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General Information:

The **MicroLogix 1100** has one 20Khz high-speed counter. The counter has four dedicated inputs that are isolated from all other inputs on the unit. The HSC can utilize inputs 0 through 3. Input device connection depends on the counter mode selected. The MicroLogix 1100 uses a 32-bit signed integer for the HSC this allows for a count range of (+/-) 2,147,483,647.

The **MicroLogix 1200** has one 20Khz high-speed counter. The counter has four dedicated inputs that are isolated from all other inputs on the unit. The HSC can utilize inputs 0 through 3. Input device connection depends on the counter mode selected. The MicroLogix 1200 uses a 32-bit signed integer for the HSC this allows for a count range of (+/-) 2,147,483,647.

The **MicroLogix 1400** has six 100Khz high-speed counters. There are three main high-speed counters (counters 0, 1, and 2) and three sub high speed counters (counters 3, 4, and 5). Each main high-speed counter has four dedicated inputs and each sub high-speed counter has two dedicated inputs. HSC0 utilizes inputs 0…3, HSC1 utilizes inputs 4…7, HSC2 utilizes inputs 8…11, HSC3 utilizes inputs 2 and 3, HSC4 utilizes inputs 6 and 7 and HSC5 utilizes inputs 10 and 11. In some cases, a sub counter can be disabled by master counter mode. Refer to HSC Mode (MOD) on page 116. Input device connection depends on the counter mode selected. The MicroLogix 1400 uses a 32-bit signed integer for the HSC this allows for a count range of (+/-) 2,147,483,647.

The **MicroLogix 1500** has two 20Khz high-speed counters. Each counter has four dedicated inputs that are isolated from all other inputs on the base unit. HSC:0 can utilize inputs 0 through 3, and HSC: 1 can utilize inputs 4 through 7. Input device connection depends on the counter mode selected.
Each counter is completely independent and isolated from the other. The MicroLogix 1500 uses a 32-bit signed integer for the HSC this allows for a count range of (+/-) 2,147,483,647.

Getting Started:

Locate the Function Files under Controller in RSLOGIX 500 and select the HSC tab, then select the [+] next to HSC:0 (See Below)

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Address	Value
HSC PTO PWM STI EII RTC DAT TPI MMI	
Address	Value
⊟ HSC:0	{...}
├ PFN - Program File Number	0
├ ER - Error Code	0
├ UIX - User Interrupt Executing	0
├ UIE - User Interrupt Enable	0
├ UIL - User Interrupt Lost	0
├ UIP - User Interrupt Pending	0
├ FE - Function Enabled	0
├ AS - Auto Start	0
├ ED - Error Detected	0
├ CE - Counting Enabled	0
├ SP - Set Parameters	0
├ LPM - Low Preset Mask	1
├ HPM - High Preset Mask	1
├ UFM - Underflow Mask	1
├ OFM - Overflow Mask	1
├ LPI - Low Preset Interrupt	0
├ HPI - High Preset Interrupt	0
├ UFI - Underflow Interrupt	0
├ OFI - Overflow Interrupt	0
├ LPR - Low Preset Reached	0
├ HPR - High Preset Reached	0
├ DIR - Count Direction	0
├ UF - Underflow	0
├ OF - Overflow	0
├ MD - Mode Done	0
├ CD - Count Down	0
├ CU - Count Up	0
├ MOD - HSC Mode	0
├ ACC - Accumulator	0
├ HIP - High Preset	2147483647
├ LOP - Low Preset	-2147483648
├ OVF - Overflow	2147483647
├ UNF - Underflow	-2147483648
├ OMB - Output Mask Bits	0
├ HPO - High Preset Output	0
└ LPO - Low Preset Output	0
⊞ HSC:1	{...}

Enter the following parameters for the **"Minimum Configuration"** required for the HSC to count pulses.

Note: There is no additional ladder logic required to enable the High Speed Counter. In other words there is no HSC instruction needed for the ladder logic program.

HSC:0.PFN	Program File Number defines which subroutine is executed when the HSC:0 accumulated count equals the High or Low preset or passes through Overflow or Underflow. The Integer number entered must be a valid sub-routine program file (3 to 255).
HSC:0/AS	Auto-Start defines if the HSC function will automatically start when the MicroLogix enters run or test.
HSC:0/CE	Counting Enabled control bit is used to enable or disable the HSC
HSC:0.HIP	High Preset is the upper set point (in counts) that defines when the HSC will generate an interrupt and execute the PFN sub-routine.

