75	**P43** COM27 SEG76	**P42** COM26 SEG77	**P41** COM25 SEG78
K	**COM0**	**COM3**	**COM2**	**COM5**	**VDD**	**VDD**	**P17** RTC1S UPMUX	**P22** QSDIO01	**VSS**	**P37** UPMUX COM23 SEG80	**P33** UPMUX COM19 SEG84	**P34** UPMUX COM20 SEG83	**P36** UPMUX COM22 SEG81	**P35** UPMUX COM21 SEG82
L	**USB_XI**	**USB18** **VOUT**	**COM1**	**VSS**	**VSS**	**P12** EXCL00 UPMUX	**P16** CLPLS UPMUX	**P21** QSDIO00	**P23** QSDIO02	**VDD**	**P27** EXSVD0	**P30** LFRO UPMUX COM16 SEG87	**P32** UPMUX COM18 SEG85	**P31** RFCLKO0 UPMUX COM17 SEG86
M	**USB_XO**	**VSS**	**VBUS**	**VBUS**	**P00** SDI0 UPMUX	**VSS**	**P11** #BZOUT UPMUX	**P15** REMO UPMUX	**P20** QSPICLK0	**P26** EXOSC	**SWCLK** PD0	**TEST**	**VPP**	**OSC2**
N	**VSS**	**VSS**	**USB33** **VOUT**	**P90** EXSVD1 (VBUS_ MON)	**P01** SDO0 UPMUX	**P03** #SPISS0 UPMUX	**P05** SENA0 UPMUX	**P10** BZOUT UPMUX	**P14** FOUT UPMUX	**P24** EXCL01 QSDIO03	**SWD** PD1	**VD1**	**#RESET**	**OSC1**
P	**N.C.**	**USB_DM**	**USB_DP**	**VSS**	**P02** SPICLK0 UPMUX	**P04** SENB0 UPMUX	**P06** REF0 UPMUX	**P07** RFIN0 UPMUX	**P13** EXCL10 UPMUX	**P25** EXCL11 #QSPISS0	**PD2** OSC3	**PD3** OSC4	**VSS**	**N.C.**

Chip


Port function or signal assignment
Pad name
Die No. CRxxxxxxx
Y
X
(0, 0)
4.840 mm
5.480 mm

■ PIN DESCRIPTIONS

Symbol meanings

Assigned signal: The signal listed at the top of each pin is assigned in the initial state. The pin function must be switched via software to assign another signal (see the "I/O Ports" chapter).

I/O:
- I = Input
- O = Output
- I/O = Input/output
- P = Power supply
- A = Analog signal
- Hi-Z = High impedance state

Initial state:
- I (Pull-up) = Input with pulled up
- I (Pull-down) = Input with pulled down
- Hi-Z = High impedance state
- O (H) = High level output
- O (L) = Low level output

Tolerant fail-safe structure:
- ✓ = Over voltage tolerant fail-safe type I/O cell included (see the "I/O Ports" chapter)
  The over voltage tolerant fail-safe type I/O cell allows interfacing without passing unnecessary current even if a voltage exceeding V_{DD} is applied to the port. Also unnecessary current is not consumed when the port is externally biased without supplying V_{DD}.

