

Output Pulse Programming

This section will explain how to program ON/OFF pulses or “dwells” in the PL-1746 card via the SLC 500 backplane M0 files, using a ladder program or a touch screen interface.

Monitoring The Error Registers & Execute Busy Bit

It is recommended that the following error registers be monitored when writing information to the PL-1746. If a command is written and no result is seen, check these error registers to see what type of error has occurred.

1. Module Status register I:S.7 (Clear errors with bit O:S.0/8). *Note: Errors in this register must be cleared or no further commands will be accepted.*
2. The error bits 10 through 15 in Pulse Edit Command Status register M0:S.902.
3. It is also recommended to monitor the execute/busy bit in the Pulse Edit Command Status register M0:S.902 bit 0. This bit is required to execute commands, and will stay high until a pulse edit command has been completed. Writing subsequent commands before this bit goes low will result in errors.

Programming ON/OFF Pulses to the PL-1746 Memory

There are 2 steps in this process as follows:

1. Enter the data to be written in the Pulse Edit M0 files (M0:S.896 – M0:S.901).
2. Enter the proper read or write command in the Command Status register (M0:S.902) to execute the M0 file data.

Example 1: Program a pulse in Program 0, Channel 1, of ON = 90, OFF = 180.

1. Since this is a write command, it requires (see table 1) that we enter the program, channel and on/off data in the M0 files (see table 2).

Data to enter	M0 file	Purpose
0	M0:S.896	Program number
1	M0:S.897	Channel number
90	M0:S.898	On: Start position of pulse
180	M0:S.899	Off: End position of pulse

1. After entering the proper information above, a command is now required in the Command Status register M0:S.902 (see tables 3 & 4).

Command	bit 4	bit 3	bit 2	bit 1	bit 0	(decimal)
Write	0	0	0	1	1	3

Once the command bits are entered, the data in the M0 files will be written to the PL-1746 memory. The execute/busy bit 0 will stay a “1” until the write is completed when it will return to “0”.

Example 2: Read the ON 90, OFF 180 pulse programmed in Program 0, Channel 1 in Example 1 above.

1. Since this is a Read command, it requires (see table 1) that we enter the program & channel data in the M0 files (see table 2). *Note: If there were more than one pulse in the channel being read, we would also need to specify the Pulse number. First pulse in channel is considered pulse #0, second pulse #1, etc.*

Data to enter	M0 file	Purpose
0	M0:S.896	Program number
1	M0:S.897	Channel number

1. After entering the proper information above, the command for a read is now required in the command status register M0:S.902 (see tables 3 & 4).

Command	bit 4	bit 3	bit 2	bit 1	bit 0	(decimal)
Read	0	0	0	0	1	1

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Once the Read command is sent, the information requested will be written to the M0 files (see table 2). In this example you would see the following information returned:

Info returned	M0 file	Purpose
90	M0:S.898	On: start position of pulse
180	M0:S.899	Off: end position of pulse
0	M0:S.900	Number of the pulse being read
1	M0:S.901	Quantity of pulses in the channel

Where to monitor outputs for use in a ladder program:

The ON/OFF status for each of the 32 outputs (or channels) can be monitored in the first two 16 bit input words.

I:S.0 Outputs 0-15

I:S.1 Outputs 16-31

Special pulse edits:

To clear all pulses in a channel write a pulse of ON = 0, OFF = 0.

To delete one of the pulses in a channel containing multiple pulses change the OFF value to equal the ON value.

To turn a channel on all the time write a pulse of ON = 1, OFF = 1.

Table 1: Data requirements in M0 files before executing specific commands.

Command	Program	Channel	On/off	*Pulse #
Read	x	x		x*
Write	x	x	x	
Inc ON	x	x		x*
Dec ON	x	x		x*
Inc OFF	x	x		x*
Dec OFF	x	x		x*
Inc both ON/OFF	x	x		x*
Dec both ON/OFF	x	x		x*
Inc all in channel	x	x		
Dec all in channel	x	x		
Change ON	x	x	x (ON)	x*
Change OFF	x	x	x (OFF)	x*

*Pulse number only required if there is more than one pulse in a channel.

Table 2: Where to write (& read) pulse edit data.

M0:S.896	Program number
M0:S.897	Channel number
M0:S.898	On: Start position of pulse
M0:S.899	Off: End position of pulse
M0:S.900	Number of the pulse being read
M0:S.901	Quantity of pulses in the channel (read only)

Table 3: Command Status Register M0:S.902.

Bit #	Purpose
0	command (execute / busy)
1	command bit
2	command bit
3	command bit
4	command bit
5 - 9	not used
10	error: incorrect pulse number entered
11	error: ON pulse out of scale factor range
12	error: OFF pulse out of scale factor range
13	error: channel number out of range
14	error: program number out of range
15	error: any above error causes this bit to go high

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Table 4: Commands entered in Command Status Register M0:S.902 bits 0 through 4.

Command	bit 4	bit 3	bit 2	bit 1	bit 0	(decimal)
Read	0	0	0	0	1	1
Write	0	0	0	1	1	3
Increment ON	0	0	1	0	1	5
Decrement ON	0	0	1	1	1	7
Increment OFF	0	1	0	0	1	9
Decrement OFF	0	1	0	1	1	11
Inc both ON/OFF	0	1	1	0	1	13
Dec both ON/OFF	0	1	1	1	1	15
Inc all in channel	1	0	0	0	1	17
Dec all in channel	1	0	0	1	1	19
Change ON	1	0	1	0	1	21
Change OFF	1	0	1	1	1	23