

This Customer Design Review Supplement is provided to prevent problems that may arise in the system development of MB90590 series.
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Item	Check	Reason for checking	Result	Remark	Update
CAN	HP-FAQ	Do you know that a reception error cannot lead to a bus-off status?	For a software that is developed assuming that reception errors lead to "bus-off" status, however, processing based on such assumption is invalidated.	Yes / No	2007/11/27
CAN	HP-FAQ	For standard ID processing at reception of CAN data, is filtering processing implemented for IDs other than the target IDs?	For non-target IDs (difference between extended format and standard format), other ID data could be included. Example: For some ID data to be processed, the data cannot be received in the processing routine of the target ID.	Yes / No	2007/11/27
CAN	HP-FAQ	In the reception processing routine, is the data processed by using the reception overrun register (ROVRR) instead of invalidating the target message buffer (BVALR)?	"Hit and Away" can occur.	Yes / No	2007/11/27
CAN	HP-FAQ	Is the error status judged only with the error counter?	There are cases where the error status value and the error counter value do not match after the error counter exceeds a count of 256.	Yes / No	2007/11/27
CAN	HP-FAQ	Do you know that when the reception error count reads REC of 128 or more and a normal reception occurs, the REC is changed to the value between 119 and 127.	There is a need to exercise caution with software that relies on the reception error count.	Yes / No	2007/11/27
CAN	HP-FAQ	Do you know that a glitch can be output to the CAN TX pin?	In terms of system operations, this does not bring about any adverse effects. However, you need to know this as information for system inspection purposes.	Yes / No	2007/11/27
CAN	HP-FAQ	Is a high-precision oscillator used to execute high-speed CAN data communications?	As the tolerance of an oscillator depends on the CAN baud rate, normal communication cannot be made when the oscillator's error is larger than the tolerance.	Yes / No	2007/11/27
CAN	Hit and Away	Is the control of message buffer prohibited processing (BVALR) for the relevant buffer during message reception or while securing message transmission permission?	A "Hit and Away" bypass can occur.	Yes / No	2007/11/27
CAN	HALT bit clear timing	Before clearing HALT bit, is it confirmed that the value of HALT bit is "1"?	When HALT bit is cleared at the timing when the value of HALT bit is changing from "0" to "1," the unconformity of internal operation may be caused.	Yes / No	2007/11/27
CAN	Implementation of RMW instruction to CSR	Do you know that the implementation of RMW instruction to CSR is restricted by the manual?	Because the implementation of RMW instruction to CSR is restricted, the development of a software without RMW instruction implementation is recommended.	Yes / No	2007/11/27
CAN	Processing for DLC of 9 and higher	Is the software fail-safe in anticipation of a DLC of 9 and higher for DLC judgment at data reception?	The CAN standard stipulates DLC of 8 and less. However there is no specification for transmission at DLC of 9 and higher. Accordingly, to avoid problems for transmission of DLC of 9 and higher, we recommend considering the fail-safe approach in developing a software.	Yes / No	2007/11/27
CAN	IDR	Is the message buffer (BVAL) enabled without setting ID in "ID"?	Because the initial value of IDR setting ID is unstable, when the target image buffer is enabled without setting the value, the data of undefined ID may be received.	Yes / No	2007/11/27
CAN	CAN baud rate	Are settings made considering the conditions of all segments for determining the CAN baud rate?	Normal CAN sending and reception cannot occur.	Yes / No	Confirm whether the following conditions in the manual are met: TSEG1 >= 2TQ, TSEG1 >= RSJW, TSEG2 >= 2TQ, TSEG2 >= RSJW
CAN	TX1 setting	Is the P15 pin direction register (DDR1:5) set to "1" to use TX1?	TX1, the sending pin for CAN1, is the pin considered for P15. Accordingly, for CAN output, port output status needs to be set.	Yes / No	2007/11/27
CAN	Acceptance mask register switching	Is the acceptance mask register changed while HALT is "0" ?	Unless the acceptance mask register is changed after setting HALT to "1" and invalidating the message buffer, "Hit and Away" can occur.	Yes / No	2007/11/27
CAN	Reception interruption processing	Confirm that RC is completely cleared in all message buffers in the reception interruption routine of CAN.	It is recommended that the software development is implemented so that the interrupt flag (CR) of an image buffer that is indicated not to be received in the reception interrupt routine of CAN is also cleared considering a fail-safe.	Yes / No	2007/11/27
