

# Ad Art VS Sports Controller



## Tennis Scoreboard Software Manual Version 1.0

(10/20/2012)

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# 1. Introduction

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## **1.1 What is Ad Art VS Sports Controller?**

The “VS” in Ad Art's VS Sports Controller is an acronym that stands for “Video Scoreboard”. Ad Art VS Sports Controller is control software developed to generate and output sports scoring and game tracking information to electronic sign hardware. This manual focuses specifically on *Tennis* scoreboards. With Ad Art VS Sports Controller, a scoreboard operator can easily track and enter real time team, player, and scoring data during a live event. It enables an operator to manage up to eight individual tennis court scoreboards at a time. Game information from these individual court scoreboards are also combined and displayed on a separate Main Scoreboard. Control of these scoreboards is provided by a combination of computers and/or laptops and several wireless hand-held remote controllers.

Ad Art VS Sports Controller software runs on standard computers. Ad Art VS Sports Controller has been fully tested running on the Windows XP, and Windows 7 operating systems. Although officially unsupported, it should also work with other operating systems such as Windows 2000, Vista, and Macintosh/Linux under the WINE emulator.

## **1.2 Purpose of This Manual**

This manual provides a general description and operating instructions. The intent of this manual is to provide general user interaction and setup instructions. It is assumed that personnel using and setting up the Ad Art VS Sports Controller software have a working knowledge of computer hardware and software as well as basic networking skills.

Although not required, some manual editing of ASCII text and INI files can be done to configure the software. These files contain configuration information that adheres to a sensitive structure. It is therefore recommended that only users who already have some experience editing these types of files manipulate them.

This manual follows a consistent format in describing each of the main software windows that comprise Ad Art VS Sports Controller. First, a general description is provided, explaining the purpose and function of the window. Then, an item-by-item explanation of the user interface is provided, detailing the use of components in the graphical user interface. Our intent is to make it easy for a user to gain access to relevant information quickly, without scanning through the whole manual to find it.

## **1.3 Conventions Used In This Manual**

### **Typographic Conventions**

The following conventions will be used throughout this manual.

#### Directory Structure:

All of the software will be installed in a single subdirectory on the drive you specified during the installation process. The default root directory is C:\AdArtVS. Therefore, subdirectories referred to in this documentation are located in this main directory. The software does not use the Windows registry, so no entries will be added. The installer will add a new font to your windows system, which will NOT be removed if the program is un-installed. The font will be located in the \WINDOWS\FONTS folder.

#### Typefaces:

**ALL CAPS** Computer keys, mouse buttons, directories, (e.g., ENTER, C:\FOLDER\FILES, CTRL+P, etc.).

**Bold Names** Names of interface menus, fields, buttons, etc. are set in bold type.

#### Keystroke Combinations

**KEY1 + KEY2** Simultaneous keystrokes. Hold the first key and press the second key.

#### Mouse Operations

**LMB** Left mouse button

**RMB** Right mouse button

*Selecting* Single-clicking an element with the LMB so that it becomes active or selected.

*Deselecting* Single-clicking an element with the LMB so that it becomes inactive or unselected.

*Activating* Selecting an option by clicking on its radio button.

*Deactivating* Unselecting an option by clicking on its radio button.

*Clicking* Placing your mouse pointer over something and then pressing a mouse button. This nearly always means the LMB.

*Right clicking* Clicking an element with your RMB.

*Double clicking* Rapidly clicking an element twice.

*Dragging* Selecting an element with your mouse pointer and continuing to hold the mouse button down as you move your mouse. This nearly always means with the LMB.

#### Note, Hint, and Warning Symbols



The warning symbol will highlight a discussion that warns the user about something. You should pay special attention to text marked with this symbol.



The note symbol will highlight a discussion that is particularly noteworthy.



The hint symbol will highlight tips and suggestions that are usually of a time saving nature.

## **Working With The Interface**

In no time, you'll find yourself mastering the intuitive graphical user interface. Most user interface functions are listed on the interface panels in plain text. Listed below are a few other conventions involved with the graphical user interface:

<i>Button</i>	A button refers to an area on the screen that you click on with your mouse to cause some function to occur. Generally, only a single click is required. There are also special types of buttons, like toggle, pop-up menu, etc. Some buttons become highlighted, indicating a chosen or active status.
<i>Dialog Box</i>	Dialog boxes appear on the screen for operations like file loading and saving. This term also refers to smaller windows that appear requesting the user to input data into various fields.
<i>Hints</i>	Hints are small text boxes that appear when the mouse cursor or pointer hovers over a button. The hint text will further identify the button or its function, thus helping you navigate the user interface more efficiently.
<i>Information Display</i>	Information Displays are text displays found throughout the different panels. These displays cannot be changed directly and simply provide information and feedback.
<i>Input Field</i>	Input fields (edit boxes) are areas on the screen where you can enter data.
<i>Pop-up Menu</i>	Pop-up menus (sometimes called a "context" menu) offer a convenient way to select program commands or options. To use, right click on an area in the program. The menu will pop up and as you move your pointer over the menu, each item will become highlighted. When the desired selection is highlighted, click the LMB. If you decide not to select an item, simply move the pointer off the menu and click the LMB in an unrelated area of the screen.
<i>Radio Button</i>	A radio button is a small button that becomes highlighted with a dot when clicked. This indicates the adjacent feature is active. These buttons usually operate in together in groups of two or more.
<i>Check Box</i>	A check box is a small box that can be checked or unchecked when clicked. This indicates the adjacent feature is active.
<i>Scroll bar</i>	A scroll bar allows you to navigate a window's contents by dragging the slider's button along the bar. Alternatively, you can click to the right, left, top or bottom of the button or use the arrow buttons at either end to incrementally change the position of the button. The effect is a scrolling of the content of a window within the defined space of that window.

## 2. System Overview

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### 2.1 The Ad Art VS Sports Controller System - How Does It Work?

How does one get scoring and other game information from the comfort of a control room out to scoreboards in several spectator areas during a live event? Ad Art VS Sports Controller is a software solution that works in harmony with Ad Art provided electronic displays. It is the link between the operator and several scoreboards - up to eight individual tennis court scoreboards and one main scoreboard. The purpose of Ad Art VS Sports Controller is to generate and format game related data in the comfort of the control room and/or other appropriate locations, and then to send it out to all related scoreboards' electronic displays, in real time.