Pin name	Assigned signal	I/O	Initial state	Tolerant fail-safe structure	Function
V_{DD}	V_{DD}	P	–	–	Power supply (+)
V_{SS}	V_{SS}	P	–	–	GND
V_{PP}	V_{PP}	P	–	–	Power supply for Flash programming
V_{D1}	V_{D1}	A	–	–	V_{D1} regulator output
$V_{C1–5}$	$V_{C1–5}$	P	–	–	LCD panel driver power supply
$C_{P1–5}$	$C_{P1–5}$	A	–	–	LCD power supply booster capacitor connect pins
OSC1	OSC1	A	-	–	OSC1 oscillator circuit input
OSC2	OSC2	A	-	–	OSC1 oscillator circuit output
TEST	TEST	I	I (Pull-down)	–	Test mode enable input
#RESET	#RESET	I	I (Pull-up)	–	Reset input
P00	P00	I/O	Hi-Z	–	I/O port
	SDI0	I			Synchronous serial interface Ch.0 data input
	UPMUX	I/O			User-selected I/O (universal port multiplexer)
P01	P01	I/O	Hi-Z	–	I/O port
	SDO0	O			Synchronous serial interface Ch.0 data output
	UPMUX	I/O			User-selected I/O (universal port multiplexer)
P02	P02	I/O	Hi-Z	–	I/O port
	SPICLK0	I/O			Synchronous serial interface Ch.0 clock input/output
	UPMUX	I/O			User-selected I/O (universal port multiplexer)
P03	P03	I/O	Hi-Z	–	I/O port
	#SPISS0	I			Synchronous serial interface Ch.0 slave-select input
	UPMUX	I/O			User-selected I/O (universal port multiplexer)
P04	P04	I/O	Hi-Z	–	I/O port
	SENB0	A			R/F converter Ch.0 sensor B oscillator pin
	UPMUX	I/O			User-selected I/O (universal port multiplexer)
P05	P05	I/O	Hi-Z	–	I/O port
	SENA0	A			R/F converter Ch.0 sensor A oscillator pin
	UPMUX	I/O			User-selected I/O (universal port multiplexer)
P06	P06	I/O	Hi-Z	–	I/O port
	REF0	A			R/F converter Ch.0 reference oscillator pin
	UPMUX	I/O			User-selected I/O (universal port multiplexer)
P07	P07	I/O	Hi-Z	–	I/O port
	RFIN0	A			R/F converter Ch.0 oscillation input
	UPMUX	I/O			User-selected I/O (universal port multiplexer)
P10	P10	I/O	Hi-Z	–	I/O port
	BZOUT	O			Sound generator output
	UPMUX	I/O			User-selected I/O (universal port multiplexer)

Pin name	Assigned signal	I/O	Initial state	Tolerant fail-safe structure	Function
P11	P11	I/O	Hi-Z	–	I/O port
	#BZOUT	O			Sound generator inverted output
	UPMUX	I/O			User-selected I/O (universal port multiplexer)
P12	P12	I/O	Hi-Z	–	I/O port
	EXCL00	I			16-bit PWM timer Ch.0 event counter input 0
	UPMUX	I/O			User-selected I/O (universal port multiplexer)
P13	P13	I/O	Hi-Z	–	I/O port
	EXCL10	I			16-bit PWM timer Ch.1 event counter input 0
	UPMUX	I/O			User-selected I/O (universal port multiplexer)
P14	P14	I/O	Hi-Z	–	I/O port
	FOUT	O			Clock external output
	UPMUX	I/O			User-selected I/O (universal port multiplexer)
P15	P15	I/O	Hi-Z	–	I/O port
	REMO	O			IR remote controller transmit data output
	UPMUX	I/O			User-selected I/O (universal port multiplexer)
P16	P16	I/O	Hi-Z	–	I/O port
	CLPLS	O			IR remote controller clear pulse output
	UPMUX	I/O			User-selected I/O (universal port multiplexer)
P17	P17	I/O	Hi-Z	–	I/O port
	RTC1S	O			Real-time clock 1-second cycle pulse output
	UPMUX	I/O			User-selected I/O (universal port multiplexer)
P20	P20	I/O	Hi-Z	–	I/O port
	QSPICLK0	I/O			Quad synchronous serial interface Ch.0 clock input/output
P21	P21	I/O	Hi-Z	–	I/O port
	QSDIO00	I/O			Quad synchronous serial interface Ch.0 data input/output
P22	P22	I/O	Hi-Z	–	I/O port
	QSDIO01	I/O			Quad synchronous serial interface Ch.0 data input/output
P23	P23	I/O	Hi-Z	–	I/O port
	QSDIO02	I/O			Quad synchronous serial interface Ch.0 data input/output
P24	P24	I/O	Hi-Z	–	I/O port
	EXCL01	I			16-bit PWM timer Ch.0 event counter input 1
	QSDIO03	I/O			Quad synchronous serial interface Ch.0 data input/output
P25	P25	I/O	Hi-Z	–	I/O port
	EXCL11	I			16-bit PWM timer Ch.1 event counter input 1
	#QSPISS0	I/O			Quad synchronous serial interface Ch.0 slave-select input/output
P26	P26	I/O	Hi-Z	–	I/O port
	EXOSC	I			Clock generator external clock input
P27	P27	I/O	Hi-Z	✓	I/O port
	EXSVD0	A			Supply voltage detector Ch.0 external voltage detection input
P30	P30	I/O	Hi-Z	✓	I/O port
	LFRO	O			LCD frame signal monitor output
	UPMUX	I/O			User-selected I/O (universal port multiplexer)
	COM16	A			LCD common output
	SEG87	A			LCD segment output
P31	P31	I/O	Hi-Z	✓	I/O port
	RFCLKO0	O			R/F converter Ch.0 clock monitor output
	UPMUX	I/O			User-selected I/O (universal port multiplexer)
	COM17	A			LCD common output
	SEG86	A			LCD segment output
P32	P32	I/O	Hi-Z	✓	I/O port
	UPMUX	I/O			User-selected I/O (universal port multiplexer)
	COM18	A			LCD common output
	SEG85	A			LCD segment output
P33	P33	I/O	Hi-Z	✓	I/O port
	UPMUX	I/O			User-selected I/O (universal port multiplexer)
	COM19	A			LCD common output
	SEG84	A			LCD segment output
P34	P34	I/O	Hi-Z	✓	I/O port
	UPMUX	I/O			User-selected I/O (universal port multiplexer)
	COM20	A			LCD common output
	SEG83	A			LCD segment output

