

This Customer Design Review Supplement is provided to prevent problems that may arise in the system development of MB95120 series.
 A complete system may not always be configured even if the following items are completely satisfied, but confirm at least the following items.
 We will recommend this Customer Design Review Supplement used to be filed as a review results.

Item		Check	Reason for checking	Result	Remarks	Update
CPU	Power-on reset	Are the power-on reset standards for electric characteristics satisfied?	If such type of power-on that does not satisfy the power-on reset standards is performed, the CPU may execute instructions without a normal reset applied.	Yes / No	Applicable only to a system that requires a reset at power-on (not applicable if a secondary reset input is expected while using a power monitoring IC, and also not applicable to a system that supports the low voltage reset input (option) function)	2007/11/28
CPU	External reset	Does the reset input width satisfy the standards of Fujitsu?	If the reset input width does not satisfy the relevant standards, the CPU may not be able to return.	Yes / No		2007/11/28
CPU	External reset IC	When external reset IC is used, are the low-voltage detection limits within the operation guarantee range of the microcontroller?	Malfunction may occur if the voltage of a reset input is not within the operation guarantee range.	Yes / No	Check the operation guarantee range in the data sheet. Not applicable to a system that supports the low voltage reset input (option) function.	2007/11/28
CPU	Interrupt	Are unused interrupt vectors processed?	If an unused interrupt is caused by runaway, the runaway is accelerated.	Yes / No	If a special type of processing is required, jump to the processing. If no special processing is required, it is recommended to jump to the reset vector.	2007/11/28
CPU	Reset cause bit	When the reset cause bits of the watchdog timer control register (RSRR) are used, is the RSRR register read once to clear the reset cause bits during program initialization?	The initial value of each reset cause bit is undefined. Therefore, to clear the individual reset cause bits, read the RSRR register once before using it.	Yes / No	Applicable only when reset cause bits are used.	2007/11/28
CPU	Transition to standby mode	Are three or more NOP instructions inserted immediately after the instruction to transfer to the standby mode?	Malfunction may occur during transition to the standby mode.	Yes / No		2007/11/28
CPU	Watchdog	Is the watchdog timer cleared by a timer interrupt? (Are the PLL multiplication error setting and each low-power consumption operation mode also considered?)	If watchdog reset intervals are not sufficiently considered, it is impossible to detect whether the program runs according to normal procedures.	Yes / No		2007/11/28
CPU	Watchdog	If the internal watchdog timer is used for sub operation, is the WDTC CS bit set so that the clock prescaler timer is used as the watchdog clock source?	If the time base timer is set as the watchdog clock source (WDTC CS bit) when the internal watchdog timer is used for sub operation, watchdog interrupts may not be caused during sub operation.	Yes / No		2007/11/28
CPU	Main clock oscillation stabilization wait time	Is matching data between the system and oscillator obtained to check the necessary oscillation stabilization wait time?	There is fear that the CPU runs without normal oscillation established.	Yes / No	Ask the vendor of the oscillator for oscillation evaluation.	2007/11/28
CPU	Clock	Is the oscillation stabilization wait time set when a transition occurs from the PLL mode directly to the stop mode, not via the main mode, or directly to the clock mode?	The PLL clock mode can be changed directly to the stop mode. In this case, however, the oscillation stabilization wait time in consideration of the PLL lock time needs to be set at return.	Yes / No		2007/11/28
CPU	Oscillation stabilization wait time	Do you know that, for mask products, you can specify the initial value of the oscillation stabilization wait time when ordering mask ROM?	For power-on reset, the oscillation stabilization wait time is fixed to the initial value. For mask products, however, the initial value of the oscillation stabilization wait time can be specified when mask ROM is ordered.	Yes / No	Applicable only when the Mask is used.	2007/11/28
CPU	Subclock oscillation stabilization wait	Do you avoid causing a transition from the main mode to the subclock mode while subclock oscillation is still not stable?	The subclock requires longer oscillation stabilization time than the main clock. When the main clock mode changes to the subclock mode, therefore, subclock oscillation must be stable in advance.	Yes / No	Applicable only when the subclock is used.	2007/11/28
Peripheral function	I/O port	Is processing such as rewriting to important I/O ports enabled for the purpose of fail safe in the system?	Basically, the status of a port does not change unless defined by software. For the purpose of fail safe in the system, however, it is recommended to insert a refresh function, implemented by software, such as for rewriting to important ports.	Yes / No		2007/11/28

This Customer Design Review Supplement is provided to prevent problems that may arise in the system development of MB95120 series.
A complete system may not always be configured even if the following items are completely satisfied, but confirm at least the following items.
We will recommend this Customer Design Review Supplement used to be filed as a review results.

