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Software Version History

Product: **ARM7 based Controllers**
 Applies to: **MC302-K**
 Started: **Version 1.9002**
 Notes: **Versions with 0.001 increments are development builds ONLY**

Current Manufacturing Release:

1.xx Released xxx

Version Number:	Bug Fixes:	New Features:	Notes:
1.9002			First Released Version.
1.9004		CAN I/O modules may be connected to the CAN port. SETCOM command functions	5 th February 2004
1.9009	Fixed Cambox(1.9007). Fixed TrioBASIC drive_read/write timeout problem (1.9008).	New optional 'time-out' parameter added to drive_read/write TrioBASIC commands. This parameter determines time processor will wait for drive command to complete before it raises the timeout exception. (1.9009)	
1.9010	Storing user programs to EPROM fixed. Support for drive parameter FPGA=3 added & hence ability to sync the drive and controller servo loops. Previous versions sync data exchange BUT NOT drive & controller servo loops (hence reports of a motor 'grumble' every 5 seconds, independent of motor speed).		16 June 2004
1.9011	Problems reported with v1.9010, hence removed drive sync code to assist isolating source of problem (In acquiescence to Trio USA request).		17 June 2004
1.9012		Added support for Cambox link option 2 (link commences at an absolute position on the link axis).	18 June 2004
1.9013	Added support for drive-controller sync using drive parameter FPGA=3.		24 June 2004. Use this version with drive parameter FPGA=3 & PTBASE=1
1.9014		Added support for printing MSPEED, and for the D,I, and OV gains (previously only P & VFF were used).	1 July 2004.
1.9015		Added new command drive_eprom (defaults to waiting 30seconds, but can be set by user with optional parameter). Added check for drive parameters on startup, current FPGA=3, PTBASE=1, AENA=0 & OPMODE=0). Controller warns user if drive does not have these values. TrioBASIC AIN(0) & AIN(1) tied to drives AININ1 & AININ2 & updated	26 July 2004

	cyclically.	
1.9016	DAC output on axis 1 now drives MONITOR1 and on axis 2 drives MONITOR2. User must have configured drive params ANOUT1/2 before MONITOR outputs can be used.	27 th September 2004
1.9017	Firmware no longer removes the 4 LSBits from the encoder value read from the drive. Use PRBASE to change between 16 and 20 bit encoder values.	4 th November 2004
1.9018	Support for devicenet added. Support for S300 added – involved commenting out the call to verify drive config parameters during startup (call caused processor exception & hence board reset).	4 th February 2005
1.9019	Support for 29-bit CAN Identifiers added via new BASIC CAN function no 11 for creating buffers using the extended ID format. Limitation : ID returned to BASIC when reading messages via CAN function no 6 restricted to Least Significant 24-bits.	16 th February 2005
1.9020	MoveModify did not work correctly either as a standalone new move or if used to interrupt a MoveAbs which had already passed the new EndPoint. Problem was with some code which assigned FloatingPoint values to FixedPoint storage for Linear.Factor.	24 th February 2005
1.9021	Drive_Clear/Drive_Eprom commands did not function with an S300 drive. This release ensures that these commands now work and also work with the S600 drive.	25 th February 2005
1.9022	Permanent error (94) occurred when 2 or more programs were set to Autorun.	28 th February 2005
1.9023	Drive_Reset did not function correctly – code did not calculate timeout correctly during communication phase hence always timed out.	Added facility to determine length of a received CAN message.
1.9024	Drive_Reset did not function correctly when executed from within a BASIC program. This was due to the code assuming that it was running within process 0 – this created a problem when using Serial IO as the resource was not protected correctly resulting in IO lockup.	8 th March 2005
1.9025	Printing to output channel #1 (RS232 port B) caused erroneous results with characters sometimes missing and re-directed to other channels instead.	9 th March 2005
1.9026	Watch Window did not display local variables. TRON stopped execution after the next command rather than at the next command.	17 th March 2005
1.9027	S600 drive generated F29 faults when dumping programs to flash with drive enabled. Motion generator now no longer disabled when writing to flash as this also disabled drive communications.	21 st March 2005
		23 rd March 2005

