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instrumentation and software for research

PULSER (PLUS) PRIZMATIX

SOF-732-6

USER'S MANUAL

DOC-323
Rev. 1.0

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CHAPTER 1 | GETTING STARTED

Introduction

The SOF-732-6 Pulser (Plus) Prizmatix software enables Med-PC® users to program trains of pulses, to create groups of trains, and to add various triggering conditions for pulsing LEDs, lasers and shutters used in Optogenetics experiments via Med-PC® protocols and Med Associates, Inc. hardware while simultaneously collecting experimental data.

The software includes a sample code that may be added to any protocol as well as a Fixed Ratio protocol.

Note: Requires a TTL output from the Med Associates interface to operate at 1ms resolution.

Software Installation and Setup

Before beginning the software installation, phone, fax or e-mail Med Associates with the registration information.

Insert the **SOF-732-6 PULSER (PLUS) PRIZMATIX** CD into the CD drive; at the welcome screen click **Install**.

If the CD does not auto-start, navigate to the CD drive in Windows Explorer and double click **"autorun.exe"** and click **Install** at the welcome screen.

Com Port Lookup

MED-PC requires the Serial Com Port number of the Pulser (Plus) to communicate. See Figure 1-1- Device Manager / Com Port Lookup.

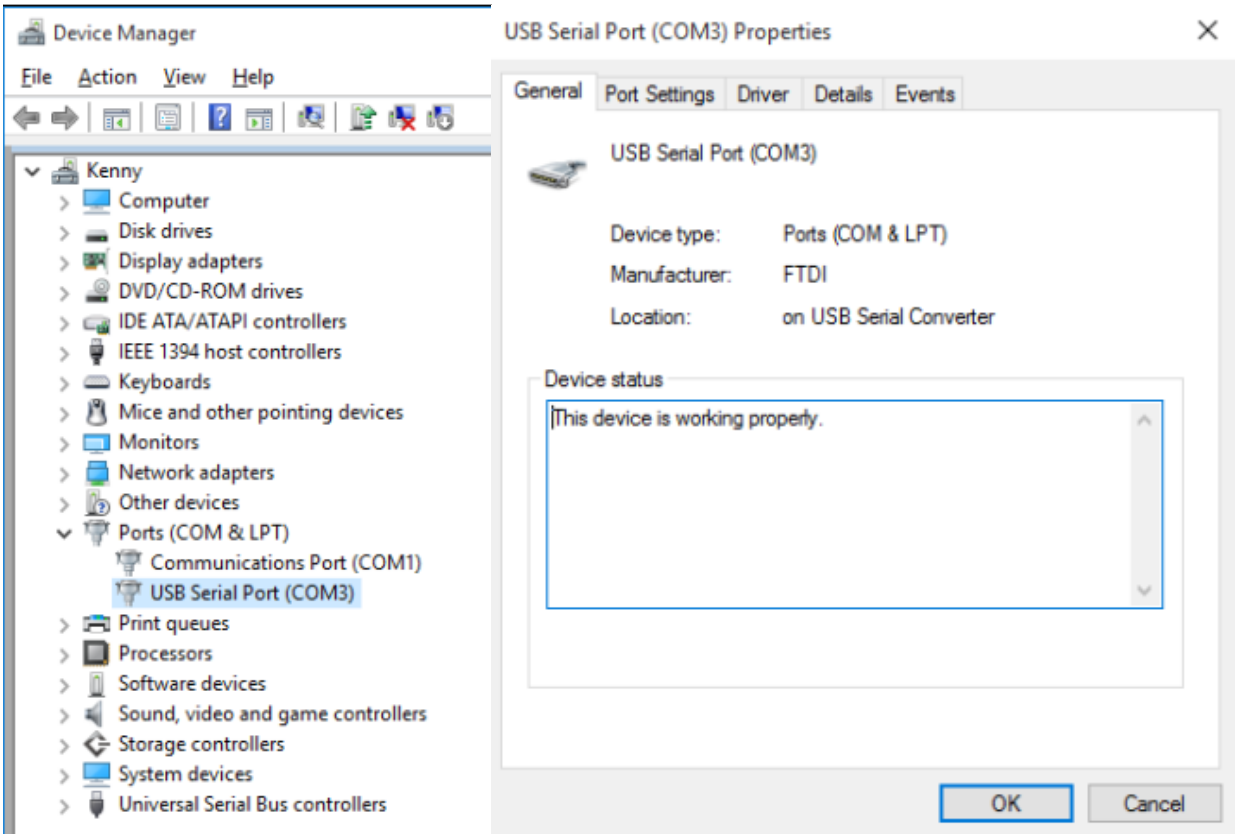
Once the Pulser (Plus) is connected via USB:

- Open Windows Device Manager.
- Expand the Ports (COM & LPT) category.
- The Pulser (Plus) will be identified as a USB Serial Port (COM#).