Pin name	Assigned signal	I/O	Initial state	Tolerant fail-safe structure	Function
P35	P35	I/O	Hi-Z	✓	I/O port
	UPMUX	I/O			User-selected I/O (universal port multiplexer)
	COM21	A			LCD common output
	SEG82	A			LCD segment output
P36	P36	I/O	Hi-Z	✓	I/O port
	UPMUX	I/O			User-selected I/O (universal port multiplexer)
	COM22	A			LCD common output
	SEG81	A			LCD segment output
P37	P37	I/O	Hi-Z	✓	I/O port
	UPMUX	I/O			User-selected I/O (universal port multiplexer)
	COM23	A			LCD common output
	SEG80	A			LCD segment output
P40	P40	I/O	Hi-Z	✓	I/O port
	COM24	A			LCD common output
	SEG79	A			LCD segment output
P41	P41	I/O	Hi-Z	✓	I/O port
	COM25	A			LCD common output
	SEG78	A			LCD segment output
P42	P42	I/O	Hi-Z	✓	I/O port
	COM26	A			LCD common output
	SEG77	A			LCD segment output
P43	P43	I/O	Hi-Z	✓	I/O port
	COM27	A			LCD common output
	SEG76	A			LCD segment output
P44	P44	I/O	Hi-Z	✓	I/O port
	COM28	A			LCD common output
	SEG75	A			LCD segment output
P45	P45	I/O	Hi-Z	✓	I/O port
	COM29	A			LCD common output
	SEG74	A			LCD segment output
P46	P46	I/O	Hi-Z	✓	I/O port
	COM30	A			LCD common output
	SEG73	A			LCD segment output
P47	P47	I/O	Hi-Z	✓	I/O port
	COM31	A			LCD common output
	SEG72	A			LCD segment output
P50	P50	I/O	Hi-Z	✓	I/O port
	SEG71	A			LCD segment output
P51	P51	I/O	Hi-Z	✓	I/O port
	SEG70	A			LCD segment output
P52	P52	I/O	Hi-Z	✓	I/O port
	SEG69	A			LCD segment output
P53	P53	I/O	Hi-Z	✓	I/O port
	SEG68	A			LCD segment output
P54	P54	I/O	Hi-Z	✓	I/O port
	SEG67	A			LCD segment output
P55	P55	I/O	Hi-Z	✓	I/O port
	SEG66	A			LCD segment output
P56	P56	I/O	Hi-Z	✓	I/O port
	SEG65	A			LCD segment output
P57	P57	I/O	Hi-Z	✓	I/O port
	SEG64	A			LCD segment output
P60	P60	I/O	Hi-Z	✓	I/O port
	SEG63	A			LCD segment output
P61	P61	I/O	Hi-Z	✓	I/O port
	SEG62	A			LCD segment output
P62	P62	I/O	Hi-Z	✓	I/O port
	SEG61	A			LCD segment output
P63	P63	I/O	Hi-Z	✓	I/O port
	SEG60	A			LCD segment output
P64	P64	I/O	Hi-Z	✓	I/O port
	SEG59	A			LCD segment output

