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Software Update History

PRODUCT: **MC SERIES 2 CONTROLLERS**
Applies to: **MC2/MC204/EURO205/MC216/MC202/MC206/MC224/EURO 205X/PCI208 unless stated**
Started: **Version 1.42 – For earlier versions contact TRIO**
Notes: **Versions with 0.001 increments are development builds ONLY**
Current Manufacturing Release:

1.42 IS REQUIRED FOR **500K MEMORY MC2** FROM 22 JULY 1999 - NO FURTHER VERSIONS
1.46 is required for **128k memory MC2** from 22 July 1999 - NO FURTHER VERSIONS
1.52 IS REQUIRED FOR THE MC202/ MC216/MC204/EURO205 FROM MAR 2003 – NO FURTHER VERSIONS
1.64 IS REQUIRED FOR THE MC206 FROM JAN 2005
1.66 IS REQUIRED FOR THE MC206X/MC224/EURO205X/PCI208 FROM DEC 2006

VERSION NUMBER:	BUG FIXES:	NEW FEATURES:	NOTES:
1.42	FIXED CAN() COMMAND, SO RETURNS BAUDRATE WITH CAN(X,2). FIXES BUG INTRODUCED IN VERSION 1.4101. RS485 ENABLE WAS SOMETIMES NOT LONG ENOUGH TO ALLOW FULL TRANSMISSION OF CHARACTER ON MC204 AND MC216. BUG INTRODUCED IN VERSION 1.39. CHANNEL B XON/XOFF ARE NOT PREFIXED WITH ESC ON MC204 WHEN TRANSMITTED WITH XON/XOFF MODE OFF. CANCEL(1) DOES NOT CAUSE SUBSEQUENT LOAD ERRORS ON MULTI-AXIS SEQUENCES. FIXED BUG INTRODUCED IN 1.33: SYSTEMS WITH 8 OR MORE AXES COULD HAVE CONDITION WHERE WATCHDOG ENABLE RELAY WILL NOT TURN OFF WHEN FOLLOWING ERROR OCCURS.	CAN ANALOG MODULE SUPPORTED: KEYWORD NAIO RETURNS NUMBER OF ANALOG CHANNELS CONNECTED. PEEK AND BATTERY_LOW KEYWORDS ADDED FOR THE OM402 CAMBOX AND MOVELINK DELAYED START MODE AND CYCLIC MODE CAN BOTH BE SET FOR ONE MOVE. DELAYED START ONLY APPLIES TO FIRST CYCLE.	CREATED 19 OCT 1998 **THIS IS THE FINAL VERSION SUPPORTING THE EXPANDED RAM MC2**

1.43	Rounding of moves altered so that distances being multiplied by UNITS are rounded to nearest integer rather than being rounded down. Serial ports above #1 cannot be addressed on OM402	FLASH_DUMP command added to allow generation of ROM image for manufacturing use only. Battery low is indicated on OM402 controller via LEDs and in IR word. System code transfer from Flash to ram is checked. CAMBOX can cycle with a sequence of scaling factors. This allows a motion shape to be entered in the table in the normal way. When this is repeated in using the auto-repeat function, a different scale factor is fetched from a circular buffer in the table.	1 Feb 1999
1.44		Build incorporates build options for MC202 and Euro205	8 Mar 1999
1.45	Fixed bug which could result in inputs not working correctly on MC216 and fixes problem introduced with 1.43 where flash eprom is not identified correctly	CAN Daughter Boards detect as COMMS daughter board type, not standard daughter board type (up to and including 1.00 gate array version). This can result in older CAN daughter boards not being listed in the power up message although the ATYPE is set correctly and they work okay.	30 Mar 1999
1.46	Fixed bug which could allow upper 8 bits from first CAN 16 I/O module to be reported via an IN command.	ENCODER keyword supports raw encoder counts up to 16 bits. Supports use of 8 bit data on RS485 port. Previously characters above 127 are assumed to be addresses. Setting ADDRESS=255 makes this NOT the case. MC202 and EURO205 versions support 14 bit encoder registers. ON GOTO and ON GOSUB both do not stop program execution if a value is not in range. FLASH_DUMP will only work under Trio test conditions on the Euro205 ONLY.	20 April 1999
1.47	Fixed 3 bugs, which apply to Euro205 only: Firstly the DAC output to axes 0,1,2 and 3 was corrupted if axes 4 and above were used. Secondly controller was running slower than it should have due to an unnecessary wait state in main memory. Thirdly the DAC output was not available on stepper encoder axes if SERVO axis parameter was ON	MOVELINK can now work in cyclic mode with options parameter set to 4 in a similar way to CAMBOX	17 June 1999

	FIXED BUG WHICH COULD CAUSE THE OM402 TO FAIL TO BOOT. (1.4607) (#2 BUG)		
1.48	FIXED BUG WHICH CAN CAUSE SMALL REVERSAL AT THE END OF A DATUM(2) SEQUENCE. MERGE CHECKS STRICTLY INCOMING GROUPS OF AXES IN A MULTI-AXIS MOVE TO AVOID MOTION JUMPS WHEN DIFFERENT AXIS GROUPS ARE MERGED TOGETHER. FIXED BUG IN READING CAN INPUTS 184..191 ON ALL VERSIONS EXCEPT MC204. FIXED BUG WHICH CAN RETURN A VALUE OF 1 FROM THE FRAC() FUNCTION WITH VALUES GREATER THAN OR EQUAL TO 0.99995 FIXED BUG IN MC202 LOADER. CAN IO CHANNELS 32..79 REPORT ERRORS CORRECTLY.	NEW AXIS PARAMETER CLUTCH_RATE INTRODUCED. THIS AFFECTS OPERATION OF CONNECT ONLY BY CHANGING THE CONNECTION RATIO AT THE SPECIFIED RATE/SECOND. DEFAULT CLUTCH_RATE IS SET VERY HIGH TO ENSURE COMPATIBILITY WITH EARLIER VERSIONS. CAM AND CAMBOX CAN USE TABLE SEQUENCES THAT START AT VALUES OTHER THAN 0. THE SOFTWARE NOW SUBTRACTS THE FIRST TABLE VALUE FROM THE VALUES CALCULATED. CANCEL AND RAPIDSTOP INSERT A 1 SERVO CYCLE PAUSE AFTER REQUESTING OPERATION. PROTECTED COMMUNICATIONS MODE SUPPORTED. THIS WILL ALLOW FUTURE VERSIONS OF MOTION PERFECT TO RETRY PACKETS IN WHICH ERRORS OCCUR. MPE=3 IMPROVED TOKENISATION SPEED, THIS GIVES IMPROVED RESPONSE ON COMMAND LINE. MODBUS PROTOCOL MODE AVAILABLE ON SERIAL PORTS #1 AND #2. BIT SET/CLEAR/TEST INSTRUCTIONS ADDED FOR USE WITH VR GLOBAL VARIABLES: SET_BIT(BIT#,VR#) CLEAR_BIT(BIT#,VR#) RES=READ_BIT(BIT#,VR#)	24 SEPTEMBER 1999
1.49	FIXED BUG IN MATCH/RECORD FUNCTIONS. THESE FUNCTIONS NOW RECORD DATA IN TABLE. MC216 TIME/DATE FUNCTIONS NOW WORK CORRECTLY. FIXED BUG (INTRODUCED IN 1.48 PROTECTED COMMS. PART) WHICH PREVENTS CHARACTERS 28 AND 30 BEING TRANSMITTED ON PORTS OTHER THAN MOTION PERFECT CHANNELS) ENLARGES TSIZE IF SCOPE COMMAND USES TABLE VALUES ABOVE EXISTING TSIZE. MOVELINK FIXED SO IT WORKS CORRECTLY IN CASE WHERE	CAN BE MANUFACTURED WITH SGS (OR ANY MANUFACTURER WITH CORRECT DEVICE CODES) FLASH CHIPS AS ALTERNATIVE TO AMD/FUJITSU MODBUS CHANGED TO WRITE VR() AS A SIGNED 16 BIT (2'S COMP) NUMBER INSTEAD OF UNSIGNED AS IMPLEMENTED IN 1.48 CAN DAUGHTER BOARD DETECTS AS AXIS AND COMMUNICATIONS DAUGHTER BOARD. MATHS OPERATIONS EXTENDED TO INCLUDE "POWER" OPERATOR: E.G. A=2^X	13 JULY 2000

INPUTDIST<(ACCELDIST+DECELDIST)

AXIS ERRORS OTHER THAN FOLLOWING ERRORS EXCEEDING THE LIMIT CAN TRIP THE WATCHDOG WHEN SPECIFIED USING ERRORMASK

FIXED BUG (INTRODUCED IN 1.48 ON MC202 ONLY) WHICH PREVENTS BASIC CAN STATEMENTS BEING USED.

CANCEL COMMAND STRICTER, CANCEL WITH ANY PARAMETER ALWAYS CLEARED THE NTYPE, NOW CANCEL(0) OR CANCEL CLEARS THE MTYPE AND CANCEL(1) CLEARS THE NTYPE.

FIXED BUG IN DRIVELINK DATUMING

FIXED BUG IN MC202/EURO205 CAN AXIS OPERATION

SOME ERROR CODES CORRECTED.

ADD_DAC COMMAND ALLOWS DUAL FEEDBACK SERVO

EXECUTE COMMAND ALLOWS EXECUTION OF STRINGS VIA USB

DLINK COMMAND NOW READS MOTOR PARAMETERS AS WELL.

