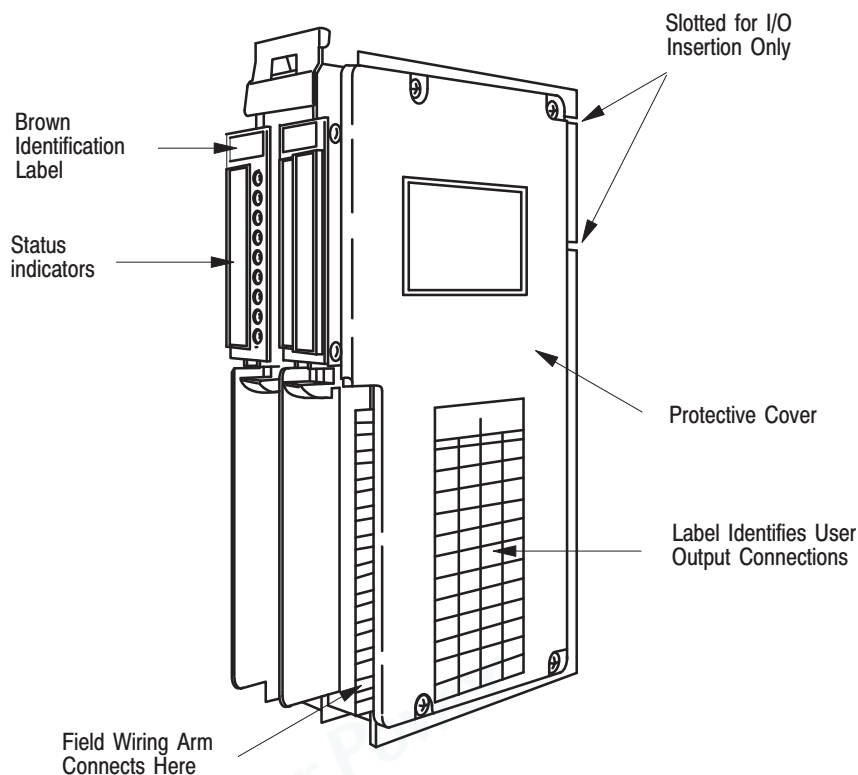


**Figure 1.1**  
**Encoder Counter Module (cat. no. 1771-IJ/IK)**



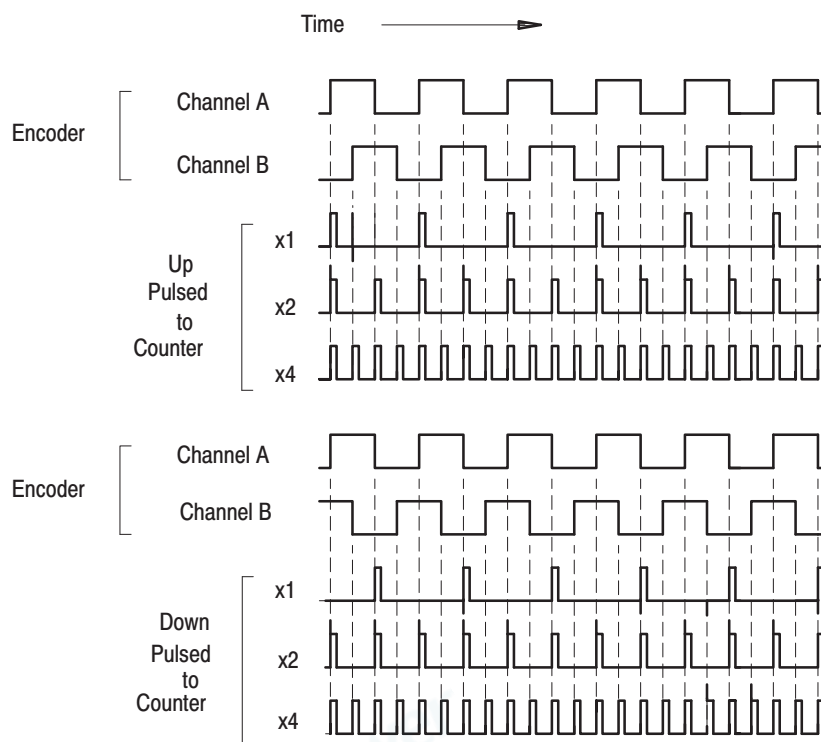
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The module will count in either BCD or binary numbers. In the BCD mode, the range is 000 to 999 with carry and borrow bits provided to cascade counters in the program. The binary mode allows a higher count total, with a range of 0000 to 4095<sub>10</sub>, but the number appears at the processor in binary. Additionally, the module can improve the accuracy of certain quadrature type of encoders by adding the count at both channel A and channel B (times 2 mode), or by counting the rising and falling of both channel inputs to give a fourfold increase in the count (times 4 mode).

