



INSTALLATION AND OPERATION

MANUAL

for the

Broadcast Tools® PSC II

Programmable Schedule Controller II

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BROADCAST TOOLS™ PSC - II
PROGRAMMABLE SCHEDULE CONTROLLER II


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BROADCAST TOOLS™ PSC - II
PROGRAMMABLE SCHEDULE CONTROLLER II

INTRODUCTION


Thank you for your purchase of a **Broadcast Tools® PSC II, Program Schedule Controller II** (referred to as the PSC II throughout this manual). We're confident that this product will give you many years of dependable service. This manual is intended to give you all the information needed to install and operate the Broadcast Tools® PSC II, Program Schedule Controller II.

 **NOTE:** *This manual should be read thoroughly before installation and operation.*

Broadcast Tools, Inc., is unable to support NON-Broadcast Tools hardware/software or NON-Broadcast Tools computer hardware/software problems. If you experience these problems, please research your hardware/software instruction manuals or contact the manufacturers technical support department.

SAFETY INFORMATION

Only qualified personnel should install Broadcast Tools® products. Incorrect or inappropriate use and/or installation could result in a hazardous condition.

 **CAUTION!** *Broadcast Tools® Products, as with any electronic device, can fail without warning. Do not use this product in applications where a life threatening condition could result due to failure.*

WHO TO CONTACT FOR HELP

If you have any questions regarding your product or you need assistance, please contact your distributor from whom you purchased this equipment.

If you would like more information about Broadcast Tools® products, you may reach us at:

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PRODUCT DESCRIPTION

PSC-II Overview:

The PSC-II is the Programmable Schedule Controller II. It obtains precision date/time information from a GPS and allows the user to schedule data string and relay closures at pre-determined times. A six-digit LED display shows the current time in 12 or 24-hour format. Two data port outputs can be set for RS-232 or RS-422. There are 16 SPDT and 2 DPDT relays. 128 control macro strings of up to 32 ASCII or 16 HEX characters each can be stored and scheduled for output from each of the two serial ports at specific times. The baud rates, parity and number of bits of the two output ports can be independently set. They can be used to change satellite receiver settings, control VTR's, or any other serial device that accepts RS-232 or RS-422.

Events are scheduled using a separate RS-232 control port and a standard terminal program such as HyperTerminal. The PSC-II supports 512 scheduled events. An event can consist of turning a relay on or off, triggering a relay momentarily for 750ms or sending a control macro out to one of the two data ports. Macros can be ASCII or any HEX value. The PSC-II has 32 inputs with 2 bank select inputs, allowing for up to 128 externally triggered events per control device. The device select control port input selects which control port (device 1 or device 2) table of control macros is selected as well as which port the control macro is sent to.

Front Panel:

The PSC-II is a 1-rack unit device (19" X 1.75" X 4.65"). The front panel supports five selection switches and 21 LED indicators.

Rear Panel:

Installation is simplified with pluggable screw terminal connectors for the relay outputs. The PSC-II may be pre-wired in minutes. All remote control input connections are via the 37-pin D-sub connector. Two 9-pin D-sub connectors are used for devices one and two for controlling VTR's, satellite receivers or any other serial device. A 9-pin D-sub connector is available for control and programming. The "AUX" 9-pin D-sub will output GPS date/time data and the 9-pin D-sub marked GPS is connected to the supplied GPS unit.

Switches:

The front panel of the PSC-II contains five push button switches. The two "Device" buttons can be used to select a pre-programmed macro identified by its number and have it sent out to the RS-232 or RS-422 data ports manually using the "Execute" button. The "Event" button displays the last event that was sent out by the scheduler. The "Clock" button returns the display to the time read-out. The buttons can also be used to adjust the display brightness and to select 12-hour or 24-hour display mode.

