

HiCON and THC Instruction Document

I. Prerequisites

A. Hardware

Please make sure that the components are complete.

HiCON Setup:

- HiCON CPU Board and Breakout Board 7775 (already attached together)
- THC Adapter Board (small board with 26pin and DB25 connector)
- THC Controller.

DspMC Setup:

- DspMC Motion Controller pn7762
- THC Adapter Board (small board with 26pin and DB25 connector)
- THC Controller.

B. Software

dspMacro or HiCON Basic Download:

- [THC HiCON Macro.bas](#)
- [THC DSPMC Macro.bas](#)

Please make sure that the following additional features have been enabled on the **HiCON** Device:

- HiCON BASIC Language Internal Programming Feature.
- Extended I/O Feature (Enable Ports 12 and 13).

*NOTE: The **DSPMC** already has these features as a factory default.*

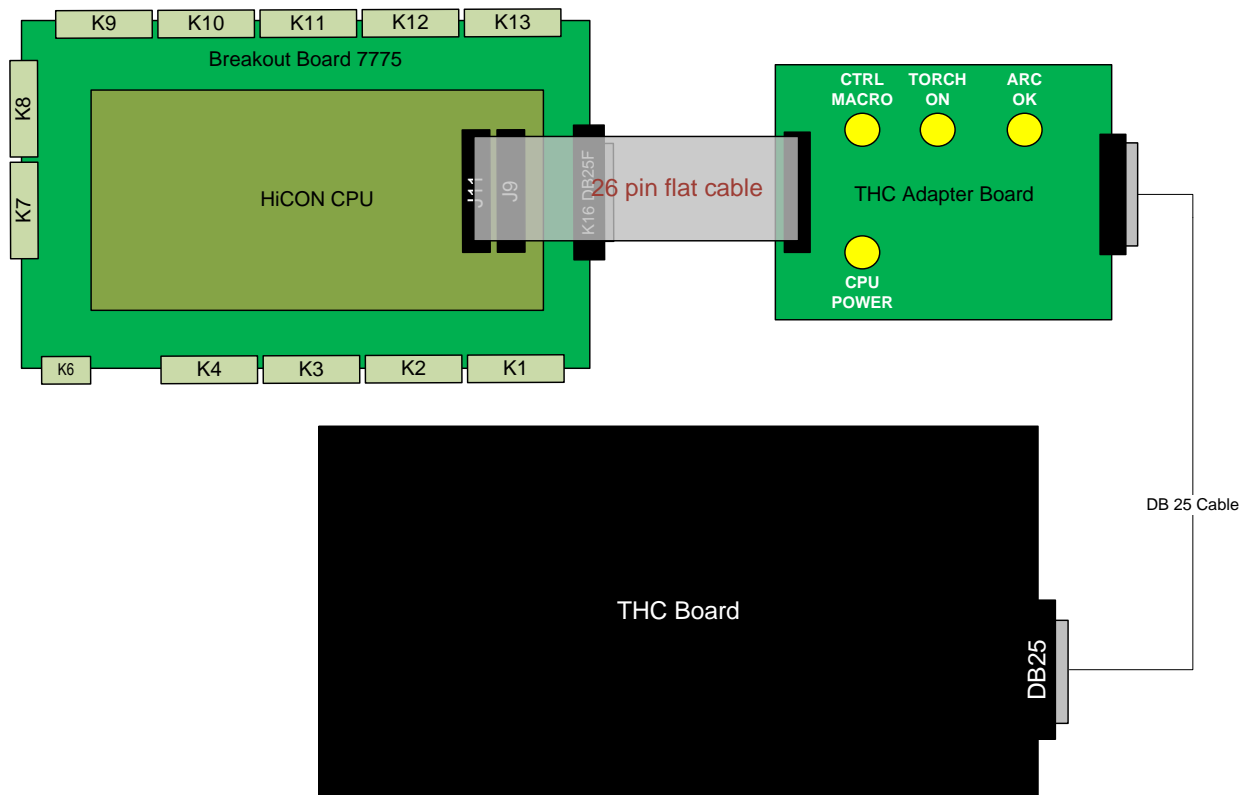
IMPORTANT:

- Make sure that the HiCON or DspMC has the latest firmware from the [vitalsystem website](#).