The encoder/counter module is available in two versions:

- cat. no. 1771-IJ - uses a 5V dc external power supply that allows inputs to be TTL compatible. Outputs can either be driven from the 5V dc supply through the module or from a separate load supply of a different voltage.
- cat. no. 1771-IK - uses a 12-24V dc external power supply. Input devices should be compatible with the voltage of the external power supply. Outputs can be driven either from the external supply through the module or from a separate load supply.

**Figure 2.1**  
**Input Pulses**



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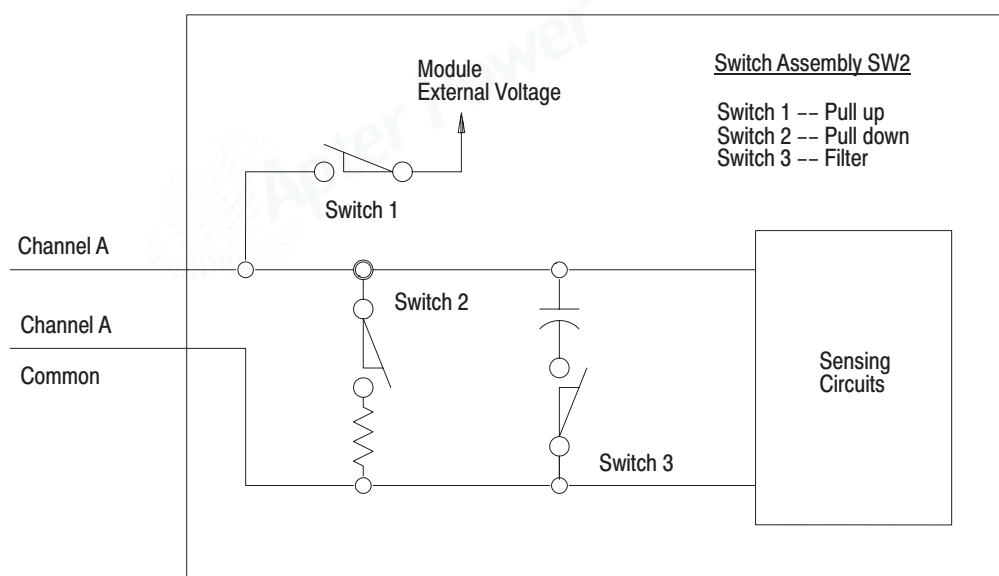
In the counter mode, the module adds the incoming pulses on channel A. The count is incremented on the rising edge of the pulse (high true). The direction of the count can be controlled with either the control word or an external switch wired to channel B. Channel B must be left unconnected if the count direction is to be software controlled. Typical input device counting might be high speed static switches and incremental encoders. Mechanical switches are not recommended as input counting devices used with the 1771-IJ because the contact bounces might be counted as pulses. However, the 1771-IK can be used with a mechanical switch, provided the module is configured for mechanical counting (filter has been put in) and the counting frequency does not exceed 50Hz. To use the module in the counter mode, switch 4 must be set to counter (off).

No special filtering is provided on channel B, since the filtering necessary for a mechanical switch would defeat the purpose of a very fast count direction change that is not dependent on the processor scan time. Therefore, a transistor switch or gate should be used to pull the channel B input low. The gate or switch must sink 14ma of current to pull the channel B input low. The count changes direction in less than 0.01ms from the time channel B input changes state.

## 1771-IK

The 1771-IK module is designed to accept several types of devices that will operate in the 12 to 24V dc range (Figure 2.2). Since most high voltage quadrature encoder outputs produce signals through an open collector output, the module is configured for a pull-up on channel B. Channel A must be set for a pull-up by setting switch 1 on and switch 2 off. Some counting devices may also use a pull-up arrangement.

**Figure 2.2**  
**Input Configuration for Channel A of the 1771-IK Showing Functions of Switch Assembly SW-2**



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The settings on the input configuration switch assembly SW-2 are not the same on the 1771-IJ as they are for 1771-IK. Refer to Table 2.D for switch settings.

## Keying

Plastic keying bands provide an easy method for keying an I/O slot to accept only one type of module. Use of keying bands is strongly recommended to prevent accidental insertion of the wrong type of module.

The module is slotted in two places on its rear edge. The position of the keying bands on the backplane connector must correspond to these slots to allow insertion of the module. Because the module uses two slots, both slots have to be keyed. Snap the keying bands on the upper backplane connectors between these numbers printed on the backplane (Table 3.A). Keying is different for the 1771-IJ and the 1771-IK.

**Table 3.A**  
**Module Keying**

| Module  | Left Connector       | Right Connector      |
|---------|----------------------|----------------------|
| 1771-IJ | 6 and 8<br>18 and 20 | 4 and 6<br>32 and 34 |
| 1771-IK | 6 and 8<br>20 and 22 | 4 and 6<br>32 and 34 |

### IMPORTANT

Insert the module in a single module group (slots 0 and 1). It must not straddle two module groups.

The position of the these keying bands may be changed if subsequent system design and rewiring makes insertion of a different type of module necessary.

## Specifications

Complete specifications for the 1771-IJ and -IK modules are contained in Appendix A.