



a division of Harvard Bioscience, Inc.

# AgilePulse™ PLUS Bipolar Transfection System

## Quick Start Guide



Download full user's manual at: [www.btxonline.com](http://www.btxonline.com)

### System Set Up and Initial Test

1. Unpack the contents of the shipping box.
2. Check for obvious signs of exterior damage. If damage is noted, contact BTX Technical Support before proceeding.
3. Place the Waveform Generator on the top of a sturdy table.
4. Connect the High Voltage Output Cable, Chamber Base Cable, or Safety Stand Cable into the HV Output and Interlock Connectors at the bottom right of the front panel.
5. Connect the mains/power cord into the Generator back panel at the bottom right.
6. Connect the Power Cord to the mains.
7. Turn the rocker switch on the front panel to the "on" position (I). The rocker switch **Power**, should illuminate and the opening touchscreen should appear within 10 seconds. When the instrument is fully initialized, the **Log On** screen display (below) will appear.

### Log On Screen

Cell Line	<input type="text"/>	<b>Welcome to AgilePulse™ PLUS</b>	
Transfectant	<input type="text"/>		
Chamber	<input type="text"/>		
Protocol	<input type="text"/>		
Operator	<input type="text"/>	Next	Setup

Log On to AgilePulse™ PLUS

User name:  Change

Password:  Change

OK

1	2	3	4	5	6	7	8	9	0	BS		
Tab	q	w	e	r	t	y	u	i	o	p	-	
Caps	a	s	d	f	g	h	j	k	l	;	=	
Shift	z	x	c	v	b	n	m	,	Home	End	Del	
										Left	Right	Clear

### User Identification Input

AgilePulse™ PLUS is factory configured with the system administrator "admin" account. By default no password is defined so the user can enter the system with parameters matching that of the initial **Log On** screen. The admin password may be changed by navigating from the **Welcome** screen to the **User Account Maintenance** screen by tapping **Setup** then **User**.

The system administrator may add/remove pulse waveform protocols, add/remove standard user accounts, and assign pulse waveform protocol access privileges to standard users. The administrator always operates under the "admin" account.

To enter user names and passwords, touch the **Change** buttons to activate a virtual keyboard.

**User name:** Enter the user's name to log in.

**Password:** Enter the password associated with the user account.

Touch **OK** to log in and proceed to the **Welcome** screen.

### Welcome Screen

Cell Line	<input type="text" value="CHO"/>	<b>Welcome to AgilePulse™ PLUS</b>	
Transfectant	<input type="text" value="Plasmid A"/>		
Chamber	<input type="text" value="MD081101-1"/>		
Protocol	<input type="text" value="Default"/>		
Operator	<input type="text" value="admin"/>	Next	Setup

Log Out

1	2	3	4	5	6	7	8	9	0	BS		
Tab	q	w	e	r	t	y	u	i	o	p	-	
Caps	a	s	d	f	g	h	j	k	l	;	=	
Shift	z	x	c	v	b	n	m	,	Home	End	Del	
										Left	Right	Clear

## Protocol Setup

Pulse protocols can be viewed and/or modified on the **Protocol** screen which is accessed from the **Welcome** screen:

- Touch **SETUP**
- Touch **PROTOCOL**

Parameters for up to five pulse groups are set by selecting the appropriate box and scrolling through the available values. Subsequent groups are activated by selecting at least one pulse in the number field and are conversely deactivated by selecting zero pulses in the number field. The adjusted protocol is saved to internal memory when the **HOME** button is touched.

- **Amplitude** defines voltage of the pulses.
- **Duration** defines the length of the pulses.
- **Pulse Interval** defines the inter-group interval (pulse interval time within a single group).
- **Group Interval** defines the intra-group interval (pulse interval time between one group and the next group. **Group Interval** also defines the interval in the middle of a group when polarity flip settings are turned on).
- **Number** defines the number of pulses.
- **Polarity** defines the directionality of the electrical current flow during the pulses. Options include Positive, Negative, Flip - → +, and Flip + → -. For the Flip polarity options, the first half the pulses of the group will be delivered in the one polarity, then the second half of the pulses of the group will be delivered in the opposite polarity. For Flip polarity groups with an odd number of pulses, the extra pulse will be delivered prior to the Flip. For example, a Flip + → - group with pulse number set to 3 will have 2 positive polarity pulses followed by one negative polarity pulse

