

* USB Full-Speed Controller



RENESAS 8-bit Single-chip Microcomputer
740 Family/38000 Series



Renesas Technology Corp.

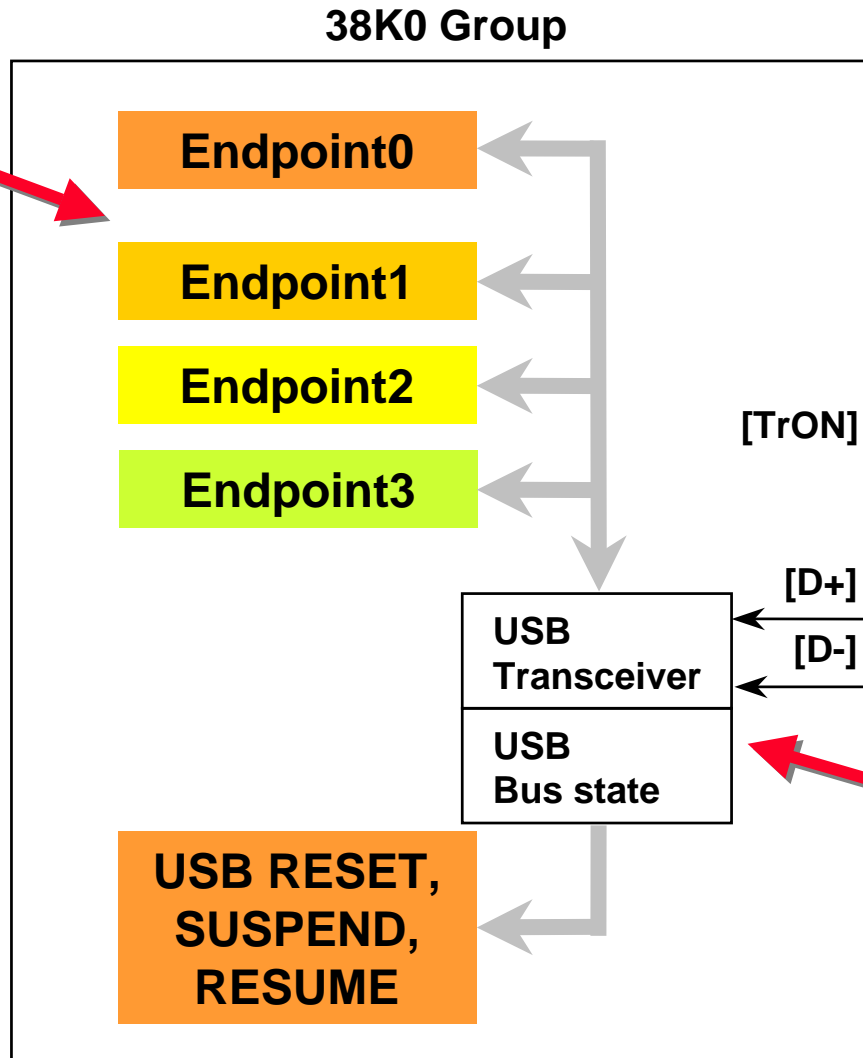
Advantage of 38K0 group (#1) USB function #1

Point 1

Easy setting!
Can freely set Transfer type, Transfer direction, and Buffer size each Endpoint.

Point 2

Easy program!
Can add application program without USB program control because USB program are process in interrupt routine.



Point 3

Easy USB circuit!
Can organize simple USB circuit using D+ pull-up voltage supply port.

Point 4

Reliable IP!
Renesas original USB IP have already passed USB-IF's USB Compatibility workshops.

Advantage of 38K0 group (#2) USB function #2



Point 1 Using flexibility!
Can freely set USB Transfer contents each Endpoint to fit user application.

