

## Fitting Ah-ha to a machine with existing Servo drives

Please note these instructions are for guidance. If you have any doubt on any particular point please check with us. Read through all the documentation a couple of times before you start. You may not understand all of it but as you proceed things should fall into place. If you think any of the documentation does not make sense please let us know. We strive to make it as clear as possible and we welcome your feed back. If you have any difficulties in getting your machine running give us a call. We can always get your machine running, hopefully without an engineers visit and any great expense.

First check the items you need.

### **We supply the following:-**

1 Ah-ha IF card that fits in the PC as per the Ah-ha instruction manual.

1 EMT F0598 IF Card that fits in or near the machine electrics.

EMT F0637 Servo interface card(s)

2 cables that connect the Ah-ha card to the EMT card. We supply 2 so that they can be joined through a slot cut in the cabinet wall saving having to make 37 connections!

EMT F0632 16OP IF card and cables if the machine needs it.

### **You will need the following:-**

A push button with normally open contacts that switches on the EMT IF card and reset the servo interface cards. We recommend adding 2 normally open contacts to the existing machine ON button if there is one.

A normally closed Emergency stop button or additional normally closed contacts on any existing Emergency stops.

A normally open push button to act as the spindle enable.

24 volt DC power supply if there is not one on the machine.

Regulated 5V power supply for Servo interface card and encoders there is not one on the machine.

### **You may need the following:-**

A normally open push button to act as remote start if required.

A normally closed push button to act as remote feed hold if required.

Normally closed axis limit switches if they are not already fitted.

Normally closed limit switches to act as shut down switches as described below.

### **MOST IMPORTANT**

All servo machines should have shut down switches or dead stops fitted on all axes at extreme travel. These should be fitted outside the limit switches that are connected into the EMT IF card sufficiently far away so that they are not operated if the axis hits a limit at rapid speed. If the machine is being retrofitted and already has servo drives it is highly likely that suitable switches exist and are already wired into the system in such a way that the drives are switched off if the switches are operated. If not we suggest that you wire the shut down switches in series and link directly into the E stop chain that is connected into the EMT IF card Estop terminal. That way you cannot switch on our circuits if you are on a shut down switch. Normally this should never happen and if it did you would have to wind the axis off the switch by hand. Alternatively you can

fit a shut down override button but this must only be operated once you have removed whatever caused the axis to hit the shut down in the first place. Failure to do this could result in MAJOR damage. We also usually take the relay or contactor chain that switches on the servo drives through the Terminals Estop1 and Estop2 on the EMT IF card. These are voltage free contacts that close when the reset input is operated. The E stop Latch link JR3 must be removed from the main EMT IF board so that the ready contacts on the F0637 servo interface cards also operate the E stop circuit in the event of a servo error. These must be wired in series to the E stop latch1 and E stop latch 2 terminals. Also it is important to put the existing servo drive ready contacts some where in the E stop circuit. This can be in the main E stop chain or the Estop latch circuit depending on when the drives come on. If we use the EMT IF card to switch on the drives we put the servo drive ready in series with the servo interface cards ready contacts mentioned above. That way reset will switch every thing on but if any thing wired into the E stop latch chain fails to switch into a ready state when the button is released the drives will be switched off. This avoids the chicken and egg situation that can arise if the drive ready signals are in the main E stop chain.

### **Suggested Procedure**

If you have a machine with programmed functions such as spindle on/off, coolant on/off, tool change, spindle speed etc. that still function it is a very good idea to operate all these individually if possible before disconnecting the old control. Identifying the relays and contactors operated along with the associated terminal numbers and making a careful note of what does what.

If you find existing wires where you need to make new connections we recommend that initially you label the end, disconnect, isolate with insulating tape and tie them out of the way. When you have the machine running you can quickly remove redundant wiring. If you rip wires completely out to soon you may lose valuable information.

Isolate machine from the mains!

If you have no experience of servo drives and your axis motors have the encoders mounted on the back we suggest that the motors are taken off and the belts or coupling are removed temporarily and the motors fitted back. Then if you get any unexpected motor movement the slides will not move. We strongly recommend that this is done first

Mount the EMT IF card in the existing cabinet (if possible) at a location where 1 of the cables can reach to a wall of the cabinet at a point where the second cable can reach the PC. Mount the servo interface card(s) as close as possible to the EMT IF card ideally vertically below or above with all the terminals on the right.

Locate the existing 24V DC power supply or mount a new one

A 24V DC connection should be made to our IF terminal T3-1 (The EMT IF terminals are numbered from the bottom in 4 blocks. T3-1 means the 3rd block up and the 1 means the lowest terminal on that block. It is clearly marked +24VDC. If it is not you have identified the WRONG terminal DO NOT CONNECT and check again until you fully understand our terminology).