The Tennis implementation of Ad Art VS Sports Controller consists of three separate software components: a client-side Master Control application, a client-side Tennis Controller application, and a server-side application. The Master Control application is called **Ad Art Tennis Master Control** and its primary function is to provide master control of all eight tennis court scoreboards as well as the Main Scoreboard. The Tennis Controller application is called **Ad Art Tennis Controller** and its primary function is to provide control of scoring and other game related functions for each individual tennis court scoreboard, one at a time. The server-side application is called **AATennisServer** and its primary function is to capture, coordinate, and route game data to all scoreboard electronics.

AATennisServer runs on a dedicated host computer connected to the actual scoreboard(s). The server software formats and displays the game state in an Output Display window which is positioned in an LED scoreboard screen capture area on the host's monitor. Users of the Ad Art Tennis Controller and Ad Art Tennis Master Controller client applications will not be able to see this Output Display window on their computer screen during normal operation. AATennisServer also takes care of saving the game state, logging system events and errors, and managing wireless remote controller commands. The server communicates with its clients over a TCP/IP network connection, either over a LAN or the Internet. Multiple software clients (controllers) can connect to the scoreboard server simultaneously.

Ad Art Tennis Master Control software and Ad Art Tennis Controller, both client applications, communicate with the server over TCP/IP - passing data to the server or sending commands for it to execute. Therefore, the computer running these clients must have an Internet or LAN connection. One or more instances of Ad Art Tennis Master Control and/or Ad Art Tennis Controller software can be run from multiple client computers simultaneously. Each client's state and data will be synchronized automatically by the server when data is entered or changed by any single client. This makes it possible for multiple users to control all or part of various scoreboards from multiple locations.

See “**Appendix A**” for a graphical representation of all eight court scoreboards, the main scoreboard, control components, data connectivity, and their respective relationships.

In addition to client-side software, AATennisServer can be remote controlled by up to eight wireless **Hand-held Remote Controllers**. During a typical match, operators in the field will use remote controllers in conjunction with an operator in the control room to manage scoreboard data for all scoreboards in use. These remote controllers also act as clients, but they do not communicate over a TCP/IP connection. Rather they communicate “over the air” via four wireless gateways and one “Crestron” processor which connects to the **AATennisServer** host computer via private Ethernet cable. See “**Appendix B**” for more information regarding remote controllers.

**NOTE:** The Tennis implementation of Ad Art VS Sports Controller uses Web technologies to implement the drawing of text, lines, and other elements visible on the scoreboard(s). This allows the same output displayed on the scoreboard(s) to be simultaneously published as web pages. The computer hosting **AATennisServer** also acts as an HTTP server that can serve out HTML documents upon request from a browser. **AATennisServer** uses HTML and CSS templates to define the graphical appearance of the court scoreboards as well as the main scoreboard. These templates can be customized by experienced HTML/CSS programmers. See “**Appendix D**” for more information.

## 2.2 Ad Art VS Sports Controller Software Overview

Ad Art VS Sports Controller is made up of three main windows. Two windows are only visible on the client software, Ad Art Tennis Master Control and Ad Art Tennis Controller. The other window is only visible on the server software, AATennisServer. These windows are described below:

- **Ad Art Tennis Master Control Window (Figure 2.1):** The scoreboard operator will use this window during a game to input and update team, player, and scoring related information as each tennis game progresses. It also acts as a preview screen, in that data visible on the form window is updated in real time and stays in sync with data displayed on the scoreboard. A “Scoreboard Selector” widget on the left of the screen allows the operator to select a scoreboard to work with. The “Main Scoreboard” menu item shows a real-time view of the output of the Main Scoreboard. Each of the tabs below shows individual views of each individual tennis court scoreboard. All data field edits will not be seen on any scoreboard until the **SEND CHANGES** button is manually pressed in the context of each scoreboard. Input of team names and team scores are only possible through the Tennis Master Control Window.

The screenshot shows the 'Ad Art Tennis Master Control (2012-Oct-01) v0.5.3' window. On the left is a 'Settings' sidebar with a 'Main Scoreboard' tab selected, listing courts Y, A, L, E, 1, 2, 3, and 4. The main area displays the 'Main Scoreboard' for a match between 'Home' and 'Visitors' at 03:23p. The Home team has a score of 4, and the Visitors team has a score of 4. The scoreboard is divided into four quadrants, each showing a set of scores for different players. Below the scoreboard are input fields for 'Team 1 Name' (Home) and 'Team 2 Name' (Visitors), each with a 'Score' spinner set to 4. A 'Send Changes' button is at the bottom.

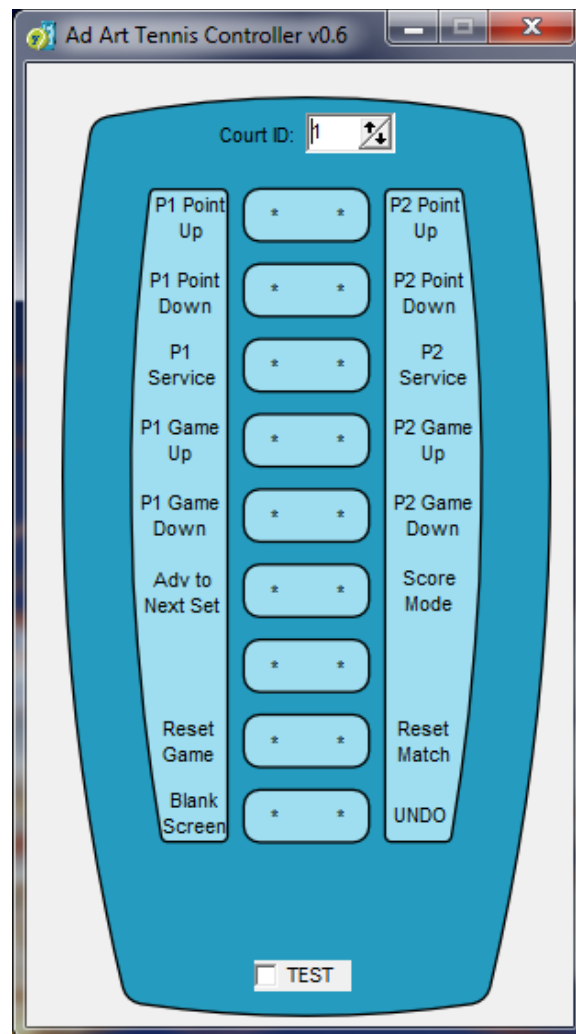
Home: 4		03:23p		Visitors: 4			
Y	JILL ANNETTE	15	2 1 0	1	JOHN	15	1
	ROSA SARAH	• 30	1 2 1		KEN	• 30	0
A	TODD WAYNE	15	1 1	2	LISA	15	2 0
	SHANE BEN	• 15	2 1		KATRINA	• 40	1 1
L	JOE TOM	• Ad	1	3	ROGER	0	2 1 1
	PETE RALPH	--	1		WILLIAM	• 30	1 2 1
E	ANITA CATHLEEN	0	2 0	4	THERESA	30	1 0
	DEBBIE DAWN	• 15	1 1		ALICE	• 0	2 1