	Transfer type	Transfer direction	Buffer size	Interrupt condition
Endpoint0	Control(Const.)	SETUP,IN,OUT (Const.)	8(Const.)	Completed (Const.)
Endpoint1	Selectable Interrupt, Bulk, Isochronous	Selectable IN, OUT	Selectable 8, 16, 32, 64	Selectable Completed, Incompleted
Endpoint2				
Endpoint3				

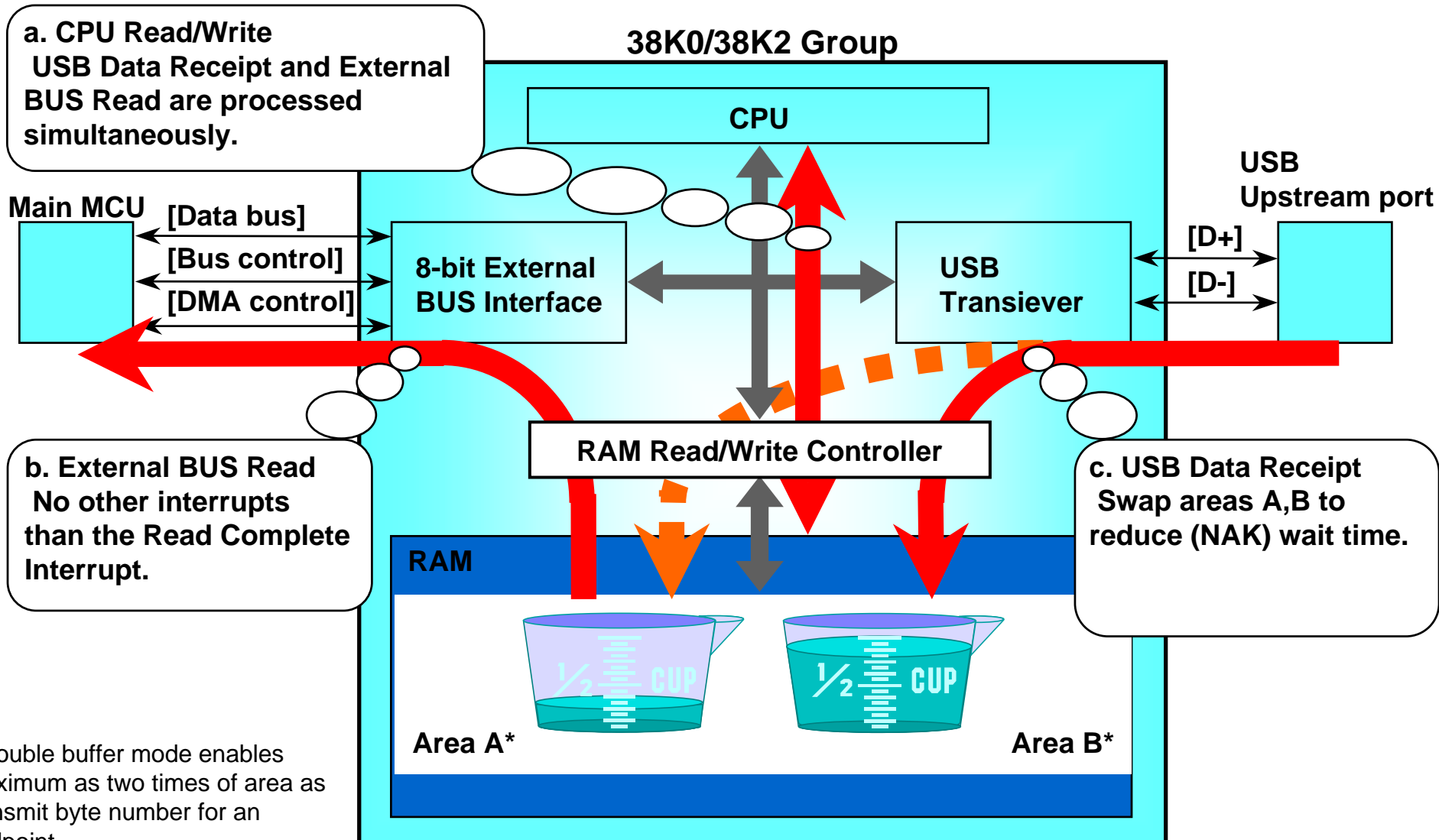


Point 2 Simple to use!
Can easily process USB signal using interrupt routines.