If you have more than one device like this in the category:

- Right-click on USB Serial Port (COM#).
- Select Properties.
- Under the General tab, the Manufacturer will be FTDI.

Figure 1-1- Device Manager / Com Port Lookup



CHAPTER 2 | MEDSTATE NOTATION™ COMMANDS

OpenPulser

Syntax	`OpenPulser(MG: MPCGlobalPtr; BOX: Real; portNumber: Integer): Integer;`
Parameters	**MG**: The MED-PC Global Parameter. Used for passing error messages back to MED-PC. **BOX**: The MED-PC Box number that is running the program. **portNumber**: The Serial Com Port # of the Prizmatix Pulser (e.g. 3)
Comments	Opens and configures the Serial Com Port of the Prizmatix Pulser. OpenPulser = 1 if successful, = 0 if unsuccessful.
Example	`~M := OpenPulser(MG, BOX, Trunc(P[4]));~;` Sets the Variable M to the Value returned by OpenPulser.

SetPulserParams (Prizmatix Pulser ONLY)

Syntax	`SetPulserParams(MG: MPCGlobalPtr; BOX: Real; Var P);`
Parameters	**MG**: The MED-PC Global Parameter. **BOX**: The MED-PC Box number that is running the program. **P:** The array with the Prizmatix Pulser parameters. The array must be declared with 4 [0,1,2,3] elements and does not have to be the array X in the MSN code. P[0] = Frequency (Hz) P[1] = Pulse Width (ms) ***Must be 1ms < (1 / Frequency)** P[2] = Stimulus Duration (sec) P[3] = Operation Mode ***See Operation Mode**
Comments	Calculate and send the pulse parameters to the Prizmatix Pulser.
Example	`~SetPulserPlusParams(MG, BOX, P);~;` Sets the elements [0,1,2,3] of array P with defined values.

SetPulserPlusParams (Prizmatix Pulser Plus ONLY)

Syntax	`SetPulserPlusParams(MG: MPCGlobalPtr; BOX: Real; Var P);`
Parameters	**MG**: The MED-PC Global Parameter. **BOX**: The MED-PC Box number that is running the program. **P:** The array with the Prizmatix Pulser parameters. The array must be declared with 4 [0,1,2,3] elements and does not have to be the array X in the MSN code. P[0] = Frequency (Hz) P[1] = Pulse Width (ms) ***Must be 1ms < (1 / Frequency)** P[2] = Stimulus Duration (sec) P[3] = Operation Mode ***See Operation Mode**
Comments	Calculate and send the pulse parameters to the Prizmatix Pulser.
Example	`~SetPulserPlusParams(MG, BOX, P);~;` Sets the elements [0,1,2,3] of array P with defined values.

Operation Mode

Pulser

0 = Execute pulse sequence after parameters sent.
1 = Execute pulse sequence one time only after trigger, parameters must then be sent again.
2 = Execute pulse sequence each time after trigger.
3 = Execute pulse sequence after trigger HIGH, then stop when LOW.

Pulser Plus

100 = Execute pulse sequence after parameters sent.
101 = Execute pulse sequence one time only after trigger, parameters must then be sent again.
102 = Execute pulse sequence each time after trigger.
103 = Execute pulse sequence after trigger HIGH, then stop when LOW.

StopPulser

Syntax	`StopPulser(MG: MPCGlobalPtr; BOX: Real);`
Parameters	**MG**: The MED-PC Global Parameter. **BOX**: The MED-PC Box number that is running the program.
Comments	Stops the current operation on the Prizmatix Pulser.
Example	`~StopPulser(MG, BOX);~;`

ClosePulser

Syntax	`ClosePulser(MG: MPCGlobalPtr; BOX: Real);`
Parameters	**MG**: The MED-PC Global Parameter. **BOX**: The MED-PC Box number that is running the program.
Comments	Closes the Serial Com Port of the Prizmatix Pulser.
Example	`~ ClosePulser(MG, BOX);~;`