Team 1 Name:  Score:

Team 2 Name:  Score:

Illustration 1: Ad Art Tennis Master Control Window (Figure 2.1)

- **Ad Art Tennis Controller Window (Figure 2.2):** The scoreboard operator will use this window during a game to input and update score related information for each tennis court scoreboard as each tennis game progresses. It is designed to work simultaneously with the Tennis Master Control window since there is no preview included with this window. Scoreboard operators will select the court they want to control “one at a time” by using the **COURT ID** buttons. Scoreboard data is updated *instantly* on respective scoreboards when software buttons are pressed.



**Illustration 2: Ad Art Tennis Controller Window (Figure 2.2)**



- **Output Display Window – AATennisServer (Figures 2.3 & 2.4):** This is the screen capture area used by AATennisServer that gets output directly to all scoreboards' display electronics. It acts as the drawing surface for scoreboard data. There are two halves to the window. The left half represents the output of the Main Scoreboard. The right half represents all eight individual court scoreboards merged together in a grid view.

Home: 4			03:13p		Visitors: 4		
Y	JILL ANNETTE	15	2 1 0	1	JOHN	15	1
	ROSA SARAH •	30	1 2 1		KEN •	30	0
A	TODD WAYNE	15	1 1	2	LISA	15	2 0
	SHANE BEN •	15	2 1		KATRINA •	40	1 1
L	JOE TOM •	Ad	1	3	ROGER	0	2 1 1
	PETE RALPH	--	1		WILLIAM •	30	1 2 1
E	ANITA CATHLEEN	0	2 0	4	THERESA	30	1 0
	DEBBIE DAWN •	15	1 1		ALICE •	0	2 1

Illustration 3: Left-Half Screen View of the Output Display Window (Figure 2.3)

JILL ANNETTE	15	2 1 0	JOHN	15	1
ROSA SARAH •	30	1 2 1	KEN •	30	0
TODD WAYNE	15	1 1	LISA	15	2 0
SHANE BEN •	15	2 1	KATRINA •	40	1 1
JOE TOM •	Ad	1	ROGER	0	2 1 1
PETE RALPH	--	1	WILLIAM •	30	1 2 1
ANITA CATHLEEN	0	2 0	THERESA	30	1 0
DEBBIE DAWN •	15	1 1	ALICE •	0	2 1


Illustration 4: Right-Half Screen View of the Output Display Window (Figure 2.4)

### 3. Master Tennis Control Window

#### 3.1 Master Tennis Control Window Functionality: What Does it Do?

The Master Tennis Control Window allows the user to input, delete, and change data fields that correspond with related scoreboard information. Data can be entered in various ways: typing in values, clicking up/down buttons, clicking form buttons, and using up/down keyboard keys on some numeric fields.

The window is laid out such that an operator can select views of various scoreboards from a “Scoreboard Selector” menu on the left side of the screen. The Main Scoreboard is the top menu item, and each of the eight individual tennis court scoreboards are below it. Selecting a view menu item on the left will change the form view on the right to the corresponding selected scoreboard. See figure 3.1 for a view of the **Main Scoreboard**.

 If using a “scroll wheel” mouse, rolling the center scroll wheel will scroll through the scoreboard selector screen views.



Home: 4		03:23p		Visitors: 4			
Y	JILL ANNETTE	15	2 1 0	1	JOHN	15	1
	ROSA SARAH	• 30	1 2 1		KEN	• 30	0
A	TODD WAYNE	15	1 1	2	LISA	15	2 0
	SHANE BEN	• 15	2 1		KATRINA	• 40	1 1
L	JOE TOM	• Ad	1	3	ROGER	0	2 1 1
	PETE RALPH	--	1		WILLIAM	• 30	1 2 1
E	ANITA CATHLEEN	0	2 0	4	THERESA	30	1 0
	DEBBIE DAWN	• 15	1 1		ALICE	• 0	2 1


  


Team 1 Name	Score	Team 2 Name	Score
Home	4	Visitors	4


Send Changes


Illustration 5: Main Scoreboard Screen View of Ad Art Tennis Master Control Window (Figure 3.1)

The Main Scoreboard view has a real-time preview screen at the top of the form that resembles the main scoreboard outside. It displays game and scoring information from the eight individual tennis court scoreboards in a combined view. It also displays tennis **Team Names** and **Team Scores**. This is the only place where team names and scores can be edited and entered. The Main Scoreboard also includes a “time-of-day” clock that displays the current time.


 The time display is based on the PC clock of the **AA Tennis Server** host computer. If the Tennis Master Control Window is closed on a client computer, the time clock will continue to count.


 A user can tab to each input field in sequence by using the TAB key on the keyboard.

 UP and DOWN keys on the keyboard will only adjust values of a numeric input field that currently has focus (is currently selected). UP and DOWN keys on the keyboard will only adjust values of *team scores* on the **Main Scoreboard** view.

 Double clicking into an input field will select all of the existing text in the field. It is quicker to type over “selected” text because it is automatically replaced and does not need to be manually deleted first. Single clicking will only select the field and give it focus but does not select the existing text.

Ad Art VS Sports Controller is designed to keep the state of the game current, so the The Master Tennis Control Window may be minimized during operation or even closed completely. The server will continue to accept input from all other clients and sources and display the updates on respective scoreboard(s).

 During a game, if the window is closed, current game information will NOT be lost, nor will the scoreboard go blank. Simply run the program again, and game state will be restored back into the interface.

 Real-time preview screens will automatically stay in sync with the server and scoreboards. However, form input fields in the Master Tennis Control Window may not automatically update and stay in sync. To keep the form up to date, temporarily select a different court view menu item in the selector and then select the current court view again. This action will “refresh” the form view and keep it in sync with the preview screen and scoreboards.