LOOKUP COMMAND ADDED. LOOKUP(0,<SYSTEM VARIABLE>,…) PRINTS A FLOAT VALUE OF THE SYSTEM VARIABLE SPECIFIED IN BINARY FORMAT ON THE CURRENT OUTPUT DEVICE. LOOKUP(1,<SYSTEM VARIABLE>,…) PRINTS AN INTEGER VALUE OF THE SYSTEM VARIABLE SPECIFIED IN BINARY FORMAT ON THE CURRENT OUTPUT DEVICE. LOOKUP(2,<NUMBER>) PRINTS A FLOAT VALUE OF THE PROCESS VARIABLE SPECIFIED IN BINARY FORMAT ON THE CURRENT OUTPUT DEVICE. LOOKUP(3,<NUMBER>) RETURNS A FLOAT VALUE OF THE PROCESS VARIABLE SPECIFIED. LOOKUP 2 AND 3 PERMIT THE PROC MODIFIER.

MULTIPLE PSWITCH STATEMENTS CAN OUTPUT TO ONE OP. THE ON STATES ARE OR'ED TOGETHER. THIS ALLOWS FOR CONSTRUCTION OF PATTERNS

VERIFY AXIS PARAMETER CAN BE USED ON SSI DAUGHTER BOARDS WITH SUITABLE GATE ARRAY TO CHOOSE BETWEEN GRAY CODE OR BINARY CODE SSI ENCODERS.

ENHANCED SECURITY FOR LOCK/UNLOCK. A DIFFERENT ALGORITHM IS USED AND AFTER 3 FAILED UNLOCK ATTEMPTS THE CONTROLLER WAITS FOR A REBOOT.

MC202 AND EURO205 AXES 4..7 CAN BE USED WITH INFRANOR CAN DRIVES.

EXTENDED CAMBOX REPEATING MODE ADDED (OPTIONS=12)

1.50	AXISSTATUS SETS DATUMING BIT AT ALL TIMES DURING A DATUMING CYCLE. PREVIOUSLY IT SET IT ONLY WHEN DATUM INPUT WAS TRIGGERED. FIXED BUG WHICH ALLOWED ZERO LENGTH PROGRAM NAMES PRINT NOW HANDLES NON TERMINATED QUOTES CORRECTLY ON COMMAND LINE &Z NOW HANDLES THE CASE OF NO PROGRAM NAME CORRECTLY POINTER TO END OF TABLE RANGE CHECKED TO BE GREATER THAN START IN CAM/CAMBOX PP_STEP IS RANGE CHECKED –1023..1023 REPDIST IS CHECKED NOT TO BE 0 ERRORMASK IS RANGE CHECKED 0..16383 ACCEL, DECEL, JOGSPEED, FHSPEED, CREEP AND FASTDEC MUST BE POSITIVE OR ZERO. COMMENTS ON COMMAND LINE NO LONGER CREATE PROBLEMS. PREVENTS SELECT ON COMMAND LINE WHEN RUNNING MOTION PERFECT STRICTER RANGE AND #ARGUMENT CHECKING IN TABLEVALUES, AXISVALUES, SETCOM, SCOPE, NIO MOD FUNCTION RETURNS ERROR IF DIVIDE BY 0 IS REQUESTED. GET, LINPUT AND INPUT CHECK CHANNEL NUMBERS. AXIS MODIFIER IS RANGE CHECKED AGAINST AVAILABLE AXIS NUMBERS ON CONTROLLER TABLEVALUES BUG FIXED WHICH CAUSED ERRORS WHEN COMMAND WAS USED IN A PROGRAM. FIXED ERROR IN COMPILER WHICH CAUSED ERRORS WHEN COMPILING MULTI-STATEMENT LINES WITH ASSIGNMENT USING LOCAL VARIABLES. EXAMPLE: VR(0)=A:VR(1)=B FIXED BUG WHICH CAN CAUSE INCORRECT DPOS FOR 1 SERVO CYCLE	INITIAL VERSION OF PROFIBUS FUNCTION. LOW LEVEL CHIP ACCESS ONLY. PROC_STATUS ADDED. THIS PROCESS VARIABLE RETURNS: 0 – PROCESS STOPPED 1 – PROCESS RUNNING 2 – PROCESS STEPPING 3 – PROCESS PAUSED THE STATUS OF OTHER PROGRAMS CAN BE OBTAINED WITH THE PROC(X) MODIFIER: PRINT PROC_STATUS PROC(3) THE CURRENT LINE NUMBER OF OTHER PROGRAMS CAN BE OBTAINED WITH THE PROC(X) MODIFIER: PRINT PROC_LINE PROC(3) AXIS PARAMETER ADDAX_AXIS ALLOWS ADDAX LINKS TO BE MONITORED. RETURNS AXIS BEING ADDED OR –1 IF NONE. AXIS PARAMETER LINK_AXIS ALLOWS LINKED AXES TO BE MONITORED. RETURNS LAST AXIS LINKED TO OR USED AS BASE AXIS IN AN INTERPOLATION GROUP. VERSION 1.4913 ONWARDS SUPPORT SLM VERSION 3 ONLY FOR DRIVELINK. EARLIER VERSIONS SUPPORT VERSION 2 ONLY. DRIVELINK REGISTRATION SHOULD BE INITIALISED ONCE IN STARTUP BASIC FILE. THIS IS DUE TO REGISTRATION PROBLEM IN DRIVELINK ASIC. IN 1.4917 ONWARDS THE VALUE IS INITIALISED TO RISING EDGE ON POWER ON. FALLING EDGE CAN BE SET USING DLINK(1,SLOT,ASIC,11,176) PRIOR TO ENABLING AXIS. LOCK VALUE IS LIMITED TO 0..9999999 PRINT STATEMENT WILL PRINT "############.####" WHEN INTEGER PART OF NUMBERS EXCEEDS 2147483647 (1.4915 BUILT AS SPECIAL VERSION WITH DUAL XY SINGLE BELT TRANSFORM) CANCEL(1) WILL CANCEL MULTI-AXIS	6 APRIL 2001

	WHEN MULTIPLE CAM MOVES ARE IMMEDIATELY FOLLOWED BY A MOVE. SET_BIT, CLEAR_BIT AND READ_BIT ARE LIMITED TO BITS 0..23 TO AVOID FLOATING POINT RESOLUTION PROBLEMS. LAST_AXIS, SCOPE_POS, DEMAND_EDGES, AND LINKAX ARE READ ONLY PARAMETERS SLM INTERFACE SOFTWARE LATCHS POSITION UPDATES FROM SLM TO AVOID PROBLEMS WHEN MORE THAN 6 AXES ARE CONNECTED. FLASHVR BUG FIXED IN MC202: VALUES COULD UNDER SOME CIRCUMSTANCES BE CORRUPTED WHEN RELOADED ON POWER UP. ALSO INSERTED SHORT DELAY TO LENGTHEN LIFE OF SOME FLASH CHIPS. WRITE PROTECT BIT OF DS1302 REAL TIME CLOCK SET CORRECTLY ON MC216 SECURITY LOOPHOLE FOR LOCK FIXED.	GROUPS OF AXES XON/XOFF CAN BE SPECIFIED FOR RS485 CHANNEL (CARE NEEDED BY USERS HOWEVER TO AVOID LOCKING UP SERIAL LINK) NEW COMMAND: INVERT_IN(IN#,ON/OFF) THIS CAN BE USED TO INVERT INPUTS 0..31 INDIVIDUALLY IN THE SOFTWARE, ALLOWING INPUTS TO BE USED WITH NO OR NC SWITCHES IF REQUIRED: INVERT_IN(9,ON) THIS SWITCHES ON INVERSION ON INPUT 9. INVERT_IN(9,OFF) RESETS INPUT 9 TO NORMAL OPERATION. REP_OPTION BIT 2 IF SET ON ALLOWS REP_DIST/DEFPOS/OFFPOS OPERATION TO ONLY SHIFT MPOS AND NOT DPOS. THIS IS DESIGNED FOR STEPPER/ENCODER AXES ONLY. (1.4927)	
1.51	ON EURO205 ONLY; CAN 16-IO INPUTS 16..31 CAN BE USED FOR JOGGING AND LIMIT SWITCHES CORRECTLY. SCOPE_POS IS READ/WRITE AS THIS IS NECESSARY FOR SCOPE WHEN TRIGGERED FROM BASIC. (NOTE THIS WAS MADE READ ONLY IN 1.50) DRIVELINK Z SEARCH ROUTINES ALTERED TO WORK WITH SLM3 MODBUS PACKET INPUT TIMES OUT AFTER 10MSEC IF EXPECTED CHARACTER FOR PACKET DOES NOT ARRIVE. BUG IN SLM ROUTINES FIXED. ALSO SLM ROUTINE CALCULATES NUMBER OF COMMS ERRORS IN 50MSEC PERIOD AND PUTS INTO REMOTE_ERROR. IN(X,Y) TWO PARAMETER IN CASE ALLOWS X=Y CASE. THIS IS REQUIRED FOR OCX CONTROL WHICH ALWAYS USES THIS VERSION OF THE IN COMMAND. (1.5008) SLM AMP_STATUS PARAMETER SETS	IN CAMBOX PATTERN MODE: THE REPEAT COUNTER FOR THE BLOCK IS SET TO −1 WHEN THE BLOCK IS COMPLETE TO ALLOW PROGRAMS TO TEST FOR COMPLETE BLOCKS. IF THE OPTIONS PARAMETER IS SET TO 12+16 IN CAMBOX PATTERN MODE THE (+ OR -) VALUE OF THE JOGSPEED PARAMETER ARITHMETICALLY SHIFT RIGHT 10 BITS IS ADDED TO THE ENDMOVE PARAMETER ON EVERY SERVO CYCLE. THIS CAN BE USED TO JOG AN AXIS IN WHILST PERFORMING A CAMBOX. AXISSTATUS UPPER/LOWER CASE STRING PRINTING ROUTINE USED BY MOTION PERFECT CHANGED. THIS NOW READS: OCYXEHDRFMAW THE BITS ARE: W – WARNING FE RANGE A - DRIVE COMMS ERROR M – DRIVE ERROR F – FORWARD LIMIT R – REVERSE LIMIT	29 AUG 2001