CPU	Watchdog	Is the watchdog timer cleared by, for example, a timer interrupt? (Are incorrect PLL multiplication settings and the intermittent operation mode considered?)	When the watchdog reset interval is not sufficient, whether a program is proceeding normally cannot be detected.	Yes / No	2007/11/27
CPU	External reset IC	When using external reset IC, is the low-voltage detecting value within the guaranteed operation voltages of the microcomputer? Is the voltage drop between detection and reset considered?	When no reset within the guaranteed operation voltages is entered, a malfunction may occur.	Yes / No	Confirm the guaranteed operation voltage range in the data sheet. 2007/11/27

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CPU	External reset	Does the reset range meet the Fujitsu's standard?	When the reset range does not meet the Fujitsu's standard, recovery cannot be implemented.	Yes / No		2007/11/27
CPU	Power-on reset	Is the standard on electrical characteristics concerning power-on reset being met?	Powering on without meeting the power-on reset standard may result in the execution of commands by CPU without the power-on reset implemented normally.	Yes / No	Applied to systems using reset at power-on (Not applied to systems using power monitoring IC for reset equivalent input).	2007/11/27
CPU	Power-on reset	Are you aware of the registers (CKSCR, LPMCR) that are initialized only by power-on reset?	The registers that are initialized only by power-on reset (CKSCR, LPMCR) are very important registers. In cases where, in terms of system operations, power-on reset cannot be implemented, we recommend using the system by taking the following step described in the manual: HSTX+RSTX (shorting HSTX and RSTX).	Yes / No		2007/11/27
CPU	Hard-wired reset	In FLASH micro computer, the values of reset vector and mode data are determined with an internal circuit. (Reset vector address: FFA000H, Mode data: 00H)	Unless the start address of a program is set to be the fixed vector address of hard-wired reset, the abnormal operation is implemented. Note that this failure is, however, not debugged with an Evaluation(EVA) chip.	Yes / No		2007/11/27
CPU	Reset cause bits	When using the watchdog timer control (WDTC) register's reset cause bits, is the WDTC register read once by using the program default setting, followed by the clearing of the reset cause bits?	The default values of all reset cause bits are undefined. Accordingly, in order to clear all reset cause bits, ensure that the WDTC register is read once before using it.	Yes / No	Applied only when reset cause bits are used.	2007/11/27
CPU	HSTX pin	Are any measures taken for HSTX pin noise?	When any input less than 4t _{cp} is made for HSTX pins, CPU standby mode cannot be released until the next regular HSTX input.	Yes / No	When an input less than 4t _{cp} can be made for the HSTX pin, we recommend using a CPU operation monitor IC such as an external watchdog. (Using an internal watchdog built into the CPU alone will not release standby mode under these circumstances.)	2007/11/27
CPU	Switching of the internal clock operation mode	When switching the internal clock operation mode (PLL, main), is the operation mode switched to another mode?	If, when switching the internal clock operation mode (PLL, main), the operation mode is switched to another mode, problems may arise when switching the mode	Yes / No	See the explanation of the MCS bits in the manual.	2007/11/27
CPU	PLL->Main	In software development, is attention given to the timing of the changes in the CPU's operation speed during the status transition of Main -> PLL -> Main -> PLL when such processing speed does change? (Is consideration given to the need to wait for eight cycles between MCS "1" write and "0" write?)	Within the eight cycles between MCS "1" write (Main) and "0" write (PLL), "0" write can be ignored.	Yes / No	Refer to the explanation of the MSC bit in the manual.	2007/11/27
CPU	Main clock oscillation stabilization wait	Is the required oscillation stabilization wait time identified by obtaining matching data of the system and oscillator?	CPU may be run before oscillation has stabilized.	Yes / No	Make a request of the oscillation evaluation to the manufacturer of the oscillator to be used.	2007/11/27