The following example uses the HSC in **Mode 0** - " Up Counter "
The **" Up Counter "** clears the accumulated value (0) when it reaches the
High Preset (HIP). This mode configures I1:0.0/0 (I:0/0) as the HSC:0 input.

Note: Each mode for the HSC will configure the inputs for different functionality
Refer to the MicroLogix 1100, 1200 and 1500 Instruction Set Reference Manual
for definitions of other valid modes and input configurations.

In this example the HSC will count input pulses coming into I:0/0, when the total number
of pulses counted equals the High Preset (HIP) the HSC will jump to subroutine file #3

The HIP is set for 5000 pulses in this example, Also once the HIP is reached the HSC
will then reset HSC:0.ACC to zero (0) and start counting again.

Important: *It is assumed that the user has connected a device to I:0/0 to generate pulses.*

Address	Value
HSC	PTO	PWM	STI	EII	RTC	DAT	TPI	MMI	
Address	**Value**
⊟ HSC:0	{...}
├ PFN - Program File Number	3
├ ER - Error Code	0
├ UIX - User Interrupt Executing	0
├ UIE - User Interrupt Enable	0
├ UIL - User Interrupt Lost	0
├ UIP - User Interrupt Pending	0
├ FE - Function Enabled	0
├ AS - Auto Start	1
├ ED - Error Detected	0
├ CE - Counting Enabled	1
├ SP - Set Parameters	0
├ LPM - Low Preset Mask	1
├ HPM - High Preset Mask	1
├ UFM - Underflow Mask	1
├ OFM - Overflow Mask	1
├ LPI - Low Preset Interrupt	0
├ HPI - High Preset Interrupt	0
├ UFI - Underflow Interrupt	0
├ OFI - Overflow Interrupt	0
├ LPR - Low Preset Reached	0
├ HPR - High Preset Reached	0
├ DIR - Count Direction	0
├ UF - Underflow	0
├ OF - Overflow	0
├ MD - Mode Done	0
├ CD - Count Down	0
├ CU - Count Up	0
├ MOD - HSC Mode	0
├ ACC - Accumulator	0
├ HIP - High Preset	5000
├ LOP - Low Preset	0
├ OVF - Overflow	2147483647
├ UNF - Underflow	-2147483648
├ OMB - Output Mask Bits	0
├ HPO - High Preset Output	0
└ LPO - Low Preset Output	0
⊞ HSC:1	{...}

Note: The following ladder logic does not need to be entered into File #2, however this allows for easy viewing of the accumulated counts from the HSC:0.ACC

IMPORTANT: Ladder Logic Subroutine file #3 must be created in order for this example to work. If the subroutine is not created the CPU will fault due to a HSC **Error Code 1** - *Invalid File Number for PFN has been entered.*

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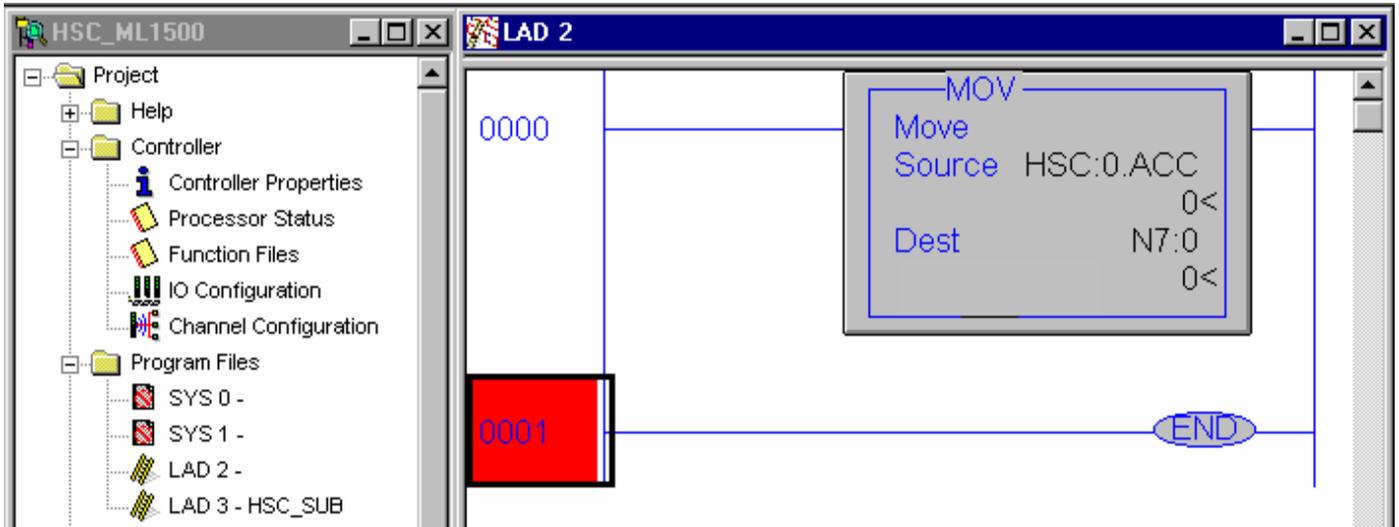
Proper wiring of a single ended encoder (Typical Allen-Bradley 845TK) when configuring HSC.MOD for Mode 6 (Quadrature Counter)