**USB RESET,
SUSPEND,
RESUME**

Selectable
Completed,
Incompleted

Advantage of 38K0 group (#3) External BUS Interface



* Double buffer mode enables maximum as two times of area as transmit byte number for an endpoint.

Advantage of 38K0 group (#4) Overview #1



Compact!

Compact and multi-functional USB Full-Speed function in 1-chip microcomputer!

Endpoint0 - 3 and FIFO 64bytes max. only but **minimized design and enough** for USB Full-Speed application.

Many USB function!

USB function can select all transfer type (Control(Endpoint0), Interrupt, Bulk, and Isochronous), can select transfer direction (IN, OUT) each Endpoint, and Upstream port has D+ pull-up power supply output port (TrON).

Trust!

Including USB SIE uses RENESAS original IP that has **already passed USB Implementers Forum USB Compliance Workshops (Plug-fest)!**

In addition to 38K0 group, many RENESAS USB devices have already passed USB Plug-fest.

Advantage of 38K0 group (#5) Overview #2



Many other function!

Valuable functions in additional to USB!
External bus interface can be used as slave, hi resolution **A/D converter** can be used efficient analog control, **serial I/F** can be used communication with other device, **key-on wake up**, **INT**, **CNTR** can be use external interrupt detection.

Small package!

Adopted IC package is small!
Can be used for small product because many function are included **10mm square package** (0.5mm pitch 64-pin LQFP : PLQP0064KB-A(64P6Q-A)).

Also can select Flash version of same package.

Good support!

RENESAS are good supporter for USB devices!
RENESAS are supporting technical document distribution with internet, FAQ with E-mail, and USB technical seminar (only Japan domestic).

Also development support tool of 38K0 group is prepared USB firmware and evaluation board.