CPU	Port status in standby mode	Does a transition to the standby mode (stop mode, time-base timer mode, clock mode) take place while any of the following pins is outputting a resource: P06/OUT0, P07/OUT1, P10/OUT2, P11/OUT3, P12/OUT4, P15/TX1, P16/SGO, P17/SGA, P34/SOT0, P35/SCK0	Since, when a transition to the standby mode (stop mode, time-base timer mode, clock mode) takes place while any of the pins on the left is outputting a resource, the resource pin output is maintained regardless of the status of the SPL bit (bit to determine the pin status in low power consumption mode), and chip power consumption may be affected by the input voltage to this pin. To avoid this, it is recommended to switch DDR of the target pin on the left to input before a transition to the standby state in order to prohibit resource output.	Yes / No		2007/11/27
CPU	Time-base timer	Do you know that the counter of the time-base timer is cleared automatically by hardware?	Since the time-base timer is used as a counter of the oscillation stabilization wait time and PLL clock stabilization wait time, the counter is automatically cleared in the following state transitions: - Transition from the main clock mode to the PLL clock mode - Transition to the subclock mode - Transition to the stop mode When the time-base timer interrupt is not prohibited during state transition from the main mode to the PLL mode or from the main mode to the sub-clock mode, an unintended time-base timer interrupt may occur.	Yes / No		2007/11/27
Peripheral	A/D converter	Is analog impedance the analog impedance described in the datasheet or less. When the analog impedance is higher, it is required to set the sample hold time longer or install an external capacitor of approximate 0.1 uF.	When the analog impedance is higher, the sampling time of analog data may become shorter than required time.	Yes / No	Only when A/D converter is used.	2007/11/27
Peripheral	A/D converter	Is voltages of AVR and AVCC are sufficiently stable?	To separate power supplies of analog system and digital system, a reactance device may be mounted in AVR and AVCC. In this case, it is recommended to configure the circuit by adding a capacitor of some micro F so that sufficient power is supplied at A/D start.	Yes / No	Only when A/D converter is used.	2007/11/27

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Peripheral	A/D converter	Is analog sampling time sufficiently long?	Yes / No	When analog input impedance is larger, a glitch may occur at analog input pin. The glitch is determined by the analog impedance and time constant of internal capacitance. When sample hold time is shorter, sample hold value may be affected by the glitch. Because the influence of the glitch is different between FLASH product and MASK product, it is recommended to set a sufficient sample hold time when the analog input impedance is larger.	Only when the analog input impedance used is larger than the analog input impedance recommended by the Data Sheet.	2007/11/27
Peripheral	A/D converter	Are the completion and start of A/D conversion implemented at the same time?	Yes / No	When the completion and start of A/D conversion are implemented at the same time, the later operation, the start of the A/D conversion, may be ignored.	Only when A/D conversion is started during A/D conversion performed.	2007/11/27
Peripheral	A/D converter	Is the analog input enable register(ADER) set to port input mode, when A/D converter is used?	Yes / No	When the port input mode is set with the ADER and A/D input (voltage of medium potential) is implemented, through current flows in CMOS input circuit of I/O port and the current consumption is increased.	Only when A/D converter is used.	2007/11/27
Peripheral	Interrupt	Is the interrupt vector processing of an exceptional interrupt performed?	Yes / No	Runaway may be caused when an undefined instruction is executed due, for example, to runaway.	When an undefined instruction is executed, an exceptional interrupt occurs. Thus, when special processing is needed, jump to the processing. When no special processing is needed, jumping to a reset vector is recommended.	2007/11/27
Peripheral	Interrupt	Is processing of an unused interrupt vector performed?	Yes / No	Runaway may be caused when an unused interrupt occurs due, for example, to runaway.	When special processing is needed, jump to the processing. When no special processing is needed, jumping to a reset vector is recommended.	2007/11/27
Peripheral	I/O port	Do you know that, after power-on without reset input from the external reset IC, the output level of port 0/1 is undefined during step-down circuit stabilization wait time (2*17/HCLK)?	Yes / No	For more details of the target port, see "Device handling" in the hardware manual and data sheet.	Only when the RSTX pin is "H" during power-on reset.	2007/11/27
Peripheral	I/O port	Is processing such as additional writing performed for the purpose of a fail-safe system in important port input/output?	Yes / No	Basically, the port state does not change as long as not set by software. However, for the purpose of making the system fail-safe, it is recommended to insert software of a refresh function such as additional writing into important ports.		2007/11/27
