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NOHAU CORPORATION

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PRODUCT: EMUL68-PC Windows (Win68)  
SUBJECT: EMUL68-PC WINDOWS INTERFACE SOFTWARE,  
MODIFICATIONS MADE ON EACH RELEASE  
REVISION: April 28, 1998 (Software Release 1.1D)  
FILE NAME: WHATSNEW.TXT  
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\*\*\*\*\* IMPORTANT NOTICES \*\*\*\*\* IMPORTANT NOTICES \*\*\*\*\*

NEW WINDOWS NT IMPLEMENTATION AND NEW INSTALLATION PROCEDURE  
(MARCH 1998)

WIN68 is now fully operational under Windows NT, effective for release 1.1A. With this release, there is a new installation script that allows the user to specify a number of critical configuration parameters such as processor type, and trace board type. Also, the name of the installation files EMUL11.EXE and EMUL11.INI were changed to EMUL68.EXE and EMUL68.INI, respectively.

Because the directory structure of the install files has changed somewhat, it is recommended that you install 1.1A into a new directory. If you wish to keep your existing configuration file, copy the file EMUL11.INI from your old install directory into the new directory before installation, and rename it to EMUL68.INI.

NEW ENHANCED TRACE BOARD (SEPTEMBER 1997)

There is a new trace board called the enhanced trace board, that is similar in function to the new EMUL51 enhanced trace board. It has shadow RAM and code coverage capabilities, and 8 filter/trigger events. Buffer size can be 64K and 256K. Use software release 1.0H or later. We will be issuing an application note to describe its operation soon.

BANKSWITCHING WITH MORE THAN 2 BANKS FULLY OPERATIONAL (AUGUST 1997)

Release 1.0F fixed an initialization problem with bankswitched applications which intermittently caused the emulator initialization to fail if there were more than 2 banks defined. With this release, bankswitching is considered fully operational including support for applications using the internal bankswitching logic of the K family parts. Be sure to review sections 3.9 and 3.10 of the file README.TXT on the release disk if you use the internal banking logic of the K family, or if you

have more than 4 banks.

There are two new sample programs that illustrate bankswitching for WIN68; both have 4 banks. One uses PORTD bits 0 and 1 for bank selection, the other uses the internal banking logic of the K family. These sample programs are contained on the release disk starting with version 1.0F.

#### NEW HELP FILES (JUNE 1997)

Version 1.0D adds an extensive help file derived from the EMUL68-PC Windows User's Manual.

#### NEW HIWARE/ARCHIMEDES LOADER (MAY 1997)

Version 1.0C added support for the Hiware HC11 compiler, resold in the US and other parts of the world by Archimedes Software. Application note 68A005B.TXT is very helpful for users of this package.

#### HIGH-SPEED PARALLEL BOX SUPPORT (MARCH 1997)

There is more good news. WIN68 versions 1.0B and later support the new high-speed box, which connects to the parallel port on the host computer. Emulator operation on the high-speed box is nearly as fast as if the emulator is installed internally. If you have a Nohau serial box (which is not currently supported by WIN68, and there are no plans to do so in the immediate future), you can upgrade it to a high-speed box for a nominal charge. Call your local representative or distributor for details. If you have the old Nohau BOX-P which is in fact an ISA expansion chassis, and you don't need portability, there is no reason to upgrade it to the high-speed box. BOX-P can also be upgraded if you need portability. The part number to upgrade an existing BOX-P or BOX-S to high-speed parallel box is EMUL-PC/HSP-SET.

#### NEW WIN68 MANUAL AND PRODUCTION RELEASE (FEBRUARY 1997)

We have good news for all WIN68 users. THE WIN68 USER'S MANUAL IS HERE. And the first non-beta software release (version 1.0A) is being released concurrently. We have put a lot of effort into the manual, and hope you think it was worth waiting for. If you purchased EMUL68-PC within the last year or you have a current software subscription agreement, call Nohau tech support and ask them for a copy of the manual. If it has been more than a year and you don't have a software subscription agreement, call tech support to find out how to purchase one.

#### RETRIEVING AN UPDATED INSTALLATION DISK

An image of the installation disk for the latest revision of WIN68 can be retrieved from Nohau's FTP site on the Internet or from the Nohau BBS in the RELEASE directory. The web site address is [www.nohau.com/sftw](http://www.nohau.com/sftw), and the phone number for the BBS is 408/378-0940. A password and user name are required to download programs from the web site or from the BBS -- these are available from Mike Quirk in Tech Support at the Campbell Office

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(408/866-1820). You will need to have purchased your EMUL68 product within the past year, or have a current software subscription agreement in force to be able to download new software releases.

#### SUPPORTED COMPILERS AND ASSEMBLERS

Compilers from COSMIC, HIWARE/ARCHIMDES, IAR, TASKING/INTERMETRICS/WHITESMITHS and INTROL are fully supported at the source code level. The TASKING/INTERMETRICS/WHITESMITHS product is a package developed mostly by COSMIC but which is no longer maintained by COSMIC. It is now supported to a limited extent by TASKING, who plans no further development. COSMIC released its own version 3.6 which added some new features, and is now shipping a major new release (Version 4) for the HC11. Version 4 employs a different binary format for the files output from the linker, and WIN68 cannot load native format Version 4 files as it could for version 3.6 and earlier. However, WIN68 can load binary files converted to the IEEE-695 format by the utility program CV695, which comes with the V4 compiler package. Version 5.3 or later of the CV695 converter will allow you to correctly view parameters and local variables from the emulator.

