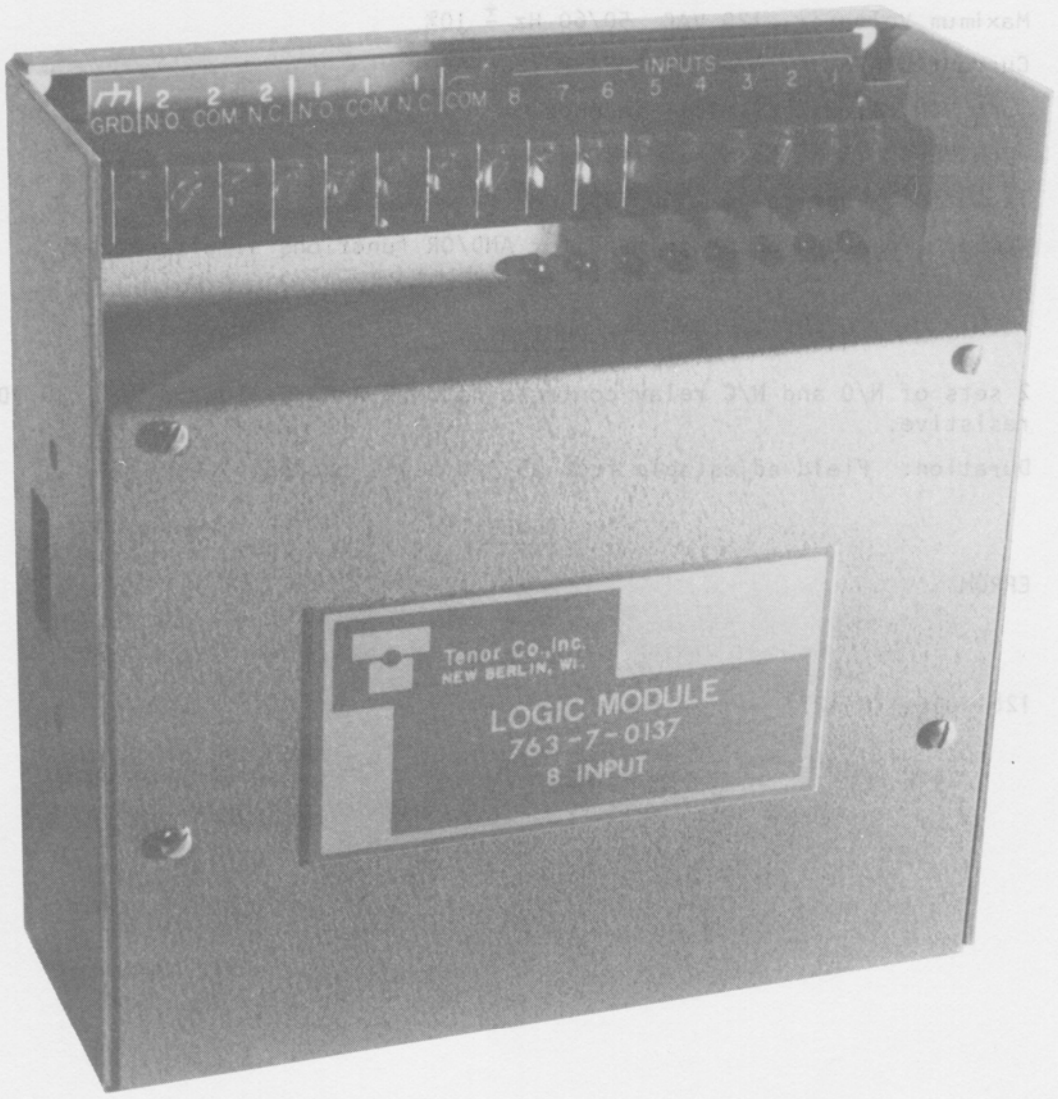
SECTION 7

INPUT LOGIC MODULE

763-7-0137



7.0 INPUT LOGIC MODULE ELECTRICAL SPECIFICATIONS MODEL 763-7-0137

GENERAL

Operating Temperature Range: 0^{o} - $+60^{o}$ C

Main Power: Connected to power supply of Solid State Stepper or Multi-Program Stepper via Ribbon Cable.