The following diagram illustrates connecting an encoder to the MicroLogix 1500, but the same wiring can be applied for the MicroLogix 1200.

The minimum configuration required for **Mode 6** operation is to enter a file number for the PFN parameter, set the AS and CE bits to a (1) and enter a (6) for the MOD parameter.

Note: If the encoder is a High Voltage Differential Line Driver do not terminate $\overline{A}, \overline{B}, $ or $\overline{Z}$

⬛ Indicates a wire makes a connection

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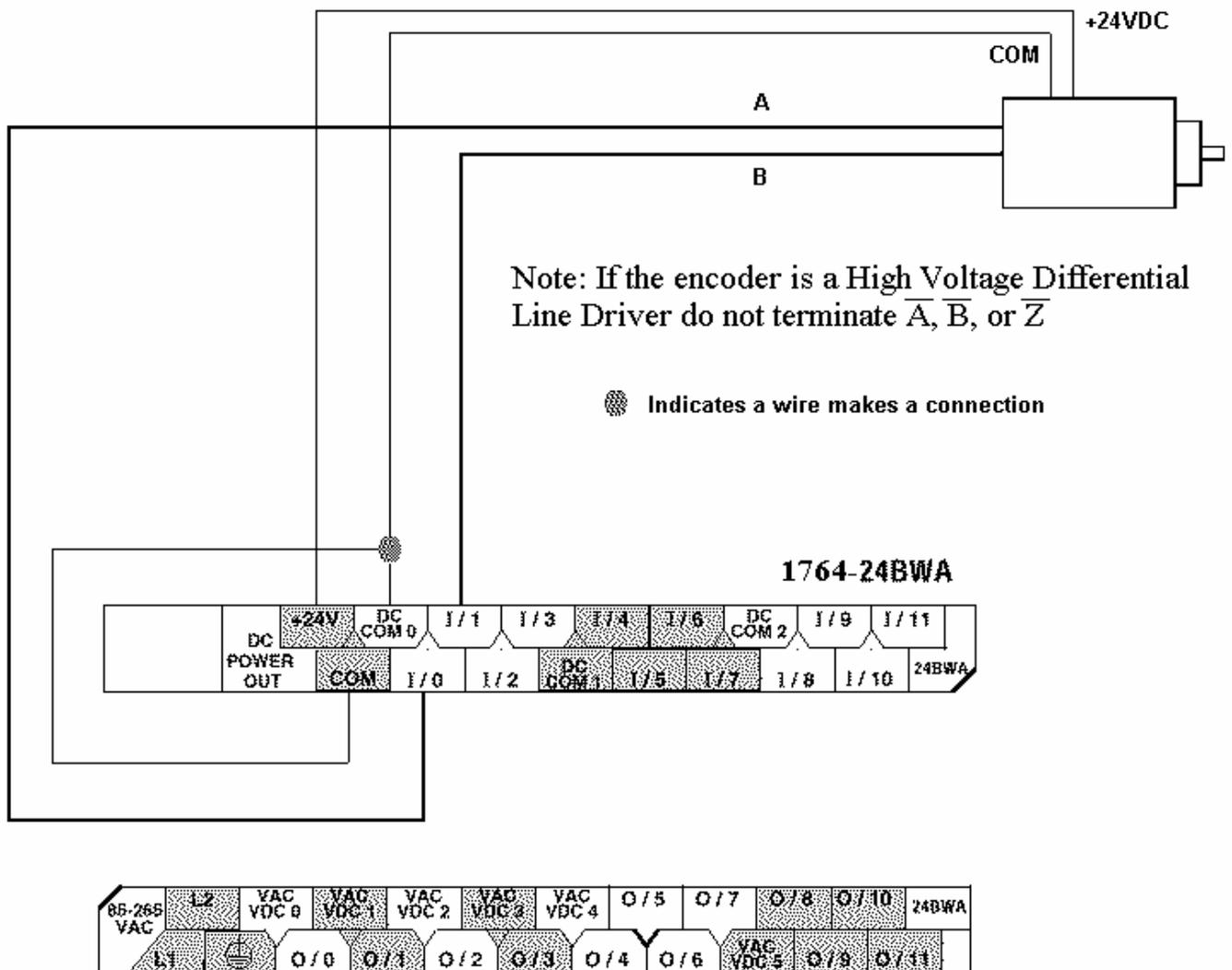
TROUBLESHOOTING