There is limited support for the HiTech/Avocet C compiler. Avocet sells the HiTech compiler but adds its own assembler and linker. If you use the Avocet version, set the -AVMON switch to cause the assembler to generate the HiTech format. Both HiTech and Avocet assembler users have symbolic support, but you cannot see assembly source code in the source window. With the Avocet package, you can use the CONVERT utility included with release 1.0E or later to view assembly listing files in the source window.

The Hiware/Archimedes C compiler is supported on WIN68, as of release 1.0C. If you use a compiler purchased from Archimedes Software while they were reselling the IAR compiler (before 1995), then you will also have full symbolic capability.

The 2500 AD C compiler is not supported at this time.

Users of Motorola's MASM 5.3 assembler have full symbolic support, and the ability to view source code in the source window. Set assembler options -Y, -O and -A. Ask the linker to put out an S19 formatted output file and a P & E map file. (If you use the Windows setup, check the S19 box and the P & E map file box.)

#### NEW UTILITY CONVERT.EXE TO VIEW ASSEMBLY LISTINGS IN THE SOURCE WINDOW (AUGUST 1997)

If you use the COSMIC version 4, Introl, or Motorola MASM assemblers, you have probably noticed that assembly source code appears in the source window if you set the assembler options appropriately.

If you use another assembler such as the IAR, Avocet, or COSMIC version 3, you cannot see source code in the source window due to

limitations of the assembler itself. However, there is some good news.

The utility program CONVERT was developed at Nohau for the EMUL51 family, so that assembly language users could at least see assembly listings in the source window. CONVERT has been recently show to work for HC11 assemblers from IAR and Avocet, and could easily be customized for others such as COSMIC-INTERMETRICS version 3. The CONVERT program reads listing files generated by the assembler and creates a file with extension SYM that can be loaded into the emulator. The result is that assembly listings appear in the source window when the PC points into an assembly language module, and the diamond in the source window tracks the PC just as if it were showing source code. If you mix C and assembler, then you should still be able to view C source code in the source window as before.

CONVERT.C is the source code for CONVERT, and now appears on the release disk. There is also an executable file CONVERT.EXE and a documentation file CONVERT.DOC which describes how to use and customize CONVERT for your particular assembler. Nohau no longer develops and maintains CONVERT in the sense of trying to keep it compatible with the latest release of all assemblers. However, instructions are included in the file CONVERT.DOC that specify how to modify the program for your specific assembler if it does not work as shipped.

#### UPDATED README.TXT FILE

Please review the file README.TXT that comes with the distribution disk. If you have a banked application with more than 4 banks, please read sections 3.4 and 3.14 of README.TXT for a description of pod connections required to view the bank number as the fifth digit for addresses displayed in the trace buffer.

#### RECOMMEND MOTOROLA PROGRAMMER FOR EPROM-BASED PARTS, WHICH NOW SUPPORTS THE PH8 VARIANT

If you use the PH8 variant which has 48K of ROM or EPROM, then you may wish to consider using the Motorola EPROM programmer for HC11's. It has a new adapter for PLCC versions of the PH8. This would be easier to use than the suite of files created to program the PH8 with the DOS interface, and the Motorola programmer is quite inexpensive.

#### SOME OF THE KNOWN BUGS

The following is a partial list of known bugs/deficiencies in the current release of WIN68.

1. Bankswitched users of older versions of the IAR compiler will not be able to specify the name of a function in the banked area in a dialog box that asks for an address (such as the breakpoint setup dialog box). This is due to the way the older versions of the IAR compiler create a global symbol in the root bank for each function in the banked area; these global symbols have the same name as the



function and specify its banked address.

2. The "Reset and Go" menu item in the Run menu is the equivalent of the GO FROM RESET command in the DOS software. However, like the DOS software, the emulation cycle counter and trace buffer include cycles that occurred during the reset phase of the command, which lasts approximately 200 ms.

3. The checkbox "Connect Reset to Target" selects the state of the CMOS switch on the pod that controls the connection between the RESET pin on the CPU, and the reset signal on the target. This checkbox does not appear to work and the switch is always closed. If you have a chip on your target that performs a watchdog function and pulls RESET low if the chip is not reset regularly, then you should lift the pin on the chip that connects to the reset signal to prevent the processor from being driven into reset when your program is not running (i.e. the emulator is "stopped").

4. For uses of the COSMIC/INTERMETRICS/WHITESMITHS version 3 compilers, the C call stack will not show correctly for functions whose first argument is of type "char" or "unsigned char", if the module is compiled without the option "-dnowiden" to prevent the compiler from widening char arguments /to ints. The call stack shows correctly if "-dnowiden" is specified.

5. If it is impossible to break emulation once the emulator is running, either from doing Go, Step or Step Over, then your pod selection probably does not match the default SFR base address jumpers on the emulator board. The general rule is that pods for C, D, K, N, and P family parts require the default SFR address jumpers to be set for zero, all other pods have a default SFR address of 1000 (which is the jumper setting installed at the factory on all emulator boards regardless of the type of pod shipped with it). Eventually, the WIN68 interface software will be able to detect the situation and display a warning box.

6. When emulation resumes after stopping at a breakpoint or after executing a step command, and at least two instructions are executed before breaking again, the following anomalies are seen:

- a. Time stamp for cycles executed during the first instruction after emulation is started will be incorrect.

- b. The execution cycle counter will not show cycles consumed by the first instruction executed after emulation is started.