INPUTS

Maximum Voltage: 120 VAC 50/60 Hz $\pm$ 10%

Current Drain: 7.4 milli-AMPS @ 120 VAC

Turn "ON" Time: 61 milli-seconds

Turn "OFF" Time: 58 milli-seconds

Isolation: Optical @ 2500 VDC

Number: 8 - can be programmed for AND/OR functions simultaneously during each step.

OUTPUTS

2 sets of N/O and N/C relay contacts rated 2 AMPS @ 120/250 VAC, 30 VDC resistive.

Duration: Field adjustable from 35-300 milli-seconds.

MEMORY

EPROM

CAPACITY

128 steps (H-127)

7.1 INPUT LOGIC MODULE I/O FUNCTIONS

TERMINAL NUMBER	DESCRIPTION
1 - Input	120 Volt AC(L1) Logic function input.
2 - Input	120 Volt AC(L1) Logic function input.
3 - Input	120 Volt AC(L1) Logic function input.
4 - Input	120 Volt AC(L1) Logic function input.
5 - Input	120 Volt AC(L1) Logic function input.
6 - Input	120 Volt AC(L1) Logic function input.
7 - Input	120 Volt AC(L1) Logic function input.
8 - Input	120 Volt AC(L1) Logic function input.
9 - Com	120 Volt AC Neutral (L2) Logic function input common.
10 - 1 NC	Convenience relay contact 1 - Normally Closed
11 - 1 Com	Convenience relay contact 1 - Common
12 - 1 NO	Convenience relay contact 1 - Normally Open
13 - 2 NC	Convenience relay contact 2 - Normally Closed
14 - 2 Com	Convenience relay contact 2 - Common
15 - 2 NO	Convenience relay contact 2 - Normally Open
16 - GRD	Customer connected to 120 Volt AC power source (L1 & L2) safety ground

All terminals will accept 2 #12 AWG wires.

Note 1: The convenience relay is energized when the correct logic conditions exist at the inputs as determined by the program.

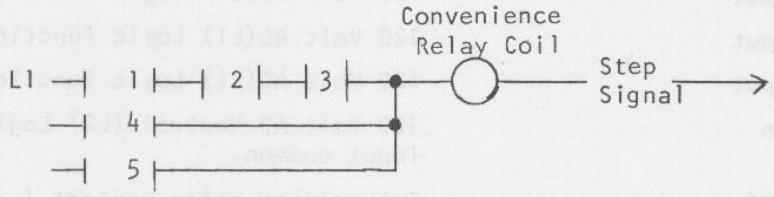
Note 2: Contact 1 on the convenience relay should be connected to the Single Step Input on the Solid State Stepper Module to provide the proper STEP signal. Contact 2 on the convenience relay is for customer usage.

7.2 INPUT LOGIC MODULE OPERATING INSTRUCTIONS

GENERAL DESCRIPTION

The Input Logic Module provides "expandable" AND/OR equation solution capability and based upon the condition of 8 AC inputs, will energize its convenience relay and cause the 763 Multi-Program Stepper or 763 Solid State Stepper to advance one program step. The desired conditions to advance the 763 PSC System are contained in an EPROM inside the Logic Module and is programmed in the field in accordance with the customer application requirements.

EXAMPLE: The following logic equation states that the step signal will be initiated when input 1, and 2, and 3 or 4 or 5 have been satisfied.



MODULE OPERATION

On each step of the program the Input Module looks at the "AND" function first and if all input programmed conditions are satisfied it will cause the 763 PSC System to advance, or if the "AND" function is not satisfied, the "OR" functions are examined and if any one of the programmed input conditions is satisfied it will cause the 763 PSC System to advance. In a program, any combination of AND/OR Logic functions can be selected for each step. However, due to the characteristics of the Module, "AND" functions are denoted as "Fast Steps" relative to "OR" functions. "LED status indicators" are connected to each of the 8 inputs to provide visual verification of input conditions at all times.