Peripheral	I/O port	When using the CMOS I/O port for output, is the DDRx register set after setting the PDRx register?	Yes / No	Since the initial value of the PDRx register is undefined, if the DDRx register is set for output without setting the PDRx register, the output becomes undefined. Before setting the DDRx register for output, set the PDRx register first.		2007/11/27
Peripheral	Flash	Do you know that FLASH memory cannot be read while writing to/deleting (chip deletion/sector deletion) FLASH memory?	Yes / No	While writing to/deleting (chip deletion/sector deletion) FLASH memory, no interrupt vector on FLASH memory cannot be read, either. Thus, remember that no interrupt processing can be performed while writing/deleting.	Only when FLASH memory is written by the user.	2007/11/27
Peripheral	Flash	When users are allowed to write to FLASH memory in user programming mode, is the hardware sequence flag used to control writing to FLASH memory?	Yes / No	Since the FMCS register cannot be used to check for write/delete errors, it is recommended to use the hardware sequence flag to control writing to/deleting FLASH memory.	Only when FLASH memory is written to by the user.	2007/11/27
Others	General	Do the voltage, ambient temperature, and operating frequency ranges satisfy the standards specified by Fujitsu? When any of them does not satisfy the standards, is any special guarantee considered and supported?	Yes / No	When not used within the guarantee range, no product guarantee can be provided.	Check the guaranteed operation range in the data sheet.	2007/11/27
Others	General	When a special guarantee is considered, is a notification form returned to the Sales Dept. after affixing a "confirmation stamp ((No problem, Problem found) in the reply)" on the notification form?	Yes / No	If a special guarantee is provided, test changes may be needed. Thus, make sure to return the notification form before ROM release.	Since it may take up to several months to deal with test changes, they may not be dealt with when the notification form is returned just before ROM release.	2007/11/27
Noise reduction measures and others	Oscillation	Is oscillation matching data of mass-produced products obtained?	Yes / No	Since oscillation characteristics of flash products and those of mask products may be different, it is recommended to obtain oscillation matching data of mass-produced products.	Make a request of the oscillation evaluation to the manufacturer of the oscillator to be used.	2007/11/27
Noise reduction measures and others	Mode(MOD) pin	Is the same level for processing of the MOD pin ensured even while executing instructions?	Yes / No	The level of the MOD pin may be read incorrectly (When a high-impedance resistor is used for treating the MOD pin, the MOD pin level may not be ensured due to noise).	When external noise tends to propagate to the MOD pin, it is recommended to take countermeasures against static electricity such as connecting a capacitor to the mode pin.	2007/11/27
Noise reduction measures and others	Mode(MD) pin	Is interconnect for treating the MOD pin too long or is there any adjacent high current signal interconnect?	Yes / No	The level of the MOD pin may be read incorrectly due to power supply deviation and noise.		2007/11/27

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Noise reduction measures and others	Oscillation	When using a crystal oscillator, is an appropriate dumping resistor inserted?	To use a crystal oscillator, a dumping resistor to reduce the excitation current is needed.	Yes / No	Make a request of the oscillation evaluation to the manufacturer of the oscillator to be used.	2007/11/27
Noise reduction measures and others	Oscillation	Is the resistance of the dumping resistor for the oscillation circuit determined in view of unnecessary radiation noise and oscillation amplitude?	When oscillation is abnormal or an overshoot or undershoot of oscillation occurs, unnecessary radiation noise may increase.	Yes / No	When a problem of unnecessary radiation noise arises, it is necessary to first confirm the oscillation waveforms and then examine whether to insert a dumping resistor as a measure to reduce unnecessary radiation noise.	2007/11/27
Noise reduction measures and others	Oscillation	Is the oscillator arranged as close to the chip as possible?	CPU runaway due to external noise may be presumed.	Yes / No	It is recommended to arrange the oscillator as close to the chip as possible?	2007/11/27