7. Users of the COSMIC/INTERMETRICS/WHITESMITHS C compiler should avoid performing a "Step Over" command at the instruction level (program window is selected) when the PC points to a JSR or BSR instruction that does not return to

the next byte immediately after the JSR/BSR. This causes the emulator to hang for a few seconds, and possibly cause breakpoints to be installed where they are not declared. The COSMIC/INTERMETRICS/WHITESMITHS C compiler will generate such code in the function prologue of functions that declare 3 or more total bytes of local variables. This problem has been fixed for step over at the source level in version 1.0B.

#### PATHS TO INTERNAL EMULATOR FILES

Be sure that the path defined for internal emulator files (as shown on the "Configure Paths" dialog box) points to the subdirectory STR\_SYM below the directory into which WIN68 was installed, so that the latest STR, SRB, and SYM files will be used. If you copy your emulator files to another directory, please modify the internal emulator files field on the Configure Paths dialog box appropriately.

Be sure to use the STR and STB files included with the WIN68 distribution disk, and not those from a DOS software release especially one before 5.2A. If you do, the emulator will not work correctly if at all. At this time the latest STR/STB files were created on August 23, 1995 except for BOARDID.STR, which was created on August 21, 1995.

#### TRACE PRESCALE FACTOR AND TIME STAMP

If you plan to use the time stamp feature, be sure to set the prescale factor on the trace setup screen to something other than zero, otherwise all time stamps will show as zero. A value of one is the normal setting.

#### \*\*\*\*\* MODIFICATION HISTORY \*\*\*\*\*

##### IMPROVEMENTS MADE IN VERSION 1.1D (April 28, 1998)

1. Corrections were made to the high-speed box driver to eliminate occasional crashes of the interface software when used on very fast computers (266 Mhz Pentium II or faster).

##### IMPROVEMENTS MADE IN VERSION 1.1C (April 24, 1998)

1. During creation of the Windows NT driver in version 1.1A, timing of basic emulator operations was simplified and timeout values were set for extremely long times. This caused the emulator to appear to hang or crash in situations where only a short delay occurred before. On this release, a new timeout scheme was implemented that works under both Windows 95 and NT so that timeout values are again inversely proportional crystal speed, and much more realistic. This should eliminate the long delays that some users have seen.

2. A bug appeared on version 1.1A as a result of the restructuring required to implement the Windows NT driver; that

is, if the Reset button is clicked while the emulator is running the interface hangs indefinitely and the only way to exit is to end the task. This problem was fixed.

#### IMPROVEMENTS MADE IN VERSION 1.1B (March 20, 1998)

1. Version 1.1A introduced a bug that caused some systems with POD-11S or POD-11E to not function. That bug was corrected.
2. The dialog box in the install script that asks for pod type was changed slightly. The option "Extended Mode Pod" was changed to read "Expanded Mode Pod" to be more compatible with Motorola terminology.

#### IMPROVEMENTS MADE IN VERSION 1.1A (March 8, 1998)

1. Windows NT is now fully supported for all existing Win68 configurations, including the high-speed parallel box. Operation is slightly slower under NT than under Windows 95 or 3.1 because of the overhead incurred communicating with the new kernel-mode driver called Nohau68.sys.
2. The cursor now changes to an hourglass (or the functional equivalent for Windows 95/NT) while scrolling the trace buffer when time stamp is displayed in one of the absolute modes (absolute time or absolute cycle). Scrolling through a 256K buffer on the ETR can take up to 1 minute in absolute time stamp mode with the high-speed parallel box, because of the time required to read and process every frame in the trace buffer.
3. A new installation procedure was created for this release. This installation procedure handles the task of installing the driver and creating or modifying the Windows NT registry appropriately. The user may now specify during installation many of the critical configuration parameters, such as type of pod and type of trace board.
4. The names of the principal executable file and the related .INI file for WIN68 were changed from EMUL11.EXE and EMUL11.INI to EMUL68.EXE and EMUL68.INI. The new install script will recognize the old .INI file, and rename it to EMUL68.INI before updating it as specified during installation.
5. A bug was fixed that under rare circumstances caused the emulator to freeze for a period of time. If a data window was opened while an ETR trace board is installed, address space for that window changed to "Shadow", and the trace board changed to standard trace, then the next time emulation is started the interface does not respond to commands for long periods of time. This is an extremely rare situation.
6. The IEEE-695 loader used by COSMIC V4 customers was fixed to properly handle path names to source files that contain an extension.
7. When bankswitching is enabled, it is no longer necessary to

exit and reenter the Win68 interface software when the memory map is changed.

#### IMPROVEMENTS MADE IN VERSION 1.0P (January 14, 1998)

1. In certain situations, the trigger frame on the trace display was labelled frame #1, when it should have been frame #0. This was fixed.
2. For ETR68 users, the S5 counter value that appears in the rightmost field of the trace toolbar will now show the correct value.

#### IMPROVEMENTS MADE IN VERSION 1.0N (January 6, 1998)

1. For users of the new ETR68 trace board, when the code coverage feature is active (Coverage window is open), a 1-character symbol was added to each line in the program window just to the right of the address, and to each line in the source window just to the right of the source file line number. This symbol indicates the status of coverage for the instruction(s) associated with that particular line. For the program window, the status character refers to the instruction on that line as follows:

status character	meaning
x	instruction has been executed (one or more bytes of instruction opcode were covered)
:	instruction has not been executed (no bytes of opcode have been covered)

For the source window, status character refers to the instructions generated by that source line, as follows:

status character	meaning
-	no instructions executed
%	some but not all instructions executed
+	all instructions executed
&	this line did not generate any instructions

2. The "Source Only" filter option available for the ETR68 was fixed.
3. The trace toolbar was made slightly larger and cleaned up to improve readability and appearance.