Each individual court view has a real-time preview screen at the top of the form that resembles an actual individual tennis court scoreboard, so it is immediately familiar. Form elements are laid out to resemble the layout of the scoreboard, so editing and updating input fields are logical and intuitive. See figure 3.2 for a view of an individual court screen view (**Court: Y**).

The screenshot shows the 'Ad Art Tennis Master Control' application window. The title bar indicates the version is v0.5.3 from 2012-Oct-01. The interface is divided into a 'Settings' sidebar on the left and a main 'Court Scoreboard' area. The sidebar lists various courts, with 'Court: Y' currently selected. The main area displays a digital scoreboard for two players: Jill Annette with a score of 15 and Rosa Sarah with a score of 30. The scoreboard also shows game counts (2-1-0 for Jill, 1-2-1 for Rosa). Below the scoreboard, there are input fields for player names, score, and games, along with a 'Swap' button and 'Serving' checkboxes. At the bottom, there are buttons for 'Reset Game', 'Reset Match', 'Blank / Unblank', 'Change Court', and an 'Adv SET' button.

**Illustration 6: Individual Court Screen View of Ad Art Tennis Master Control Window (Figure 3.2)**

When manually editing input boxes in the Master Tennis Control Window, edits will not be updated on the scoreboard until the **UPDATE SIGN** button is clicked. Individual court scoreboard scoring input fields can be reset to their default values by game and by match by pressing the **Reset Game** button or **Reset Match** button. Each court scoreboard can be “blanked” (turned completely black) and “un-blanked” independently by pressing the **Blank/Unblank** button. As each tennis set ends, the operator will typically select the **Adv SET** button to advance the players to the next set in the match. This will display the data currently displayed in the **Games** input fields on the scoreboard.

The remaining functions of the Master Tennis Control Window will be explained further in the next section.

### 3.2 Master Tennis Control Window User Interface: How Does It Work?

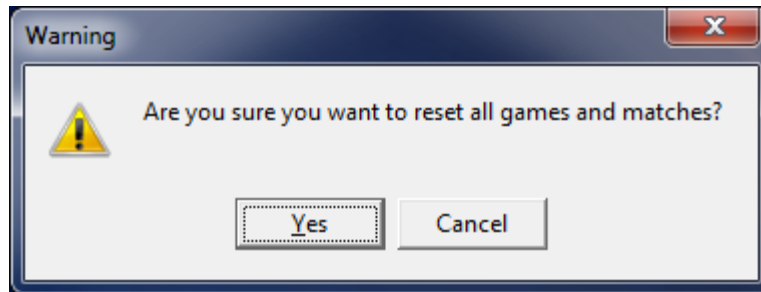
The user interface of the Master Tennis Control Window is a simple form laid out to resemble the “Main Scoreboard” and individual “Court Scoreboards” located outside the control room. It has a standard Menu area on top, and a customized form layout below. The Menu contains one top level item, “**Settings**”- see figure 3.3.



Illustration 7: Settings Menu (Figure 3.3)

Each menu item performs a specific function. Access the function by clicking the menu item. Each menu item is explained below:

1. **Blank All** – All eight individual court scoreboards and the Main Scoreboard will be rendered black.
2. **Un-Blank All** – All eight individual court scoreboards and the Main Scoreboard will be rendered with their current respective game data.
3. **Blank Main Board** – The Main Scoreboard will be rendered black.
4. **Un-Blank Main Board** – The Main Scoreboard will be rendered with current game data.
5. **Clear All Matches & Courts** – All scoring data (Not including **Team Names** and **Team Scores**) will be reset to their default values. A warning dialog box will appear to allow a user to confirm – see figure 3.4.



**Illustration 8: Clear All Matches & Courts Warning Dialog (Figure 3.4)**



Be cautious before clearing games and courts, as there is no way to undo this action.


**Main Scoreboard Screen View Input Fields:**


Home: 4				03:23p	Visitors: 4			
Y	JILL	15	2 1 0	1	JOHN	15	1	
	ANNETTE	30	1 2 1		KEN	30	0	
	ROSA							
A	TODD	15	1 1	2	LISA	15	2 0	
	WAYNE	15	2 1		KATRINA	40	1 1	
	SHANE							
L	BEN	Ad	1	3	ROGER	0	2 1 1	
	JOE							
	TOM	--	1		WILLIAM	30	1 2 1	
E	PETE			4	THERESA	30	1 0	
	RALPH	0	2 0					
	ANITA	15	1 1		ALICE	0	2 1	


**Illustration 9: Main Scoreboard View Input Fields (Figure 3.5)**


A primary function of the Tennis Master Control Window is to send data entered by the operator to the scoreboard. Typing data into any input field will require the user to press the **SEND CHANGES** button in order for the new text to be visible on the scoreboard.

**TEAM NAMES** (Input/ Edit Field – ASCII text). **MEANS OF INPUT:** The user will type in the names of the two teams playing in a tennis tournament directly into the “Team 1 Name” or “Team 2 Name” input field. The left / right layout of team names corresponds with the Main Scoreboard preview screen. After editing Team Names, select the **SEND CHANGES** button as discussed previously.


 The input fields for team names will allow as many characters as can be typed. However, approximately 9 or 10 characters will be displayed correctly on the scoreboard. Therefore, choose team names carefully.


 Use upper and lower case letters to fit more characters in the box. Abbreviations may be necessary.

 The default team name values are “Home” and “Visitor”. These names will be automatically entered into the fields when **Reset Game** is selected from the **Setup Menu**. The **Hand-Held Remote Controllers** and **Ad Art Tennis Controller** application does not have the capability to change team names or scores.

 Entering a value of -1 will blank the **Team Score** display.

**TEAM SCORES** (Input/ Edit Field – Numbers only). **MEANS OF INPUT:** The user may type numbers directly in the field, use the **UP/DOWN** buttons, or use the UP and DOWN arrow keys on the keyboard in order to adjust the score for each team. **UP/DOWN** buttons and keys increase or decrease the score one point at a time. Scores can be manually edited by typing into the input field directly. After editing Team Scores, select the **SEND CHANGES** button as discussed previously.

 Team score input fields will allow non-numeric characters to be typed in the field, but these characters will not be displayed on the scoreboard when the **SEND CHANGES** button is pressed.

 Use the **UP/DOWN** buttons with this input field to save time.