A 24V return should be made to EMT terminal T1-1.

Fit the Normally Closed contacts to the emergency stop switch(es) and take a 24V connection in series to

EMT terminal T1-12 The Axis shut down switches must also be in series with this circuit or better still a contact of a relay controlled by the shut down limits. If you are not using any guards with interlock switches this is a good time to link out the built in guard circuit by fitting a link between EMT terminal T1-11 and 24V

Fit the new ON push button or one of the new normally open contact to the existing ON push button and make a connection from 24V to one side of the contact . Connect the other side of the contact to the EMT terminal T1-10 (RESET)

Locate the machine limit switches and check they are normally closed. Do not confuse these with the shut down switches mentioned earlier. These are fitted inside the shut down switches and stop the axis moving if you programme or jog to a position that is outside the machine limits. You can jog off these switches

Wire the limit switches normally closed as per the drawing. Taking Z + as an example first remove the existing wire from the common and trace it back to a suitable connection point where it can be disconnected safely Connect a new wire to the common and connect the other end in the machine cabinet to +24V DC.

Connect the other side of the switch to EMT terminal T2-3.

Repeat For the Z - switch but using the terminals as the drawing. (The common can be just connected to the common of the Z + limit switch)

Now deal with the X and Y limit switches in the same way.

A N/O push button needs to be fitted to act as the spindle enable button and we normally fit a small button somewhere on the existing machine panel. Connect this new switch as per the circuit diagram supplied using 2 more new wires . Note the purpose of the enable button is to prevent the spindle running just from the PC control. Whenever the control issues a spindle command the programme operation is suspended until the enable button is pressed which also starts the spindle. To be used the Block allow parameter must be mapped to 202. If you use a N/O (normally Open) switch the polarity must be set in parameters to LOW=TRUE.

If you are going to use the remote cycle start and feed hold 2 more push buttons need to be fitted at a convenient position and wired back to the EMT board using AUXIN 3 for feed hold and AUXIN 4 for cycle start. These must be mapped in the parameters to 203 and 204 respectively. If you use a N/O (normally Open) switch the polarity must be set in parameters to LOW=TRUE and for a N/C (normally closed) switch HIGH=TRUE. We strongly recommend N/O (normally Open) switches for Enable and Cycle Start and N/C (normally closed) switch for Feed Hold

Fit the card supplied with the software into the PC as the Ah-ha instructions and connect the PC board and the machine interface using the 2 cables supplied joining the cables at a slot already cut in the cabinet.

Check that the machine is connected correctly to the 3 phase mains and most important that the earth connection is properly made and of an adequate size. At this stage if you can disable the servo drives it should be safe to switch on the machine but take care in case any mistakes have been made in the new wiring. If all is well you can now press the on button which will switch on both the machine electrics and the new interface card. Keep your hand on the Estop ready to shut down immediately if any thing goes wrong. You should now see red LED's on indicating RLE1 is on and all the green LED's for limits that have been connected are on. If this is not the case switch off and carefully go through all the connections you have made

looking for any errors.

Next wire the servo interface cards as per separate instructions .

If you have a mill needing extra IO see the separate 16OP instructions

If the machine is a lathe and you require threading you will need to connect a spindle encoder. There are 2 options. The first is to use our 16OP interface card and if you have purchased this you will have received separate documentation. The second option on simpler machines is to connect the spindle encoder direct to the ahha 25 way D type. The documentation for this starts on page 134 of the ahha manual. If you have a disc type encoder with only one channel and an index connect the index to pin 13 of the 25 way and the channel to phase A which is pin 21 of the 25 way. The signals must be 5 volt DC as specified.

## **Installing The Software**

Insert Floppy Disc in Drive A and log onto A by typing in A: and pressing the enter key.

Type GO and press Enter

When the self-extracting process is complete you can run the software.

Eject the floppy disk and switch the computer off and then after 2-3 seconds on again to reboot the computer. You should get an option screen enabling you to run Artisan version 4.0, the previous version of Artisan or DOS. The option to run the previous version of Artisan is only applicable if you have the old version and have upgraded.

## **If we have supplied a PCK file on disk do the following:-**

After Running Ah-ha software and for the first time go into setup (ALT S) and then into the CNC timing menu and make a note of the Linear master timer rate and circular timer rate. These are generated to match the speed of your computer.

Insert the disk with the PCK file and log onto A by typing in A: and pressing the enter key.

Type GO and press Enter. This will copy the PCK file

Run the software again by typing CNC40 followed by the enter key and then change the timer rates to the value previously noted (If necessary).