	BIT 3 OF AXISSTATUS IF CERTAIN BITS ARE SET. THE MASK TO DEFINE THE AMP_STATUS BITS IS $6FF20. THE AXISSTATUS BIT IS NOT LATCHED AND WILL BE CLEARED IF THE DRIVE ERROR IS CLEARED. BUG FIXED WHICH ALLOWED ERRORS TO OCCUR WHEN SET_BIT AND CLEAR_BIT WERE USED ON MULTIPLE PROCESSES SIMULTANEOUSLY.	D – DATUMING H – FEEDHOLD E – FOLLOWING ERROR X – FWD SOFT LIMIT Y – REV SOFT LIMIT C – CANCELLING MOVE O – ENCODER OVERCURRENT IF MULTIPLE SLM DAUGHTER BOARDS ARE FITTED THEY ARE SYNCHRONISED TOGETHER TO TRANSMIT ON THE SAME 125USEC CYCLE.	
1.52	MULTIPLE PROCESSES CAN USE CAN COMMAND SAFELY AND SIMULTANEOUSLY. DATUM(0) CLEARS SLM ERRORS ON SLM AXIS. (NOTE THAT SLM PARAMETERS SHOULD NOT BE READ WHILST DATUMING THE AXIS) FIXES BUG IN COMMUNICATIONS BETWEEN TRIO OCX AND VERSION 1.51 OF SOFTWARE. FIXES BUG WHERE STEPPER PULSE CONTROL BITS ARE MODIFIED WHEN AXIS IS USED AT SERVO AND REGIST COMMAND IS USED. FIX TO MC216/MC204 USB SUPPORT FOR OCX (1.5116) FIX TO BUG THAT CAUSED SLM AXES TO MISS THE Z MARK WHEN DATUMING SOMETIMES.(1.5117) IMPROVED SERIAL PORT INTERFACE ON MC202 THAT CAN HANDLE LONG SEQUENCES AT 19200 BAUD AND SETS FLAG IN COMMSERROR ON BUFFER OVERRUN. PRINT FORMATTING – FIX FOR ERROR IN NUMBER OF CHARACTERS PRINTED WHEN VALUE IS NEGATIVE.	PATTERN REPEAT CAMBOX: THE VERY FIRST MOVE MULTIPLIER IS TAKEN FROM THE CURRENT POSITION VALUE IN THE CONTROL BLOCK RATHER THAN THE START PATTERN VALUE. THIS ALLOWS PATTERNS TO COMMENCE THE FIRST TIME AROUND AT POSITIONS OTHER THAN THE START. ON SLM AXES THE REGISTRATION CAN BE SWITCHED OFF FROM REACHING THE ASIC USING THE BOOST AXIS PARAMETER. WHEN REGISTRATION IS ON BACKGROUND PARAMETER PASSING IS SUSPENDED TO FIT IN WITH ASIC. ON SLM AXES REGISTRATION AT THE START OF THE SLM CYCLE IS IMPROVED BY DETECTING THE "START" OF THE SLM CYCLE AND ADJUSTING THE CALCULATION. THE MICROSTEP IS RE-USED ON SLM AXES TO CONTROL THE "START" POSITION. THE DEFAULT IS SET TO 1033. SOFTWARE PATCH FOR BUG IN DRIVELINK FPGA VERSION 6 FOR REGISTRATION (1.5109) SIMPLIFIED, BUT FUNCTIONAL VERSION OF SLM REGISTRATION. (1.5113) ADDITONAL CAMBOX MODE FOR STARTING PART OF THE WAY THROUGH A REPEATING CAM SHAPE FAULT INPUT ON EURO205 NOW SETS BIT 12 IN AXISSTATUS PARAMETER.	24 MAR 2003 FOR MC216/MC204/MC202/EURO 205 ONLY
1.5205	FIXES BUG IN ANALOG INPUTS ON MC202 IN 1.52 ONLY FIXES BUG IN SP02 SPECIAL VERSION OF MC202 ONLY	PORT_CHECKSUM KEYWORD IS A READ WRITE SYSTEM PARAMETER ON MC202. CHARACTERS TRANSMITTED ON SERIAL PORT #1 ON MC202 HAVE THE CHARACTER VALUE ADDED TO THE PORT_CHECKSUM. IT CAN BE USED TO CONSTRUCT MESSAGE CHECKSUMS. FASTDEC CAN BE USED WHEN CANCELLING. IF SET TO ZERO (NOW DEFAULT) IT WILL BE IGNORED.	2 OCT 2003

1.60	FIXES BUG IN SERIAL LOADER OF MC206 WHICH CAN CAUSE SERIAL LOADS TO BE FAULTY. FIXES BUG IN FIBRE-OPTIC OUTPUT #3 ON MC206. FIXES BUG WHEN ON-BOARD MC206 ANALOG INPUT IS USED AT SAME TIME AS CAN ANALOG CHANNEL 0.	PROTOCOL KEYWORD AND PORT MODIFIER ADDED TO ALLOW FOR FUTURE RE-ASSIGNMENT OF COMMAND LINE ETC TO OTHER PORTS FOR ETHERNET SUPPORT ETC.	5 MARCH 2002 (THIS IS A NEW VERSION SEQUENCE FOR MC206)
1.61	FIXES BUG IN MC206 WHICH PREVENTED USE OF FLASHVR(-1) AND FLASHVR(-2) FIXES BUG IN SCOPE HANDLING OF INPUTS 16 TO 32. DEVICENET MODIFICATIONS FOLLOWING TESTING WITH THE CONFORMANCE SOFTWARE.	SERCOS CAPABILITY ADDED ATYPE=16 SERCOS SPEED MODE ATYPE=17 SERCOS POSITION MODE FEATURE CODE 15 REQUIRED TO SET SERCOS ATYPES. SERCOS_PHASE KEYWORD RETURNS SERCOS PHASE. ETHERNET COMMAND SUPPORT FOR ETHERNET DAUGHTER BOARD FROM 1.6006 LOAD_PROJECT KEYWORD ADDED FOR FUTURE SUPPORT OF FAST DOWNLOAD METHOD. BREAK_ADD, BREAK_LIST, BREAK_DELETE AND BREAK_RESET ADDED TO ALLOW FOR CONTROL OF DYNAMIC BREAKPOINTS TO BE ADDED INTO RUNNING PROGRAMS. GLOBAL AND CONSTANT KEYWORDS ADDED FOR SUPPORT OF GLOBAL CONSTANTS AND NAMED GLOBAL VARIABLES. ELSEIF FUNCTION ADDED.	15 MAY 2002:
1.62	SLM DAUGHTER BOARD INITIAL VERSION USING SRC3. PROFIBUS COMMS BOARD ADDED TO STARTUP MESSAGE. FIX TO SERIAL BUG WHICH PRODUCED OCCASIONAL SERIAL PORT ERRORS.(1.6105) SCANNING FOR GLOBAL'S AND CONSTANT'S SPEEDED UP.(1.6109) FIX TO BUG AFFECTING INVERT_IN ON CHANNELS 16 TO 31. THE INVERTING	DEVICENET MODS TO MEET CONFORMANCE TEST LOAD_PROJECT KEYWORD ADDED. ADDED ETHERNET SUPPORT FOR TRIO COMMS OCX. ETHERNET DB SOFTWARE V1.0.2.0 REQUIRES AT LEAST THIS (1.6103) VERSION OF MC SYSTEM SW. IEEE_IN AND IEEE_OUT KEYWORDS ADDED TO ALLOW IEEE 32 BIT FLOATS TO BE TRANSFERRED IN AND OUT OF THE MOTION COORDINATOR OVER BUS	24 JAN 2003

ACTION AFFECTED THE MOTION CORRECTLY BUT DID NOT CHANGE INPUTS READ WITH THE IN() COMMAND. (1.6110)

FIX BUG FOR RUNNING STEPPER DAUGHTER BOARDS IN MC224 AXES 0..4 (1.6121)

FIX TO BUG THAT CAUSES INFRANOR CAN DRIVES TO RUN-AWAY AT CONSTANT SPEED

FIX TO BUG THAT CAUSED SLM AXES TO MISS THE Z MARK WHEN DATUMING SOMETIMES.(1.6125)

SERCOS – CORRECTED ENCODER FEEDBACK REFRESH RATE (V1.6127).

SYSTEMS. THE ROUTINES CONVERT FLOATS INTO 4 BYTES AND VICE-VERSA:

VALUE=IEEE_IN(BYTE0,BYTE1,BYTE2,BYTE3)

IEEE_IN CONVERTS 4 BYTES WHICH TYPICALLY HAVE BEEN TRANSMITTED ON A BUS SUCH AS MODBUS INTO A FLOATING POINT VALUE.