7.3 PROGRAMMING THE LOGIC MODULE EPROM

It is best to prepare in advance a program chart that reflects the desired input conditions for each step. See sample program chart below:

Step No.:	"AND" Function — Input Number								"OR" Function — Input Number							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
H					X					X		X		X		
1	X	X	X										X	X		
2	X		X					X		X			X			
3	X		X					X		X			X			
4	X		X					X		X			X			
5					X	X	X			X						X
6	X	X													X	

After a program chart has been developed by placing an "X" in the corresponding input column to designate the desired condition at each program step the EPROM can now be removed and placed into the Tenor EPROM Loader. See Figure 1.27 for Logic Module EPROM location.

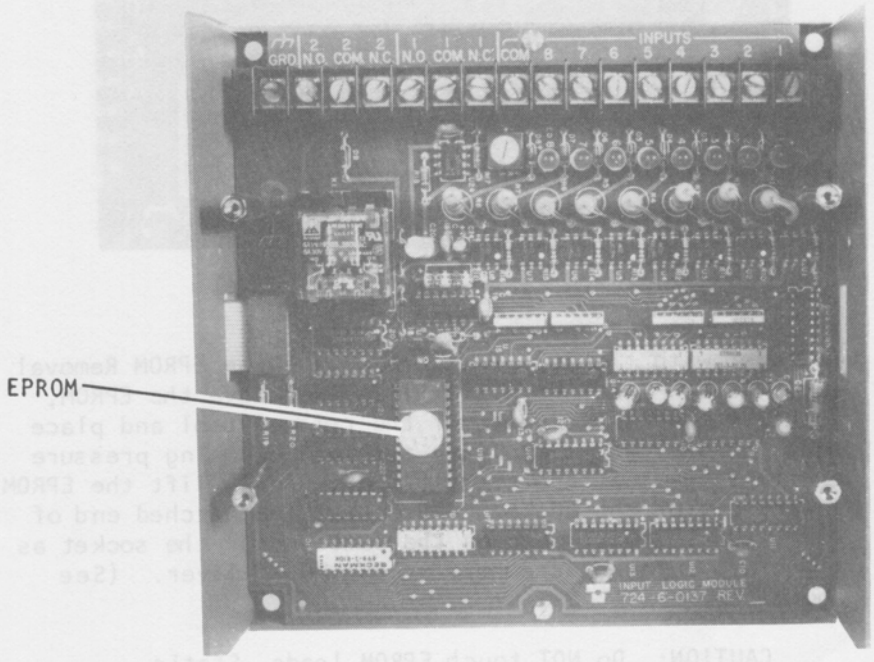


Figure 1.27

EPROM REMOVAL PROCEDURE

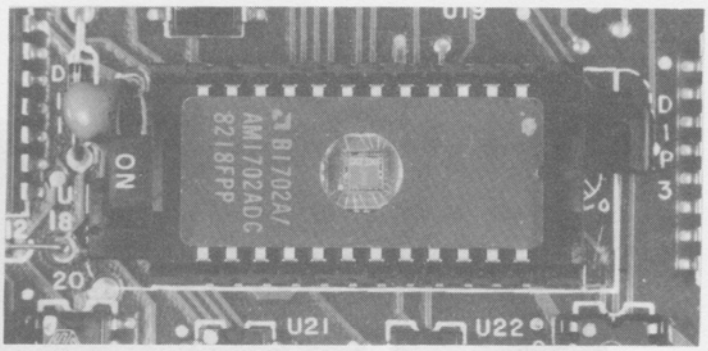
CAUTION: During removal and replacement of the EPROM AC line power (L1 & L2) must be disconnected from the 763 Multi-Program Stepper or 763 Solid State Programmer to prevent damage to the device.

The EPROM is mounted in a "zero force" insertion socket to protect the device from damage during removal and replacement. To remove the EPROM perform the following steps:

1. Locate the clamp release screw on the end furthest from terminal block TB1. Note that it is marked O - C.

REMOVAL PROCEDURE - continued

2. Insert an appropriate size flat head screwdriver into the clamp release screwhead and rotate it fully counter-clockwise or push "ON" lever to the right until the "OFF" lever is exposed. (See below).



3. Included with the 763 Stepper Module is an EPROM Removal Tool (Augat - Part No. T114-1)*. To remove the EPROM, gently spread the fingers of the removal tool and place under EPROM. While applying a slight clamping pressure on the fingers of the removal tool, gently lift the EPROM upward out of the socket. Note that the notched end of the EPROM is positioned on the same end of the socket as the clamp release screwhead or the "OFF" lever. (See above).