#### IMPROVEMENTS MADE IN VERSION 1.0M (December 10, 1997)

1. The PPA used in conjunction with the ETR trace board was fixed.

#### IMPROVEMENTS MADE IN VERSION 1.0L (December 8, 1997)

1. Recent versions of the IAR C compiler use register Y to hold local variables under some circumstances. In previous releases of WIN68, when the user attempted to step through a function that uses register Y to hold a local variable a red-hand warning message appeared each time emulation stopped. The red-hand warning will no longer appear and the user may now inspect or watch the variable defined in register Y.

2. The names of special function registers are no longer automatically added to the symbol table. Previously, the name of each SFR was added to the symbol table with a value equal to the offset from the SFR base. This only works if the SFR's start at zero.

3. The Hiware/Archimedes loader was repaired so that it can correctly process line number information from assembly source code.

4. The value of TIMER2, a 32-bit counter on the standard trace board (i.e. with 4K or 16K trace buffer) is now shown in the rightmost field of the trace toolbar. TIMER2 is turned on when A condition is true, turned off when B condition is true, and counts ECLK cycles when on. A frequent use of TIMER2 is to determine the percentage of cycles consumed by a particular function and all of the functions that it calls. This can be accomplished by setting the A condition to be true when the function is entered, and the B condition to be true when the function exits. The ratio of the value of TIMER2 to the total cycles elapsed as shown by the execution cycle counter is the fraction of time spent in the function.

5. A problem was fixed that was introduced on the last release. This problem caused malfunction of the trace when the high-speed box was used in conjunction with a PC that runs at 166 Mhz or faster.

#### IMPROVEMENTS MADE IN VERSION 1.0K (October 30, 1997)

1. For high-speed box users, the restriction that the emulator and trace board both be configured to reside within the same 32 byte window in I/O space was removed. This provides for the use of the ETR68 in the high-speed box, since the ETR68 requires 32 locations by itself.

2. A minor change was made to the high-speed box driver to accomodate some PC's for which the previous driver did not work because of slow rise and fall times in the parallel port.

3. For the ETR68, the value of the S5 counter is now shown on the trace toolbar in both cycles and microseconds.

4. A bug was corrected that caused a general protection fault to occur when the "Write without readback" command was used, and an ETR68 trace was installed.

5. Display of multi-byte values in a shadow RAM window was corrected.

6. A fix was installed in the code coverage feature to prevent a general protection fault when a coverage report was requested in "source only" mode.

#### IMPROVEMENTS MADE IN VERSION 1.0J (October 22, 1997)

1. For the new enhanced trace board, the status of each state is now displayed on the right side of the trace status bar.
2. Corrections were applied to the time stamp algorithm for the enhanced trace board.
3. The "Got Trig" display on the trace toolbar for the ETR68 was fixed.
4. Problems with removing the coverage window were addressed. A bogus coverage window would sometimes appear when the emulator interface was started, after the coverage window was closed prior to exiting.
5. Display of double precision floating point values in watch and inspect windows was fixed.

#### IMPROVEMENTS MADE IN VERSION 1.0H (September 26, 1997)

1. Support was added for the new enhanced trace board.
2. A bug was fixed that caused erroneous time stamp values to be displayed if the trace stopped and the emulator was still running.

#### IMPROVEMENTS MADE IN VERSION 1.0G (September 8, 1997)

1. Items dealing with serial port configuration on the hardware configuration screen were grayed out, as WIN68 does not (and probably never will) support the serial box. Eventually, these fields will be removed after the manual is updated. Items dealing with the high-speed box were unchanged.
2. A bug was fixed such that if emulation stops at a breakpoint, then one or more steps are performed, and finally a value shown in a DATA window is changed by entering a new value, the diamond in the source window pointing to the source line encompassing the current PC would incorrectly revert back to where the last breakpoint occurred.
3. Fix a problem displaying values in any window if the address range for the values shown in the window overlaps 10000 hex. In this case, all values in the window were incorrectly displayed as "\*\*\*".
4. Fix display of time stamps in the trace buffer window when the time stamp prescaler is set to any value greater than 1.



5. Another attempt was made at displaying double precision floating point values in watch and inspect windows. Be sure to set byte order for floating point to "Motorola" on the Preferences dialog box accessible from the File menu, in order to view float and double values correctly.

6. Further improvements were made to the demonstration mode, activated by setting port address for the emulator to zero. A bug was fixed that caused the first attempt to load a user file to be ignored after the interface was set into demo mode from normal mode, or when the interface was started in demo mode.

#### IMPROVEMENTS MADE IN VERSION 1.0F (August 12, 1997)

1. A serious bug causing intermittent failure of the bankswitching initialization logic was fixed. This bug caused intermittent failure for banked applications with more than 2 banks. The primary symptom of the problem was an error box displayed on the screen with the title bar that read "Error sending bank select table".

2. Two new banked demo programs were added to the release disk in the EXAMPLES subdirectory: BNKDEM11.ZIP and BNKDEMK.ZIP. Both have 4 banks, and BNKDEMK.ZIP uses the internal banking logic of the K family. There is a DOC file in with each program that describes the proper pod connections.