BYTE 0 IS THE HIGH BYTE OF THE 32 BIT FORMAT.

BYTE=IEEE_OUT(VALUE,0..3)

IEEE_OUT EXTRACTS A SINGLE BYTE IN IEEE REPRESENTATION FOR TRANSMISSION OVER A BUS SYSTEM. THE COMMAND WILL TYPICALLY BE CALLED 4 TIMES TO EXTRACT EACH BYTE IN TURN:

BYTE0=IEEE_OUT(VALUE,0)
BYTE1=IEEE_OUT(VALUE,1)
BYTE2=IEEE_OUT(VALUE,2)
BYTE3=IEEE_OUT(VALUE,3)

MEMORY TEST ADDED TO TEST APPLICATION RAM ON EACH POWER UP.

FEATURE_ENABLE COMMAND ADDS CONFIRMATION CODES TO ALLOW FOR USERS TO MODIFY SERIAL NUMBERS UNDER SPECIAL CIRCUMSTANCES. THE CONFIRMATION CODE IS PRINTED OUT WHEN THE FEATURE_ENABLE COMMAND IS EXECUTED WITH NO PARAMETERS. IT ALLOWS TRIO TO CONFIRM THAT THE SERIAL NUMBER HAS BEEN CHANGED. (1.6107 ONWARDS)

NUMBER OF GLOBALS AND CONSTANTS SET TO 128 EACH. LOCAL VARIABLES SET TO 1024 FOR EACH PROCESS ON MC206 AND MC224. (1.6110)

SERCOS COMMAND CAN NOW READ PARAMETER OPERATIONAL DATA > 16 WORDS, AND CAN WRITE LIST IDNS TO THE PACSCI (1.6110).

1.6114 is first version for the MC224 controller.

STICK_READ AND STICK_WRITE COMMANDS ARE AVAILABLE ON MC206/MC224 TO ALLOW FOR DATA READ AND WRITE TO THE MEMORY STICK. (1.6119)

CAN COMMAND SUPPORTS CANOPEN PARAMETER READ/WRITE USING

		FUNCTION NUMBERS 8 AND 9. SERCOS AXIS POSITION MODE SUPPORTS SERVO ON/OFF. WHEN SERVO=OFF DEMAND POSITION IS SET TO ENCODER POSITION. FEATURE ENABLE CODES EXTENDED TO 22 CODES: 8..11 FOR ENCODER INPUT ON MC206 12..21 FOR SERCOS/CAN REMOTE AXIS ENABLING. PRIMITIVE SUPPORT FOR SERCOS REGISTRATION ADDED (V1.6126). ADDITONAL CAMBOX MODE FOR STARTING PART OF THE WAY THROUGH A REPEATING CAM SHAPE	
1.63	ETHERNET – WILL NOW WORK IN ANY DAUGHTERBOARD SLOT ON THE 224 (V1.6201) SERCOS – NEW FPGA'S SERCOS CYCLE TIME TO SERVO PERIOD CYCLE TIME SYNCHRONIZATION. (1.6202) SERCOS – WHEN SERCOS DB NOT IN SLOT 0 OF AN MC224 THE MOTION ASM WAS READING AT STATUS WORD FROM INCORRECT ADDRESS & RAISING FALSE REMOTE AXIS ERRORS(1.6208). SERCOS – FIX TO ENABLE PROCEDURE COMMANDS TO BE SET & ENABLED (WITHOUT CANCELLING), AND CANCELLED (WITHOUT ENABLING) (1.6210). FIX TO USB HANDLING FOR OCX INTERACTION (1.6213) MODBUSTCP – INCLUDE HEADER'S UNIT ID BYTE WHEN CALCULATING MBAP HEADER LENGTH BYTE (PREVIOUSLY WAS OUT BY ONE) (1.6213) FIX TO CORRECT UNRELIABLE READS OF DRIVE PARAMETERS WHEN USING SLM SYSTEM (1.6216) MODBUSTCP – CORRECT MBAP HEADER BYTE COUNT FOR MSG 16 REPLY. (1.6218) FIX TO ALLOW MC224 TO RUN SERIAL PORTS AT 38400 BAUD. THIS IS REQUIRED FOR FIBRE OPTIC NETWORK OPERATION WITH KEYPADS. (1.6221) FIX TO AVOID OCCASIONAL REGISTRATION ERRORS ON SLM WITH MC224. NOTE THAT REGISTRATION INPUTS MUST BE LOW DURING	ANALOG INPUT POSSIBLE FOR FEEDBACK ON UP TO 4 AXES. CAN_ADDRESS SETS ANALOG CHANNEL. ATYPE NEEDS TO BE SET TO 30 AND REMOTE AXES ENABLED. A VERSION OF P325 SOFTWARE WITH 5MS UPDATES SYNCHRONISED TO CONTROLLER SERVO LOOP IS ADVISED.(V1.6204) Added support for ModbusTCP – integer only, for functions 1,2,3,5,6&16. Requires Ethernet db s/w v1.0.3.1. (v1.6204). SUPPORT ADDED FOR LENZE CAN DRIVES: ATYPE=21 USED ADDITIONAL SERVO LOOP FEATURES ADDED WHICH ARE PARTICULARLY USEFUL FOR PIEZO MOTOR CONTROL: POS_OFFSET – Offset to dac when output is positive NEG_OFFSET – offset to dac when output is negative (should normally be negative) D_ZONE_MIN – dac output clamped to zero when magnitude of following error falls below this value after completion of a move. The value is specified in axis units. D_ZONE_MAX – dac output clamp released when magnitude of following error rises above this value or if a fresh move is started. The value is specified in axis units. Modbus – can now run ModbusTCP and Modbus on serial port 1 concurrently. ModbusTCP supports integer and floating point register values (use Ethernet(2,slot,7,value) where value 0: (default) integer mode or 1:floating point	1 MARCH 2004

INITIALISATION OTHERWISE DRIVE PRODUCES DL ERROR. THIS APPEARS TO BE AN SLM ASIC RESTRICTION. (1.6224)

FIX TO UPDATING OF TICKS VARIABLES IN 250 / 500USEC MODE ON MC206 / MC224 (1.6230)

FIX TO ENSURE VERIFY, OUTLIMIT AND DAC_SCALE AXIS PARAMETERS ARE THE SAME AFTER INITIALISE COMMAND AS AFTER POWER UP. (1.6232)

SERCOS – fix to servo.asm:: force_dac to remove 24 bit limit on calculated dac value (v1.6234)

FIX FOR TIMINGS AND DAC BOARD DETECTION FOR REVISED PCI208 GATE ARRAY. GATE ARRAY VERSION IS 01_01_24. (v1.6238)

WORKAROUND TO FIX ETHERNET DB FPGA TIMING PROBLEM WHICH PREVENTED SUCCESSFUL TCP SOCKET CONNECTION (V1.6241). PROBLEM AROSE ON MC224 VERSIONS >1.6226.

CAN COMMANDS 8 AND 9 DO NOT HALT BASIC ON ERROR, BUT RETURN 0 TO INDICATE THIS TO BASIC.

MODBUSTCP – CORRECT TCP HDR LEN IN COIL (FUNCTION 1) (V1.6245).

mode (1.6209).

Ethernet – can now set default gateway (using TrioBASIC command Ethernet(x,x,8)). Requires db firmware v1.0.3.2 & above. (v1.6216)

FIRST VERSION FOR EURO205X (1.6222)

ENCODER keyword is no longer masked to 16 bits. This allows it to be used for returning absolute encoder positions within one turn with a resolution of greater than 16 bits. This is required for Yaskawa P730 SERCOS systems with 17 bit/turn absolute encoders.(1.6226)

FIRST VERSION WITH SUPPORT FOR OKI CAN CONTROLLERS AS USED ON PCI208 (1.6229)

STEPPER DAUGHTER BOARDS CAN RUN IN SYSTEMS WITH 250/500 USEC SERVO PERIOD. (1.6230)

ModbusTCP – can now use either the VR variables or the Table for register data functions. Location is determined using the Ethernet(2,0,9,x) cmd. (1.6230)

ModbusTCP – increased throughput, and controller table or vr points are now contiguous when using floating point data format. (1.6231)

SERCOS – controller now monitors ring open & excessive distortion error flags. If error occurs, it will set the axis-status remote comms error flag and reset to CP0. (v1.6234)

SERCOS – now possible to access the MDT control word using the sercos(0/1,x,16,0[,x]) TrioBASIC keyword. (v1.6234)

B_SPLINE FUNCTION ADDED. EXPANDS A SET OF POINTS IN THE TABLE USING A SPLINE FUNCTION. (V1.6242)

USB COMMAND ALLOWS PORT TO BE OPENED/CLOSED (V1.6236)
USB(SLOT,2) – OPEN
USB(SLOT,3) – CLOSE

USB HEARTBEAT FACILITY INCORPORATED SO THAT USB DRIVER CAN DETECT AND RESTART (V1.6244)

EURO205X TABLE MEMORY INCREASED TO 32000 LOCATIONS. THESE ARE BATTERY BACKED AND CAN BE STORED INTO FLASH WITH FLASHVR(-1) AND FLASHVR(-2) (V1.6245)