CAUTION: Do NOT touch EPROM leads. Static electricity will damage this chip.

4. To reinstall the EPROM, reverse the above procedure being careful to position the device in the socket correctly and lock it in place by rotating the clamp release screw fully clockwise or push "OFF" lever to the left until the "ON" lever is exposed. (See above).

LOADING THE PROGRAM

To program the EPROM with the Tenor EPROM Loader (Catalog No. 763-7-0120) first plug the programmer into a 120 VAC 60 Hz grounded receptacle. After the loader is plugged in, install the EPROM into its socket.

WARNING: Do not connect or disconnect AC power from the loader with an EPROM in the socket.

*AUGAT, INC., P. O. BOX 779, ATTLEBORA, MA 20703

REMOVAL PROCEDURE - Continued

The locking handle on the socket must be "up" to allow the EPROM to be inserted. The notched end of the EPROM must be at the locking handle end of the socket, Figure 1.28. With the EPROM correctly inserted in the socket, push the locking handle down to secure the EPROM in its socket.

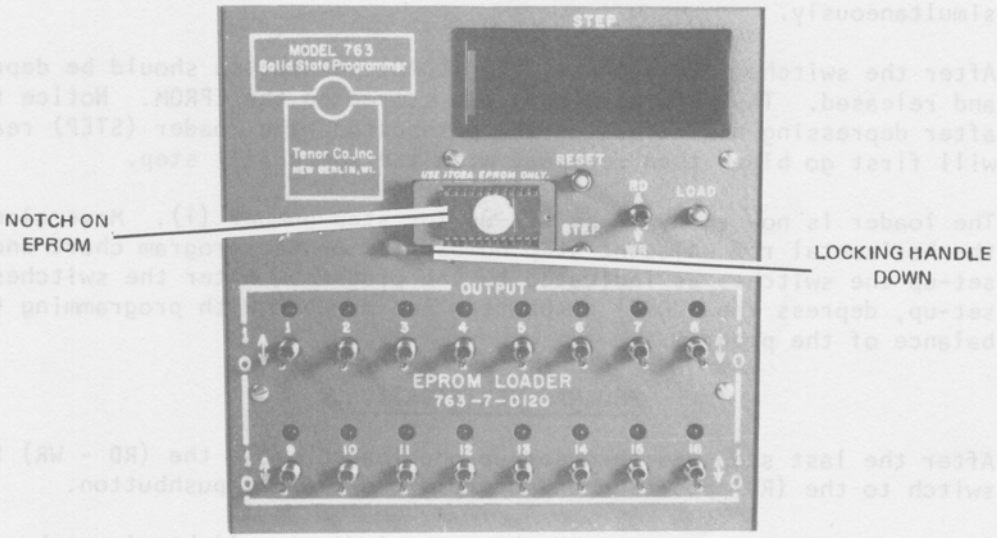


Figure 1.28

With the EPROM secured in its socket, move the read-write (RD-WR) toggle switch on the loader face to the (RD) position and depress the (RESET) push button. The step readout should now indicate the Home (H) step and all (16) of the lights on the face of the loader panel should be off.

With the loader in the Read (RD) mode of operation it is now advisable to check the EPROM address locations to ensure that they are empty. By pressing and releasing the (STEP) pushbutton the loader will now step to step number (1). All (16) lights on the face of the loader panel should be off. A quick check of the remaining memory locations should be made by cycling the (STEP) pushbutton, verifying that all lights are off for the balance of the program steps. When you arrive at step 127, push the pushbutton to return to the Home (H) step.

Before programming, a piece of opaque tape must be placed across the window of the EPROM to prevent possible erasure of the light sensitive device. A marking should be made on the tape to aid in identifying the program about to be stored at its proper system location.

Move the (RD - WR) toggle switch to the Write (WR) position. The loader is now in the programming mode. Refer to the program chart and look at the horizontal row adjacent the (H) (STEP NO.). Wherever an (X) occurs in the (H) row, the corresponding toggle switch on the programmer should be put in the "1" position.