CHAPTER 3 | SAMPLE CODE

```
\ Inputs
^LeftLever  = 1
^RightLever = 2

\ Outputs
^LeftLever  = 1
^RightLever = 2
^PulserTTL  = 3

\ P() = Control Variables with Assigned Aliases as Defined
Var_Alias Frequency (Hz)                                  = P(0)  \ Default = 20 Hz
Var_Alias Pulse Width (ms) Must be 1ms < (1 / Frequency) = P(1)  \ Default = 5 ms
Var_Alias Stimulus Duration (sec)                         = P(2)  \ Default = 3 seconds
Var_Alias Operation Mode                                  = P(3)  \ Default = 2 (See below)
Var_Alias COM Port for Prizmatix Pulser                   = P(4)  \ Default = 3

\ Constants for the Prizmatix Pulser
^Frequency     = 0
^PulseWidth    = 1
^Duration      = 2
^OperationMode = 3
^COMPort       = 4

\  M = Response from the Prizmatix Pulser Open Command
\  S   = Elapsed Time in Session
\ Array for the Prizmatix Pulser parameters
DIM P = 4
\ P(^OperationMode) =  0 = Execute pulse sequence after params sent
\                      1 = Execute pulse sequence one time only after trigger, params must then
be sent again
\                       2 = Execute pulse sequence each time after trigger
\                       3 = Execute pulse sequence after trigger HIGH, then stop when LOW

\ K-Pulses Used in this Program
\ K1 - Trigger the Pulser.
\ K2 - End Program.

\ Z-Pulses Used in this Program
^Z_End        = 32  \ Signal End of Session

DISKCOLUMNS = 5
```

```
\*********************************************************
\                    Pulser Sample
\ S1 - Set Default Values
\  Frequency                                  (20 Hz)
\  Pulse Width  (Must be 1ms < (1 / Frequency))  (5 ms)
\  Stimulus Duration                          (3 seconds)
\  Operation Mode                             (2)
\  COM Port for Prizmatix Pulser              (3)
\*********************************************************
S.S.1,
S1,
  0.01": SET P(^COMPort)    = 3, P(^Frequency)     = 20, P(^PulseWidth)  = 5;
         SET P(^Duration)   = 3, P(^OperationMode) = 2;
          ---> S2


S2,     \ First Statement: Wait for START signal.
        \
        \ Second Statement: Update screen display with default values
        \ for Control Variables.  This will show any changes made via
        \ the "Configure | Change Variables" Window prior to START.
  #START: SHOW 1,Session,S/60 ---> S3
  1": SHOW 6,COM Port,P(^COMPort),         7,Frequency,P(^Frequency),          8,Pulse
Width,P(^PulseWidth);
      SHOW 9,Stim Duration,P(^Duration),  10,Operation Mode,P(^OperationMode) ---> SX


S3,
  1": ADD S; SHOW 1,Session,S/60 ---> SX
  #Z^Z_End: ---> S2

\*************************************************
\             PRIZMATIX PULSER CONTROL
\*************************************************
S.S.2,
S1,     \ Open the Prizmatix Pulser
        \ Show error and exit if there was a problem
  #START: ~M := OpenPulser(MG, BOX, Trunc(P[4]));~;
          IF M = 1 [@Open, @NotOpen]
             @Open: SHOW 5,Pulser Opened,M ---> S2
             @Not:  SHOW 5,Pulser Not Opened,M;
                    Z^Z_End ---> SX


S2,     \ Send the stimulus parameters to the Prizmatix Pulser
        \ NOTE: At the 57600 Baud Rate for the COM Port it will
        \       take ~5ms (0.005s) to send the command to the Pulser
  0.01": ~SetPulserParams(MG, BOX, P);~ ---> S3
```

```
S3,     \ Wait for K-Pulse, then send TTL signal to the Pulser
  #K1: ON ^PulserTTL ---> S4
  #K2: Z^Z_End ---> S5

S4,
  0.01": OFF ^PulserTTL ---> S3
  #K2: Z^Z_End ---> S5

S5,     \ Wait for Screen Update and end with
        \ STOPABORTFLUSH for Automatic Data Saving
  2": ~ClosePulser(MG, BOX);~ ---> STOPABORTFLUSH
```

CHAPTER 4 | CONTACT INFORMATION

Please contact Med Associates, Inc. for information regarding any of our products.

For Technical questions, email support@med-associates.com.

For Sales questions, email sales@med-associates.com.

Visit our website at www.med-associates.com.