PRODUCT DESCRIPTION

LED Indicators:

The PSC-II's front panel LED indicators provide operational display of the following information: 16 LED's show the on/off status of the 16 control relays. Device 1 and 2 LED's will blink when data is being transmitted. The "Time" LED is on when the time sync relay is turned on. The "Sig" LED turns on when there is not a valid GPS signal present and the "PWR" LED will be on when the power supply is connected. The "PWR" LED flashes when control port characters are being received AND the unit number being addressed matches the PSC-II's dipswitch selected unit number. This LED flashing indicates communication activity between the host computer and the PSC-II.

Serial Communications:

The PSC-II serial communication may be configured for multi-drop RS-232 allowing up to seven PSC-II's on the same computer's serial port. Commands may be entered either via a menu (menu mode) or a short form code (burst mode). All commands and responses, except the data download command, use only normal ASCII characters, facilitating scripting.

User Programming:

The PSC-II parameters and schedule programming are stored in non-volatile memory. Configurations are set with computer commands and an eight position DIPswitch located inside the box.


INSTALLATION GUIDELINES

Inspection:

Please examine your PSC-II carefully for any damage that may have been sustained during shipping. If any is noted, please notify the shipper immediately. Retain the packaging for inspection by the shipper. The package contains the PSC-II, "wall wart" 12 vac, 1 amp power transformer, installation manual, Garmin GPS antenna/receiver and one 37-pin D-sub connector with shell.

Setting Operation "DIP" Switches:

The PSC-II is equipped with an eight-position function DIPswitch. The DIPswitch specifies board address, control port baud rate, certain aspects of macro generation and relay control and the ability to lock out events for equipment maintenance.

 **NOTE:** *NO look-ups occur unless both Bank Selects are high or floating (not connected).*

Bank Selects and Device Selects are located on the DC-37 connector. Device Select is pin 3; BS0 is pin 24 and BS1 is pin 35.

BROADCAST TOOLS[™] PSC - II
PROGRAMMABLE SCHEDULE CONTROLLER II

INSTALLATION GUIDELINES

Dip Switches:

The DIP switch is numbered left to right 1-8.

Board Address:

Unit	SW1	SW2	SW3
0	Off	off	Off
1	On	off	Off
2	Off	on	Off
3	On	on	Off
4	Off	off	On
5	On	off	On
6	Off	on	On
7	On	on	On

Control Port Baud Rate:

Baud	SW4	SW5
2400	On	off
4800	On	on
9600	Off	off
19,200	Off	on

Control Input 1-16 Look-Up Enables:

SW6	SW7	Device Select	Input 1-16 Action
off	off	high	Device 1 Macro 1-16
		low	Device 2 Macro 1-16
on	off	high	Look-Up Table 1-16
		low	Device 2 Macro 1-16
off	on	high	Device 1 Macro 1-16
		low	Look-Up Table 1-16
on	on	high	Look-Up Table 1-16
		low	Look-Up Table 1-16



NOTE: *This manual should be read thoroughly before installation and operation.*

INSTALLATION GUIDELINES

Look to see if an action specifier has been stored in that entry of the Look-Up Table. If it has, then that action is invoked (send control macro to device or control a relay). If not, then no action takes place (such as invoking a control macro). The Look-Up Table entries are set up by selecting Enable in the Event Records “TYPE” field.

SW8 Event Search Lock Out Enable:

SW8 = Off: Search Enable parameter is automatically activated upon reset, menu mode timeout, or normal menu command exit.

SW8 = On: Search Enable parameter value is retained when board is reset, when menu command times out, and when normal menu mode exit occurs.

Setting Search Enable parameter = FALSE blocks searching for and executing any scheduled events.

Mounting:

The PSC-II is designed to be rack mounted in a standard 19” rack. It should be mounted in an area that is accessible from the rear and preferably away from sources of heat. We recommend before permanently installing the PSC-II, you bench test and become familiar with the operation of the unit

Power Supply Connection:

Install the 5.5 x 2.1mm power plug into the receptacle on the PSC-II. Mount the 12vac 1 amp “wall wart” in a convenient location. When ready, plug the “wall wart” into the appropriate AC receptacle.