### Individual Court Screen View Input Fields:


The screenshot shows the 'Ad Art Tennis Master Control (2012-Oct-01) v0.5.3' window. On the left is a 'Settings' sidebar with a list of courts: 'Main Scoreboard', 'Court: Y' (selected), 'Court: A', 'Court: L', 'Court: E', 'Court: 1', 'Court: 2', 'Court: 3', and 'Court: 4'. The main area displays the 'Court Scoreboard' for 'Court: Y'. It shows two players: 'JILL ANNETTE' with a score of 15 and games of 2, 1, 0; and 'ROSA SARAH' with a score of 30 and games of 1, 2, 1. Below the scoreboard are input fields for 'Player Name(s)', 'Score', and 'Games' for each player. A 'Swap' button with a circular arrow icon is to the left of the input fields. A 'Send Changes' button is to the right. At the bottom are buttons for 'Reset Game', 'Reset Match', 'Blank / Unblank', and 'Change Court'. A red cloud highlights the input fields, the 'Send Changes' button, and the 'Swap' button.


Player Name(s)	Score	Games
JILL ANNETTE	15	2 1 0
ROSA SARAH	30	1 2 1

**Illustration 10: Individual Court View Input Fields (Figure 3.6)**

**PLAYER NAMES** (Input/ Edit Field – ASCII text). **MEANS OF INPUT:** The user will type in the name or names of the players playing in an in a tennis match directly into the “Player Name(s)” input field. If the match is between single players, then type one name in each input field. If it is a doubles match (two players per team), then type in two player names in each input field, separated by a carriage return.

 After editing any or all of these fields, select the **SEND CHANGES** button as discussed previously to display the updates on the scoreboard.

 The input fields for team names will allow as many characters as can be typed. Use the real-time preview screen to make sure player names appear as expected.

 Use upper case letters to ensure characters are large enough to be legible.

**SWAP** (button). Clicking this will swap players from one side of the court to the other, while keeping their scores and serving status intact. This is button is convenient to use when players switch sides of the court between sets.



**SERVING** (check-box). Checking this will indicate that the corresponding player(s) are serving the ball. The indicator is a round dot in line with the player's name(s) as shown on the scoreboard and preview screen. The check-box acts as a toggle - when one side is checked, the other side becomes unchecked automatically.

**SCORE** (Input/ Edit Field – Numbers only). **MEANS OF INPUT:** The user may use the **UP/DOWN** buttons in order to adjust the *current game score* for each player or team. These scores represent an individual tennis game. **UP/DOWN** buttons and keys increase or decrease the score one point at a time.

**GAMES** (Input/ Edit Field – Numbers only). **MEANS OF INPUT:** The user may type numbers directly in the field in order to adjust the *number of games won per set*. These scores represent how many games a player or team has won per set. Each input field represents a set, with the left-most field representing the first set. All three sets represent a match.



Each input field for **Games** is limited to a single digit ranging from 0-9.

**ADV SET - Advance Set** (button). Clicking this will display the next set in the match on the corresponding scoreboard(s). Whatever values are in the corresponding “set” fields will instantly be displayed on scoreboard(s).



It is possible to type in values for *all* sets in the form but only display the *first* and/or *first and second* sets on the scoreboard. This is because Advancing Sets will display each field in a sequential order. There are four steps in the display sequence – each step is triggered by clicking the **ADV SET** button. Step one displays the first set, step two displays the first and second sets, step three displays all three sets, and step four “blanks” (turns black) all sets. Clicking **ADV SET** again will re-start the display sequence from the beginning.



There is no need to click the **SEND CHANGES** button when using this button.

**SEND CHANGES** (button). After editing any or all fields, select this button to display the updated field values on related scoreboard(s) and preview screen(s).