	<p>Adding new style breakpoints (not TRON) did not work as no feedback was returned to MotionPerfect.</p> <p>Issuing an Eprom command in the command window with programs active resulted in resources not being de-allocated with the net result being a program was always active even after being STOPped.</p>		
1.9028	<p>Inline breakpoints correctly implemented.</p> <p>Power-up text corrected with regard to IO configuration.</p> <p>Ampstatus/Drive_Status now loaded with status word received from the Drive.</p> <p>Axisstatus bit 3 (Remote Drive Error) now set for any error reported by the drive.</p> <p>Any significant error (ErrorMask) now trips the WDOG/Servo loop rather than just FE errors. ErrorAxis/MotionError now indicate the first axis and its status when this occurs. Any active moves are cancelled. Datum(0) will now reset ErrorAxis in addition to MotionError.</p> <p>Eprom command updated to correctly disable WDOG/Drive and to also disable motion generation.</p> <p>FERange bug corrected, it used to read/write to FELimit by mistake.</p> <p>DRIVE_xxxx functions now return status results that are consistent with other BASIC functions ie. 0 for FAIL, -1 for success. Commands also changed to prevent where possible Exceptions being generated and replaced with status info.</p>	<p>SERVO_PERIOD now changeable and stored in Flash.</p> <p>New DRIVE_INTERFACE function no 5 to access 32-bit error code from drive : (5,0) = MSW, (5,1)= LSW.</p> <p>Controller now behaves the same if drive/WDOG is disabled as if servo loop is open, this prevents the sudden jump to position if the motor is moved while the drive is disabled.</p>	2 nd June 2005
1.9029	<p>FLASHVR now works when executed from within a BASIC program.</p> <p>DATUM(0) initialised 1 axis more than present.</p> <p>Incorrect range checking on Axis for ADDAX and CAMBOX – an axis value of 1 greater than permitted could be specified.</p> <p>CONNECT command could fail if link axis not being processed.</p>		24 th June 2005
1.9030	<p>Movecirc command caused timing problems and missing characters within MotionPerfect as it took approx 1ms to execute. Low-level math functions written to replace linker library functions being used, now takes 15us to execute.</p> <p>Bug fixed whereby if Following Errors are masked out via ErrorMask the servo loop would still behave as though a Following Error has occurred.</p> <p>XON/XOFF bug fixed where serial</p>	<p>CAN FIFO facility within OKI CAN device can now be utilised via CAN command functions 5 (11-bit) & 11 (29-bit). This is achieved by specifying an optional last parameter which indicates if the message buffer is the last message in the FIFO list.</p>	14 th July 2005

	<p>characters would still be transmitted even though an XOFF had been received.</p> <p>Flash_Dump command caused a system reset and wouldn't have generated the correct S-Record format output. New Dump command added for doing HEX dumps of memory.</p> <p>Successive Move commands from within the same process could be ignored even if specifying different axes.</p>		
1.9100	<p>Bug fixed whereby creating more than the allowable number of normal programs (14) lead to midbehaviour of the directory structure.</p> <p>Drive connection is now established correctly following an 'EX' command or jumping to the System Software from the Boot.</p> <p>Implemented Directory locking commands ie. LOCK/UNLOCK.</p> <p>'WAIT LOADED' command now works, previously execution would continue from a random line number.</p>	<p>Added Position Latching functionality required to support Regist (modes 1..4)/Datum commands(modes 1..6).</p> <p>New DPR Feedforward parameters forced to 0 by controller to prevent motion control side effects.</p> <p>New Drive_Home command added to encapsulate homing sequence.</p>	27 th October 2005
1.9102	<p>Corrected problem of printing to a port other than #0 when disconnected from MotionPerfect – potential lockups with serial communication could occur.</p> <p>Corrected problem when transmitting characters with ASCII codes of 28 and 30 on port #1; these were both incorrectly substituted with 2 characters with codes 10 and 13.</p> <p>Programs halted using 'stop' are now correctly flagged to be stopped - previously any process that matched the program identifier was tagged for halting even if it wasn't active leading to a program halting as soon as it was started.</p> <p>A program still awaiting compilation, when run from another program caused misbehaviour because the compilation progress text was directed to TX channel '-1' but wasn't inhibited.</p>	<p>Registration modes 3 & 4 now supported on Axis(1) for external Encoder feedback.</p> <p>Increased number of local variables supported from 127 to 255.</p> <p>RUN_ERROR, ERROR_LINE and PP_STEP now supported.</p> <p>Timeouts added for Flash programming commands with errors now reported.</p>	9 th February 2006
1.9200	<p>MotionPerfect would timeout with errors if an INPUT/LINPUT command was used in the command window and the data entered not quickly enough – this was because MotionPerfect communications would freeze until any command was completely processed.</p> <p>Port #1 not correctly initialised at power-up – both Modbus and normal (transparent) comms protocols were activated by mistake, only a SETCOM command would correct the behaviour.</p> <p>When compiling code containing</p>	<p>As a result of parallel MC302-X development to support legacy commands and also missing commands that should have been implemented the following commands/parameters are now supported: FLAG, FLAGS, AFFGAIN, FWD_JOG, REV_JOG, FAST_JOG, PROCNUMBER, PROC_LINE, INDEVICE, OUTDEVICE, AINO-3, AINBIO-3, COMMSERROR, PORT_CHECKSUM and CHECKSUM. Some axis keywords have been added that don't do anything functionally but have been added to allow legacy BASIC code to compile: FEMIN, FEGRAD,</p>	12 th April 2006