Noise reduction measures and others	Vcc, GND	Is consideration given to making Vcc and GND as strong as possible?	Problems of unnecessary radiation noise and CPU runaway due to external noise may be presumed.	Yes / No	To avoid problems of unnecessary radiation noise and external noise, it is recommended to take the power supply and GND as widely as possible (By arranging GND under the chip, for example, the GND can be strengthened).	2007/11/27
Peripheral	Unused pin treatment	Is any unused pin pulled up or pulled down by the resistor of 2 k Ω or more? Or, is the port output treatment performed in the initial routine by leaving the pin opened?	When an unused pin is treated without a resistor and the port level opposite to the processing level is output due to CPU runaway, problems such as latch-up may arise.	Yes / No		2007/11/27
Noise reduction measures and others	Capacitor	Is the optimum capacitor connected near the chips as a capacitor for reducing noise?	The capacitor connected to reduce noise may not work with reactance components of interconnect (Measures that take noise components into account are needed).	Yes / No		2007/11/27
Noise reduction measures and others	C pin	The capacitance of the smoothing capacitor connected to Vcc is larger than that of the capacitor connected to C pin?	When the capacitance of the smoothing capacitor is smaller, the internal regulator may become unstable.	Yes / No		2007/11/27
Noise reduction measures and others	Software	Is the setting made in which Start.asm is linked at first at the development with C language?	In Start.asm of Softune, the link is generated automatically at the beginning of the address where RAM is cleared. Therefore, when Start.asm is used, it is necessary to set the order of the link at first because the address information becomes wrong if it is not set.	Yes / No	Only for the use of Start.asm of Softune.	2007/11/27
Noise reduction measures and others	ESD, latch-up, noise	Are mass-produced chips used to evaluate ESD, latch-up, and noise resistances?	Since the resistances against ESD, latch-up, and noise of Flash products and those of mask products are different, it is recommended to use mass-produced products to evaluate ESD and latch-up resistance.	Yes / No	Since it is possible to submit measurement results of Fujitsu as characteristic examples of resistance characteristic data between MASK and FLASH products, make a request of them.	2007/11/27
Noise reduction measures and others	Connection of reactance	Is reactance connected directly with power supply?	The characteristic of internal regulator might not be obtained by the reactance element.	Yes / No	If reactance is put directly in the power supply of chip, it is necessary to connect capacitor between chip power supply and reactance.	2007/11/27
Noise reduction measures and others	Memory map	Are the operation checks made by enabling the guarded break for unused area conforming to the ROM and RAM amounts of the Flash and mask chips in the memory map for tool evaluation?	The built-in memory amount of the EVA chip for evaluation and that of the Flash and mask chip are different. Therefore, the actual chips may not work even if normal operation is confirmed by using a tool.	Yes / No		2007/11/27
Noise reduction measures and others	Bit manipulation instruction	Read-modify instruction is prohibited by some registers of each resource. Is any RMW instruction used in the target register?(Is not RMW instruction executed for the register including write only bit?)	The instruction may not be executed normally, resulting in unintended data being written. Since, when a read-modify-write related instruction (such as SETB) is used on a register with write-only bits, the read value of the write-only bit is undefined, problems may be caused (When safety use of the read-modify-write instructions is described in the manual for a register, no problem will be caused).	Yes / No	Read-modify-write related instruction is indicated in the instruction list by * in RMW.	2007/11/27
Noise reduction measures and others	Stack usage	Is the maximum usage of stack confirmed?	Incorrect estimation of the stack usage could lead to RAM damage.	Yes / No	It is recommended to use the C analyzer of Softune to confirm the maximum usage of stack (Since the C analyzer cannot confirm a dynamic stack, it is necessary to consider the possibility of multiple interrupts when confirming the maximum usage).	2007/11/27
Noise reduction measures and others	Operation mode of tools	Is the operation confirmed by setting the operation mode to the native mode for final tool evaluation?	The native mode and debug mode are available as the operation modes of tools. Since the working speed in debug mode is different from the actual working speed, it is recommended to make an evaluation after setting the native mode.	Yes / No		2007/11/27