Item		Check	Reason for checking	Result	Remarks	Update
Peripheral function	ADC	Is analog input impedance below that specified in the data sheet? If the analog impedance is higher, the sample hold time needs to be set longer or a capacitor of about 0.1 uF needs to be mounted externally.	If analog input impedance is higher, the analog data sampling time may become insufficient.	Yes / No	Applicable only when an A/D converter is used.	2007/11/28
Peripheral function	ADC	Is sufficient analog sample hold time secured?	If analog input impedance is higher, a glitch may occur in the analog input pin. The glitch is determined by the analog input impedance and the time constant of the internal capacitance. If the sample hold time is shorter, the sample hold time may be affected by the glitch. (Because differences may also exist between Flash and Mask products, sufficient sample hold time should be secured when analog input impedance is higher.)	Yes / No	Applicable only when the product is used at the recommended analog input impedance in the data sheet or higher.	2007/11/28
Peripheral function	ADC	When A/D is used, is the A/D input disable register (AIDRH/L) set in the analog input mode?	If the port input mode is set in the AIDRH/L register and A/D (voltage level of intermediate potential) input is performed, through-current will flow into the CMOS input circuit of the I/O port and increase current consumption.	Yes / No	Applicable only when an A/D converter is used.	2007/11/28
Peripheral function	ADC	Are the AVR and AVCC voltage levels sufficiently stable?	Reactance may be put in AVR and AVCC to perform power supply separation between the analog and digital power supplies. In this case, circuits should be configured to enable sufficient power supply at A/D converter startup such as by adding a capacitance of several uF or more to AVR and AVCC.	Yes / No	Applicable only when an A/D converter is used.	2007/11/28
Peripheral function	ADC	Is the ADMVX bit set to 0 before transition to the standby mode?	To suppress current consumption, set the ADMVX bit to 0 before transition to the standby mode.	Yes / No		2007/11/28
Peripheral function	ADC	Is there any case that A/D conversion finishing and triggering are the same timing?	If yes, the second trigger may be ignored.	Yes / No	Applicable only when you trigger under A/D conversion.	2007/11/28
Debug	Note on debugging	Do you know that a chip deletion instruction must not be issued for debugging using the EVA chip?	The background software used for chip monitoring is stored in the EVA chip flash memory area. If a chip deletion instruction is issued, even the background software is deleted and accordingly normal operation may be disabled.	Yes / No	Applicable only when the EVA chip is used for debugging.	2007/11/28
General	-	Do the voltage range used, temperature range used, and operating frequency used satisfy the Fujitsu-specified standards? If not, do you have any agreement for special guarantee?	Product guarantee is not available when the product is used out of the guarantee range.	Yes / No	Confirm the operation guarantee range on the data sheet.	2007/11/28
General	-	In linker layout/linkage, is the memory range area set according to the ROM and RAM amounts of the Flash and Mask products?	The internal memory amount of the EVA chip for evaluation differs from those of the Flash and Mask products. For this reason, even if normal operation can be confirmed with the tool, operation may be disabled on the actual products.	Yes / No		2007/11/28
General	-	Is the maximum usage of the stack checked?	Incorrect estimation of stack usage may result in damage to RAM.	Yes / No	The maximum usage of the stack should be checked using the Softune C analyzer. (Because the C analyzer cannot check dynamic stacks, it is necessary to check the maximum usage in consideration of the occurrence of concurrent multiple interrupts.)	2007/11/28
General	-	The suffix varies depending on the included options. Have you confirmed your options?	The optional functions vary depending on the suffix.	Yes / No		2007/11/28
General	-	Do you know that the MB95120 series contain dual operation flash memories?	Because the MB95120 series contains dual operation flash memories, writing and reading can be performed concurrently. (See the manual for details of operation.)	Yes / No	Some product contains a one sector flash memory. Check whether the product used has a dual operation flash memory.	2007/11/28
Noise measures and others	MOD pin	Is the same level secured for MOD pin processing even during instruction execution?	There is fear that the MOD pin level is read incorrectly. (When the MOD pin is processed by a high impedance resistor, the MOD pin level may not be secured due to noise.)	Yes / No	If external noise is likely to intrude into the MOD pin, countermeasures against static electricity such as connecting a capacitor to the mode pin should be taken.	2007/11/28

This Customer Design Review Supplement is provided to prevent problems that may arise in the system development of MB95120 series.
A complete system may not always be configured even if the following items are completely satisfied, but confirm at least the following items.
We will recommend this Customer Design Review Supplement used to be filed as a review results.