Pin name	Assigned signal	I/O	Initial state	Tolerant fail-safe structure	Function
P65	P65	I/O	Hi-Z	✓	I/O port
	SEG58	A			LCD segment output
P66	P66	I/O	Hi-Z	✓	I/O port
	SEG57	A			LCD segment output
P67	P67	I/O	Hi-Z	✓	I/O port
	SEG56	A			LCD segment output
P70	P70	I/O	Hi-Z	✓	I/O port
	SEG9	A			LCD segment output
P71	P71	I/O	Hi-Z	✓	I/O port
	SEG8	A			LCD segment output
P72	P72	I/O	Hi-Z	✓	I/O port
	SEG7	A			LCD segment output
P73	P73	I/O	Hi-Z	✓	I/O port
	SEG6	A			LCD segment output
P74	P74	I/O	Hi-Z	✓	I/O port
	SEG5	A			LCD segment output
P75	P75	I/O	Hi-Z	✓	I/O port
	SEG4	A			LCD segment output
P76	P76	I/O	Hi-Z	✓	I/O port
	SEG3	A			LCD segment output
P77	P77	I/O	Hi-Z	✓	I/O port
	SEG2	A			LCD segment output
P80	P80	I/O	Hi-Z	✓	I/O port
	SEG1	A			LCD segment output
P81	P81	I/O	Hi-Z	✓	I/O port
	SEG0	A			LCD segment output
P90	P90	I/O	Hi-Z	✓	I/O port
	EXSVD1 (VBUS_MON)	A			Supply voltage detector Ch.1 external voltage detection input (VBUS voltage detection input)
PD0	SWCLK	I	I (Pull-up)	–	Serial-wire debugger clock input
	PD0	I/O			I/O port
PD1	SWD	I/O	I (Pull-up)	–	Serial-wire debugger data input/output
	PD1	I/O			I/O port
PD2	PD2	I/O	Hi-Z	–	I/O port
	OSC3	A			OSC3 oscillator circuit input
PD3	PD3	I/O	Hi-Z	–	I/O port
	OSC4	A			OSC3 oscillator circuit output
COM0–15	COM0–15	A	Hi-Z	–	LCD common output
SEG10–55	SEG10–55	A	Hi-Z	–	LCD segment output
USB_DP	USB_DP	I/O	I	–	USB D+ signal input/output
USB_DM	USB_DM	I/O	I	–	USB D- signal input/output
VBUS	VBUS	P	–	–	USB VBUS input (5 V input allowed)
USB_XI	USB_XI	A	–	–	USBOSC oscillator circuit input
USB_XO	USB_XO	A	–	–	USBOSC oscillator circuit output
USB18VOUT	USB18VOUT	P	–	–	USB 1.8 V regulator output
USB33VOUT	USB33VOUT	P	–	–	USB 3.3 V regulator output