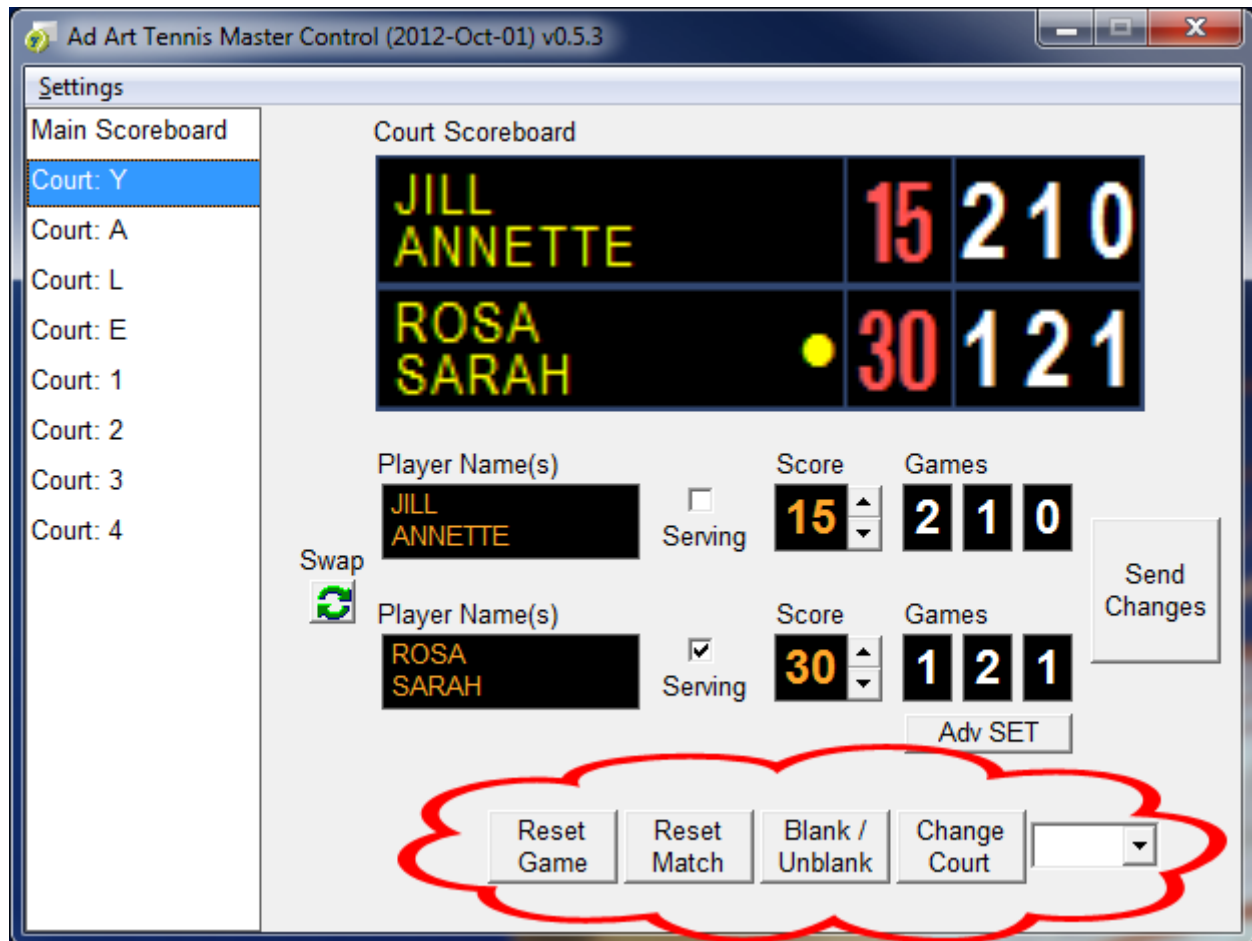


Illustration 11: Individual Court View Buttons (Figure 3.7)

**RESET GAME** (button). Clicking this will reset all *game score* fields in the current Court View to their default values and un-check the **Serving** checkbox. A pop-up warning window will appear if this is selected to allow the user to confirm the selection – see figure 3.8.

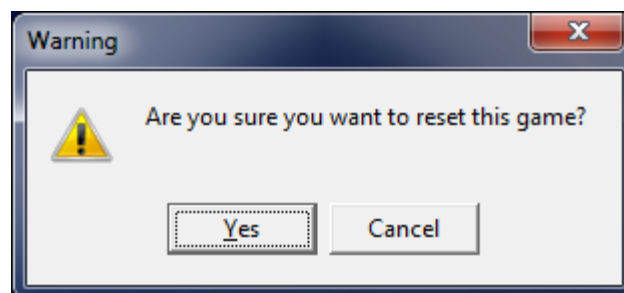
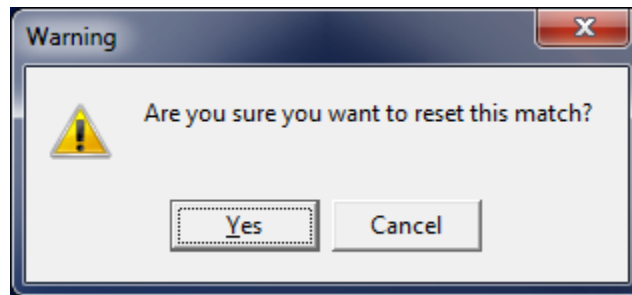



Illustration 12: Reset Game Warning Dialog (Figure 3.8)

- Resetting the game can be undone by using the UNDO button in the Ad Art Tennis Controller application.

**RESET MATCH** (button). Clicking this will reset all *game score* fields AND all *set score* fields in the current Court View to their default values and un-check the **Serving** checkbox. A pop-up warning window will appear if this is selected to allow the user to confirm the selection – see figure 3.9.



**Illustration 13: Reset Match Warning Dialog (Figure 3.9)**

 Resetting the game can be undone by using the UNDO button in the Ad Art Tennis Controller application.

**BLANK/UNBLANK** (button). This is a toggle that will switch between showing the scoreboard in its normal scoring mode, or turning it completely black when selected. This toggle may be handy when operators need to change the scoreboard but keep the changes from being visible to the public. It can also be used to blank the scoreboard when there is no game in session.



**Illustration 14: Change Court Button and Select Drop-Down (Figure 3.10)**

Sometimes an entire game or match will need to be relocated to a different court during a tournament. To facilitate this kind of change, any single court can “switch places” with any other single court, while still keeping all player and score information intact. For example, all player and score data in court “Y” can be instantly “swapped” with all player and score data on court “2”, with the click of a button. The **CHANGE COURT** button and drop-down list engages this functionality.

**CHANGE COURT**(button/ drop-down select box). MEANS OF INPUT: The user may select a court from the drop-down list box to the right of the **CHANGE COURT** button. The court selected will “swap” positions with the court corresponding with the current individual court view when the **CHANGE COURT** button is pressed. The change will be reflected instantly on all associated scoreboards.



There is no need to click the **SEND CHANGES** button when using this button.

## 4. Tennis Controller Window

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### 4.1 Tennis Controller Functionality: What Does it Do?

The Tennis Controller Window is a simple application that allows the user to input scoring information and execute game related commands on individual tennis court scoreboards. Data can be entered by clicking form buttons and check-boxes.

The Ad Art Tennis Controller application should be used in harmony with the Ad Art Tennis Master Control application during a tournament. This is because there are some functions on Ad Art Tennis Controller that are not available on Ad Art Tennis Master Control and vice-versa. Ad Art Tennis Master Control must be used to add and edit team names and scores, add and edit player names, swap players on a court, and swap entire matches from one court to another. Ad Art Tennis Controller must be used to change the **Score Mode** and perform **UNDO** operations (explained below). Both controllers have a real-time effect on **AATennisServer**, so both can be used in conjunction to control all scoreboard displays.

The Tennis Controller application is designed to control only one individual Court Scoreboard at a time. To switch between individual courts, select the **UP/DOWN Arrow** buttons next to the **Court ID** field.



Court Ids correspond with Court Names using the following pattern:

Court ID	1	2	3	4	5	6	7	8
Court Name	Y	A	L	E	1	2	3	4

On the bottom of the window is a **TEST** check-box. Clicking this will begin a test sequence procedure that sends random scoring data and commands to **AATennisServer** at high speed. This function is for testing and diagnostic purposes only, so it should rarely be used after all scoreboards have been initially set up. Activating this test will completely and permanently overwrite any current data displayed on all scoreboards.



Be cautious before checking this box, as there is no way to undo this action.

The remaining functions of the Master Tennis Control Window will be explained further in the next section.

## 4.2 Tennis Controller Functionality: How Does it Work?

The Graphical User Interface of the Tennis Controller Window is fashioned after actual wireless hand-held remote control hardware devices. Buttons on the left of the controller control Player One scores, while buttons on the right control Player Two scores. See figure 4.1 below.

