
Hardware Reference

MC9S12X family iCARD Debug module

Ordering code	IC30121
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Hardware Reference

iCard General Notes

The iC3000 and iC4000 support a wide range of serial debug interfaces like Motorola's Background Debug Mode (BDM), the Serial Debug Interface (SDI) and the On-Chip Emulation (OnCE) interface. JTAG based debug interfaces are also supported by these Emulators. For each specific debug interface a special iCARD is available.

The iCARD is a PCMCIA-style interface card which contains all necessary adaptations including the target interface cable for a selected serial debug interface. The iCARD plugs into the PCMCIA-style card slot of the iC3000 unit. Features like on-chip-, in-system programming and programming voltage generation are standard features.

Note: Whenever connecting to the target both target and the Emulator must be switched off. The Emulator is first switched on, and the target right afterwards. Note that otherwise during connecting the target a massive current spike may flow during static discharge or ground potential equalization.

On debugging iCards beside the interface specific cable there's a 3-pin connector. The 5V/300mA output provides power to small low-power targets. On some iCards, also the 12V/60mA programming voltage is available and also generated by the iC3000/4000 development system and routed to the iCARD's 3-pin connector. Note that the 12V output is controlled by the software. The output defaults to 5V. On the iC3000 the current for 12V flows from the 5V source. Thus, a 12V/50mA load represents 120mA load on the 5V power source. Note that on interface cards for ActiveEmulator, iTRACE and similar this connector is not available, and also on some iCards, the 12V output is not available since it is not needed.

When not in use, the iCARD should be kept in its protective antistatic bag to ensure its dependability and keep the 68-pin PC-Card connector clean.

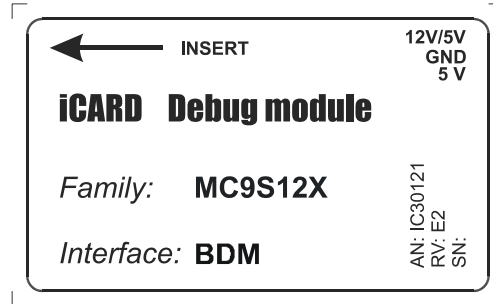
The iCard is a delicate piece of equipment. Always handle it with care, make sure not to bend it or deform it in any way, to keep it clean, etc. If these instructions are not followed, damage to the iCard or the Emulator can occur.

Note: Despite using the same format, iCARDS are not pin compatible with PCMCIA cards. Do NOT use iCARDS in PCMCIA slots and vice-versa! If the iCARD is inserted into a PCMCIA slot, damage to the iCARD and/or the PCMCIA slot will occur. If a PCMCIA card is inserted into the iCARD slot, damage to the PCMCIA card and/or the Emulator will occur.

Hardware Reference

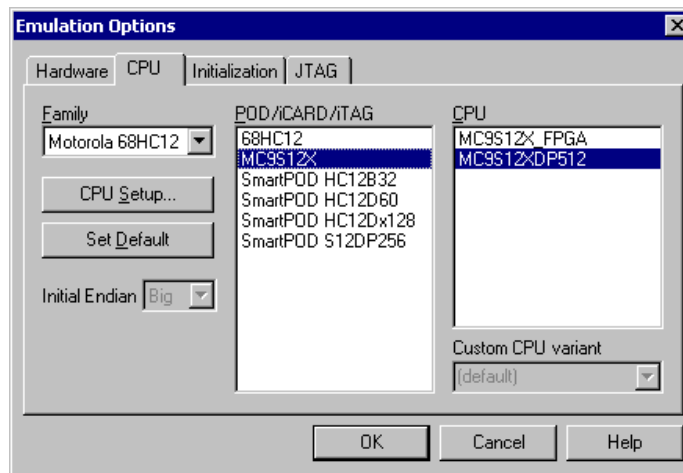
MC9S12X family iCARD Debug module

Ordering code	IC30121
Dimensions (WxLxH, mm)	54x84x5



Supported CPU families
68HC12
MC9S12
MC9S12X + XGATE

Note that when debugging the 68HC12 or MC9S12 families, the 68HC12 iCARD must be selected in winIDEA. When MC9S12X + XGATE is debugged, the MC9S12X iCARD must be selected in winIDEA.



The following pinout is valid on the target side:

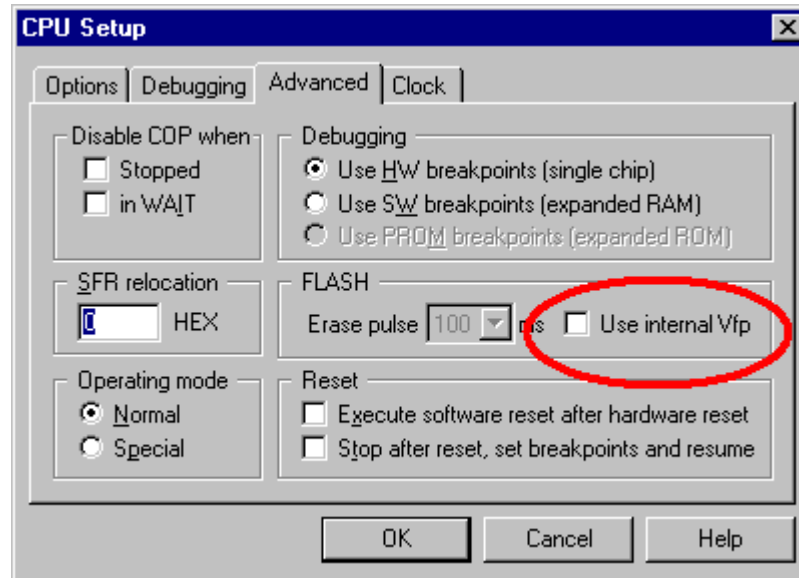
2	4	6
GND	RESET	Vcc
BGND	NC	Vfp
1	3	5

BDM/SDI target side pinout

Important notes concerning FLASH programming voltage (Vfp) on pin 5

The BDM connector varies from the standard connector, as specified by Motorola, in pin 5. The BDM emulator can provide through this pin Vfp (FLASH programming voltage) during FLASH programming. Make sure that this pin is connected only to the CPU's Vfp pin. The programming voltage occurs on this pin and if it is connected anywhere else (e.g. GND), hardware failure may occur.

To control the Vfp voltage on this pin, an option is present in the "Emulation options/CPU/CPU Setup/Advanced" dialog.



Even if "Use internal Vfp" is unchecked, pin 5 of the BDM connector still must not be connected anywhere else but to the Vfp pin of the CPU.

For more information, please consult the Hardware User's Guide.

Note that the Vfp voltage is only required with older 68HC12 CPUs. If Vfp is not required, pin 5 of the BDM connector must not be connected anywhere.

If pin 5 is connected to GND, a short circuit will occur and hardware failure may result.

Hot Attach

Hot Attach is supported for Motorola HC12, HCS12, S12X, HCS08 and National Semiconductor CR16 CPU families (status on June 2004). It allows attachment of the debugger to a running target system without affecting its operation. Refer to the Hardware User's Guide for more details on Hot Attach use and necessary winIDEA configuration.

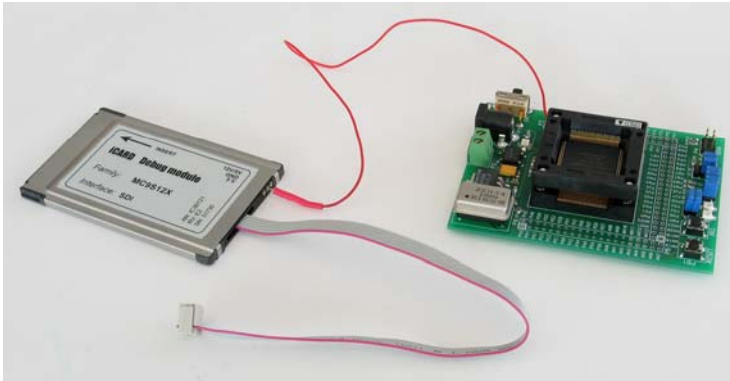
Hardware Considerations

When using Hot Attach make sure that Emulator GND and Target GND are connected before the debug iCARD cable is connected to the target debug connector. The debug iCARD can be damaged if this connection is not established prior to applying the power to the emulator and the target.

Before applying the power to the target and the

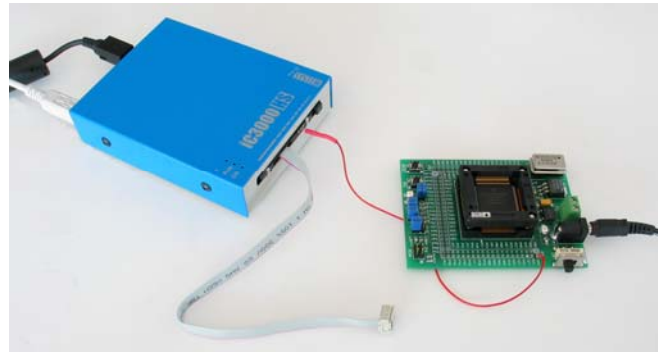


emulator, take a wire and connect it to the target GND. On the other side, connect it to the emulator GND (Picture 1). The emulator has GND accessible at the edge of the debug iCARD.



Picture 2 depicts a system ready for the Hot Attach use. Next, insert the iCARD into the emulator, switch on the emulator and then apply the power to the target.

The target should be running now (Picture 3) and ready for Hot Attach..



winIDEA Configuration

- Check the 'Hot attach to target' option in the 'Hardware/Emulation Options/Hardware' tab.
- Execute Download debug command.
- Connect the debug iCARD cable to the target system
- Select the 'Attach' debug command in the 'Debug' menu to attach to the target system.
- Now, the debugger should display run status and the application can be stopped and debugged if necessary.

Important iCard information

Note: Despite using the same format, iCARDS are not pin compatible with PCMCIA cards. Do NOT use iCARDS in PCMCIA slots and vice-versa!

Note also the direction in which the iCARD is inserted into the iCARD slot. The side with the label is the top side; the arrow shows the direction in which the iCARD should be inserted.

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