II. HiCON Setup

Follow the setup diagram below to setup HiCON with the THC. For instructions on the individual setup of the HiCON or the THC, refer to their respective setup instructions.

- Connect the 26pin flat cable from the THC Adapter Board to the HiCON CPU Board J11.
- Connect the DB25 cable from the THC adapter board to the THC Control Board.



HiCON and THC Setup

IMPORTANT:

The THC HiCON-Basic Macro uses the values in from Mach3 Motor Tuning, namely acceleration and velocity for the THC axis.

The HiCON-Basic macro automatically monitors the up and down command signals from the THC and issues the corresponding motion command to the Axis. To achieve hi-speed machining, it is recommended that the acceleration is given a large value so the axis motion can respond quickly.

A. Loading the HiCON-Basic Macro:

After completing the setup, load the provided HiCON Macro Program (THC_HiCON_Macro.bas) on the HiCON. This can be done with the HiCON Basic Loader Program.

The HiCON Basic Loader Program can be downloaded from:

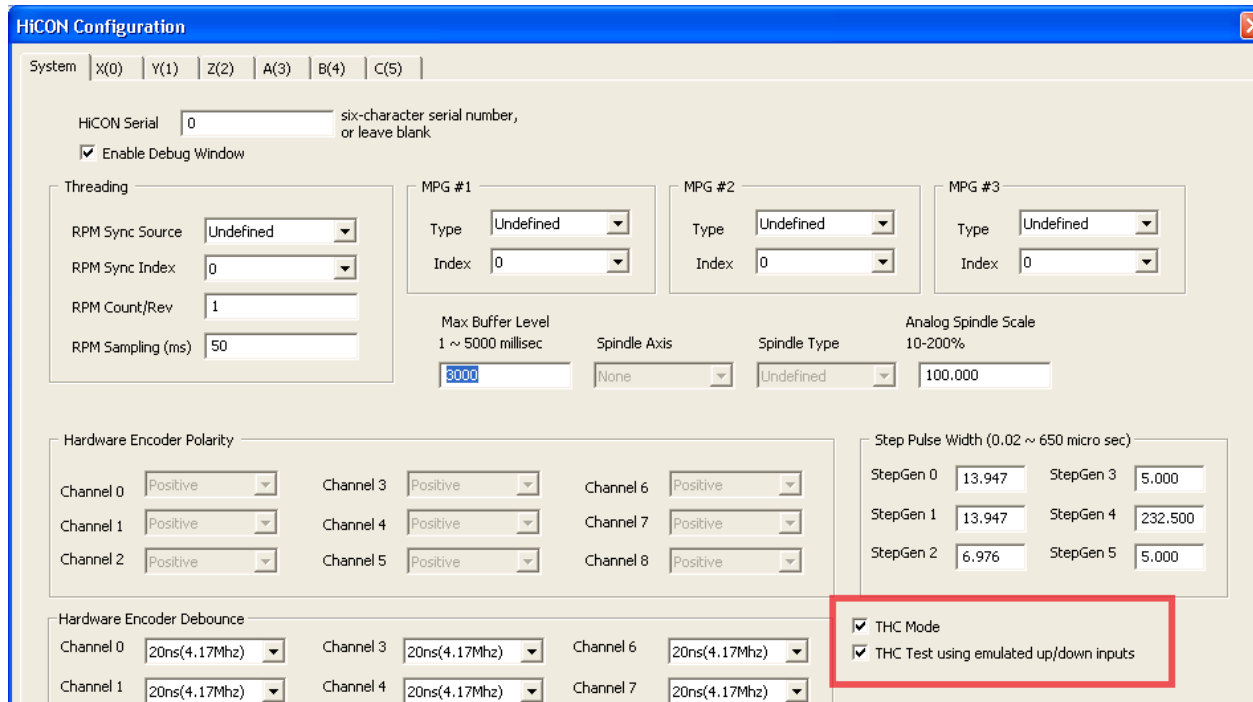
<http://www.vitalsystem.com/web/hicon/HiCONbasic.zip>

- Click the "Connect" button to connect to the HiCON.
- Click the "Download Program" button and navigate to the "THC_HiCON_Macro.bas" file.
- Click on Run/Stop when Mach3 is running.

- The program should also be put to auto start at power-up by Clicking “Autorun ON/OFF”. This will have the device run the HiCON-Basic macro at startup.

