

EMT F0598 IF Card Documentation

NOTE From revision D onwards all our inputs are operated by +24VDC * Not * Ground (24 Volt Return) which is different to our earlier boards.

Ah-ha limit switch inputs and auxiliary inputs

The Ah-ha inputs are all 5 volts switched to ground. Our board operates these inputs through a reed relay isolating the machine electrics which are all 24 volt DC. Our inputs are all operated by +24VDC. Therefore to operate an input connect the 24 Volt power supply ground (24 Volt Return) to the 24VRET T1-1 terminal and connect the +24V of the power supply via a suitable switch to the input you wish to operate.

Ah-ha outputs

The Ah-ha outputs are all low current 5 volt signals. Our board uses these inputs to operate a solid state relay switching 24 volts again isolating the machine electrics. The maximum loading is 130Ma and should be used to drive a relay operating any devices on the machine. The output switches +24VDC. A suitable relay is the one fitted on the board to operate the Emergency Stop and spindle circuits as described below. It is capable of switching 1 Amp up to a maximum of 100V ac/dc.

Dedicated inputs

Emergency Stop Input

Purpose

The emergency stop circuit is to shut the machine down safely if the emergency stop button is operated.

Connection

This must be connected to +24VDC via a normally closed contact on all Emergency Stop buttons fitted to the machine OR a normally open contact on a relay operated by the machine Emergency Stop button.

Operation

De-energises the RLE1 (Emergency Stop) relay. A contact of the RLE1 relay operates the reed relay that grounds the Emergency Stop input (Pin 15) on the Ah-ha board halting software operation. The RLE1 relay also de-energises under the following condition:-

The guard is opened while the spindle enabled.

When de energised the RLE1 relay also stops the spindle if being controlled from the Ah-ha software M03 and M04 (Auxout 3 and Auxout 4) For this reason we strongly recommend you do not use any other outputs for switching spindles. It also breaks the connection between the terminals on our board Estop 1 and Estop 2. For complete safety these should be wired into the machine Emergency Stop chain so that opening the guard also puts the machine electrics into Emergency Stop.

Guard Closed Input

Purpose

To operate Estop if opened during operation and to prevent the spindle starting if not closed.

Connection

This must be connected to +24VDC via normally closed contacts on tamper proof switches fitted to the machine the machine guards. These contacts must break when the guard is opened. If for any reasons guards are not fitted this input must be linked direct to +24VDC for the machine to operate

Operation

Energises the GDCLS relay

Reset Input

Purpose

To reset (turn on) the board on at switch on or following an emergency stop

Connection

This is normally operated by a normally open contact of the existing machine On button connected to +24VDC

Operation

The On button energises the RLRST relay. This relay in turn energises the RLE1 (Emergency Stop) relay providing that the Emergency Stop input is connected to +24V via the Emergency Stop switch AND providing EITHER that the RLENB (Enable) relay is de-energised OR the GDCLS (Guard Closed) relay is energised. If the E Stop latch outputs are connected to external drives on servo systems RLE1 relay will drop out when the on button is released unless the drives complete the circuit. This therefore provides switching on the external drives using Estop 1 and Estop 2 terminals but will drop back to emergency stop state if the drives do not switch on properly. Note that JR3 Jumper must be removed for this to work.

Enable Input

Purpose

The enable is to ensure that the software cannot start the spindle without additional operator intervention and is provided so that the spindle cannot start through a computer malfunction. If the spindle is fully guarded with a guard that complies with current safety regulations this could be wired through the guard switch so that enable is always present. Even then we would still recommend a manual switch is fitted unless the machine is fitted with an automatic tool change mechanism.

Connection

This should be connected through a normally open contact on a suitable button to +24VDC.

Operation

The BLOCK ALLOW (AUXIN 2) circuit must be complete for the software to run if it is set to 202 in the Ah-ha parameters. We strongly recommend that this is the method used. The circuit is normally made by a normally closed contact of the SPRRQ relay The Enable button is used only with an M03 or M04 (Auxout 3 Auxout 4) from the Ah-ha. When either of these operate they energise relay SPRQ (Spindle Request) This immediately opens the BLOCK ALLOW signal to the Ah-ha software and that stops the programme running and puts a message on the screen THE SPINDLE DOES NOT START! The reason is that although the M03 or M04 relay energise the circuit is not complete until the enable button is pressed. This energises the RLENB relay which does complete the circuit between the M3/M4 common and the M3 out or M4 out. The RLENB relay also completes the BLOCK ALLOW circuit and the software carries on to the following blocks. When the M03 or M04 commands are removed the SPRRQ relay also de-energises which in turn de-energises the RLENB relay ready for the next time the spindle is programmed to run. The BLOCK ALLOW signal is removed by the normally open contact of RLENB but is immediately replaced by the normally closed contact of SPRRQ. Please note that if a guard circuit is in place opening the guard also de-energises the RLENB relay and stops the spindle

Note For advanced use cut the track connecting BLOCK ALLOW to AUXIN 2 behind the jumper JR2 and use the AUXIN 2 terminal for wiring whatever external controls you use instead of our standard circuit. If you then need to revert to our standard all you need do is fit a jumper to JR2