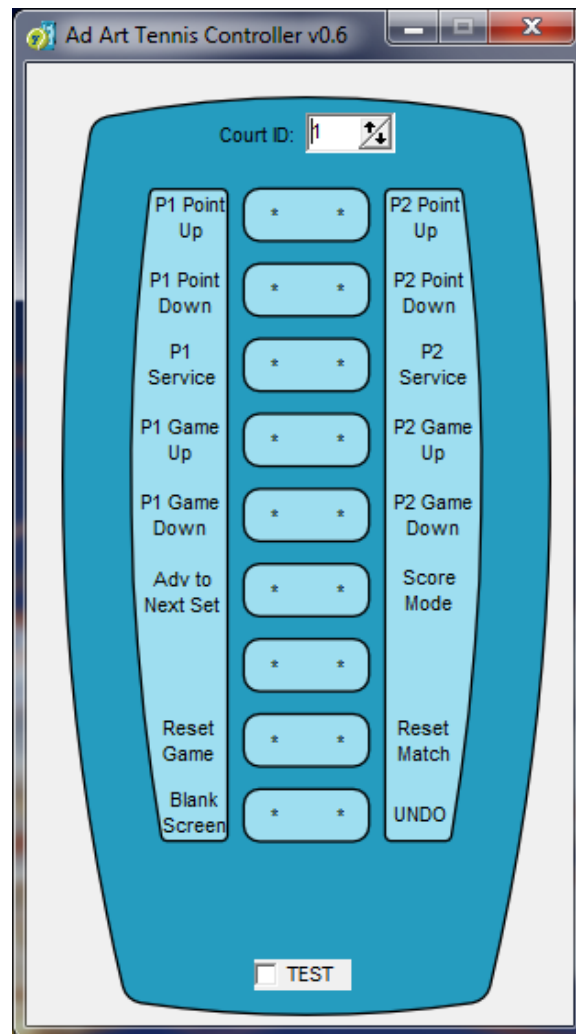



Illustration 15: Ad Art Tennis Controller Window (Figure 4.1)

**P1/P2 POINT UP / POINT DOWN (\* button).** Use these buttons in to adjust the *current game score* for each player or team. These scores represent an individual tennis game. Buttons increase or decrease the score one point at a time.


**P1/P2 SERVICE (\* button).** Clicking one of these buttons will indicate that the corresponding player(s) are serving the ball. The buttons work together to act as a toggle - when one player is serving, the other player is automatically set to NOT be serving.


**P1/P2 GAME UP / GAME DOWN (\* button).** Use these buttons in to adjust the *number of games won per set* for each player or team. These scores represent how many games a player or team has won per set. Buttons increase or decrease the score one point at a time.

**ADV SET - Advance Set** (\* button). Clicking this will display the next set in the match on the corresponding scoreboard(s). Whatever values are in the corresponding “set” fields will instantly be displayed on scoreboard(s).


 Advancing Sets will display each “SET” field in a sequential order. There are four steps in the display sequence – each step is triggered by clicking the **ADV SET** button once. Step one displays the first set, step two displays the first and second sets, step three displays all three sets, and step four “blanks” (turns black) all sets. Clicking **ADV SET** again will re-start the display sequence from the beginning.

**SCORE MODE** (\* button). Instead of displaying scores in the traditional manner (0, 15, 30, 40, AD In, AD Out, Duece), clicking this button will change the display of the score to standard decimal increments (). Only the display is changed, the internal values remain the same. To switch the score mode back to its previous mode, click the **SCORE MODE** button again.


 When switching score modes, make sure to temporarily select a different court view menu item in the Scoreboard Selector of the Tennis Master Control Window, and then select the current court view again. This action will “refresh” the form view and keep it in sync with preview screens and scoreboards.

 Decimal scores are not limited in value. High decimal values may yield unexpected results when the **Score Mode** is changed back to traditional scoring.

**RESET GAME** (button). Clicking this will reset all *game score* fields in the current Court View to their default values and blank the **Serving** indicator.


 Resetting the game can be undone by using the UNDO button.

**RESET MATCH** (button). Clicking this will reset all *game score* fields AND all *set score* fields in the current Court View to their default values and blank the **Serving** indicator.

 Resetting the game can be undone by using the UNDO button.

**BLANK SCREEN** (button). This is a toggle that will switch between showing the scoreboard in its normal scoring mode, or turning it completely black when selected. This toggle may be handy when operators need to change the scoreboard but keep the changes from being visible to the public. It can also be used to blank the scoreboard when there is no game in session.

**UNDO** (button). When pressed, this button will conveniently undo the last action performed. This makes it easier to recover from some mistakes that may take longer to fix otherwise. There is a limit of 20 sequential actions that can be undone.

 Actions can still be undone after a game is reset. Actions can NOT be undone if the **TEST** Check-box is selected.

## 5. Output Display Window

### 5.1 Output Display Window Functionality: What Does it Do?

As mentioned earlier in this manual, the main function of AATennisServer's Output Display window is to format and display the scoreboard in the screen capture area used by the electronic display. AATennisServer is the server side software component of the Ad Art VS Sports Controller. AATennisServer runs on a dedicated host computer connected to all of the actual scoreboards (sometimes referred to as the scoreboard or sign computer). Therefore, users of Ad Art Tennis Controller software will not be able to see this screen during operation.

For reference, Figures 4.1 and 4.2 below shows a picture of the left and right sides of the Output Display window. All Output Display window items correspond with the Ad Art Master Control Window with its Main Scoreboard View Screen and all eight of its Individual Court View Screens.

Home: 4			03:13p	Visitors: 4		
Y	JILL ANNETTE	15	2 1 0	1	JOHN	15 1
	ROSA SARAH •	30	1 2 1		KEN •	30 0
A	TODD WAYNE	15	1 1	2	LISA	15 2 0
	SHANE BEN •	15	2 1		KATRINA •	40 1 1
L	JOE TOM •	Ad	1	3	ROGER	0 2 1 1
	PETE RALPH	--	1		WILLIAM •	30 1 2 1
E	ANITA CATHLEEN	0	2 0	4	THERESA	30 1 0
	DEBBIE DAWN •	15	1 1		ALICE •	0 2 1

Illustration 16: Left-Half Screen View of the Output Display Window (Figure 5.1)



JILL ANNETTE	● 15	2 1 0	JOHN	● 15	1
ROSA SARAH	● 30	1 2 1	KEN	● 30	0
TODD WAYNE	● 15	1 1	LISA	● 15	2 0
SHANE BEN	● 15	2 1	KATRINA	● 40	1 1
JOE TOM	● Ad	1	ROGER	● 0	2 1 1
PETE RALPH	--	1	WILLIAM	● 30	1 2 1
ANITA CATHLEEN	● 0	2 0	THERESA	● 30	1 0
DEBBIE DAWN	● 15	1 1	ALICE	● 0	2 1

**Illustration 17: Right-Half Screen View of the Output Display Window (Figure 5.2)**

The Output Display window is designed to remain on top of all other application windows that may be running on the server computer. This is to ensure nothing but scoreboard information appears in the capture area of the screen, and subsequently on the scoreboard.