B. Running the HiCON-Basic Macro

Make sure THC Mode is enabled in the System tab of HiCON plugin configuration as shown below. To allow testing Z axis motion using keyboard emulation, turn on “THC Test using emulated up/down inputs”.



When running the system, make sure that the “CTRL MACRO” LED on the THC Adapter board is blinking as this indicates that HiCON is currently running the THC Macro.

Turn on the TORCH ON output from Mach3. The TORCH ON output is mapped to **P13, pin 4**. Use spindle ON/OFF (M3/M5) commands.

The HiCON macro will **ONLY PERFORM Z MOTION** if all of the following conditions are met:

1. THC Correction is enabled in Mach3 (LED24)
2. The ArcOK signal is ON from the THC controller
3. X or Y axis are moving.

In the THC Test Mode, Z motion can be generated without axis velocity and ArcOK.

NOTE: Make sure the spindle Output (Torch On Output Signal) is mapped to Port 13, pin 4.

ArcOK signal can be read directly from hardware input **Port 13, pin 2**.

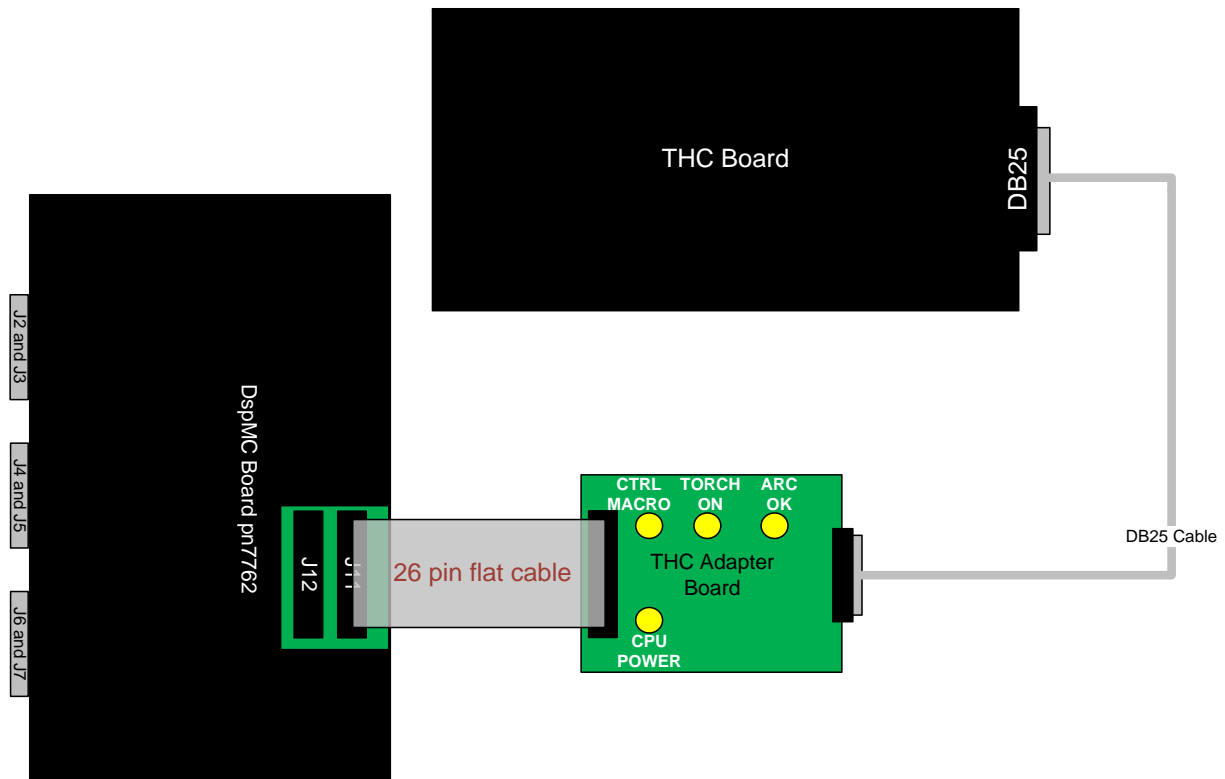
C. Mach 3 Ports and Pins Config

| Signal | Type | Port | Pin | Active Low |
|--------------------|--------|------|-----|------------|
| Torch (Spindle M3) | Output | 13 | 4 | TRUE |
| Torch Up | Input | 13 | 1 | TRUE |
| Torch Down | Input | 13 | 0 | TRUE |
| Arc OK (Torch ON) | Input | 13 | 2 | TRUE |

III. DSPMC Setup

Follow the setup diagram below to setup DSPMC with the THC. For instructions on the individual setup of the DSPMC or the THC, refer to their respective setup instructions.