	<p>active breakpoints, incorrect line numbers would be resolved for labels after any breakpoints leading to incorrect execution. Only once breakpoints had been removed and the code recompiled would execution behave correctly again.</p> <p>The MoveModify command sometimes caused misbehaviour because random data was being loaded into the Datum modes by mistake.</p> <p>OP command corrected for writing to a range of outputs using a single OP command (ie with 3 parameters).</p> <p>Using the PROC modifier could cause misbehaviour because the process executing the PROC modifier would then assume the same process number as specified within the modifier.</p> <p>CAN_ADDRESS now replaced with CANIO_ADDRESS for consistency with other controllers. CANIO_STATUS now implemented.</p>	MICROSTEP.	
1.9201	<p>ADDAX did not work when a CONNECT was also active for the same axis.</p> <p>Potential for axis measured position to be outside of REPDIST for 1 servo cycle.</p>	Added VRSTRING command.	12 th May 2006
1.9202	<p>Specifying a DECEL value for an axis other than the base axis by using an axis modifier (eg DECEL AXIS(1)=50000) did not work correctly resulting in the wrong deceleration for AXIS 1 and also AXIS 0.</p> <p>Using port #0 for Modbus via SETCOM sometimes caused the controller to reset.</p>		17 th May 2006
1.9203	<p>Corrected REP_OPTION=1 bug whereby it did not allow MPOS=0 to be a valid position.</p> <p>TICKS now managed correctly – previously it always counted in 250us steps regardless of Servo Period, now it counts in Servo Periods.</p>	<p>Added Program Encryption.</p> <p>Added CANopen support via axis types 18 (position) & 19 (velocity) and CAN_ENABLE/CAN_ADDRESS axis parameters.</p>	14 th July 2006
1.9204	32-Bit Floating-Point Modbus protocol (SETCOM mode 7) corrected.	Added DIM variable types STRING, VECTOR and ARRAY.	20 th September 2006
1.9205	32-Bit Floating-Point Modbus (SETCOM mode 7) did not read (via function 03) the correct VR data, the address specified by the HMI should be divided by 2 before accessing the VR variable, hence only the base address of 0 would work correctly.		29 th September 2006
1.9300	<p>New flash management for parameters incorporated – there was a potential problem when storing a parameter that required a new flash page to be initialised, plus flashing VRs above 253 would not work correctly.</p> <p>DeviceNet command now successfully stores a startup baud rate for CAN in flash.</p>	The serial number can now be read via SERIAL_NUMBER.	16 th November 2006

	The 'Control' parameter now behaves correctly when the controller is LOCKed – the previous behaviour meant that MotionPerfect thought the controller was unlocked even when it was locked.		
1.9301	INPUTS0/1 now correctly accessed via Scope feature.	Added CANopen IO functionality.	21 st February 2007
1.9302		The commands IF, REPEAT, WEND, WHILE, WAIT and WA are now available on the command line.	28 th February 2007
1.9303	Fix in 1.9301 for INPUTS0/1 storage via the scope introduced a bug – only 16 inputs for each should be stored in the Table.		6 th March 2007
1.9304	Fixed CONNECT bug – a new CONNECT command issued for an axis that is already connected shouldn't cause any break in its position profile; this was happening for 1 servo cycle.		26 th March 2007
1.9305	Low-level CAN message reading was not implemented correctly, it was reading 1 more byte than necessary causing overflow of array elements when reading a fully loaded 8-byte CAN message ie. Stomping on RAM locations causing random side effects. Corrected bug preventing certain types of functions being used as parameters for other commands eg CAN(-1,7,1,VR(0),VR(1)) would not work but CAN(-1,7,1,TABLE(0),TABLE(1)) did work.	MC302K LEDs 3 & 4 can now be used to display DeviceNet Module Status (DISPLAY=32) or Network Status (DISPLAY=33). Added FASTDEC support. Added new axis types 26 (Position) & 27 (Velocity) for extended CANopen support – as axis types 18 & 19 but with Status & Control Words cyclically transferred. New DRIVE_CONTROL axis parameter added. CAN command function 2 can now be used to read the current baud rate setting eg PRINT CAN(-1, 2). CAN command functions 8 & 9 for SDO access modified to be consistent with all other controllers.	11 th May 2007
1.9306	The fix in 1.9305 to correct a bug when using function calls as parameters for other functions introduced a new bug causing unexpected BASIC errors to be produced at random intervals when running more than 1 program.		21 st May 2007
1.9307	CANIO modules were not always initialised correctly when powered-up at the same time as the controller. DeviceNet protocol problems when handling Expicit Message requests at the same time as Polled IO requests.		22 nd May 2007
1.9308			MC302X Update Only
1.9309	Resource management problems when processes are halted – a halted process may not relinquish all held resources.		8 th August 2007
1.9310		Added RS232_SPEED_MODE as per other Trio controllers – default setting is for High Speed 38400 baud comms. New SETCOM functions 10&11 added to allow the command line to be disabled with port#0 available for program use instead.	13 th November 2007