Feature of 38K0 group

***USB Hub Upstream (Hub function)**

***USB D+ pull-up voltage output**

***Serial I/F(Clock synchronous/UART): 8bit x 1**

***10bit A/D converter: 8ch.**

***Timer: amount (with 8bit prescaler): 8x3**

***Watch-dog timer: 16bit x 1**

***I/O ports: 48**

***INT input function: 2**

***CNTR function: 1**

***Key-on wake up function: P0x8**

***8bit bus I/F: 1ch.**

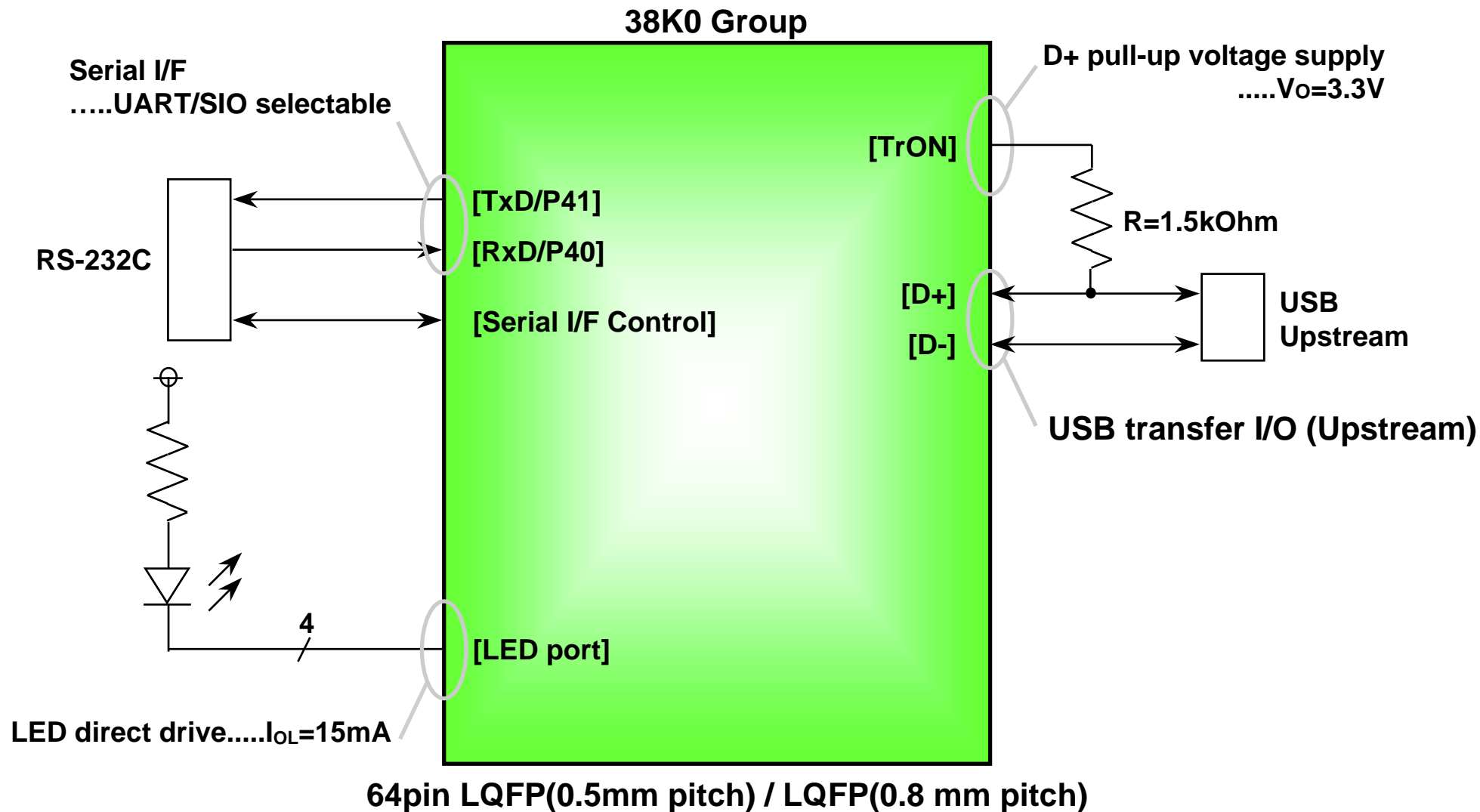
***0.5mm pitch 64pin LQFP (PLQP0064KB-A)**

***0.8mm pitch 64pin LQFP (PLQP0064GA-A)**

***Flash version supported**

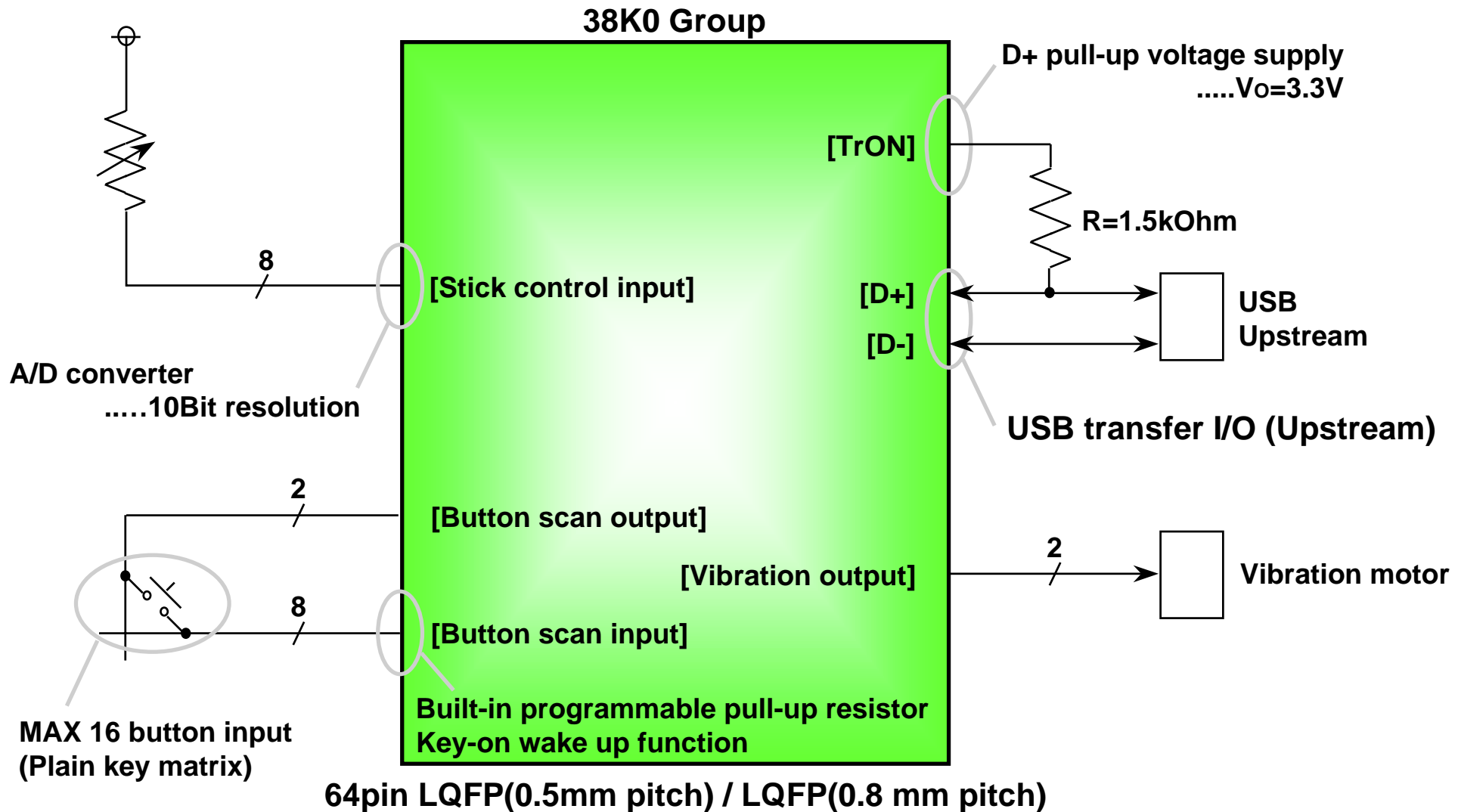
38K0 group application (#1)