GPS:

The supplied Garmin GPS unit consists of a GPS embedded antenna/receiver in a small enclosure. Mount the GPS preferably outside with a clear view to the sky. If this is not possible, you may be able to mount it in a window if it has good visibility to the sky. Connect the cable to the GPS input on the PSC-II. If need be you can extend the cable with a standard 9-pin D-sub computer extension cable available at your local computer store. When power is first applied to the PSC-II it will display “no GPS” until valid data is received. Depending on how clear the view is to the sky for your GPS antenna, it may take anywhere from 30 seconds to ten minutes for it to acquire enough signal data to give a valid output. Once valid data is received from the GPS the time will appear on the front panel LED display.

INSTALLATION GUIDELINES

The colon between the minutes and seconds digits will remain solid as long as valid data is being received. If you should lose the GPS signal, or the cable is removed, the time will continue to display using the PSC-II's internal clock, but the colon will begin to blink. The red "SIG" LED and signal loss relay will also turn on. To assure continued precision time be sure to maintain your GPS connection. If you are using the RS-422 converter that supplies RS-422 data, move the shorting block (located behind the GPS connector) from RS-232 to RS-422.

GPS Port Pin-Out Is As Follows:

- Pin 2 - RS-232 data from GPS Receiver/Antenna to PSC-II
- Pin 4 - +5 Vdc, regulated to power GPS-18
- Pin 5 - Ground
- Pin 7 - RS-422 B
- Pin 8 - RS-422 A
- Pin 9 - Unregulated +12 Vdc to power GPS Receiver/Antenna

Device One and Two:

Device one and two data ports can be connected to any piece of equipment with an RS-232 or RS-422 control port input. A configuration header is located behind each port connector to allow setting for RS-232 or RS-422. It is factory set for RS-232. To change to RS-422 move the jumpers over as marked on the board. There are two LED's on the front panel associated with device one and two. They will blink when data is being transmitted out the device port.

Control Port:

Refer to the DIPswitch settings to adjust the control port baud rate. It is factory set to 9600, 8N1. Connect a standard 9-pin serial cable to your computer. Any terminal program can be used. A terminal program called "HyperTerminal" comes with Windows and can be used to control and program the PSC-II. Any other terminal program such as ProComm, Tera-Term, Telix, etc. can also be used. NOTE: Your terminal program MUST be setup for local character echo. Some terminal emulations interfere with the Escape character used for exiting to the next higher level in the Menu Command program. The alternative "X" command also e(X) it's to the next higher level. We have found the "TTY" emulation option is best for talking to the PSC-II. Other emulation options will work but you may experience problems with the destructive backspace when editing macros or missing characters when using the escape key.

OPERATION GUIDELINES

Using the Menu:

To enter the programming menus, connect to a computer with the terminal program set to 9600, 8N1. The control port baud rate can be changed with the DIP switch. Refer to the “Setting operation ‘DIP’ switches” section above. Enter * followed by the unit number and an “M” (lower case command letters are also accepted). From the factory the PSC-II is set to a unit ID of 0. Enter *0M <cr>. If no selections are made, the menu will time out after two minutes and *0M <cr> must be entered again to access the menu. The menu will display as follows: >*0M

```
Broadcast Tools, Inc
Programmable Schedule Controller II
```

MAIN MENU:

<ESC> to e(X)it	(P)arameters
(V)ersion	(R)elays & Labels
(L)ast Event	(1)st Device Macros
(T)ime & Date	(2)nd Device Macros
(M)enu	(E)vent Records
PSC_II>	

The Escape key is used to exit the main menu and to go from a sub-menu to the previous (higher level) menu selection.

“V” will display the current version running in the PSC-II
PSC-II Version 1.04 or greater

“L” will display information about the last event that has been performed by the scheduler (note: if the PSC-II is reset or the power is lost the last event information will also be lost. “No event” will be displayed after reset if no scheduled event has been sent since power was applied).

