Test Release Changes KFLOP/KMotion Versions 4.34b -> 4.35c 09/01/2020

KFLOP

Support FRO and Feedhold while in Spindle Synchronized mode (G95)

Advanced Trip State Blending

New Script Commands:
GetAllDestVelHex
MoveRelAtVelAccel
MoveAtVelAccel
JogAtAccel

Disallow DisableAxis(8); as 8 is invalid and ignored, caused crash in previous versions

MutexLock/Unlock – now uses count and Thread which allows same Thread to lock multiple times

scanf/printf library functions changed to use internal buffers of 110 characters instead of 510 characters to reduce memory usage and stack overflows.

DSP Memory Model changed to use Trampolines for smaller code faster execution.

DSP math functions in ROM now utilized for smaller code and faster execution

KMotionDef.h

Add new constants
#define SQRT2 (1.4142135623730950488)
#define ISQRT2 (0.7071067811865475244)
#define SQRT3 (1.7320508075688772935)
#define ISQRT3 (0.57735026918962576509)

HostStatus new bit added to indicate KMotionCNC has Block Delete turned on
#define BLOCK_DELETE_CHECKED (HostStatus & HOST_BLOCK_DELETE_BIT)

New optimized function definitions will execute much faster:
```
extern float rsqrtf(float x);
extern float exp2f (float x);
extern float exp10f(float x);
extern float log2f (float x);
extern float recipf(float y);
extern double rsqrt(double x);
extern double exp2 (double x);
extern double exp10(double x);
extern double log2 (double x);
extern double recip(double y);
extern double CubeRoot(double v);
```

New Motion Functions:
```
void MoveAtVelAccel(int chno, double x, float MaxVel, float MaxAccel);  // move using absolute coordinates and specify the velocity and acceleration
void MoveAtVelAccelDecel(int chno, double x, float MaxVel, float MaxAccel, float MaxDecel);  // move using absolute coordinates and specify the velocity, Accel, Decel
void MoveRelAtVelAccel(int chno, double x, float MaxVel, float Accel);  // move relative to current destination and specify the velocity and accel
void MoveRelAtVelAccelDecel(int chno, double x, float MaxVel, float Accel, float MaxDecel);  // move relative to current destination and specify the velocity and accel
```

```
void MoveRelAtVelAccelDecelSoft(int chno, double x, float MaxVel, float MaxAccel, float MaxDecel);  // move rel to curr dest and specify the vel, accel, decel and limit to soft limits
void JogAtAccel(int ch, double vel, double MaxAccel);       // move continuously at specified velocity using specified acceleration

// Creates potentially blended Jerk limited move where current state (a0=current accel, v0=current velocity, x0=current position)
// attemps to accelerate/decelerate (using Amax) to a desired velocity (Vmaxp) before stopping at position x1 using deceleration Dmax.
// returns 0 if sucessful
int MoveEx(double x1, TRIP_COEFF * Trips, double a0, double v0, double x0, double Amax, double Dmax, double Vmaxp,
        double J, int *MoveType, int *Nstates, CHAN *ch);  // Move with Extended options - different Accelleration and Deceleration

MOVE_TYPE created to define type of motion blending
// Create Trip States for Independent Movement (with specified Acceleration)
void SetupForMoveAccel(double From, double To, float MaxVel, float MaxAccel, CHAN *ch, int CoeffOffset,
                int NoJerkControlAtStart,
                int NoJerkControlAtEnd,
                int Start,
                int *Nstates);


CurrentThread now properly declared volatile
extern int volatile CurrentThread;  // current thread that is/was executing  0 = Pri 1-7 = User Threads
```

C Programs

3-Axis Touch-off TK.c – example to do probe corner of block

jerbroZCircles_Rev3.c – Jeremy Brown's probe example updated to make Probe Polarity Configurable

TimeRemaining.c – display Time Remaining in KFLOP's Motion Buffer

Init3Analog.c – Kanalog Example Updated

KflopToKMotionCNCFunctions.c – SetEditControl function added

Modulo360Position.c - example added to reset angular axis with feedback (Position)

KNozzControlTempsMCode.c – Fixed to read in the last Temperature bit

ShowSnapStatus.c – Updated added WaitNextTimeSlice to avoid interrupt possibility

CaptureXYZMotionToFile3.c – added captures 3 axes of commanded trajectory

CaptureXYZPosDestToFile.c - added captures 3 axes of commanded trajectory including measure position