To allow for programming of the "AND" function the toggle switches numbered 1 - 8 are used. Programming of the "OR" functions is accomplished through toggle switches numbered 9 - 16. It is important to verify both "AND"/"OR" conditions as both functions for each step are loaded simultaneously.

After the switches are all set, the (LOAD) pushbutton should be depressed and released. The information is now stored on the EPROM. Notice that after depressing and releasing the pushbutton, the loader (STEP) readout will first go blank then reappear with the number (1) step.

The loader is now ready to be set-up for step number (1). Move along the horizontal row adjacent step number (1) on the program chart and set-up the switches as indicated by the program. After the switches are set-up, depress the (LOAD) pushbutton and proceed with programming the balance of the program.

PROGRAM VERIFICATION

After the last step has been set-up and loaded, move the (RD - WR) toggle switch to the (RD) position and depress the (RESET) pushbutton.

Verify the EPROM program by checking the indicator lights in each step of the program. To step forward, press and release the (STEP) pushbutton.

If a memory location was accidentally left unprogrammed ("0") it may be programmed ("1") by following the regular programming procedure outlined in this section. However, a memory location that was accidentally programmed and should have been left empty cannot be erased in this manner. Instead, the entire EPROM should be erased.

When the program has been verified, move the locking handle up, and remove the EPROM from its socket. Handling of the EPROM should be kept to an absolute minimum. Replace EPROM in its respective module socket as soon as possible. Note: Now power down the loader.

ERASING THE EPROM

To erase or empty the data stored in the EPROM, a U-V (Ultra-Violet) Memory Chip Eraser is available (Catalog No. 763-3-0121). This device will erase up to 4 EPROMS at the same time. A picture of this device is shown in Figure 1.29.

WARNING: Never look directly into the lit U-V lamp because this may cause permanent eye damage.

NOTE: Allow 45 minutes in the EPROM Eraser to insure total erasure of the EPROMS.

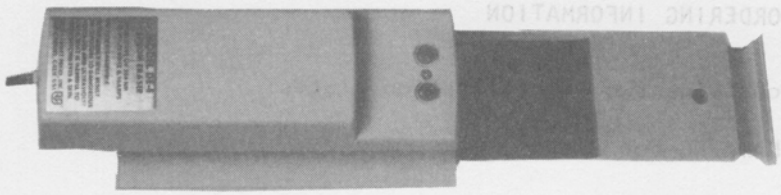


Figure 1.29

7.4 MAINTENANCE

Solid state control devices require a minimum of maintenance. A good preventive maintenance program should include the following.

1. Keep inside of enclosure free of dust and contaminents. (Do NOT steam or hose clean.)

2. Keep enclosure doors closed except when servicing.

3. Do not store loose or unnecessary articles in the enclosure.

   WARNING: Keep personnel clear of machinery and equipment that can be hazardous if activated by the control system during maintenance or troubleshooting. Use generally accepted safe practices for electrical equipment maintenance.

4. Check terminal block connections, plugs and sockets periodically for tightness. This is especially important after any troubleshooting.

5. Do not insert or remove modules, module covers, IC's or fuses while power is on.

7.5 RECOMMENDED SPARE PARTS

Description	Tenor Part Number
EPROM (National or AMD 1702)	700-3-0769
Flat Interconnection Cable	700-3-5059
Output Relay	700-3-1804

SPARE PARTS ORDERING INFORMATION

Each module contains two identification plates:

1. Catalog Name/Number Plate

2. Serial Number Plate

Name/number plates generally are located on module covers. Serial number plates generally are located on sides (outside) of bases.

To aid in furnishing the proper spare parts, please show both numbers.

EXAMPLE: Parts for a Stepper Module 763-7-0115

Serial Number - 763-1234-S-0580
1 Each Battery - Part Number 670-3-8075

All Prices: F.O.B. New Berlin, Wisconsin

Terms: As Arranged

Minimum Billing: $50.00

Factory: Tenor Company, Inc.
17020 W. Rogers Drive
New Berlin, Wisconsin 53151

(414) 782-3800

Prices and all terms and conditions of sale are subject to change without notice. Prices are net and do not include any applicable State, Federal or Excise Taxes which are payable by purchaser.

All orders are subject to acceptance by Tenor Company at its home office.