LAST EVENT RECORD:

```
### mm/dd/yy hh:mm:ss *-----Action-----* *Type*
[column formatting]
003 12/09/01 21:19:20 MOMEN R01:      NORMAL
```

This shows that the last event output by the scheduler was event 003 sent at 21:19:20 on 12/09/01. It was a momentary closure of relay 1. It was a “Normal” type event (see “Event Records” for a discussion of event types). 24-hour time will always be used regardless of the front panel display setting. The PSC-II uses the American standard of Month/Day/Year.

OPERATION GUIDELINES

Using the Menu: *Continued*

“T” will cause the date and time to be output to your control computer. It will be updated every second.

12/08/01 19:39:50

Parameter Sub-Menu:

Enter a “P” to select the Parameters sub-menu.

```
PSC_II> P
PARAMETERS:  (R) reset Values      Device1      Device2
(H) 12 Hour Mode (D) DST No          9600N81     19.2N81
(P) UTC Negative (U) UTC -08        (I) Baud     (L) Baud
(B) Brightness 06 (S) Sync 00        (J) Parity   (M) Parity
(E) Events Enabled (K) Bits           (N) Bits
<ESC> to e(X)it
```

“H” toggles between 12 hour and 24-hour front panel display. If the display is in 12-hour mode the decimal point on the far right is used as a PM indicator.

“D” is used to turn Day Light Savings time on and off. “DST No” indicates that standard time is being displayed. Entering another “D” will cause the time to advance by one hour and “DST Yes” to be displayed.

“P” adjusts your local time read out to be negative or positive in relation to UTC (GMT).

“U” causes the UTC offset to advance by one hour for each time the “U” is entered. If, for example, you’re local time zone is Eastern Standard Time, enter the “U” until UTC -05 is displayed. If you are in the Pacific Standard Time zone enter the “U” until UTC-08 is displayed.

“B” changes the brightness on the front panel display. The display is adjusted between 1 and 16 with 16 being the brightest setting. The brightness can also be adjusted from the front panel by holding down the clock button and then pressing the event button. “brl =” (Brightness Level) will be displayed along with a value. Use the “device 1” and “device 2” buttons to change the brightness.

“S” adjusts the time sync minute. Default is 00, which means that a 750ms pulse will be output on the time sync relay at the top of each hour. The front panel “time” LED will also be activated. Each time you enter the “S” the minute will advance by one.

OPERATION GUIDELINES

Using the Menu: *Continued*

“E” (Scheduled Events) can disable events by using this selection. This allows the user to keep events from being output during your programming session. If DIP switch 8 is turned on the events will continue to be disabled when you exit the programming menu to allow for equipment maintenance, etc. If DIPswitch 8 is off then the events will be re-enabled once the “Menu” has been exited.

“I” adjusts the baud rate for the device 1-output port. It can be set from 1200 – 38.4K baud.

“L” adjusts the baud rate for the device 2-output port. It can be set from 1200 – 38.5K baud.

“J” adjusts the parity for device 1. It can be set to “None”, “Even” or “Odd”. The state of the parity will be displayed along with the baud rated, bits and stop bit readout below “Device 1”.

“M” adjusts the parity for device 2. It can be set to “None”, “Even” or “Odd”. The state of the parity will be displayed along with the baud rated, bits and stop bit readout below “Device 2”.

“K” toggles the number of bits for device 1 between 7 and 8.

“N” toggles the number of bits for device 2 between 7 and 8.

“R” will reset all parameters to the default values.

Relays & Labels Sub Menu:

“R” from the main menu selects “Relays & Labels”. It will display:

```
RELAY NAMES:  
01:      02:      03:      04:  
05:      06:      07:      08:  
09:      10:      11:      12:  
13:      14:      15:      16:  
(C)lear page; (S)elect Relay; e(X)it:  
PSC_II>
```

This allows you to enter an 8-digit label to be associated with a relay and makes it possible to directly control a relay from your keyboard.

“C” will clear or erase the labels.

“S” will allow you to select a relay number to edit.