CoordMotionInKFLOPFunctions.c – Update to track CS0_TimeDownloaded

Knozz\KNozzControlTempsMCodeStateMachine.c – State machine example controlling KNozz
RigidTapCycle+M119 Feedhold Rev 6.c – Rigid Tap Example

SendDoubles.c / ReceiveDoubles.c – example sending doubles between KFLOPs via RS232

SNAPAMP\SnapAmp 1 Stepper.c – SnapAmp Configuration for 1 Stepper Motor

\SpindleUsingJogs\CSS\TestIncludingCSSwSSV.c / CSSJogwithSSV.c – Spindle Constant Surface speed with Sinusoidal Spindle Speed Variation to avoid chatter example

\ToolChanger\Linear4ToolHolders\ARotateToolChanger.c – Tool Changer based on rotating A Axis example

\RigidTap\RigidTapMultiPassJogM119_v1_Jim.c – Multi pass (peck) rigid tapping example using Spindle Controlled as an Axis.

SimulateProbeAndStock.c – Simulates how a probe would trigger hitting an imaginary rectangular stock

SimulateProbeAndStock Internal.c – Simulates how a probe would trigger hitting an imaginary rectangular internal pocket in stock

KMotionDLL

COFF Loader fix issue with sections not aligned/padded to 8 bytes. Sometime an issue using TI Compiler and large programs.

CCoordMotion Library

Fix issue with cases where roundoff, subdividing segments, combining segments with colinear tolerance changes segments from purely angular to mixed xyz and angular resulting in incorrect feed rates.

Trajectory Planner

Fix issue where subdividing or combining segments switched segments from being considered pure angles vs XYZ linear motions. This occurs where axes deltas are tiny and near Thresholds. Original determination should now be maintained.

Kinematics

New Kinematics Classes – CKinematicsScara and CKinematics2AxisRobot

Kinematics Virtual Function Initialize() called after Construction to allow Kinematics Class to read any parameters from Kinematics.txt file.

Kinematics base class has MainPath to installation directory to assist in finding Kinematics.txt file

int CKinematics::GetParameter(const char* key, double *v) helper function added to extract key based parameters from the Kinematics.txt file in the form such as: Length = 123.4

InvertTransformCADtoActuators() to numerically solve for CAD position to iterate in maximum 0.1 inch increments to avoid large overshooting with highly nonlinear systems.

CKinematics5AxisTableAGimbalB now reads parameter PivotToChuckLength from Kinematics.txt

KMotionCNC Screen Editor

40 Customizable Combo Box Controls Added

Edit Controls now support UNICODE. Persist file is now a UNICODE file to support international characters.

Combo Boxes now support UNICODE Text and Tool Tips. Now persist like Edit Controls and increments EditScreenChangesCount whenever value changes so KFLOP can detect the need to refresh.

New Search Option to find and Select any controls with a specified substring. Text, Name, Script, Bitmap File name, Font Name, or Var Number are searched.

PC_COMM_SCREEN_SCRIPT command to execute screen script from KFLOP no longer crashes if there isn't a screen script previously loaded.

Screen Script lines max length increased from 900 to 4000 characters

DRO Labels with Screen Script Text property set to $KEEP$ will not alter the Label Text when loading Screens.

Edit Control text can now be written to like DRO Labels by placing a negative gather buffer offset into the persist variable

Combo Box Control text can now be written to like DRO Labels by placing a negative gather buffer offset into the persist variable

Non ASCII international characters can be read/written to/from KFLOP to/from Controls by using wide character hexadecimal values. Format is \xnnnnnn where nnnnnn is the hexadecimal representation.

Toggle Buttons may now both toggle a bit and execute a Screen Script command such as an Action to execute a C Program.

Screens now support relative paths. Image files, screen script files, or C Program files without an absolute path will be searched for in the following directories in this order:

#1 the directory of the current Screen Script file
#2 <KMotion Installation Dir>\KMotionCNC\Screens
#3 <KMotion Installation Dir>\KMotionCNC\res
#4 <KMotion Installation Dir>\C Programs

Paste controls into multiple Screen Script Files feature. Copy Controls, Push R/W Paste, select multiple Screen Script Files, Open.