Comm. : USB-serial converter



38K0 group application (#2)

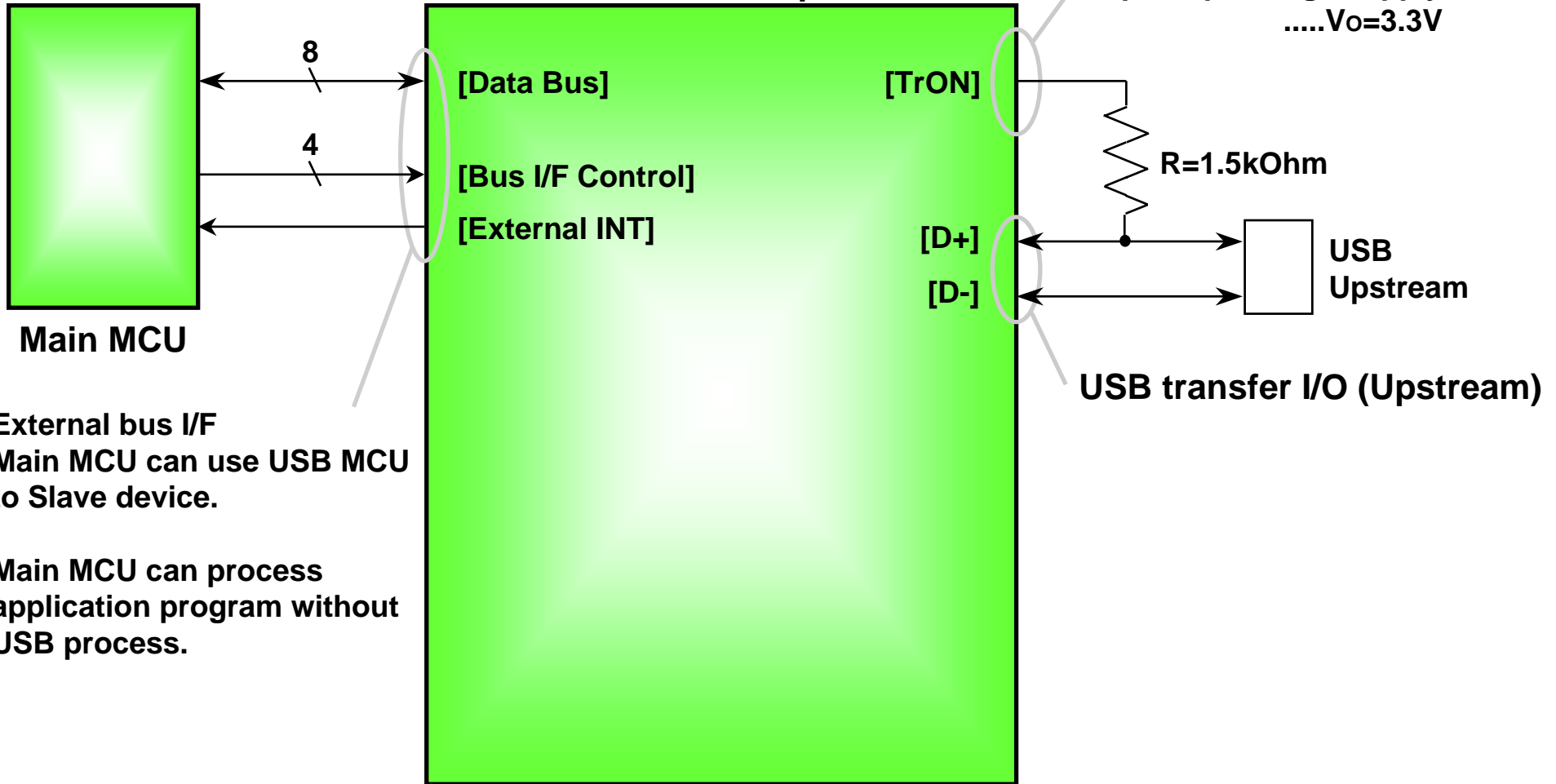
PID : USB joystick



38K0 group application (#3)

Others : USB slave device

38K0 Group



External bus I/F
Main MCU can use USB MCU
to Slave device.

Main MCU can process
application program without
USB process.

64pin LQFP(0.5mm pitch) / LQFP(0.8 mm pitch)

38K0 group Application Development Tools

H/W (Evaluation, Development Board)



M3A-8K02

Evaluation/development board for the 38K0 Group and 38K2 Group. Embedded with circuits needed for USB function and USB hub, application of the external circuit use universal board (G04) facilitates simple development and evaluation of USB systems. Replacing the two-board set upper surface boards (G02,G03) makes it possible to conduct inspection with both flash-chips and debuggers. Since it is possible to exchange $V_{cc}=5V/3.3V$, and USB rewriting/serial rewriting of flash memory with an easy switch, changes in peripheral setup can be performed in a short time.



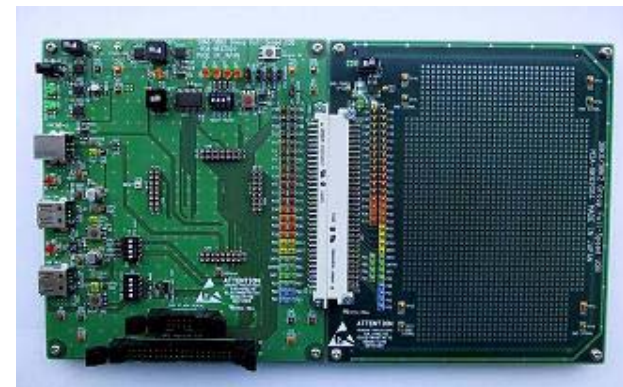
M3A-8K02 (with M3A-8K02G03)



M3A-8K02G02



M3A-8K02G03



M3A-8K02G04 (with M3A-8K02G01)

S/W (Firmware)