## Protocol Screen

<u>Protocol</u>	Default	Add New	Remove	Copy
<b>Pulse</b>	Group 1	Group 2	Group 3	
Amplitude	100 v	100 v	100 v	
Duration	10.000 ms	0.050 ms	0.050 ms	
Pulse Interval	20.0 ms	0.2 ms	0.2 ms	
Group Interval	50.0 ms	50.0 ms	100.0 ms	
Number	2 #	0 #	0 #	
Polarity	Flip - → +	Positive	Positive	
Sound	<input type="checkbox"/> Enable			
Multi Cycle	<input type="checkbox"/> Enable   <input type="checkbox"/> Maintain HV level between cycles			
<div style="display: flex; justify-content: space-around; margin-top: 10px;"> <span>Logs</span> <span style="background-color: #4a7ebb; color: white; border-radius: 50%; padding: 5px 15px;">Protocol</span> <span>User</span> <span>Home</span> </div>				

## Pulse Delivery Procedure

1. Prepare sample for electroporation with BTX Large Volume Chamber, Flatpack Chamber, cuvette or in vivo electrode.
2. Make proper connections between generator, electrode, and sample.
3. Enter Cell Line, Transfectant, and Chamber data on the **Welcome** screen, then tap **Next** to advance to the **Pulse Delivery** screen.
4. Touch the **Load** icon. The system will automatically deliver a short low voltage pulse to estimate the load resistance. If the resistance is too low, the pulse will not be delivered. If the resistance is within acceptable limits, the **Ready** button will turn yellow.
5. Touch the **Ready** button. When the system is charged, the **Start** button will turn yellow.
6. Touch the **Start** button. The system will deliver the set pulse protocol. When delivery is complete, the **Done** button will turn green and the pulse log will be displayed in the text box.
7. Touch the **Done** button to return to the **Welcome** screen. The identification fields will be reset. Repeat the procedure for each pulse delivery.

## Pulse Delivery Screen—Pre-Pulse

Cell Line	CHO	System	0 volts
Transfectant	Plasmid A	Est.	ohms
Chamber	MD081101-1	Cycle	1
Protocol	Default		
Operator	admin		
<div style="display: flex; justify-content: space-around;"> <span style="background-color: #ffc107; border-radius: 50%; padding: 5px 15px;">Load</span> <span style="border: 1px solid #ccc; border-radius: 50%; padding: 5px 15px;">Ready</span> <span style="border: 1px solid #ccc; border-radius: 50%; padding: 5px 15px;">Start</span> <span style="border: 1px solid #ccc; border-radius: 50%; padding: 5px 15px;">Done</span> </div>			

## Pulse Delivery Screen—Post-Pulse

Cell Line	NA	System	0 volts																											
Transfectant	NA	Mon.	530 ohms																											
Chamber	NA																													
Protocol	Default																													
Operator	admin																													
<div style="display: flex; justify-content: space-around;"> <span style="background-color: #28a745; border-radius: 50%; padding: 5px 15px;">Load</span> <span style="background-color: #28a745; border-radius: 50%; padding: 5px 15px;">Ready</span> <span style="background-color: #28a745; border-radius: 50%; padding: 5px 15px;">Start</span> <span style="background-color: #28a745; border-radius: 50%; padding: 5px 15px;">Done</span> </div>																														
Start: 12/11/2019 10:08:37 AM (12/11/2019 3:08:37 PM GMT) Process Completion Return Code: 0 (Success)																														
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Pulse</th> <th>VSet</th> <th>PVMon</th> <th>PIMon</th> <th>RMon</th> <th>DurSet</th> <th>DurMon</th> <th>IntSet</th> <th>IntMon</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>-100</td> <td>-95</td> <td>0.17</td> <td>559</td> <td>10.000</td> <td>9.975</td> <td>50.000</td> <td>49.857</td> </tr> <tr> <td>2</td> <td>+100</td> <td>+90</td> <td>0.18</td> <td>500</td> <td>10.000</td> <td>9.973</td> <td>50.000</td> <td>0.000</td> </tr> </tbody> </table>				Pulse	VSet	PVMon	PIMon	RMon	DurSet	DurMon	IntSet	IntMon	1	-100	-95	0.17	559	10.000	9.975	50.000	49.857	2	+100	+90	0.18	500	10.000	9.973	50.000	0.000
Pulse	VSet	PVMon	PIMon	RMon	DurSet	DurMon	IntSet	IntMon																						
1	-100	-95	0.17	559	10.000	9.975	50.000	49.857																						
2	+100	+90	0.18	500	10.000	9.973	50.000	0.000																						
Pre-pulse Estimated Load: 5000 Ohms Average Monitored Pulse Load: 530 Ohms																														