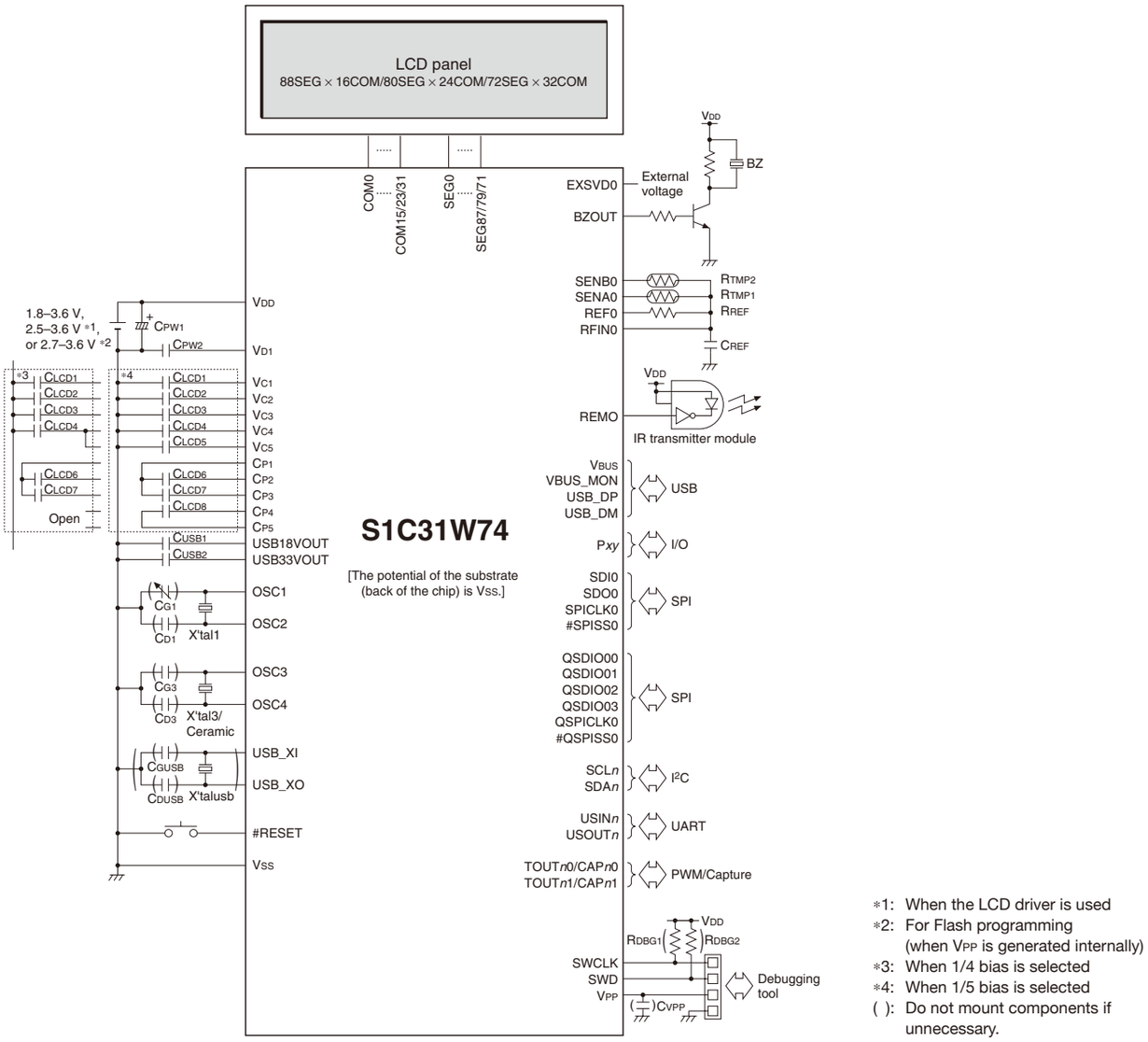
Universal port multiplexer (UPMUX)

The universal port multiplexer (UPMUX) allows software to select the peripheral circuit input/output function to be assigned to each pin from those listed below. Note, however, that a function cannot be assigned to two or more pins simultaneously.

Peripheral circuit	Signal to be assigned	I/O	Channel number *n*	Function
I²C (I2C)	SCL*n*	I/O	*n* = 0, 1	I2C Ch.*n* clock input/output
	SDA*n*	I/O		I2C Ch.*n* data input/output
UART (UART2)	USIN*n*	I	*n* = 0, 1	UART2 Ch.*n* data input
	USOUT*n*	O		UART2 Ch.*n* data output
16-bit PWM timer (T16B)	TOUT*n*0/CAP*n*0	I/O	*n* = 0, 1	T16B Ch.*n* PWM output/capture input 0
	TOUT*n*1/CAP*n*1	I/O		T16B Ch.*n* PWM output/capture input 1

S1C31W74

■ BASIC EXTERNAL CONNECTION DIAGRAM



*1: When the LCD driver is used
*2: For Flash programming (when VPP is generated internally)
*3: When 1/4 bias is selected
*4: When 1/5 bias is selected
( ): Do not mount components if unnecessary.

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Document Code: 413119001
First Issue October 2015
Revised June 2017 in JAPAN

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