Make sure you have the input and output polarities set correctly for any custom switches and you have fitted. If the machine has programmable spindle speeds you will probably need to create an MCDMAP.AGC programme in the CNC40 directory. If we have provide an example this can be installed by typing A: enter and GO enter in the same way as the PCK file was installed. Please note that if you edit the MCDMAP.AGC programme from within the CNC software you must exit to DOS and restart the CNC software as otherwise your changes are not recognised. This is because if an MCDMAP programme is present in the CNC40 directory it is loaded into memory when the software is started.

### **Most Important**

When you have the Computer set up copy all the PCK files to 2 floppy disks and LOCK one of them away with the original software disks for safety.

To do this log onto C if necessary by typing in C: and press "Enter". Type CD \CNC40 and press "Enter".

Insert the floppy disk. Log onto A by typing in A: and press "Enter".

Type Copy C:\*.PCK and press "Enter".

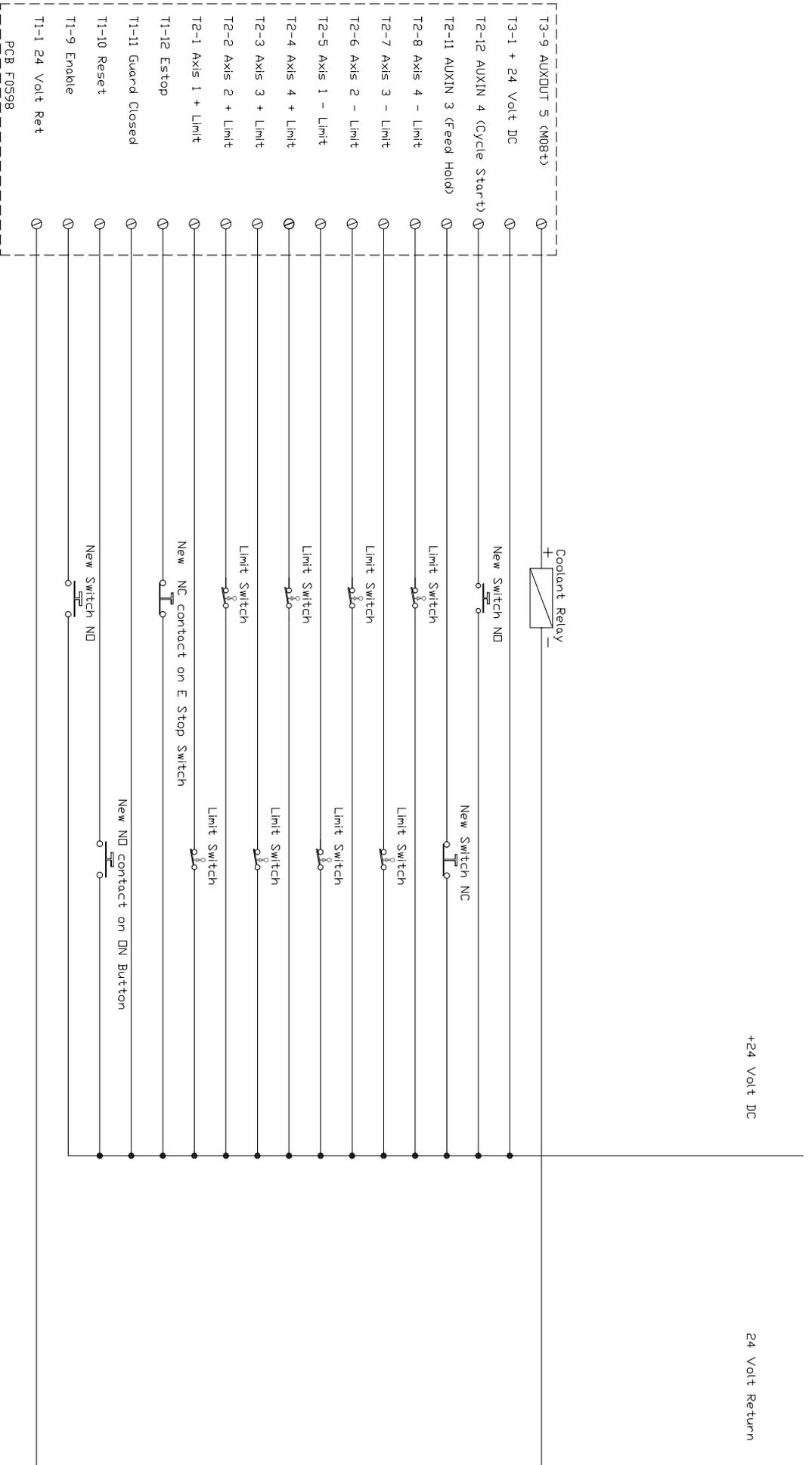
Log back onto C by typing in C: and press "Enter".

We also include a tiny programme to do this. Insert a floppy disk and type PCK2A and press "Enter".