3. Display of double precision floating point values was corrected.

4. A new help file was installed that repaired some minor problems in the previous version.

5. A utility program called CONVERT was added to the release disks. This program allows listing files generated by an assembler to appear in the source window if the assembler does not generate sufficient information for the emulator to display assembly source code there. See the section above entitled "NEW UTILITY CONVERT.EXE TO VIEW ASSEMBLY LISTINGS IN THE SOURCE WINDOW (AUGUST 1997)" and the file CONVERT.DOC included on the release disk for more information about this program.

#### IMPROVEMENTS MADE IN VERSION 1.0E (July 7, 1997)

1. Clicking the OK button on the banking setup dialog box now does a complete emulator reset, obviating the need in previous releases to perform an emulator reset after changing the banking setup. (Emulator reset could be done by opening the emulator hardware configuration dialog box and pressing OK, or selecting "Emulator Reset" from the Run menu.) This will cause a longer delay than before after pressing OK from the banking setup dialog box.

2. The Hiware/Archimedes loader was fixed to correctly determine the end address for functions in the bank area, when bank number

is greater than zero.

3. In the SpecialRegs window, bit fields that appear are now saved and restored when the program is terminated and restarted.

4. The Write Without Readback feature on the View/Edit menu now works correctly.

5. The display of relative time stamp value is now correct when the time stamp counter rolled over since the previously recorded frame, and the option to record overflow frames is not selected.

6. The IAR loader has been updated to skip over many of the new record types added by IAR on version 4.00 and later. If you cannot load your program because loading terminates prematurely displaying an error box with "undefined tag" or "undefined subtag", try relinking your program specifying the "-Y#" linker option which specifies the old version 3 binary file format. (On IAR's new windows IDE, select the option to generate the version 3 file format.) IAR has been telling customers not to use this option because they claim the file loses valuable debug information. In fact, the debug information removed by the "-Y#" option is only useful to IAR's CSPY simulator; EMUL68 simply ignores it.

#### IMPROVEMENTS MADE IN VERSION 1.0D (June 30, 1997)

1. An extensive help capability was added.

#### IMPROVEMENTS MADE IN VERSION 1.0C (May 20, 1997)

1. The COSMIC Version 4 Compiler is now fully supported, including correct display of parameters and local variables in inspect and watch windows. You must use the native to IEEE-695 format converter called CV695, version 5.3 or later, available from COSMIC. The loading of label information for assembly language source for the COSMIC V4 assembler was corrected, so that assembly source now appears in the source window. To step in the assembly source code, however, please select the program window.

2. The Hiware HICROSS V2.7 compiler is now supported at the source level by WIN68. This product is marketed in the USA and parts of the world by Archimedes Software. The C call stack is not yet supported.

3. Numerous problems with source line stepping for users of the IAR compiler were fixed, including stepping off the end of a function in the bank area.

4. If emulation stops with the PC pointing into a module that has no debug information (such as a module pulled from a library supplied by the compiler vendor), then executing a step or step over instruction with the source window selected will cause the emulator to stop at the first instruction of the next source line

to be executed that was compiled with debug information.  
Previously, emulation would stop at the next function called.

5. There is a new suite of programs and command files for programming the EPROM in the HC711PH8 and all other HC11 derivatives with 48K of EPROM. The normal PROGRAM command does not work with these parts, and you must use the new batch files if you wish to program them. They are stored in the installation directory as a file called PROGPH8.ZIP.

6. The trace search dialog box was modified to correctly show that "Search Next" is Ctrl-X, not Ctrl-S as previously shown.

#### IMPROVEMENTS MADE IN VERSION 1.0B (March 20, 1997)

1. Support for the high-speed box was added. To select the high-speed box on the emulator hardware configuration screen, under "Connection Type:" click on "High Speed Box", and below that select the parallel port to which the box is attached (LPT1 - LPT4). If you have a trace board, the current implementation requires that base I/O port addresses for emulator and trace boards have the same values for address bits A5-A9 (A10 to A15 are ignored). For example, if the emulator is at 120 hex, then the trace must be at 130 hex and vice versa. It would not work to have the emulator at 120 and the trace at 140. A future release will remove this limitation. This should not be a serious limitation since emulator and trace boards installed in the high-speed box will not conflict with boards installed at the same address in the host PC.

2. A problem was fixed that causes the emulator to hang for a few seconds for users of the COSMIC/INTERMETRICS/WHITESMITHS compiler. The situation occurs if the operator tries to perform a step over command at the source level when the PC is pointing to the function prologue (initialization code) of a function that declares 3 or more bytes of local variables. The problem has to do with the fact that for this type of function, the first instruction is a JSR to a library function that does not return to the next byte after the JSR; the next byte is a parameter for the library function and return is made to the instruction following that.

#### IMPROVEMENTS MADE IN VERSION 1.0A (February 25, 1997)

This is the first full-production release.

1. A correction was made for users of the Avocet assembler so that user-defined symbols now appear in the program window.

2. The Registers window was changed so that all quantities displayed are shown with leading zeros. This makes viewing individual bits in the CC register easier.

3. The program window was fixed so that the opcodes for 5-byte instructions display correctly. Previously, the 5th byte was displayed incorrectly.

4. Before this release, the probe fields were accidentally reversed in the dialog box to define a trace condition qualifier -- conditions specified for PROBE1 were applied to PROBE0, and vice versa. This has been corrected.

5. A bug was fixed with the trace configuration logic such that when the PPA was terminated and normal operation resumed, an active trace filter was not being reactivated and all frames were recorded.

6. A major speed improvement has been completed. Previously, each time emulation began trace condition information was being written to the trace board. This adversely effected the time it takes to do a go, step or step over operation when the trace configuration had not changed. Now, trace condition information is only written to the trace board in the following circumstances:

1. The user clicks OK on the trace setup dialog box.
2. The PPA is started or stopped.
3. The user interface software is first started.
4. The Reset Emulator option on the Run menu is selected.