Jumpers

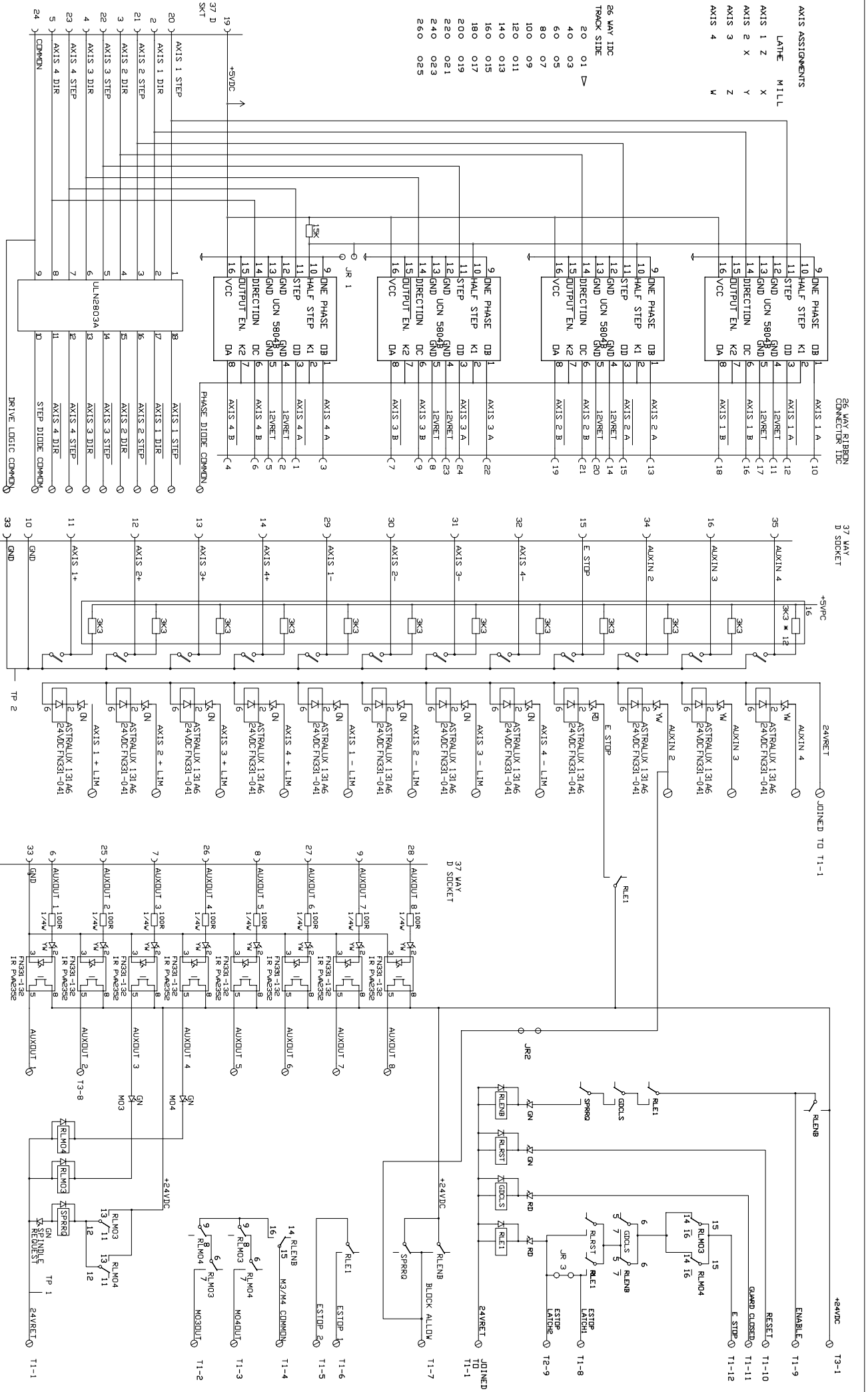
JR1 is only effective if the UCN5804B stepper IC's are fitted. It puts them into full step mode. The default is ½ step mode

JR2 is on the block allow signal track to the Ah-ha input. This jumper is tracked on the other side. Normally this track is never cut but on certain applications the block allow is operated by external signals and therefore the track has to be cut. The jumper is there only to restore the cut should it ever be necessary.

JR3 This is normally fitted on stepper drive machines and forms part of the emergency stop chain. It is only removed if the Estop Latch1 and Estop Latch2 connections are completed by external circuits which is usually the case if servo drives are used.

These notes are for guidance and all users must ensure they understand sufficiently to correctly wire the circuits particularly the Emergency Stop. All functions must be fully tested before the machine is in operation. If in doubt consult us or your CNC machine service engineer.

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Title
 EMT IF Card
 Drawn By
 RJ Lock & RIE
 DWG NO.
 F0598
 Revision
 E 7-10-98
 Rev C - E STOP MOVED TO PINS FROM PINS7 (37 D TYPE) & NOW INPUT ONLY
 Rev D - RELE1 Contact moved from M03/M04 line to RLENB line & AT1 24V Logic
 Inverted for positive side contacts
 Rev E - RJM03 and RJM04 NC Contact inserted in E STOP Line
 ALL UNMARKED DIODES TYPE 1N4005
 ALL LEADS 13AW/5mm SIEMENS LK5360-K
 ALL UNMARKED RELAYS FARNELL 179-852 24VDC 4P C/D
 SOCKET - 37-WAY D-TYPE PCB MOUNT
 TERMINALS KLIPPON SLV/PL 2-PART TOP-ENTRY
 IDC CONNECTOR 26-WAY STRAIGHT PCB MOUNT 0.05 PITCH CABLE
 JRI JRE FN535-114