OPERATION GUIDELINES

Relays & Labels Sub Menu: *Continued*

SELECT RELAY:
Number> 1

RELAY 01: RELAY 1
(P)rev; (C)lear; (N)ext; (L)atch; (U)n latch; (M)omentary; (E)dit; e(X)it; PSC_II>

“P” takes you to the previous relay; in this case it would be 16.

“C” clears the relay label.

“L” will latch or turn on the selected relay.

“N” takes you to the next relay, in this example it would be 2.

“U” will unlatch or turn off the selected relay.

“M” will turn on the selected relay for 750ms.

“E” will allow you to edit the label for the selected.

EDIT RELAY NAME

Type new value, then <ENTER>
01: RELAY 1
New>

Enter the new relay label followed by an <Enter>. You are limited to eight characters.

From the Main Menu “1” will list Device 1 Macros.

DEVICE 1 MACROS:
MACRO
001 009
002 010
003 011
004 012
005 013
006 014
007 015
008 016
(P)rev; (C)lear; (N)ext; (S)elect Macro; Device(2); e(X)it: PSC_II>

OPERATION GUIDELINES

You can have up to 128 macros for each of the two device outputs. Each macro can have up to 32 ASCII characters or 16 HEX characters. A page of 16 macros will be displayed at a time.

“P” will display and allow clearing the previous page of 16 macros.

“C” will clear the present page of 16 macros.

“N” will display and allow clearing the next page of 16 macros.

“S” will bring up the following prompt:

```
SELECT MACRO:  
Number>
```

Enter a macro number. There is no need to enter leading zeros. For example, to select macro 001 enter a “1”. Note: Any macro number from 1 through 128 may be entered regardless of which page of 16 macros have been previously displayed.

```
DEVICE 1 MACRO:  
### MACRO  
001  
(P)rev; (C)lear; (N)ext; (S)end; (E)dit; e(X)it:  
PSC_II>
```

You can now edit the macro and cause it to be sent out the device port to test it.

“P” goes to the previous macro. In this example it would be number 128.

“C” clears the content of the selected macro.

“N” goes to the next macro. In this example it would take you to macro 002.

“S” will cause the macro to be sent out the device port.

“X” will exit to the previous menu level.

“E” will allow you to edit the selected macro. It will display:

```
EDIT MACRO: Type new value, then <ENTER>  
To embed chars: \\ \bs \esc \cr \lf \<hex> \ctl<A-z>  
001:  
New>
```

OPERATION GUIDELINES

A macro can be up to 32 ASCII characters or 16 HEX characters long. Hex characters can be entered with a “\” followed by two hex characters. The following format characters can be directly entered:\

\bs = Back Space (08h), \esc = Escape (1Bh), \cr = Carriage Return (0Dh), \lf = Line Feed (0Ah).

Any control character can also be embedded into the data string by entering \ctl followed by a letter A through Z, either upper or lower case. Do not place any spaces between hex or control entries. From the Main Menu “2” selects the device 2 macros and follows the exact same format as outlined above for device 1 macros.



Application Example for Sony VTR's

For an example to control a Sony VTR, reset the jumpers on the PSC II (behind the 9-pin D-sub) for RS-422 and set the baud rate for 38.4K, Odd parity, 8 data bits from the Parameter sub-menu. Create macros with the following data:

Play - \20\01\21
Stop - \20\00\20
FF - \20\10\30
Rew - \20\20\40
Rec - \20\02\22

You can cause the macro to be sent from the Macro menu for testing or press the “device 1” or “device 2” buttons on the front panel to display the macro number then press the “execute” button.

Event Records:

Access Event Records from the Main Menu. The PSC-II supports 512 timed events. An “event” is defined as a macro string being sent out of device port 1 or 2, a relay being turned on, off, or momentarily for 750ms or, at a specific time, enabling or disabling an input to perform an event's action, such as sending a macro or controlling a relay. Events can be programmed to occur at specific times, at periodic times such as every day at 8:00 AM, Monday through Friday at noon, etc. Wild cards can be used to select any month, day, year, hour, minute or second. For example, relay 1 could be programmed to pulse at the top of every hour.