7. Several cosmetic changes were made to the trace setup screen.

8. The trace buffer display was compressed so that time stamps will show if your display is configured for 640 x 480 mode.

9. The trace buffer display was changed so that the "data" field can contain instructions up to 5 bytes in length. Previously, only the first 4 bytes of an instruction could be viewed.

10. The trace buffer display was expanded for bankswitched applications. The address field now shows bank number as the fifth hex digit (10000's place) for frames recorded from the bank area. For example, an access to bank 4 at location C000 would show as address 4C000. Frames outside of the bank area are unchanged and show only in the range from 0 to FFFF regardless of the currently selected bank. If you have more than 4 banks, then to view correct bank number in the trace buffer you need to connect signal BSW2 (and BSW3, if you use it) to PROBE1 bis 0 and 1, respectively. PROBE1 is a header on the pod. Please see Sections 3.4 and 3.14 of the file README.TXT included with the distribution disk for more information.

11. The PPA facility was modified to better support bankswitched applications. On the address range for a bin in the bank area, the user must now specify a bank number as the 5th digit (the 10000's digit). For example, address C000 in bank 4 would be specified as 4C000. C000 in bank zero could be entered simply as C000, or 0C000. This scheme was designed to match the way symbols in the bank area are defined in the symbol table. To select a specific function in the banked area for a PPA bin, double click on the function name shown in the function list displayed in the "Add a PPA bin" dialog box, and then click the ADD button just as you would for a function not in the bank area. The name of the function will be shown in parentheses after the

range on the main PPA window, and bank number will appear as the 5th digit of start and end addresses. If you have more than 4 banks, then for the PPA to work correctly in the bank area you must connect signals BSW2 (and BSW3, if you use it) to the pod's PROBE1 bis 0 and 1, respectively. Please see Sections 3.4 and 3.14 of the file README.TXT included with the distribution disk for more information.

12. The dialog box to add a bin to the PPA was modified to show the module name containing each function listed, in the scrolled window showing all program functions. Previously, module names for functions were not visible because the box in which they were shown was not large enough. The control that allowed selection of a bank number was removed, as bank number is now specified as the 5th hex digit of an address (see item 9 above).

13. When the user performs an emulator reset by closing the Emulator Configuration dialog box using the OK button or by selecting "Reset Emulator!" from the Run menu, the symbol table is no longer cleared and current breakpoints are no longer removed.

#### IMPROVEMENTS MADE IN VERSION 0.9L (February 14, 1997)

1. A bug was fixed in the logic to perform single stepping at the source code level, whereby users of the IAR compiler would sometimes not be able to step into a function in a different source file from the one displayed in the source window.
2. The trace local menu was changed so that a checkmark will appear next to the "show timestamp" option if one of the four timestamp options is currently selected.

#### IMPROVEMENTS MADE IN VERSION 0.9K (January 27, 1997)

1. The symbol files for all processor families were updated to accurately reflect the registers for each particular family. Individual bits will be added in the future.
2. The feature to automatically pulse the COP in monitor mode (not running the user program) was fixed.
3. D family pods now work with WIN68.
4. The option "Reset Signal To Target" that appears on the Emulator Hardware Configuration screen has been fixed. This option will open or close the software-controlled switch that connects RESET on the target to the RESET pin on the chip.
5. The option to override the BPROT after reset in monitor mode has been fixed. This option does not work on K family parts with either the Windows or DOS software, because of cycle stretching enabled out of reset. It does work on KA and all other families.
6. The loader for COSMIC/INTERMETRICS/WHITESMITHS files was modified to remove duplicate symbols with a leading "\_" that



appeared in the symbol table. All symbols defined in assembly language modules will now have the first "\_" stripped off, so symbols with two leading underscores, such as "\_\_stext" will appear in the symbol table as "\_stext" (with one leading underscore).

7. Please note that in the SpecialRegs window, the address for each register shown is now the offset from the register base address, as defined in the low-order 4 bits of the INIT register. In releases prior to 0.9I, it showed the absolute address.

#### IMPROVEMENTS MADE IN VERSION 0.9J (January 24, 1997)

1. The C call stack was fixed for users of Introl and IAR compilers.

2. The COSMIC C call stack should work now if the -dnowiden option is specified.

3. A bug was fixed when a step or step over was issued at a final return statement or the closing brace of a function, and the return is to the closing brace or final return statement in the calling function. In this case, the emulator did not stop at the closing brace or final return of the calling function but stopped in the function that called it.

4. The symbol files for the Default CPU symbols and SpecialRegs windows were redone so that each family has its own unique .SYM file. Previously, there were only 4 symbol files corresponding to the .STR files. Therefore, the A, E, F, J, and L families all shared the same .SYM file.

5. The SpecialRegs and Default Symbols windows were upgraded to display correct values for SFR's even if the SFR's had been moved by writing to the INIT register.

6. A bug was fixed in the logic to toggle breakpoints on a set of source lines that were specified to the same memory address. Previously, if the user clicked on the last line of such a set of lines that was highlighted because a breakpoint was set, the last line was no longer highlighted but the other lines remained highlighted. Now all the lines will be cleared.

7. A note to Introl users: to step through an assembly language source module shown in the source window, select the Program window before stepping. Source line stepping only applies to C modules. This may be fixed in the future.