Problem #1:   The input LEDS on the Micrologix Base unit turn on and off, but no counts are seen in the HSC accumulator.

Solution: The input filter frequency may need to be adjusted in order to capture the input pulses.

Follow the steps below....

Select "I/O Configuration"
Highlight the " 1764-Micrologix 1500 "
Select "Adv Config "
Select the " Embedded I/O Configuration " Tab
Adjust Input filters as needed
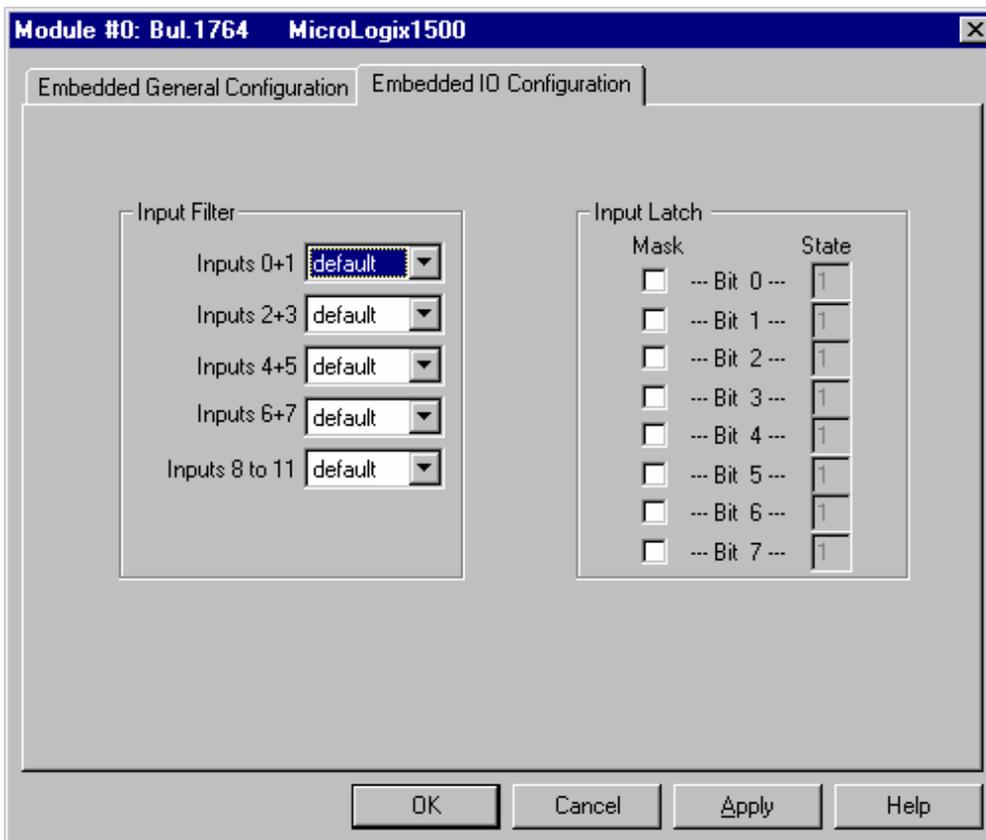
Problem #2: The HSC instruction does not accumulate counts and the Error Code (ER) shows a value of (1).

Solution: A file number was entered into (PFN) but the value entered was less then (3) or greater then (255) or the file number entered was correct, however the file does not exist.