	10=XON/XOFF disabled, 11=XON/XOFF enabled		
1.9311	Added Virtual IO access for unused Outputs. Added support to Modbus protocol for configuring VR/TABLE as the data source – achieved through a 7 th parameter in the SETCOM command (0=VR, 1=TABLE), if not specified the default is VR.	23 rd November 2007	
1.9312	REG_POS was incorrectly updated following a DEFPOS operation. Corrected VR range checking for various commands that specify a VR index.	12 th March 2008	
1.9400	Low-level floating-point multiplication problem – if 2 small numbers very close to 0.0 are multiplied that should give a result of 0.0 then the exponent is miscalculated causing the result to be a potentially large number. This is particularly noticeable when applying a MOVE operation close to 0.0 because the motion calculations involve a square of the distance to move.	23 rd April 2008	
1.9401		MC302X Update Only	
1.9402	The INPUT command was echoing an extra SPACE character before the CR/LF sequence.	27 th May 2008	
1.9403	Added support for REGIST_SPEED. Added support for latest Atmel onboard flash device.	4 th August 2008	
1.9404		MC302X Update Only	
1.9405	Fixed potential CAMBOX misbehaviour when the repeat option bit is set and the link axis is moving in a reverse direction. Fixed possible lock-up of command line if channel 5 is constantly loaded with serial data. Fixed problem with TRACE_ON/TRACE_OFF stopping the wrong program	Added BITREV8 and SHIFTR commands. Serial data is now validated with bad characters 'junked' when there are parity/framing/overrun errors.	18 th September 2008
1.9406	Corrected potential problem when using AND, OR and XOR functions with large numbers (>31 bit). Corrected low-level hardware watchdog behaviour such that if the watchdog trips it will now cause a full external reset rather than just an internal processor reset. FAST_DECEL was not fully implemented.	10 th December 2008	
1.9500	Negative CANIO Analogue voltages were not processed correctly, a positive result was always produced – this bug was introduced with v1.9201.	22 nd December 2008	
1.9600	When programming flash with BASIC programs and CAN activity is present, a controller with the latest Atmel processor could reset, the same activity on a controller with the previous Atmel processor would not behave this way. This can only be explained by flash erase/programming timing	16 th January 2009	

	<p>differences because in theory the problem could have occurred.</p> <p>Corrected 'ON x GOSUB a,b,c,...' behaviour when x is > than the range of labels provided, the next RETURN command executed would not return to the expected code line, instead it would return to the erroneous 'ON x GOSUB a,b,,c... ' line.</p>		
1.9601	<p>Corrected processing of negative positions in PSWITCH command.</p> <p>Corrected INVERT_STEP behaviour for stepper axis.</p> <p>Bit 1 of REP_OPTION now functions for MOVELINK requests.</p>	<p>Added READ_OP command.</p> <p>Added BIT 5 option bit for MOVELINK/CAMBOX – positive motion from link axis only. Old BIT5 (CAMBOX offset start position) now BIT7.</p>	15 th February 2010
1.9604	<p>Corrected problem when using a GLOBAL variable as a loop control index – the loop would not execute for the correct number of iterations.</p>	<p>PSWITCH now supports any IO point including CAN & virtual IO.</p>	2 nd August 2011
1.9605	<p>Implemented fix for MOVEABS when trying moving away after a Software Limit switch has triggered, due to rounding errors (in the first servo cycle after the MOVEABS is loaded) the firmware sometimes determined that the demand was in the other direction causing the MOVEABS to be cancelled in error.</p>		16 th January 2012
1.9606		<p>Added SETCOM function 9 to support 32-bit integer ModBus.</p>	17 th April 2012
1.9607		<p>Modified CANIO code to utilise the alternate OKI CAN registers thus allowing simultaneous access with the CAN command.</p>	13 th February 2013