		MODBUSTCP – WHEN USING FLOATING POINT FORMAT WE NOW MAP EVERY-OTHER MODBUS REGISTER NUMBER TO CONTIGUOUS VR (OR TABLE) INDICES. (V1.6245) MODBUSTCP – ADDED SUPPORT FOR FUNCTION CODE 23 (V1.62V46). ANALOG FEEDBACK AXES EXTENDED TO ALLOW USE WITH MC224 AND P325 VERSION 1.4	
1.64	FLASHSTICK STOPPED WORKING AROUND V1.6240. FLASHSTICK SUPPORT NOW REINSTALLED. (V1.6301) FIXED BUG IN EURO205X WHERE AXIS CONFIGURATION CHANGED FOLLOWING ATYPE WRITE ON ANOTHER AXIS. SETCOM HAS A SHORT DELAY TO ALLOW CHARACTERS TO BE ECHOED BEFORE BAUDRATE CHANGE FIXED BUG IN EURO205X WHERE INCORRECT VALUES COULD BE TRANSFERRED INTO DAC WHEN ATYPE=0 ON AXES 1,2 AND 3 (V1.6305) SERCOS – FIXED USE OF POSITION MODE WITH ABSOLUTE ENCODERS (CONTROLLER NOW RETRIEVES INITIAL ENCODER VALUE FROM SLAVE). PREVENTED MOTOR RUNAWAY WHEN WDOG=ON & SERVO TURNED OFF (CONTROLLER KEEPS LAST CMD VALUE IN MDT) (V1.6305) FIXED BUG IN INITIALISATION OF ENCODER READING PARAMETERS. THIS COULD HAVE LIMITED SPEED IN SOME APPLICATIONS. OCX SUPPORT – FIXED BUG WHICH PREVENTED CONTROLLER FROM RUNNING THE REMOTE PROGRAM REQUIRED BY THE OCX. (CONTROLLER WILL RESET WHEN OCX ATTEMPTS TO OPEN SYNCH COMMS PORT BETWEEN V1.6303-1.6307) (V1.6308) IF BUG FIXED – PARSER WAS GENERATING INVALID PROGRAM LINE NUMBERS FOR CERTAIN IF <> THEN <> STATEMENTS. (V1.6308) BUG FIXED IN TAMAGAWA ENCODER SUPPORT WHICH PREVENTED Z MARK REGISTRATION WORKING (V1.6310) SET PLM MODE DL_PROTO_CONFIG TO 184 AS DEFAULT TO AVOID REGISTRATION BUG IN SLM ASIC. PLM	FASTDEC AXIS PARAMETER NOW FUNCTIONS. IF A LIMIT CANCELS A MOVE THE MOVE WILL DECELERATE AT THE FASTDEC VALUE, PROVIDED THIS IS NOT ZERO. IF IT IS ZERO DECELERATION WILL OCCUR AT THE DECEL VALUE. FOR BACKWARD COMPATIBILITY FASTDEC VALUE NOW DEFAULTS TO ZERO. (V1.6305) Support for PLM axis types in addition to SLM. A new option in the DLINK command sets PLM mode: DLINK(12,slot,asic,axis) is similar to DLINK(4,slot,asic, axis) but sets PLM mode for the axis. This sets ATYPE to 20. In PLM mode positions are transferred to the PLM for it to close the position loop. (v1.6306) SUPPORT FOR ANALOG INPUT DAUGHTER BOARDS P225. THESE 16 BIT 0..10V CHANNELS ARE READ VIA AIN(40)..AIN(47) SUPPORT FOR TAMAGAWA ABSOLUTE ENCODERS: ENCODER_ID ENCODER_TURNS ENCODER_STATUS 2 NEW ATYPES ARE SUPPORTED: ATYPE=31 IS TAMAGAWA ABSOLUTE + STEPPER PULSE. ATYPE 32 IS TAMAGAWA ABSOLUTE + SERVO (V1.6309) ENCODER_RATIO FUNCTION ALLOWS ENCODER COUNTS TO BE SCALED BY A RATIO OF 2 INTEGER NUMBERS: ENCODER_RATIO(MULTIPLIER,DIVIDER) USING ENCODER_RATIO OVERRIDES THE PP_STEP VALUE WHICH IS SET TO 1 OR -1 BY THE ENCODER_RATIO FUNCTION. THE ENCODER_RATIO FUNCTION CAN BE DISABLED BY USING A MULTIPLIER VALUE OF ZERO.	12 JAN. 2005

AXES FETCH FOLLOWING ERROR FROM SLM IF VFF_GAIN IS SET TO 8. IN PLM MODE 2 AFFECTS ARE APPLIED: IF WDOG IS OFF THE SERVO PARAMETER WILL BE AUTOMATICALLY SET OFF. THE SEQUENCE TO INITIALISE SHOULD THEREFORE BE WDOG=ON THEN SERVO=ON. WHEN SERVO IS OFF ANY MOVES ARE AUTOMATICALLY CANCELLED SO THAT THE MPOS AND DPOS STAY IN SYNC WITH THE PLM. (V1.6312)

VIRTUAL SERIAL PORTS ARE INITIALISED CORRECTLY.

SERCOS POSITION MODE – CORRECTLY INITIALISE FIRST ENCODER READING WHEN ATYPE SET. PREVIOUSLY, ERRONEOUS OFFSET OF 301 WAS INTRODUCED ON SOME AXES (DEPENDENT UPON AXIS CONFIGURATION) (1.6313)

FIXED BUG WHICH PREVENTED MC206 AXIS 4 ATYPE BEING SET TO ZERO. (V1.6316)

FIXED BUG WHICH PREVENTED EURO205X ENCODER/STEPPER TRANSCEIVERS BEING SET CORRECTLY AFTER SOME ATYPE CHANGES. (V1.6319)

CORRECTED GLOBAL/CONSTANT INITIALISATION (1.6327)

FIXED INITIALISATION OF SHIFT AXIS CONSTANTS ON MC206 AND EURO205X. THIS COULD HAVE AFFECTED DAUGHTER BOARDS WITH 12 BIT ENCODER REGISTERS SUCH AS PSWITCH IN THESE CONTROLLERS ONLY (1.6327)

ANALOG INPUT DAUGHTER BOARD IS SCANNED BY SOFTWARE IN SLOTS OTHER THAN ZERO IN AN MC224 (1.6328)

ON-OFF SPECIAL FOR TRIO USA CUSTOMER, WHICH READ AIN CHANNELS 0-7 ALL VIA CAN (1.6329).

FIXED BUG INTRODUCED BY ENHANCED SERVO DAUGHTER BOARD CODE, WHICH PREVENTED WINDOWING WORKING ON REGISTRATION.(1.6331)

FIXED BUG WHICH AFFECTED USING P325 ANALOG INPUT MODULES WITH THE PCI208. (1.6332)

FIXED FLASH MEMORY ALLOCATION PROBLEM WHICH COULD PREVENT LARGE MC224 PROGRAMS FROM BEING STORED INTO FLASH (1.6338)

(V1.6315)

Helical option supported:
th

Optional 7 Parameter of MHELICAL command will allow Z distance to be ignored in path length calculation if it is none zero. Default is to include Z distance for backward compatibility (1.6316)

KEYWORDS FOR MULTI-MOVE LOOK AHEAD ADDED (ALTHOUGH MOVEMENTS DO NOT YET FUNCTION)

MOVEABSSP
MOVESP
MOVECIRCSP
MHELICALSP
MOVETANG
FORCE_SPEED
ENDMOVE_SPEED
MOVES_BUFFERED
VECTOR_BUFFERED

PCI208 HAS SYNCHRONOUS CAN OPEN OUTPUTS FOR SERVO CONTROL OF UP TO 8 AXES. (V1.6320)

CAN BAUDRATE CAN BE SET TO OTHER THAN 500KBAUD ON POWER UP USING THE CANIO_ADDRESS PARAMETER:

BITS 8 AND 9 CONTROL THE CAN BAUDRATE OF THE BUILT-IN CHANNEL:
0 – 500 K (DEFAULT)
256 – 256 K
512 – 125 K
768 – 1M
BITS 10 AND 11 CONTROL THE CAN BAUDRATE OF THE SECOND BUILT-IN CHANNEL OF THE PCI208:
0 – 500 K (DEFAULT)
1024 – 256 K
2048 – 125 K
3072 – 1M

NOTE THAT THE BAUDRATE MUST BE SET TO 500K TO USE THE TRIO IO MODULES.
(V1.6320)

ETHERNET – ADDED ABILITY TO CHANGE MODBUSTCP PORT NUMBER (1.6321)

SERCOS – WHEN READING STRING AND IDN ARRAY PARAMETERS THEY CAN NOW OPTIONALLY BE WRITTEN INTO VR VARIABLES. (1.6322)

Fix for MC224 flashstick data reading unreliability (1.6338)

Fix for errors which occurred when using ENCODER_RATIO with sercos registration. (1.6339)

Fixed bug in fetching data from EnDat encoders (1.6342)

Hostlink enabled (1.6323)

Support for EnDat absolute encoders:
ENCODER_CONTROL
ENCODER_READ
ENCODER_WRITE
Keywords added and new ATYPES of 33 and 34.

New format of Lenze CAN drives implemented (replacing old format) Drives connect in position mode only
V1.6326:
ATYPE is 21
Drive control word is mapped to DRIVE_ENABLE. Drive status word is mapped to DRIVE_STATUS. Monitor channel is mapped to REG_POS axis parameter. DATUM(0) must be issued twice to clear a drive error.