- Connect the 26pin flat cable from the THC Adapter Board to the DSPMC Board J11 Connector.
- Connect the DB25 cable from the THC adapter board to the THC Control Board.



DSPMC and THC Setup

IMPORTANT:

The THC dspMacro uses the values in from Mach3 Motor Tuning, namely acceleration and velocity for the THC axis.

The dspMacro automatically monitors the up and down command signals from the THC and issues the corresponding motion command to the Z Axis. To achieve hi-speed machining, it is recommended that the acceleration is given a large value so the axis motion can respond quickly.

A. Loading the dspMacro

After completing the setup, load the provided dspMacro Program (THC_DSPMC_Macro.bas) on the DSPMC controller. This can be done with the DspMacro Loader Program.

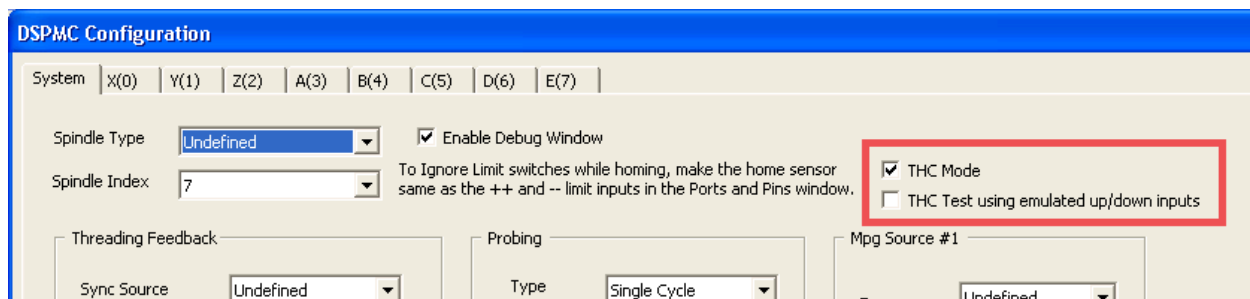
The DspMacro Loader Program can be downloaded from:

<http://www.vitalsystem.com/web/motion/dspMacroSetup.zip>

- Click the “Connect” button to connect to the DSPMC.
- Click the “Download Program” button and navigate to the “THC_DSPMC_Macro.bas” file.
- Click on Run/Stop when Mach3 is running.
- The program should also be put to auto start at power up by Clicking “Autorun ON/OFF”. This will have the device automatically run the macro at power up.

B. Running the Macro for DSPMC

Make sure the THC Mode is enabled in the System tab in the DSPMC plugin configuration. To allow testing Z axis motion using keyboard emulation, turn on “THC Test using emulated up/down inputs”.



When running the system, make sure that the “CTRL MACRO” LED on the Adapter board is blinking as this indicates that HiCON is currently running the THC Macro.

Turn on the TORCH ON output from Mach3 using M3/M5 spindle commands. The TORCH ON output is mapped to **J11, pin16 (Mach3 output pin 20)**.

The macro will **ONLY START MOTION** if all of the following conditions are met:

1. THC Correction is enabled in Mach3 (LED24)
2. The ArcOK signal is received from the THC controller
3. X or Y axis is moving.

In the THC Test Mode, Z motion can be generated without XY motion and ArcOK.