Screen Script Actions now include a floating point Parameter that is passed as a float into the persist Var. The parameter can be used as a code to allow a single C Program to be used for multiple buttons as an identifier for which button called the C Program.

Combo.scr – Example added to show Combo box usage

Probe Screen Set located in \PC VC Examples\KMotionCNC\Screens\ProbeJB_Stig

Screen Editor now Defaults to not show hidden controls

KMotionCNC / GCode Interpreter

G83 Peck Drill Canned cycle now supports K parameter for chip breaking rapid delta previously fixed at 0.01 inches and still defaults to that value. Also supports P parameter for dwell time in seconds.

Round Corner option added to GCode Editor Transform Feature. Arcs can be inserted between selected linear segments. Avoids gouge issues with radius compensation along inside corners.

Tool Table now entirely cleared and initialized including unused entries and parameters.

Tool Setup Screen last Tab Viewed now persists.

Fix crash when selecting Tool Dropdown with empty or missing Tool Table.

Set DRO Screen now has set to DRO/2 option. Facilitates zeroing one side, moving to opposite side, then setting to center.

Fix crash when displaying Tool Tip for Tool Selector when Tool Description, offsets, etc. is very long

Threading Mode status and feedrate dist/time vs dist/rev displayed properly for both G32 (Threading) and G95 (feed/rev)

Spindle State – CW, CCW, Stopped now updated properly when using screen buttons the same as from GCode/MDI. Otherwise there can be an issue with Threading and Feed dist/rev.

Tool Tip added for Stop Jog Step Button

Interpreter Setup File Example added - \KMotion\Data\KeepOffsetsMMFanucCompNoToolIndex.set to Keep Offsets, mm mode, Fanuc Radius Compensation entry, keeps Tool Index.

KMotion.exe

Fix missing Regular Expression Option in C Programs Screen Find/Replace Screen

Axis Screen fix formatting of huge numbers.

C Program Screen Validation better support of clicking on error/warning and jump to line.

C Program Screen Validation ValidateOptions.txt file changed to not warn about unused functions.

Step Response Screen – Load Data – now properly closes data file

.NET

KM_Controller.Compile Function fixed

KM_Controller now reports BoardID and _BoardNumber correctly when using multiple boards.

Scintilla Editor Control

Pre-compiled headers optimized to build faster

Chip VB Example

Extensive CNC Control Program written in Visual Basic contributed by Rick Caddell

Jogger.NET Example

Command line option “UpdateFirmware” added to immediately Flash KFLOP with New Version and exit

Dynomotion VB.net Example

Fixes for Sync Button to Clear any previous Halt or Aborts

Flush Execute now waits for segments finished

New button Do Test CMS to demonstrate full Coordinated Motion sequence including Clear, Sync, Feed, Flush, wait for finished.

Halt Coordinated Motion Button added.

KFlopWebNC Example

Bug fixed regarding MCode Actions mixups

KMotion_dotNet Console

Interpreter example includes example line to display current line of execution.

SimpleGCodeWPF Example

Title corrected to C# WPF App instead of C# Forms App

TeachMotion Example

MoveExp terminated when disabling Sync

Cleanup feature added to analyze GCode file, detect motions away from material, and optimize motion to a straight line.

GCode Examples

G83_Peck_Drill_Cycle_with_dwell_rapiddelta.ngc – example using new dwell and rapid retract distance specified

G95.ngc – Simple G95 example showing feed per rev mode

DrawRectStock4x3x1.ngc – Simulation Run draws what a rectangular Stock would look like for testing/visualizing Probe sequences

DrawRectStock4x3x1 Internal.ngc – Simulation Run draws what a rectangular Stock with internal pocket would look like for testing/visualizing Probe sequences

Mach3

Fix issue with IO not updating after Estop while a Notification C Program is Active.

TCC67

Allow #include files to contain absolute paths

Allow file extensions of .C as well as .c

Fix compiler crash compiling functions with undefined type such as: `void S(XXX x)`

Fix Old Style Function definitions not treating floats as doubles:

```
void S(a,b)
float b;
char a;
{
	printf("%d %f\n",a,b);
}

void main()
{
	S(99, 123.0f);
}
```

Help

G83 G84 listed in KMotionCNC quick reference

Step/Direction Description added missing Quadrature Mode Description

Installer

Microsoft Visual C++ Redistributables(x86) now installs the generalized 2015-2019 redistributable Version 14.27.29016