Added XON/XOFF protocol for the RS485 (Cobble) 1.6327

Added SLM/PLM only function which clears Z detected flag when an SLM command 242 is issued. This allows the user to get the SLM to re-scan for the Z mark. 1.6334

Encrypted projects are compatible with the first released version of the Project Encryptor program 1.6335

New function to read banks of digital outputs:
READ_OP(start,end)
This function can read back 1..23 digital outputs as a binary sum.

ETHERNET_IP function added:

This can read/write data to and from the Anybus module on the Ethernet IP daughter board.

ETHERNET_IP(slot#,0,param#,#values,vr#)
This reads 1..4 values into a VR sequence.

ETHERNET_IP(slot#,1,param#,value1
<,value2><,value3><,value4>)

This form writes 1..4 data values. The function returns TRUE for success and FALSE for fail. (1.6340)

		LENZE DRIVES SUPPORT INCLUDES TRIO DATUMING FUNCTIONS AND REGISTRATION. (1.6341) BUILT-IN ANALOG INPUTS ARE READ VIA CHANNEL 32 AND 33 RATHER THAN 0 AND 1 TO AVOID CONFLICT WITH CAN-IO (1.6343)	
1.65	FIXED BUG WHICH PREVENTS ENCRYPTED PROJECTS BEING USED WITH LOOKAHEAD VERSION FIXED BUG WHICH COULD TOGGLE DIRECTION LINE OF STEPPER OUTPUT WHEN NO STEP PULSES ARE OUTPUT. FIXED BUG WHICH COULD ALLOW AXES TO CONTINUE TO JOG FURTHER INTO A LIMIT SWITCH AT LOW SPEED FIXED BUG WHICH COULD RETURN DAY OF WEEK AND NUMBER OF DAYS SINCE 1900 INCORRECTLY ON REAL TIME CLOCK (1.6410) MODIFIED CHANNEL MESSAGE CHANGE MECHANISM TO REDUCE MOTION PERFECT DISCONNECTION POSSIBILITY. (1.6415) FIXED BUG (INTRODUCED AT 1.6417) WHICH COULD CORRUPT RAM PROGRAM DIRECTORY WHEN USING CLEAR COMMAND. (1.6422) FIXED LIMITATION WHERE "START ON POSITION" OPTION FOR MOVELINK ETC COULD NOT RELIABLY BE THE END POINT OF A REP_DIST RANGE (1.6449) FIXED USE OF ADDAX AND REP_DIST WITH MOVECIRC (1.6450) FIXED USE OF FLASHSTICK WITH MC206 RECENT VERSIONS.(1.6450) FIXED USE OF RESOLVER DAUGHTER BOARDS IN MC206 (1.6450) FIXED BUG WHICH DIDN'T SET ENCODER TRANSCEIVERS FOR OUTPUT OF STEP/DIRECTION ON EURO205X AND MC206X (1.6461) FIXED MODBUS SERIAL SUPPORT FOR FLOATING POINT NUMBERS. USE SETCOM MODE 7. (1.6470) FIXED BUG WHEN MOVEMODIFY WAS USED WITH LOOKAHEAD MOVE BUFFER. (1.6470) MODBUS FLOATING POINT SUPPORT FIXED FOR SERIAL CONNECTIONS (AS PER	LOOKAHEAD VERSIONS AND NORMAL VERSIONS CAN BE BUILT FROM SAME SOURCE FILES CANOPEN PARAMETER READS CAN USE "TYPE" 67 REQUESTS WHICH RESPOND AS TYPE 66. ADDED FLASHVR(-3,FLASHPAGE,TABLEPAGE) AND FLASHVR(-4,FLASHPAGE,TABLEPAGE) TO STORE AND RETRIEVE 16000 LOCATION PAGES TO/FROM FLASH. THIS IS FOR EURO205X AND MC224 ONLY. (1.6411) ADDED FE_LATCH – THIS AXIS PARAMETER STORES THE VALUE OF FE WHICH TRIPPED THE SERVO OFF AND SET BIT 8 OF AXISSTATUS. IT IS CLEARED USING DATUM(0) TO 0. FEMIN REMOVED FROM KEYWORD LIST NUMBER OF FLASH PAGES FOR PROGRAMS INCREASED TO ALLOW VERY LARGE PROGRAMS TO BE STORED ON MC224. (1.6416) UNUSED IO'S CAN BE USED AS "VIRTUAL" IO'S. INCLUDING VIA MODBUS. (1.6420) SUPPORT FOR PWM GENERATION ON SPECIALLY ADAPTED CONTROLLERS ADDED. NEW STEP_RATIO(X,Y) FUNCTION ALLOWS STEPPER PULSE RATIO'S ON AN AXIS TO BE SCALED TO MATCH ANOTHER AXIS. (1.6422) NEW FE_LIMIT_MODE AXIS PARAMETER ALLOWS FE_LIMIT TO BE IGNORED FOR 1 SERVO CYCLE WHEN SET ON.(1.6430) NEW SERCOS POSITION MODE CONTROL. (1.6444) DAC_OUT SET TO SERVO VALUE WHEN SERVO AND WDOG SET ON, AND TRACKS ENCODER (DPOS SET TO	20 JULY 2006

TCP connections) (1.6472)

Fixed bug which stopped programs from Autorunning in MC224. (1.6486)

Fixed bug in setcom command for MCX build – previously handshaking had always been turned off irrespective of command parameter value.(1.6495)

SERCOS – new sercos db FPGA counter reset mechanism (triggered by the kernel's timeslots & not in main)

Counter mechanism resets standard daughter boards including P201. Shift applied to interrupt timing on first cycle to more accurately synchronise the 2 interrupt sources. P201 Daughter board encoder reads are therefore synchronised to start of slot 0 servo timeslot (1.6496)

EXECUTE - no longer prints anything back as this causes problems when being used from the OCX

SLOT_COUNT variables redefined as an array to make the variable time slot assignment more efficient (1.6498)

CAN – corrected a buffer size problem and corrected the time wait for CANopen writes. (1.6498)

RTC – reverted to original routines as the existing "optimized" version does not work correctly on the MC224. Tested on the MC224. (1.6498)

INPUTS0 and INPUTS1 now work on the MCX16 (1.6500)

MPOS) when WDOG off (1.6444)

New LIMIT_BUFFERED system parameter. This can be set to limit the moves buffered ahead in the lookahead software version. Setting LIMIT_BUFFERED =2 will give similar buffering to the non lookahead version.

New AXIS_ENABLE for each axis to allow enable/disable of individual SERCOS or MECHATROLINK axes. Also groups can be set using DISABLE_GROUP(x,y,...)

New CANopen I/O mode: Up to 64 inputs and 64 outputs can be transmitted cyclically when CANIO_ADDRESS=40 and CANIO_ENABLE=ON

Modbus serial – can now use the VRs or table area when accessing registers. This is determined by extension to setcom command – setcom(<>,4,x) where x = 0 = vr (or if absent), and x = 1 = table. (1.6477)

ActiveX can now access the controller via serial ports 1 or 2.
SETCOM(38400,8,1,2,1,8)
REMOTE(0)
Run the above in highest process. Sync connection only, use Open(1,com_port) in PC. (1.6491)

PLM_OFFSET axis parameter added to allow for difference between DPOS and feedback position of PLM axes (1.6496)

RS232_SPEED_MODE added to allow RS232 based controllers to power up with the default fast parameters. (1.6498)

Increased the TABLE size to 32000 on the PCI208 (1.6500)

Command Line port is now cleared at boot up to try and avoid spurious characters due to noise problems. AUTORUN will be aborted if any key is pressed after the initialisation messages and before the AUTORUN check (1.6500)

1.66	USB – corrected slow boot on some PCs when the USB is connected (1.6503) AUTORUN – corrected for RUN QUEUES (1.6504) Hardware PSWITCH – bug fixed which affected operation when output specified as OFF (1.6507) Fixed bug where ANALOGUE axis type 30 position values were sign extended to delete top 4 bits in MC224.(1.6508) Fixed bug which initialised enhanced CAN DB to wrong baudrate. This bug was introduced in 1.6492 (1.6509) Remote connection for the PCI208 now releases the dual port RAM to avoid starving out the PC side connection (1.6512) Fixes bug where MC224 did not include the CANopen mode introduced in 1.6508 because of the different kernel file. (1.6513) Fixed bug which affected motion where MOVELINK/CAMBOX linked to REGIST input occurs at the time of an OFFPOS adjustment (maybe due to REP_DIST application). (1.6513) RUN – Fixed a bug introduced in 1.65 that did not return an error when running a non-existent file. FLASHVR – The new structure introduced in 1.64 development releases assigned 32 flash pages to the flash table. FLASHVR(-1) cleared all these pages, making it very slow. It now only clears the pages required (2). SEND – The keyboard address setting now uses the Basic parameter structure. (1.6518). Fixed bug where MSPHERICAL input for 360deg move with endpoint of 180deg specified as second point on circumference was rejected as invalid input. (1.6522) Serial communications – Fixed a UART buffer overrun problem (1.6523) Serial Modbus – Fixed a problem which caused incorrect CRC values	CAN – added support for MC026X OKI and Infineon chips (1.6503) TASK RUN QUEUES – re-enabled on MC224 (1.6503) MSPHERICAL spherical move command added to lookahead version only. (1.6505) MSPHERICAL(xend,yend,zend,xmid,ymid,zmid<,option><,gtpi>) Option=0 or non-existant: Mid point values are any point on sphere surface Option=1: Mid point values are sphere centre. Gtpi=non zero in option=1 case to indicate angle is >pi. MSPHERICAL is for lookahead versions only. New CANopen I/O mode: Up to 128 inputs and 128 outputs can be transmitted cyclically when CANIO_ADDRESS=41 and CANIO_ENABLE=ON (1.6508) CANIO routines adapted to allow for (RoHS compatible) MC224 and Euro205X versions which may have either Infinion or OKI CAN chips fitted. Also MC224 serial number upper word is read from FPGA not serial# chip on the revised version. (1.6506) MSPHERICAL extended to allow for option=2 (move 360deg) specifying 2 points on sphere and option=3 (move 360deg specifying centre) (1.6514) CANOPEN_OP_RATE – new keyword allows transmission rate of CANopen PDO's for OP's to be adjusted. Default is 5msec. (1.6514) DATUM(7) function added which clears motion error state, similar to DATUM(0) but for a single axis. (1.6515) EURO205X version detects and supports OKI CAN chip or INFINEON CAN chip. (1.6521) SERCOS: master now monitors slave drives, and if any resets it will flag an error and reset SERCOS_PHASE to 0.	14 Dec 2006