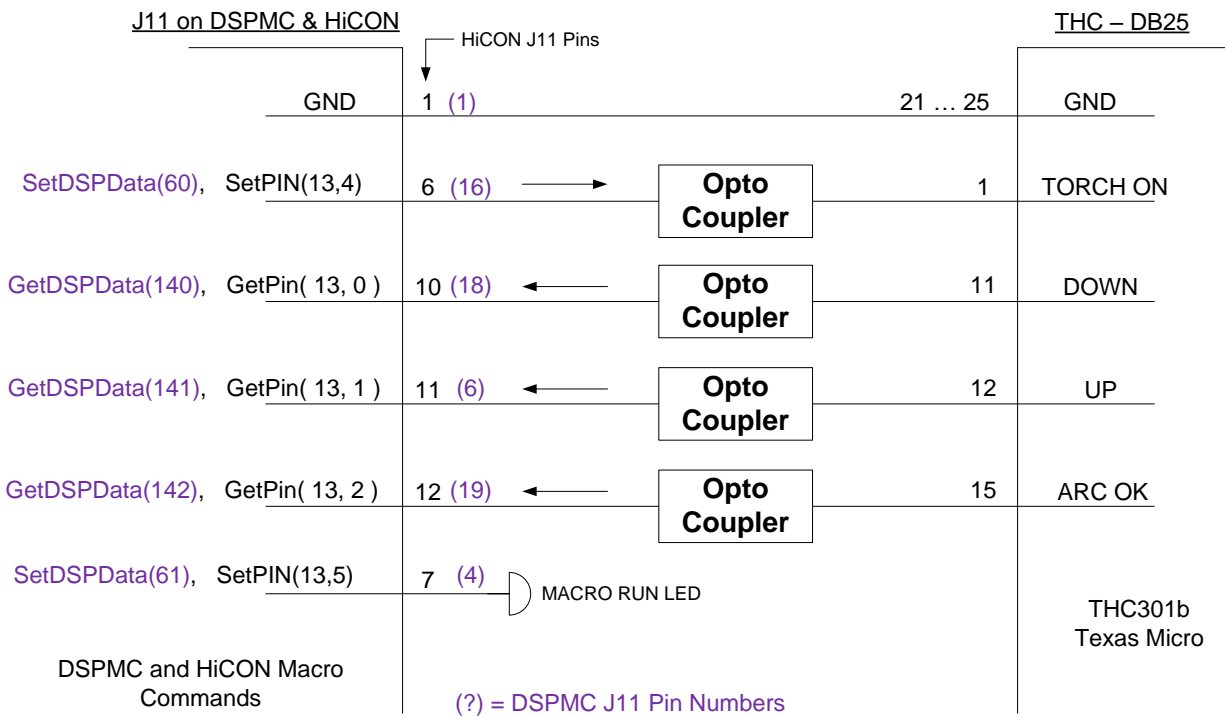
NOTE: Make sure the spindle Output (Torch ON Output Signal) is mapped to **J11, pin16 (Mach3 output pin 20)**.

ArcOK signal can be read directly from hardware input **J11, pin19 (Mach3 pin 34)**.

C. Mach 3 Ports and Pins Config

| Signal | Type | Pin | Active Low |
|--------------------|--------|-----|------------|
| Torch (Spindle M3) | Output | 20 | TRUE |
| Torch Up | Input | 33 | TRUE |
| Torch Down | Input | 32 | TRUE |
| Arc OK (Torch ON) | Input | 34 | TRUE |

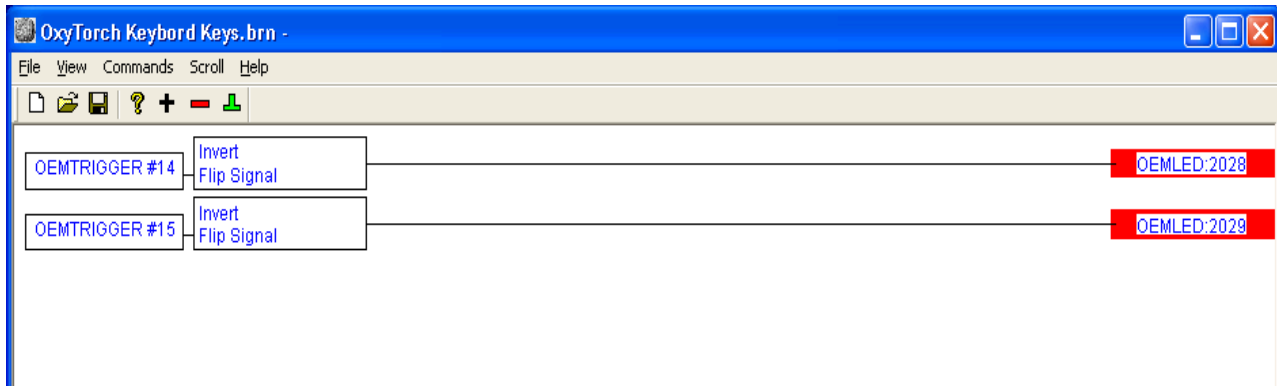
IV. THC IO Connections



V. THC Test Mode Setup

Up/Down Signal Emulation via Keyboard

Up/Down signals emulation may be accomplished by mapping OEMTriggers to OEMLED:2028 and OEMLED:2029 respectively via a Mach3 Brain. The OEMTriggers can then be mapped to keyboard using ports & pins input setting. Below is an example:



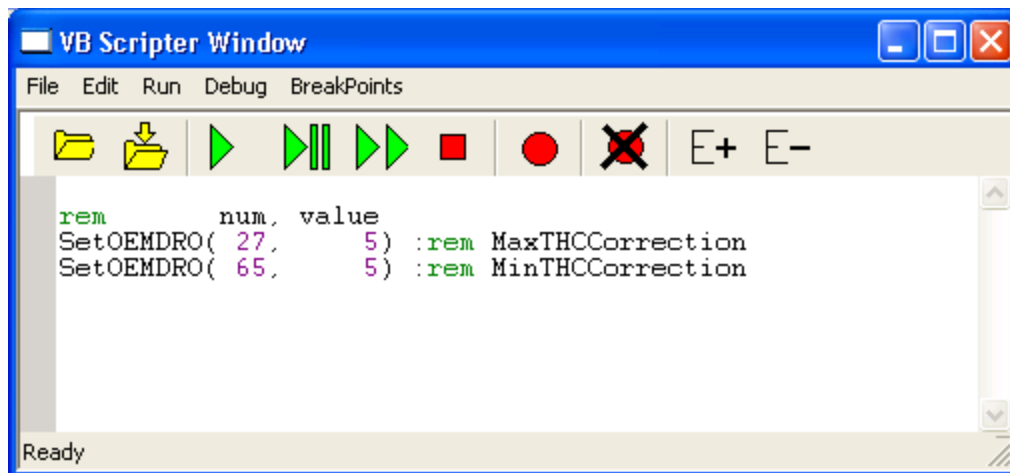
The screenshot shows the "Engine Configuration... Ports & Pins" dialog box. It has several tabs: "Port Setup and Axis Selection", "Motor Outputs", "Input Signals", "Output Signals", "Encoder/MPG's", "Spindle Setup", and "Mill Options". The "Input Signals" tab is selected. Below the tabs is a table with the following columns: Signal, Enabled, Port #, Pin Number, Active Low, Emulated, and HotKey. The table contains the following data:

| Signal | Enabled | Port # | Pin Number | Active Low | Emulated | HotKey |
|--------------|-------------------------------------|--------|------------|-------------------------------------|-------------------------------------|--------|
| OEM Trig #10 | <input checked="" type="checkbox"/> | 0 | 0 | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | 0 |
| OEM Trig #11 | <input checked="" type="checkbox"/> | 0 | 0 | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | 0 |
| OEM Trig #12 | <input checked="" type="checkbox"/> | 0 | 0 | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | 0 |
| OEM Trig #13 | <input checked="" type="checkbox"/> | 0 | 0 | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | 0 |
| OEM Trig #14 | <input checked="" type="checkbox"/> | 0 | 0 | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | 85 |
| OEM Trig #15 | <input checked="" type="checkbox"/> | 0 | 0 | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | 68 |
| Timing | <input checked="" type="checkbox"/> | 0 | 0 | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | 0 |
| Jog X++ | <input checked="" type="checkbox"/> | 0 | 0 | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | 0 |
| Jog X-- | <input checked="" type="checkbox"/> | 0 | 0 | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | 0 |
| Jog Y++ | <input checked="" type="checkbox"/> | 0 | 0 | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | 0 |
| Jog Y-- | <input checked="" type="checkbox"/> | 0 | 0 | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | 0 |

Below the table, there is a note: "Pins 10-13 and 15 are inputs. Only these 5 pin numbers may be used on this screen". At the bottom of the dialog box, there are buttons for "Automated Setup of Inputs", "OK", "Cancel", and "Apply".

Max and Min THC Correction Values

The maximum and minimum THC correction values must be set to DROs 27 and 65 respectively. This can be done by writing a script as shown below.



While in Test Mode, after setting the min/max DROs, the values can be refreshed in the controller by toggling the “THC ON/OFF” button (LED 24).