Standard F/W Standard Requests / Descriptors

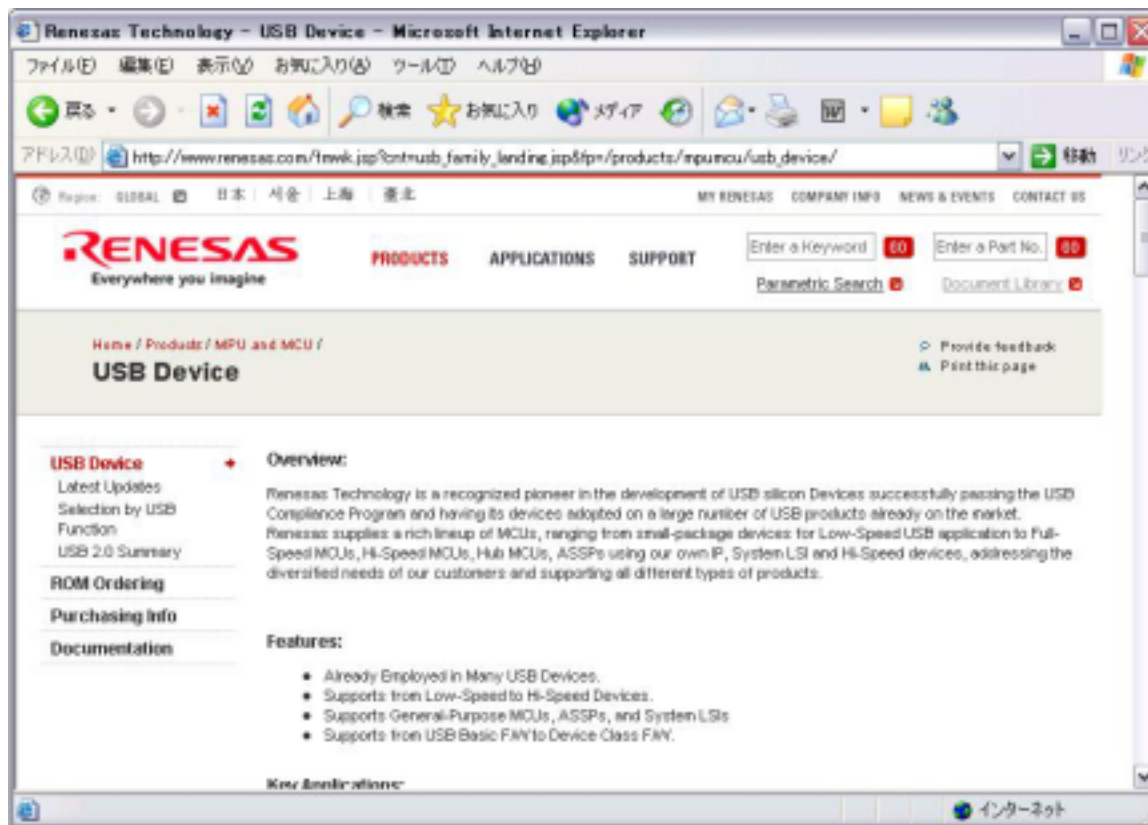
Com. F/W Communication Device Class Descriptors included

RENESAS USB devices information

38000
740 Series

For RENESAS USB devices information (Users' manuals, tools, etc.), please refer to the following Home Page.

<http://www.renesas.com/en/usb>



* Final update: October 3 2006.

* Please note that the version of specifications etc. can be revised in the future.

38K0 group information



Click “38K0 group” on RENESAS USB devices site ahead one page, can be take 38K0 group relation information.

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Full Product Info

Product Overview:

The 38K0 Group consists of 8-bit single-chip MCUs compliant with the Full-Speed USB2.0. The built-in 4 endpoints, external bus interface x1, serial I/O x1, 8-bit timer x3 and an A/D converter (8-channel) enable various USB functions, such as changeable FIFO size. In addition, 38K0 Group MCUs are suitable for USB conversion devices since the internal RAM can be accessed directly from USB and external interfaces. For evaluation tools of this group, please click left navigation "Software and Tools".

Key Applications:

USB peripheral equipment

- Telephone
- Audio System
- PC Peripheral
- Communication Apparatus
- Pocket Apparatus
- Scanner
- Digital Camera
- Memory Card Reader, others

Product Lineup:

38K0 Group

Full Specification List

Docu	Part No.	ROM	RAM	ROM Type	Operating	Status	Remarks	PKG

FAQ

Relation documents

Tools



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