	to be calculated for packets containing negative floating point values. (1.6524) SERCOS – automatically clear the AT miss error flag on the SERCON ASIC when entering CP4. (required by new features added in 1.6518). (1.6524)	Also, preliminary support added for torque and open loop speed control modes. (1.6518) PSWITCH can switch on axis DPOS as alternative to axis MPOS using setting 5 : PSWITCH(chan,5,… (1.6520) SCARA transformation is incorporated into main build (1.6520) POWER_UP variable cannot be assigned when controller is LOCKed (1.6521) Local process variables increased to 1536 for each task (1.6521) DAT_IN axis parameter can be in range 0..63 on MC224/MC206X and EURO205X (1.6522) MODBUS – Function 1 (read coils) now returns the output status, and Function 2 (read discrete inputs) now returns the input status. (1.6522) Table validation – added more validation to the table during boot. If the table is not valid then it is erased.(1.6524) Added Modbus (serial) support for 32 integers (setcom(<>,9), and for function 15 (write multiple coils) (1.6524)	
1.67	Fixed bug where MPOS not displayed correctly in SCOPE sometimes in 1.66 (1.6603) Fixed bug where forcing ATYPE of axis 4 on MC206X affects other axes. ATYPE on MC206X axis 4 can be set to 2 provided Feature FEC 22 is enabled.(1.6609) Fixed and out by one error which meant that the OCX PCI table transfer worked very slowly (1.6611). Fixed TABLE corruption when writing TABLE(0) (1.6612) Fixed error which could cause error when MOVELINK or CAMBOX start on position (option 2) and link axis position changes in same	Command line – Now accepts up to 100 characters to make it compatible with the MPE command line. (1.6601) BACKLASH() command and BACKLASH_DIST axis parameter added.(1.6602) Main build incorporates FRAME 6,2 and 1 transformations. (1.6607) Euro205X version detects and supports 8M and 2M bit application RAM chips (1.6611) GCODE – Improved system software functions and updated the TrioBASIC support program (1.6611). CanOpen axis types 26 (CAN 402	14 Jan 2008

cycle due to OFFPOS/REPDIST/DEFPOS (1.6612)

Fixed VR write error introduced in 1.6612 (1.6613)

Fixed bug in can message read routine which could overwrite memory location next to the message buffer when 8 bytes are read. CAN axes position write out uses unique register. CAN transmits synchronized to servo when using OKI chip (1.6614).

Fixed bug which could allow characters to appear on initial terminal line in Motion Perfect after using/opening editor. (1.6616)

Fixed bug which prevented Modbus running on RS485 (1.6618)

Fix to RS232A Transmit Function (1.6622)

PCI208 fixes for CAN ports – port #-1 didn't work because it was tagged as CAN_COMMS rather than CAN_COMMS2. Port #1 was setting the baud rate register incorrectly. Slot 0 was also identifying itself as SERCOS when nothing is in that slot. Slot s #-1 & #1 now configured for CAN_COMMS2. (1.6622)

Increased the number of times the Modbus output function is called by the comms process to ensure consistent message transmit timing. (v1.6624)

Changed offset to TABLE data used to pass data into transforms on PCI208 only. (v1.6625)

Fixed bug in free memory calculation introduced in v1.6617 (v1.6625)

Fixed 32 byte transfer bug for Phoenix IO coupler. (v16627)

LINKAX works correctly as a second name for LINK_AXIS (v1.6628)

SDCARD – fixed various bugs in the FILE "xxx" commands.

Modbus – Fixed modbus corrupting Position mode) and 27 (CAN 402 Speed Mode) added (1.6614)

Added ENCODER_RATIO support for SLM axes (1.6616)

SPLINE function supports NURBS maths using type=2 (1.6619)

Initial SD Card support to include DIR D, STICK_READ, STICK_WRITE, LOAD_PROJECT and FILE commands (1.6619)

FRAME=5 (rotation via matrix) built-in as standard (v1.6625)

SD card support added to EURO205X software for Lookahead version only and for cards fitted with 8Mbit apps ram. P158's ver B (v16625LA)

TIMER function added. Sets/clears an output(s) for a timed period. TIMER(#,op,value,time<,option>) #=0 to 7, op#, value normally 1 but other values can be used as a bit pattern to switch multiple outputs, time (in msec), set option=1 to invert output(s). Only works with outputs <32. (1.6627)

Version of EURO205X lookahead version built with 64k table space for P158 with 8Mbit Apps RAM chip only. (1.6627)

Added support for text files. Text files can be opened and read from BASIC programs (v1.6628)

Added support for FIFO files. (v1.6632).

Added CALCULATE_CRC and TERMINATE_CRC tokens. (v1.6638)

Modbus serial – increased speed with which holding register response messages are transmitted (v1.6638)

Added FILE FIND_FIRST / FIND_NEXT / FIND_PREV / PWD functions (v1.6640)

Added MPE_CHANNEL to assign default channel after changing protocol (v1.6640)

NAIO made writable for flexibility. (v1.6641)

209 series: the IP parameter reset switch now does not reset the MAC address. The Ethernet command to change the MAC

PROGRAM MEMORY BUG. IT WAS POSSIBLE FOR THE SERIAL MODBUS TO MAKE AN OUT OF RANGE VR WRITE CAUSING PROGRAM MEMORY TO BE CORRUPTED. THE PROTOCOL WAS CALLING WRITEVR, AND NEITHER IT NOR THIS FUNCTION RANGE CHECKED THE GIVEN VR INDEX. (1.6629)

RTC – FIXED INSTABILITY ESPECIALLY WHEN CALLED SIMULTANEOUSLY FROM MORE THAN ONE PROGRAMME (1.6632).

PROTOCOL – FIXED (V1.6640)

ANALOGUE INPUT NUMBER PROCESSING SET TO 16 BIT IF AXIS_ADDRESS>=40 RATHER THAN USING NAIO (V1.6641)

REPEATED STOP COMMANDS NO LONGER LOCK UP CHANNEL 9 COMMUNICATIONS (V1.6650)

FIXED BUG IN DISABLE_GROUP WHICH COULD CRASH CONTROLLER. (V1.6652)

MC224 – CORRECTIONS TO ENABLE RS485 TO WORK WITH XON/XOFF (V1.6658)

ALL FLASH STICK VARIANTS – UPDATED FAT AND FIFO FILE SUPPORT (V1.6660)

ALL – FIXED ERROR IN PARSER THAT ONLY ALLOWED 15 CHARACTER VARIABLE NAMES (V1.6660)

ALL – FIXED A POSSIBLE OUT OF RANGE ERROR WHEN LOADING MOVES (V1.6660)

MC206X/MC224 – FIXED ETHERNETIP COMMAND(V1.6661)

P201 DETECTION ROUTINE ALTERED TO CORRECTLY MAKE INITIAL ENCODER READ. (V1.6661)

ALL – EDPROG1 COMMAND ADDED (ACCELERATOR = '!'). IDENTICAL TO EDPROG BUT TAKES AN ADDITIONAL PARAMETER THAT SPECIFIES THE PROGRAM TO WORK ON.

ALL – WHEN STEPPING INTO AN INCLUDED FILE WE GET THE CORRECT FILE MESSAGE RETURNED.

ALL – STRTOD NOW HANDLES INTEGER FORMAT.