8. On program startup and after clicking OK on the emulator hardware initialization screen, the interface software was actually performing the initialization sequence twice. This is no longer the case.

9. With the COSMIC compiler, when emulation stops at a function with no parameters and no locals, the function declaration statement will be show in the source window. Previously, the



next line containing the opening brace was shown in the source window and the function declaration was not shown.

#### IMPROVEMENTS MADE IN VERSION 0.9I (December 13, 1996)

1. A bug in the memory mapping logic for bankswitched boards was fixed. This bug caused unexpected breaks on the bankswitched board if some of memory was mapped to target.
2. Several problems with the COSMIC/INTERMETRICS/WHITESMITHS V3 loader were repaired. First, the initial underscore on symbols defined in C modules was removed. Second, a problem where the emulator incorrectly determined the last location in a function was fixed.
3. An improvement to the C call stack window was made for users of the COSMIC/INTERMETRICS/WHITESMITHS version 3.32 or COSMIC version 3.6 compilers. The window will now show the two lowest-level functions of the C call stack correctly. That is, the C call stack window will show the current function and the function that called it. If the program counter points to the first instruction to a function (or anywhere in the function prolog), then the call stack will only show the current function and values for parameters will be incorrect. We are working on a solution for this problem.
4. It was discovered that with the COSMIC V4 compiler used in conjunction with COSMIC's CV695 format converter, local variables do not display correctly. The problem has been traced to a deficiency in the CV695 converter, which has been reported to COSMIC.
5. Single-stepping off the end of a function was improved. In some cases, a step in the source window would result in a break after the JSR in the calling function even if there were additional instructions between the JSR and the start of the next source line. With the IAR compiler, there are still some problems stepping off the end of a function, but we are working on fixing this soon.
6. There is a new screen that duplicates the DDI command in the DOS interface. This screen can be viewed by selecting the "Display debug info" menu item from the Help Menu. The information displayed can be used to determine if the emulator and its software are correctly configured. The most significant fields shown are as follows:

LUT	a lookup table used by the emulator to find memory blocks that have no internal memory
SFR	range where the emulator has determined the SFR's are located
inRAM	range where the emulator has determined the internal RAM is located.

EEPROM     range where the emulator has determined the EEPROM  
            is located. A range from 0 to 0 implies the  
            EEPROM is not enabled.

INIT        the emulator's latched copy of the low-order 4  
            bits of the INIT register (which define the high-  
            order 4 address bits of the SFR registers).

#### IMPROVEMENTS MADE IN VERSION 0.9H (November 21, 1996)

1. WIN68 can now load COSMIC Version 4 binary files after conversion to IEEE-695 format using a converter available from COSMIC called CV695. (Don't use TO695 -- that is a converter for Version 3.6 binary files to IEEE-695.) There is a bug in CV695 such that arrays of structures get the wrong type information and cannot be viewed in an inspect window. COSMIC V3.6 and COSMIC/INTERMETRICS/WHITESMITHS V3.32 files are still loadable in the native format, and do not require conversion to IEEE-695 format.
2. The COSMIC native format loader will now correctly enter global symbols defined in assembly language modules into the symbol table.
3. The cycle counter now gets reset to zero when a "Reset and Go" command is issued. It will still count cycles that occur while the RESET signal is active, as before.
4. A bug was fixed in the banking setup screen: the bank pattern table was not getting processed correctly when the banking setup screen was closed. The EMUL11.INI file was updated so that the bank pattern table would be correct after the interface was closed and restarted.
5. The in-line assembler was modified to ignore a leading dollar sign in hex constants, and to allow a symbol to be used for relative jump instructions.
6. Data windows will now display floating point values correctly. Previously, the software assumed Intel byte order for floats, rather than Motorola byte order.
7. When entering a value into a data window if one of the multi-byte integer formats is selected for that window, bytes no longer get stored in reverse order. For example, if you enter E000 into a data window when display format for that window is 16-bit hex, then 00E0 was written to that location in memory.

#### IMPROVEMENTS MADE IN VERSION 0.9G (October 30, 1996)

1. Bankswitching is now fully supported but with the following caveat. If you use the bankswitched emulator board whether or not banking is enabled, after opening the memory map setup dialog box and subsequently closing it by clicking on the OK button you must do a full emulator reset, reload your program and reinstall all breakpoints. This is required even if you didn't change the

memory mapping before clicking on OK. If you closed the memory map setup screen by clicking on CANCEL, then no action is required. A full emulator reset can be performed by doing one of the following: a) exit the interface software and restart it, b) open the emulator hardware configuration dialog box and then click on OK, or c) open the emulator hardware configuration dialog box and click on Reset Emulator, then click on OK or CANCEL.

Also, if you enable bankswitching and you use a POD-11KE with a K0, K1, K3 or K4 processor in the pod (as is the default shipping configuration), then currently you must check the "Disable Cycle Stretching" checkbox on the emulator hardware configuration dialog box. Operation of this feature is described under item 2 below. In the future this may not be required.

The banking setup dialog box is described below.

Field -----	Description -----
Banking enabled	Check to enable bankswitching. If not checked, then only 64K of nonbanked memory is available.
Bank address area	"From" is the start of the bank area. "To" is the end of the bank area. For example, a 16K bank area starting at 8000 would show From = 8000, To = BFFF.
Bank Select Byte	Set both fields to zero for now, as this feature is not yet implemented.
Pod Signals Used for Bank ID	Check the boxes for each pod pin to which a bank select signal is attached. If you use a POD-11KE, POD-11NE or POD-11PE then BSW2 and BSW3 represent pod pins labelled B0 and B1, respectively. Otherwise, BSW2 and BSW3 are signals soldered to the cable connector, as described in chapter 9 of the EMUL68 user's manual. BSW2 and BSW3 are required only if you have more than 4 banks.
Bank Signal Specification	A table describing which logical bank numbers are active, and for each active logical bank the corresponding pattern that appears on the bank select pins checked under "Pod Signals Used for Bank ID" described above. E0 is the lowest order pin and BSW3 is the highest. For logical banks that are not active, you must enter a period in the corresponding Pattern field.