Events do not need to be in chronological order. They are divided into pages of 16 to allow grouping according to type, function, or any other logical order the user may choose.

OPERATION GUIDELINES

“E” will display the following:

```
EVENT RECORDS:
SMTWTFS
### mm/dd/yy hh:mm:ss *-----Action-----* *Type*
001 01/01/00 00:00:00 NONE
002 01/01/00 00:00:00 NONE
003 01/01/00 00:00:00 NONE
004 01/01/00 00:00:00 NONE
005 01/01/00 00:00:00 NONE
006 01/01/00 00:00:00 NONE
007 01/01/00 00:00:00 NONE
008 01/01/00 00:00:00 NONE
009 01/01/00 00:00:00 NONE
010 01/01/00 00:00:00 NONE
011 01/01/00 00:00:00 NONE
012 01/01/00 00:00:00 NONE
013 01/01/00 00:00:00 NONE
014 01/01/00 00:00:00 NONE
015 01/01/00 00:00:00 NONE
016 01/01/00 00:00:00 NONE
(P)rev; (C)lear; (N)ext; (S)elect; e(X)it:
PSC_II>
```

“P” selects the previous page of 16 events. In this example it would display events 497 – 512.

“C” clears or erases the events on the selected page.

“N” selects the next page, in this example it would display 17 – 32.

“S” will display:

```
SELECT EVENT:
Number>
```

OPERATION GUIDELINES

Enter an event number. It does not have to be from the current page. It can be any event from 1 to 512. For example, select event 256:

```
SELECT EVENT:
Number> 256
EVENT RECORD:
  SMTWTFS
### mm/dd/yy hh:mm:ss *-----Action-----* *Type*
256 01/01/00 00:00:00  NONE
(P)rev; (C)lear; (N)ext; (E)dit; e(X)it: PSC_II>
```

To edit this event select “E”:

```
EDIT EVENT FIELDS:
(P)rev; (C)urrent; (N)ext; <number>; (A)ll; e(X)it; <ENTER> = accept
DAY/DATE = DATE >
```

Pressing the space bar will toggle between DAY and DATE. Selecting DAY gives you the ability to have an event occur on specific days of the week, repeat daily, etc. For example, if you want to send macro 001 to a satellite receiver through device port 1 Monday through Friday at 08: 59:00 make the following selections:

```
EDIT EVENT FIELDS:
(P)rev; (C)urrent; (N)ext; <number>; (A)ll; e(X)it; <ENTER> = accept
DAY/DATE = DAY >
WEEKDAY = -MTWTF- > (Enter 2,3,4,5 & 6)
HOUR = 08 > 08
MINUTE = 59 > 59
SECOND = 00 > 00
ACTION = DEVICE 1 > (Space bar cycles through the selections.)
MACRO = 001 >
TYPE = NORMAL > (Space bar cycles through the selections.)
```

Note: The “WEEKDAY” selection is made numerically with 1 being Sunday, 2 Monday, etc. Entering a number 1-7 will toggle that day on and off.

“All” – Entering an “A” in any time or date field will load it with the “*” wild card and will cause the setting to accept any hour, day, minute, etc. For example, if you want a relay to pulse at the beginning of each minute, set “Weekday” for all, “Hour” for all, “Minute” for all, “Second” for 00, select a “Momentary R” for your action with an event type of “Normal”. The selected relay will now pulse for 750ms every minute.

OPERATION GUIDELINES

Action Types:

Action types consist of the following:

- Device 1 -
The device 1 macro following device-1 will be sent out port 1
- Device 2 -
The device 2 macro following device-2 will be sent out port 2
Latch R, Unlatch R, Momentary R –

Relay events will bring up the following screen:

RELAY NAMES:

01: Relay 1	02: Relay 2	03:	04:
05:	06:	07:	08:
09:	10:	11:	12:
13:	14:	15:	16:

RELAY = 01 > (Select a Relay number)

- *Fallbk* – Use this option to program the PSC-II to automatically transition from daylight savings to standard time at the specified date and time.
- *Spring* – Use this option to program the PSC-II to automatically transition from standard time to daylight savings time at the specified date and time.
- *None* – No event will occur. This can be used to turn off an event but keep the other data already programmed such as date, time, macro number, etc.