ADDRESS CAN ONLY BE USED WHEN THE CONTROLLER SERIAL NUMBER IS -1. (V1.6649)

STEP_Z ATYPE #37 USABLE WITH EURO205X (V1.6647)

MC224 – NEW USER DEFINED MODBUSTCP FUNCTIONS 65 AND 66 WHICH PROVIDE ACCESS TO FULL TABLE RANGE (V1.6648)

TABLE_POINTER AXIS PARAMETER RETURNS CURRENT POSITION OF TABLE EXECUTION FOR CAMBOX AND CAM. THE VALUE RETURNED CAN HAVE A FRACTIONAL PART IN-BETWEEN TABLE VALUES. (V1.6651)

INTEGER_READ AND INTEGER_WRITE FUNCTIONS ADDED FOR 32 BIT INTEGER TRANSFERS IN AND OUT OF PARAMETERS. (V1.6650)

REGIST_SPEED AND REGIST_SPEEDB RECORD MSPEED AT TIME OF REGISTRATION EVENT. (V1.6652)
SERCOS – ADDED ABILITY TO 'PAUSE' AN EXECUTING PROCEDURE COMMAND (1.6653)

MOVE OPTIONS FOR MOVELINK/CAMBOX ALLOW BIT 5 (32) TO BE SET. THIS IGNORES MOTION ON THE LINK AXIS IN A NEGATIVE DIRECTION. (1.6654)

ETHERNET(1,-1,13) CAN BE USED TO SET MAC ADDRESS BASED ON TRIO UNIQUE ID, PRODUCT FPGA AND SERIAL NUMBER. THIS APPLIES TO TRIO CONTROLLERS WITH BUILT-IN ETHERNET (1.6654)

WDOGB PARAMETER AVAILABLE ON MC224 ONLY. DEFAULT -1 SETTING MAKES SECOND WDOGB RELAY OUTPUT FOLLOW WDOG RELAY SETTING. USE 0 (OFF) AND 1 (ON) TO SWITCH RELAY INDEPENDENTLY OF WDOG. (1.6657)

NEW SETCOM PARAMETER WHICH ENABLES THE TIME OF THE RS485 TRANSMIT ENABLE SIGNAL TO BE DEFINED BY THE USER (V1.6660)

MC209 – BUILD RELEASED WITH MODBUSTCP SUPPORT BUT THE ADC DISABLED (REQUIRED TO WORKAROUND AN FPGA IPC FIFO BUG.) (V1.6661)

NEW SETCOM PARAMETER WHICH

MC224/206X – disable SERCOS drives during firmware download, and ensure SERCOS db's recognised after download completed. (v1.6662)

MC209 – TEXT_FILE_LOADER now has another optional parameter at the end that specifies the protocol. By default protocol = 0 and is the original format. Protocol = 1 is transparent and just stores all the characters sent, the file is terminated after a 1 second timeout (v1.6662)

EURO205X and MC206X – Daughter board axis and above can be assigned to any axis type (other than external axis types) with ATYPE write. (v1.6663)

ALL – SCOPE command now validates which system variables can be stored by the assembly code in PLC.ASM. The assembly code in PLC.ASM can now handle nearly all storage types. TOKENTABLE command now reports the flag "u" for those system variables that are not scopeable. (SRC3 – 1.6664, SRC3LA – 1.6663, SRC3CJ1 – 1.6635)

Fix for problem with P225 in MC224 where occasionally wrong analogue channel was read (1.6664)

Fix for problem which could result in wrongly identified daughter boards in MC224 only from 1.6658 onwards. (1.6667)

Fix for problem which could result in wrongly identified Ethernet boards in MC224 only in 1.6667. (1.6668)

Fix for problem which prevented Tamagawa-Stepper ATYPE=31 from fully working(1.6668)

MC224 – Fixed problem which could lead to mis-detection of axis/comms boards fitted (1.6670)

ERRORMASK value can include bit 14 for fault bit on EURO205X (1.67)

enables the user to select Modbus over 2-wire RS485 (the protocol handles the response echoes.) (1.6662)

ENDAT encoders can now be 32 bit, rather than previous limit of 31 bits. (1.6664)

SERCOS - added ability to return the service channel 'last error' using the sercos(0,slot,17) cmd. (1.6665)

EURO209 – Tamagawa encoder support added on axes 4-7 of hardware. ATYPE 32 and 31 supported. FEC for encoder is required. (1.6665)

FRAME 13 - Added support for dual arm robot similar to 2D "flex-picker" (1.6671)

Added option to invert "Fault" input on EURO205X. Set bit 5 of AXIS_MODE axis parameter to invert bit 14 in AXISSTATUS parameter. (1.67)

Added option to not cancel CONNECT moves when limit hit but to override ratio to zero instead. Activate this mode by setting bit 1 of AXIS_MODE axis parameter (1.67)

1.67xx	MC206X – MODBUSRTU – CORRECTED PROBLEM WHICH CAUSED CONTROLLER TO RESPOND TO MESSAGES NOT INTENDED FOR ITSELF. (V1.6707) PROJECT/PROGRAM LOAD NOW HANDLES OUT OF MEMORY CORRECTLY (V1.6709) EURO209 – TEXT_FILE_LOADER – FIXED . (V1.6710) ENDAT ENCODERS WITH LESS THAN 16 BITS FETCHED CORRECTLY. CAN COMMAND SDO FUNCTIONS MODIFIED TO REPLACE BASIC ERROR EXCEPTION CODES WITH A FALSE RETURN VALUE INSTEAD (V1.6721) ENCODER_RATIO PROBLEM CAUSING ENCODER COUNTS TO BE DROPPED CORRECTED (V1.6722) Fixed recently introduced immediate command problem where commands such as >>BREAK_ADD "prog",1 could not be used both with and without the comma. (v1.6728 / V1.7002 in LA version) FIXES PROBLEM WITH LOOK AHEAD SCANNING THAT ALLOWED SPEED TO INCREASE BEYOND PROGRAMMED SPEED IN MOVESP/MOVEABSSP ETC (V1.7005 IN LA VERSION) FIXES FOR CANOPEN READ MESSAGE PROBLEM – MAIN PROCESSOR CODE HAD TO CHANGE TO MATCH NEW PRP V67. (V1.7006 LA, REQUIRED FOR EURO209.) THE MC224 AND E205X HAVE 2 INTERNAL ANALOGUE INPUTS. WHEN CAN ANALOGUE IO WAS DETECTED, THE INTERNAL ANALOGUE INPUTS WERE IGNORED. THIS HAS NOW BEEN FIXED. (V1.6729) SGN(0) NOW EVALUATES CORRECTLY. (V1.6731 & 1.7011) ATYPE 35 AND 36 (PWM TYPES) CAN USE DATUM(7). ALL VERSIONS. (V1.6731 & 1.7011) MODBUS SERIAL – FIX TO SUPPORT NEGATIVE NUMBERS WITH 32 BIT DATA EXCHANGE (V1.7012)	MC224 WITH G-CODE SUPPORT (V1.6713) BIT 6 OF AXIS_MODE SET S AN ANALOGUE FEEDBACK AXIS TO NON SIGN-EXTENDED MODE. FOR P225/P184. (V1.6727) SUPPORT FOR P326 CANIO ANALOG IN/OUT MODULE FOR EURO209 – REQUIRES NEW PRP V67. (V1.7004) 10TH PARAMETER POSSIBLE FOR MSPHERICAL/MSPHERICALSP (LA VERSION V1.7005 ONLY) USE OF ATYPE=37 (STEPPER/ENCODER MODE) CAN BE CONTROLLED USING FEC CODES 24..31 ON EURO209 (LA VERSION ONLY V1.7007) ADDED MODBUS 32 BIT INTEGER SUPPORT FOR THE EURO209 - SIMPLY BY INCLUDING EPPMODBUS32 IN THE PORT AND CHANNEL DISPATCH FUNCTIONS. (V1.7008) INCREASED ADDRESS RANGE OF MODBUSTCP IO FUNCTIONS, BY ALLOWING ACCESS TO THE VIRTUAL IO (0..287). (V1.7009) ENCRYPTED PROJECTS CAN BE LOADED FROM SD CARD. NEW KEYWORD PROJECT_KEY. (V1.6731 & 1.7011) ATYPE 36 PWM+SERVO AXIS TYPE SUPPORTED. (V 1.7012 LA VERSION ONLY) MODBUS RTU: IMPROVED FILTERING OF INCOMING STRING TO PREVENT RESPONSES TO NON-MODBUS STRINGS. (V1.6733)	V1.7009 – 12 APRIL 2011 V1.7010 – 23 JUNE 2011 V1.6730 – 23 JUNE 2011 V1.7011 – 28 JUNE 2011 V1.6731 – 28 JUNE 2011 V1.7012 – 9 SEPT 2011 V1.7013 – 17 SEPT 2011 V1.6733 – 19 JAN 2012 V1.7014 – 20 JAN 2012 V1.7016 – 13 FEB 2012 V1.7019 – 16 MAR 2012 V1.7020 – 22 MAR 2012

FIXED BUG WHICH ALLOWED DECEL AND ACCEL AXIS PARAMETERS TO SOMETIMES GENERATE INCORRECT VALUES INTERNALLY , ALTHOUGH ACC() AND DEC() COMMANDS FUNCTION OK. (V1.7013)

FIXED EURO209 CAN ANALOGUE HANDLING. AIN(1) AND ABOVE HAD LOW RESOLUTION. (V1.7014)

FIX FOR MP2 ISSUE WHEN SAVING VRS TO STARTUP. VRS WERE BEING CORRUPTED IN THE CONTROLLER. (V1.6734)

FIXED EURO209 BUG - CAN ANALOGUE VALUES INCORRECTLY PASSED TO MOTION CODE FOR ANALOG AXES. (V1.7016)

FIXED BUG IN SCARA FRAME TRANSFORMATIONS. THIS AFFECTS THE TRANSFORMATION WHEN THE ARM IS RIGHT BEHIND THE FORWARD POSITION. I.E. WHEN THE FIRST JOINT ANGLE IS POSITIVE AND THE SECOND JOINT ANGLE EXCEEDS PI RADIANS OR IF THE FIRST JOINT ANGLE IS NEGATIVE AND THE SECOND JOINT ANGLE EXCEEDS –PI (V1.7019)

CORRECTED SMALL FRAME 1 BUG INTRODUCED IN 1.7019. (V1.7020)