2. A new checkbox has been added to the emulator hardware configuration dialog box: Disable Cycle Stretching. This option

only applies if you have an HC11K0, K1, K3 or K4 processor in a POD-11KS or POD-11KE pod. If you use a POD-11KE or POD-11KS but have replaced the processor with an HC11KA part such as the HC11KA4 (using a socket adapter), then this checkbox does not apply. If the Disable Cycle Stretching box is checked and the processor selected on the emulator hardware configuration dialog box is "68HC11K0-4", then the emulator interface software will automatically write a 0 to the clock stretch control register at address 5A immediately after any reset initiated by the emulator to disable the default cycle stretching on the program chip select pin. This will almost double the effective speed of the processor as bus cycles to external memory will not be automatically stretched 1 additional ECLK cycle (the default condition after reset). If you start your program with the "Reset and Go" menu item on the Run menu, the emulator will NOT automatically disable cycle stretching before your program is started and you should insert the instruction

CLR CSCSTR

as one of the first instructions of your power-on reset code to do so, if appropriate.

If you need cycle stretching because your external EPROM or RAM is too slow to run without it, you can still check this box even if program space is mapped to target. Be sure and start your program with the Reset and Go option on the Run menu. You will benefit by saving a lot of time while the emulator is performing its initialization sequence.

3. The program loader for COSMIC and INTERMETRICS/WHITESMITHS binary files was fixed so that function names can be used in any dialog box asking for an address.

4. The program loader for COSMIC and INTERMETRICS/WHITESMITHS binary files was fixed so that structure members that are pointers to a structure will load correctly, and display appropriately in the inspect window.

5. The emulator hardware configuration screen was changed so that when the OK button is pressed, a complete emulator reset is preformed. Previously, to cause a complete emulator reset it was necessary to click on Reset Emulator and then OK or cancel.

#### IMPROVEMENTS MADE IN VERSION 0.9F (May 31, 1996)

1. Several small corrections were made to COSMIC file loader which under rare circumstances would abort loading of symbols with the message "File read error".

2. Three of the options specified on the hardware config screen are now saved to the INI file, including test mode, connect reset to target, COP Kick enable options.

3. The special regs window was fixed to allow hex values to be entered without requiring a leading "0x".

4. The memory map screen was fixed so that "0x" is not required

on map ranges the first time they are entered.

5. A new checkbox on the load preferences dialog box now enables support for Nohau's LanICE product.

6. Support for long file names under Windows 95 was expanded to handle the case where multiple files have names with the same first 6 characters. When the emulator needs to open a source file whose name not including extension has more than 8 characters, the emulator will now search for a user-supplied text file with the same name as the load file (except that the extension must be ".DIR") and stored in the same directory as the load file. For example, if the load file is ABC.ABS, then the text file would be ABC.DIR. When this text file is found, the emulator will search all lines in that file until it encounters a line containing the long file name. The corresponding short DOS-compatible file name will then be extracted from the beginning of the same line. This file can be generated with the DOS DIR command when Windows 95 is running, piping the result to a disk file.

7. CONTROL/G was implemented as an accelerator key for the "Reset and Go" function in the Run menu.

8. A new option "Write without readback" was added to the View/edit menu to provide a mechanism to store a byte into memory without having it read back to verify success of the write operation.

9. The DDE fields on the miscellaneous setup screen were removed, and a new field "Tab size" was added to specify the tab spacing in the source window. Acceptable values range from 1 to 12.

10. The ability to display typeless assembly-language symbols in the watch and inspect windows was added. The user must provide a type for the symbol in the form of a cast, for example, to view location XYZ as an unsigned integer the user would enter:

(unsigned int) XYZ

in the watch window's add dialog box or in the address field of the inspect window.

11. Values specified on the load preferences dialog box are now saved in the .INI file, so they will remain unchanged from one run to the next.

12. Values specified on the misc setup screen are now saved in the .INI file.

13. A new option on the Run menu was added: Mask interrupts on Step. This option is required to be set in order to proceed when stopped at a breakpoint and an interrupt is pending. The setting for this option is not saved in the .INI file.

14. The remove item on the watch window local menu was fixed. Previously, the Del key was the only way to remove a watch point.

		SIM	SIM-PT
1010.	NM	NM	NM
10x0 x10x	M		M
xxxx	AM		AM

SIM - NM → write it immediately

SIM-PT - NM → write imm

AM → pass through with WHS bit

M → start val & mask  
 BCOF read TX  
 merge with Msh & Val  
 write to TX

ISR

How to set? set Mode first?

then ~~set~~ valMsk - save x's in msk

Switch to Sim - convert x → 0 for val, leave msk alone  
 if rewrite valMsk - so be it.

Switch to SIM-PT - display 0x1x0 -

leave msk untouched until new set valMsk?

interpret x as in SIM don't use msk value!

IF ~~in~~ SIM-PT,  
 IN/OUT

Scan

check ISR status, & enable/disable to conserve CPU!

WM structs and act on msk & d to deal with ISR enable.