TRIO
M O T I O N | T E C H N O L O G Y

Doc No.:	AN-279
Version:	1.2
Date:	27 September 2012
Subject:	P311 48 Channel Pswitch MC464 Module

APPLICATION NOTE

1. Scope

This document provides information on using the P311 customer specific module.

2. Overview

The P311 features

- Fast switching 48 x 24 volt / 1 Amp/channel Pswitch outputs

- Overall (channels summed together) 2A and 4A electronic current limits

- Update at 2 x servo frequency (125usec updates at 250usec servo period)

- Convenient rugged P channel output drivers: ZXMP6A18DN8TA

- Designed for switching large number of solenoid valves in sequence but where only a limited number are ON at any one time.

- PWM control

3. Connection Pinout

The P311 uses a 62 way high density D connector to allow the 48 outputs to be connected.

1	24 V IN	22	24 V IN	43	24 V IN
2	PSW 0	23	PSW 20	44	24 V IN
3	PSW 1	24	PSW 21	45	24 V IN
4	PSW 2	25	PSW 22	46	24 V IN
5	PSW 3	26	PSW 23	47	24 V IN
6	PSW 4	27	PSW 24	48	No connection
7	PSW 5	28	PSW 25	49	0 V
8	PSW 6	29	PSW 26	50	0 V
9	PSW 7	30	PSW 27	51	0 V
10	PSW 8	31	PSW 28	52	0 V
11	PSW 9	32	PSW 29	53	0 V
12	PSW 10	33	PSW 30	54	0 V
13	PSW 11	34	PSW 31	55	PSW 40
14	PSW 12	35	PSW 32	56	PSW 41
15	PSW 13	36	PSW 33	57	PSW 42
16	PSW 14	37	PSW 34	58	PSW 43
17	PSW 15	38	PSW 35	59	PSW 44
18	PSW 16	39	PSW 36	60	PSW 45
19	PSW 17	40	PSW 37	61	PSW 46
20	PSW 18	41	PSW 38	62	PSW 47
21	PSW 19	42	PSW 39		

NB: 24 V IN and 0 V connections must all be made !

4. Configuration
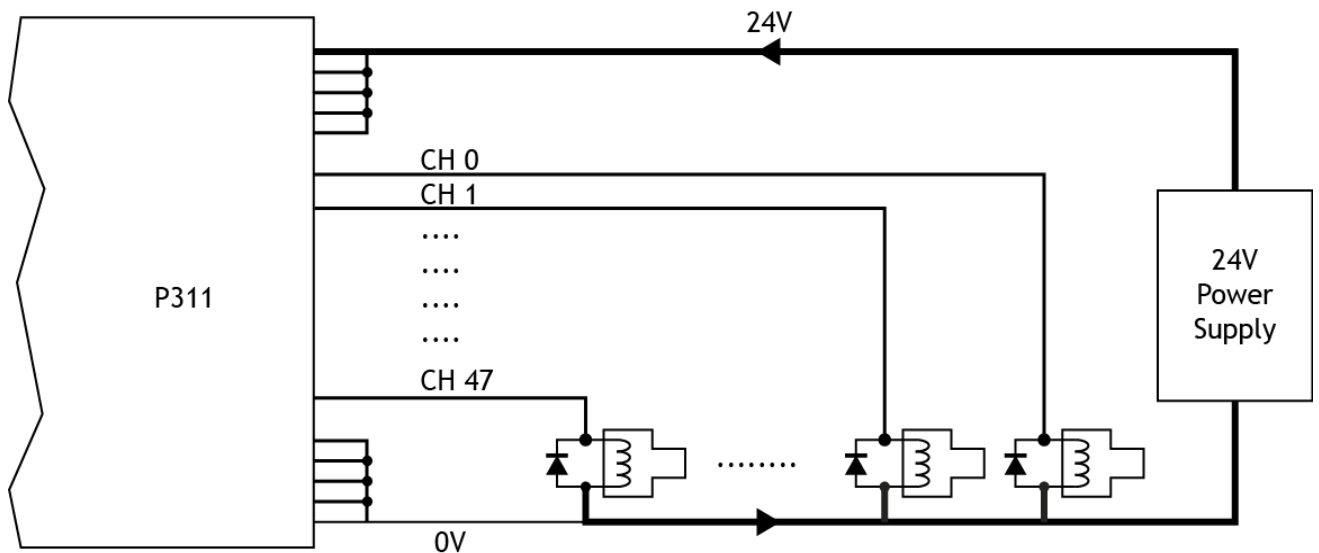
Note that each solenoid coil MUST have a suitable flyback diode across the coil !

5. Programming

PSWITCH(64,ON/OFF,axis,slot,option,#outputs,table)

ON/OFF	-	Use ON to activate
axis	–	Axis for position comparison
slot	–	MC464 slot number
option	–	0 at present
#outputs	-	Number of outputs defined in table
table	-	Pointer to table of switch points + control words.

3 table values are used for each channel used: position A, position B, control. If "control" is ON then channel will be set ON between positions A and B otherwise OFF. If "control" is OFF then channel will be set OFF between positions A and B.

LEDs:

1- (Green)   – Module detected / Power

2- (Red)   - Flashing = 2A limit reached, solid = 4A current limit

3- (Yellow)   - Channel 0 output

4- (Yellow)   - Channel 1 output

6. Example Program:

```
ATYPE=0
UNITS=50

' Machine cycle is 0..360 deg:

REP_DIST=360
REP_OPTION=ON

SPEED=360

' Bank of 12 outputs: 0..11 are loaded by this program although 0..47 are available on P311

TABLE(1000,10,15,ON)
TABLE(1003,15,20,ON)
TABLE(1006,20,25,ON)

TABLE(1009,60,62,ON)
TABLE(1012,70,72,ON)
TABLE(1015,80,82,ON)

TABLE(1018,30,34,ON)
TABLE(1021,34,38,ON)
TABLE(1024,38,42,ON)

TABLE(1027,160,162,ON)
TABLE(1030,200,211,ON)
TABLE(1033,10,320,OFF)

ax=0
sl=0
numused=12

PSWITCH(64,ON,ax,sl,0,numused,1000)
PRINT "12 pswitches loaded"

' Positions can be altered by changing the TABLE values.  No need to reload the PSWITCH command
```

7. PWM Control:

The PSWITCH_PWM_CONTROL should be set prior to the PSWITCH function.

PSWITCH_PWM_CONTROL(slot, 48-bit PWM Enable, Hold Time, PWM Space Time)

Slot: Controller module slot number

48-bit PWM Enable:

1 bit per PWM output so bit 0 will enable/disable output 0 for PWM control etc. If the bit is 0 then the output behaves exactly as before, if it is 1 then the FPGA will override the output based on the Hold Time and PWM Space Time

Hold Time:

Time period in msec from output turning on to start of PWM (0..15)

PWM Space Time:

Length of PWM Space. 0..50us; PWM frequency is fixed @ 20KHz, this defines just the PWM space, so if this is 0us then the output will be permanently on, if this is 50us then the output will be permanently off. The PWM is changed in 5% steps only.

A = 50 usec (from 20Khz PWM)

B = PWM Space Time parameter (usec) 0..50

C = Set by PSWITCH positions

D = Initial hold time in msec (0..15)