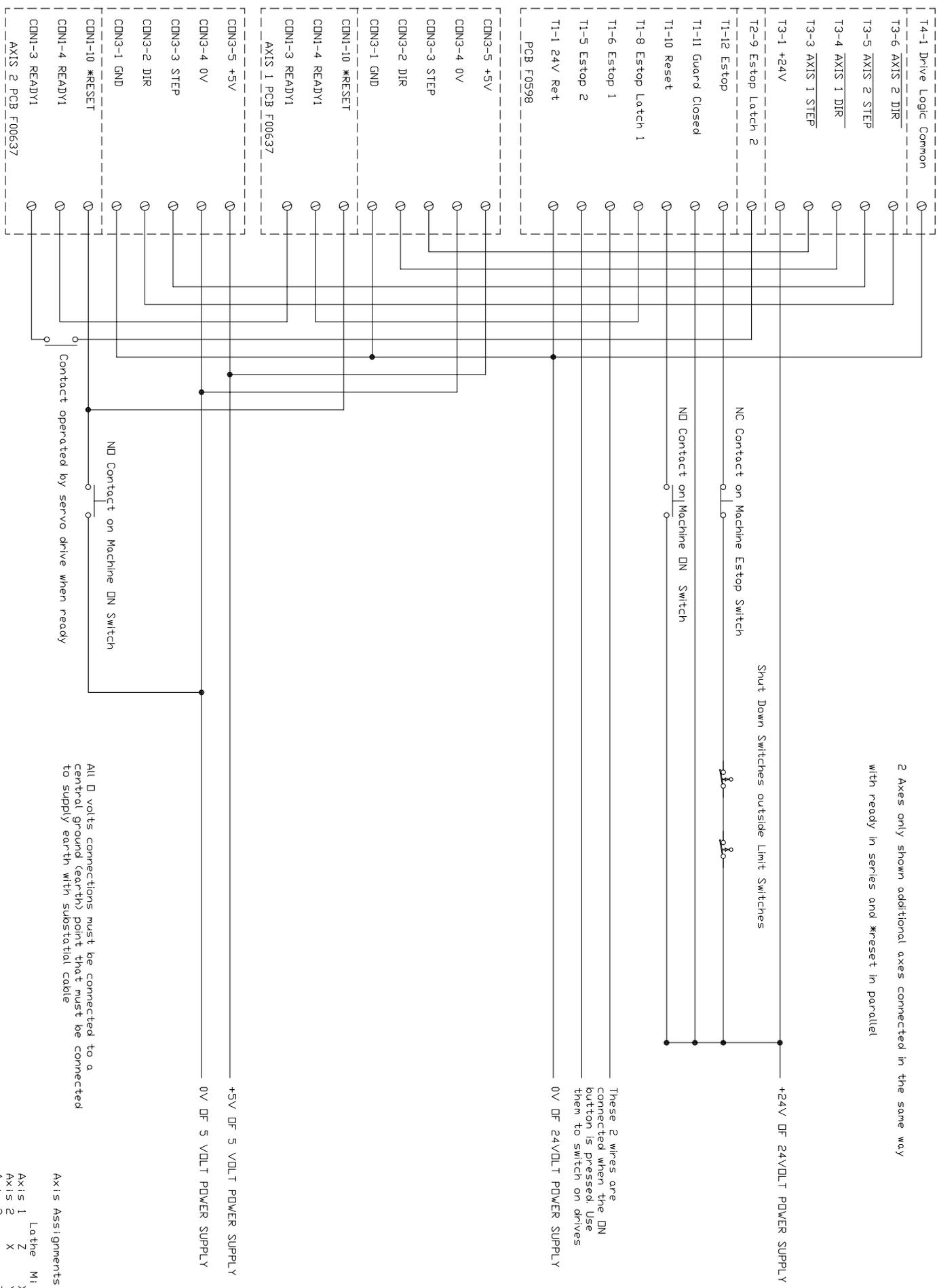
For you convenience we also include a tiny programme to copy all user programmes to a floppy. Insert a floppy disk and type AGC2A and press "Enter".

If you have any difficulties we can be contacted by telephone 01297-446000, fax 01297-446001 or email [sales@eagland.co.uk](mailto:sales@eagland.co.uk)

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Axis Assignments  
 Lathe Mill  
 Axis 1 Z X  
 Axis 2 X Y  
 Axis 3 Z  
 Axis 4 A/W



2 Axes only shown additional axes connected in the same way with ready in series and \*reset in parallel

These 2 wires are connected when the DN button is pressed. Use them to switch on drives

All 0 volts connections must be connected to a central ground (earth) point that must be connected to supply earth with substantial cable

Axis Assignments

Axis	Lathe	Mill
AXIS 1	Z	X
AXIS 2	X	Y
AXIS 3	Y	Z
AXIS 4	A/W	