Event Types:

There are three Event Types to choose from after selecting an action. They are “Normal”, “Enable” and “Disable”.

- *Normal* – Will fire off the selected event at the time specified, immediately from the program menu by selecting the “send” option or from the front panel buttons.
- *Enable* – At the specified time the selected event will enable the selected input (1-16 only) to generate it. For example, if you program relay 2 to turn on momentarily after enabling input 5 at noon, closing input 5 will have no effect on relay 2 until noon. After noon passes any time you close input 5 it will cause relay 2 to turn on momentarily.

OPERATION GUIDELINES

- *Disable* – At the specified time the selected event will be disabled. Following the above example, if you specified 1PM as the time to disable input 5 from controlling relay 2 then what you have done is created a window of opportunity for input 5. Between noon and 1pm, if input 5 closes, it will trigger relay 2. It will have no effect any other time of day.

Alternative approach to Event Types:

- *Normal* – Normal events have their event's action taken immediately whenever there is a match between the date and time and the event's specified date and time.
- *Enable* – At the date and time specified by the event, the event action is placed in a look-up table according to the Input Number (1-16). Subsequently, the control input (1-16) will cause the event's action to occur (sending a macro, or controlling a relay).
- *Disable* – When the event occurs, the look-up table entry is cleared. Subsequent Control Input (1-16) signals will no longer cause the event's action to occur.

Using the Front Panel Button:

There are five buttons on the front panel: “device 1”, “device 2”, “event”, “clock” and “execute”.

- *Device 1 & 2* – Are used to manually select one of the 128 macros associated with each device port. Pressing the “execute” button will cause the displayed macro to be transmitted out its port. Each press of the Device button will cause it to increment one step. Holding it down will cause it to advance ten at a time after it reaches an even decade.
- *Event* – is used to display the last scheduled event. When the PSC-II is reset it will display “No event” until a new scheduled event has been performed. The display will show the event number followed by d0, 1 or 2. “d0” means that the last event's action was to control a relay, d1 and d2 means there was a macro sent out of the device 1 or 2 ports.
- *Clock* – will cause the display to show the current time.
- *Execute* – is used to trigger device 1 and 2 macros manually.
 - LED Display brightness: Hold down the “clock” button while pressing the “event” switch causes the text “brl=06” (or the current value) to be displayed. This is the brightness level. You can now use the device 1 & 2 buttons to increase or decrease the brightness of the LED display.
 - 12/24 hour display change: Hold down the “clock” button while pressing the “D1” switch changes the time display to 12 hour mode. Pressing “D2” changes the time display to 24 hour.


OPERATION GUIDELINES

Using the Control Inputs:

All of the inputs are located on the DC-37P connector on the rear panel. These inputs can be used to generate macros or be combined with scheduled events using the enable/disable functions. DIPswitch settings 6 and 7 also affect how the inputs are defined. With DIP switch 6 & 7 off:

When “device select” pin 33 is not connected or a TTL “high” Pins 1-32 correspond to banks of device 1 macros. When Pin 33 Device Select is active low or grounded the Device 2 macros are selected.

Macro Numbers		Bank Select 1 (pin 35)	Bank Select 0 (pin 34)
001 - 032	High	High	
033 - 064	High	Low	
065 - 096	Low	High	
097 - 128	Low	Low	

 **NOTE:** “High” is defined as open (it is internally pulled up to +5) or TTL +5VDC.

Low is ground or active TTL low.