Item		Check	Reason for checking	Result	Remarks	Update
Noise measures and others	MOD pin	Is the MOD pin processing interconnect moderately short (not too long) and free from large current signals in the neighborhood interconnect?	There is fear that the MOD pin level may be read incorrectly due to power supply fluctuation or noise.	Yes / No		2007/11/28
Noise measures and others	Oscillation	Do you collect oscillation matching data with mass-produced products?	Oscillation characteristics may differ between flash and mask products. It is recommended to collect oscillation matching data with mass-produced products.	Yes / No	Ask the vendor of the oscillator used for oscillation evaluation.	2007/11/28
Noise measures and others	Oscillation	When a crystal oscillator is used, is an adequate dumping resistor inserted?	When a crystal oscillator is used, a dumping resistor is required for suppressing drive current.	Yes / No	Ask the vendor of the oscillator used for oscillation evaluation.	2007/11/28
Noise measures and others	Oscillation	Are unnecessary radiant noise and oscillation amplitude considered to determine the dumping resistance of the oscillating circuit?	Oscillation may not normally be performed, or unnecessary radiant noise may increase due to oscillation overshoot or undershoot.	Yes / No	If a problem of unnecessary radiant noise occurs, it is needed to study oscillation waveforms and to insert a dumping resistor as countermeasures against unnecessary radiant noise.	2007/11/28
Noise measures and others	Oscillation	Is the oscillator placed as close to the oscillation pin as possible?	The CPU may cause runaway due to external noise.	Yes / No	Be sure to place the oscillator near the product.	2007/11/28
Noise measures and others	Vcc,GND	Is it designed to make Vcc and GND as resistant to noise as possible?	There is fear of unnecessary-radiant noise problems and the CPU runaway due to external noise.	Yes / No	Consider preventing unnecessary radiant noise and external noise in advance, and secure the power supply and GND areas as wide as possible. (Placing GND under a chip can enhance GND.)	2007/11/28
Noise measures and others	ESD, latch-up, noise	Are ESD, latch up, and noise evaluated with mass-produced products?	Because ESD, latch-up, and noise performance differ between flash and mask products, it is recommended to evaluate such performance with mass-produced products.	Yes / No	For performance data with mask and flash products, Fujitsu is ready to submit internal measurement results as performance examples upon request.	2007/11/28
Noise measures and others	Capacitor	Is a most appropriate capacitor connected near the device for countermeasures against noise?	The capacitor placed for measures against noise may be impaired by reactance components of signal line. (Countermeasures with noise components taken into account are needed.)	Yes / No		2007/11/28
Noise measures and others	How to put in an inductor	Do you avoid connecting an inductor directly to the power supply?	The characteristics of the internal regulator may not be obtained because of reactance components.	Yes / No	If an inductor is input directly to the power supply for the product, a capacitor must be inserted between the power supply for the product and the inductor	2007/11/28
Noise measures and others	Unused-pin processing	Is an unused pin treated with a 2kΩ or higher resistor for pull-up or pull-down? Or, is port output processing performed in the initial routine while the pin is left open?	If an unused pin is processed without intervention of a resistor, a problem such as latch-up may occur if the port level output is opposite to the processing level due to CPU runaway.	Yes / No		2007/11/28
Noise measures and others	Software	If you use Start.asm included in Softune, do you link Start.asm at the first ?	In Start.asm, it generate like RAM clear address automatically. So, you have to care the linking order, if you use Start.asm.	Yes / No	Applicable only when you use Start.asm included in Softune.	2007/11/28
Noise measures and others	Special Guarantee	You may have a contract of special guarantee. If so, did you return the paper with "confirmation stamp (problem: exists/not exists)" clearly stated to your salesperson?	If you have a contract of special guarantee, a test change may be needed. Be sure to return the paper before the ROM release.	Yes / No	Because it may take a few months to perform a test content change, it may be too late to change the test contents if you return the paper immediately before the ROM release.	2007/11/28