Create the **NEW** program file by "**Right**" mouse clicking on "**Program Files**"
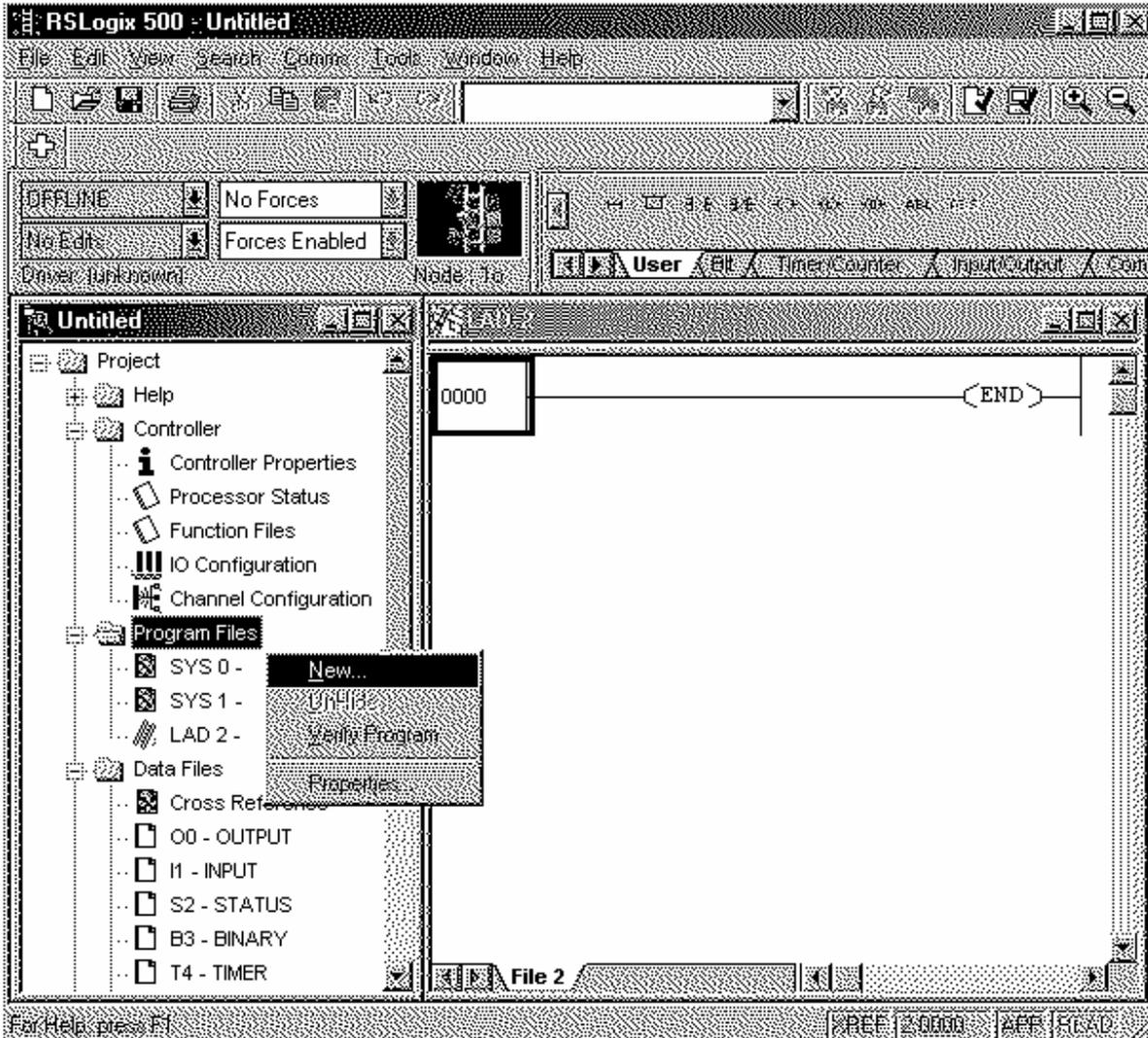
Problem #3: Some of my outputs will not turn On or Off when the ladder logic appears to indicate that they should.

Solution: **OMB (Output Mask Bits)**. Verify what the OMB has been configured for in the HSC function file. If an output(s) has been assigned to the HSC for control, then the output(s) will not be controlled anywhere else in the ladder program. Only the HSC will have control over these outputs.