Refer to the DIPswitch table shown earlier. There are combinations of DIPswitch 6 & 7 that will allow you to either output device macros or use inputs 1-16 to be enabled by the scheduler during specific time windows so that when they are brought low they will generate “look-up table” events. For example, if DIP positions 6 & 7 are on and you set up an event to enable input 1 to generate a macro out of device port 1, it will enable input 1 to send the macro after that event’s specified time, if the event type is “enable”.

Pin 36 is an open collector output with one pulse per second.

Pin 37 is ground.

CONTROL PORT COMMANDS

In addition to the menu, there are various direct control commands available on the serial control port. The PSC-II supports five control port commands: *uU, *uD, *uK, *uC, and *uM where *u refers to the ASCII ‘*’ lead-in character followed by the ASCII Unit ID digit ‘0’ through ‘7’. The commands are: U = unit ID, D = data upload or download, K = relay command, C = command macro, and M = menu.

Unit ID Command

Sent: *uU<cr>

Returns: PSC-II Version 1.05<cr><lf>

OPERATION GUIDELINES

Data Upload/Download Command:

Sent: *uDUn<cr> (Upload data: from PSC-II to serial device)

Returns: Fixed length data block for selected data followed by <cr><lf>

Sent: *uDDn<cr> Fixed length data block for selected data followed by <cr><lf>
(Download data: from serial device to PSC-II)

Returns: ACK (06h) after data is written to EEPROM. The controlling software must wait for this ACK (or, alternatively, wait for 5 milliseconds or longer) before continuing with further data download commands.

N = 0 data is block of miscellaneous parameters including: UCT, DST, configuration options,

last 10 events, etc.

N = 1 data is Device 1 Control Macros.

N = 2 data is Device 2 Control Macros.

N = 3 data is Event Table.

N = 4 data is Relay Names Table.

Relay Command:

Sent: *uK##A<cr>

Returns: nothing.

= decimal ASCII relay number 01 through 16

A = ASCII action code: L or l = Latch the relay, U or u = Unlatch the relay, M or m = momentarily pulse the relay (~750ms).

Command Macro Command:

Sent: *uCdmmm<cr>

Return: nothing.

d=device: '1' = Device 1, '2' = Device 2.

mmm= ASCII command macro number for selected Device 001 – 128 Leading zeros are permitted, but not required.

BROADCAST TOOLS[™] PSC - II
PROGRAMMABLE SCHEDULE CONTROLLER II

BROADCAST TOOLS[®] PSC-II SPECIFICATIONS

Digital Inputs:	<i>32 control inputs (pulled high) plus Device Select and two Bank Select inputs.</i>
Relay Outputs:	<i>14 - SPDT relays, two -DPDT 1-amp relays. One - SPDT GPS signal loss relay, one - SPDT time sync relay.</i>
Data Outputs:	<i>Two device ports independently configurable RS-232/RS-422 Multi-drop 1200 – 38.4 K baud, 7 or 8 data bits, even, odd or no parity. One auxiliary data output port with GPS date and time data at 4800, 8,N,1.</i>
GPS Port:	<i>RS-232 or RS-422, 4800 baud 8N1</i>
Operation Control:	<i>Front Panel – Momentary switches Remote – Momentary closure to ground > 100ms RS-232 2400 – 19,200 baud, 8N1</i>
Interfacing:	<i>TTL Control Inputs - DC-37P connector Relays - Removable Screw Type connectors (Euro) RS-232/RS-422 Device Control Ports – DE-9P RS-232 Control Port – DE9S RS-232 Auxiliary Port – DE9S RS-232 / RS-422 GPS Port – DE9P</i>
Logic:	<i>Flash microprocessor / Non-volatile memory</i>
Power:	<i>12 Vac @ 1 Amp / 120 Vac 50-60 Hz, “Wall Wart” Supplied. (CE 240 Vac 50-60 Hz optional)</i>
Mechanical:	<i>19” X 1.75” X 4.65”</i>
Weight:	<i>3 pounds</i>

BROADCAST TOOLS[™] PSC - II
PROGRAMMABLE SCHEDULE CONTROLLER II

**BROADCAST TOOLS, INC.
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