The mouse cursor will disappear when it intersects the Output Display Window. This behavior is intentional by design, so the mouse cursor does not accidentally display on the scoreboard during a match.

The Output Display window can be custom configured. For example, by default, the capture area is designed to be located on the top left corner of the computer screen, and set to capture a specific rectangular area (measured in pixels). The position and size corresponds to the “capture area” of the LED display electronics. The Output Display window settings can be changed in the AATennisServer.ini file. This file is automatically generated when the server software is first run, and located in the server program's installation folder. There are many configuration settings that can be modified in this file, but most of these have already been configured by qualified Ad Art technicians. The INI file should generally be left alone after the scoreboard is initially set up.

# Appendices

## Appendix A: Ad Art VS Sports Controller LED Tennis Scoreboard System Schematic.

Below is a schematic drawing of how the Ad Art VS Sports (Tennis) Controller works as installed for the Yale Tennis Scoreboard System.

### Yale Tennis LED Scoreboard System

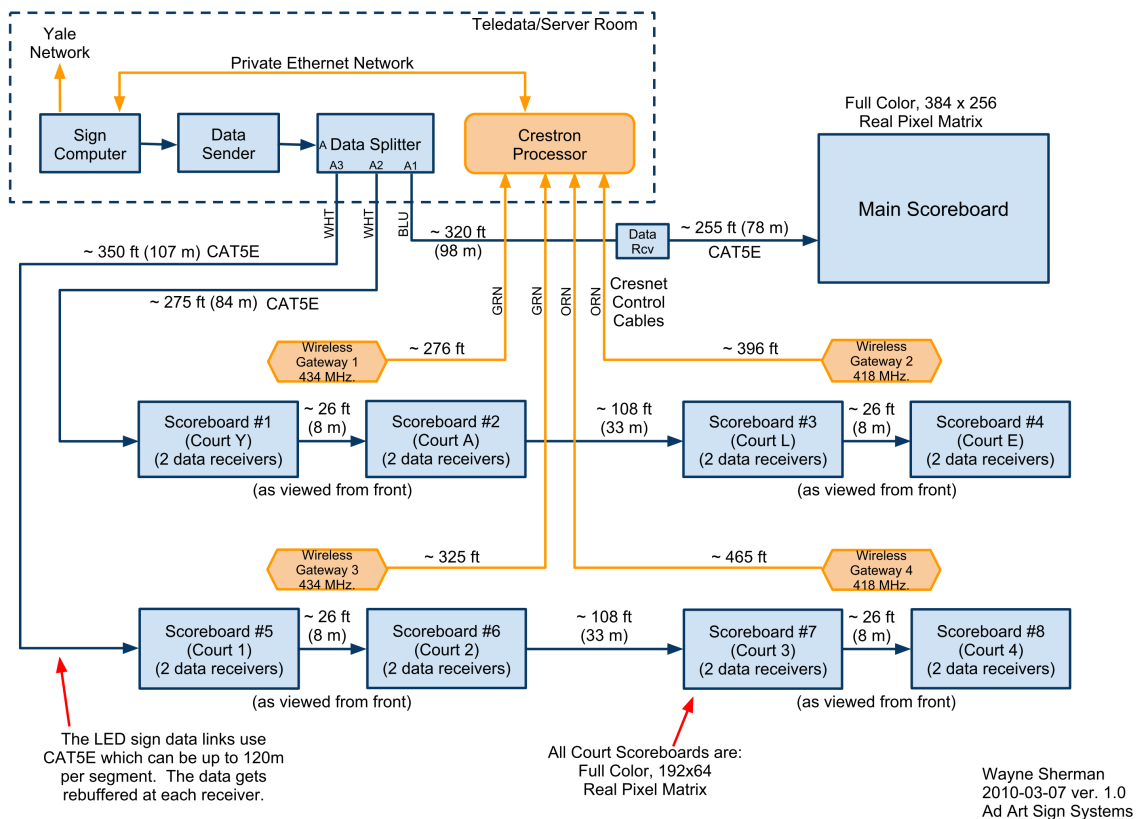


Illustration 18: LED Tennis Scoreboard System Schematic

## Appendix B: Using the Ad Art VS Sports Controller with a hand-held remote

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Some deployments require the scoreboard to be controlled from the field level without the use of a computer. Or there may be instances where the scoreboard will be controlled by more than one person in more than one location. During a typical match, operators in the field will use remote controllers in conjunction with an operator in the control room to manage scoreboard data for all scoreboards in use. To facilitate this operation, Ad Art provides a wireless **Hand-held Remote Controller** solution that plugs into the server computer running the **AATennisServer** application. Up to eight wireless Hand-held Remote Controllers can be used simultaneously with **AATennisServer** at a time. These remote controllers act as wireless clients that communicate “over the air” via four wireless gateways and one “Crestron” processor which connects to the **AATennisServer** host computer via private Ethernet cable. See “**Appendix A**” for more information regarding the set-up of wireless components.

Hand-held Remote Controllers are programmed by Ad Art technicians, who mapped keys on the controller's keypads to various functions that are equally implemented by Ad Art Tennis Controller software. The keypad keys are labeled to indicate what function they serve. All keys on the keypad perform identical functionality as their Ad Art Tennis Controller counterparts. See the photograph below.



**Illustration 19: Hand-held Wireless Remote Controller**

## Appendix C: Using the Ad Art VS Sports (Tennis) Controller Simulator Application

Included with Ad art VS Sports Controller is a Tennis Controller Simulator application named Tennis\_Controller\_Test.exe. It is a test program useful for training purposes to practice using the Ad Art Tennis Controller application. The simulator does not connect to AATennisServer, nor does it control any scoreboards.

Filling out the provided **Player Names** and clicking the various **Controller Buttons** will output the data to the preview screen on the right upper corner of the application window. This preview screen simulates a scoreboard display. A text box on the lower right corner of the application window will display status information indicating the current set, the current score mode, and point counts for Teams 1 and 2.

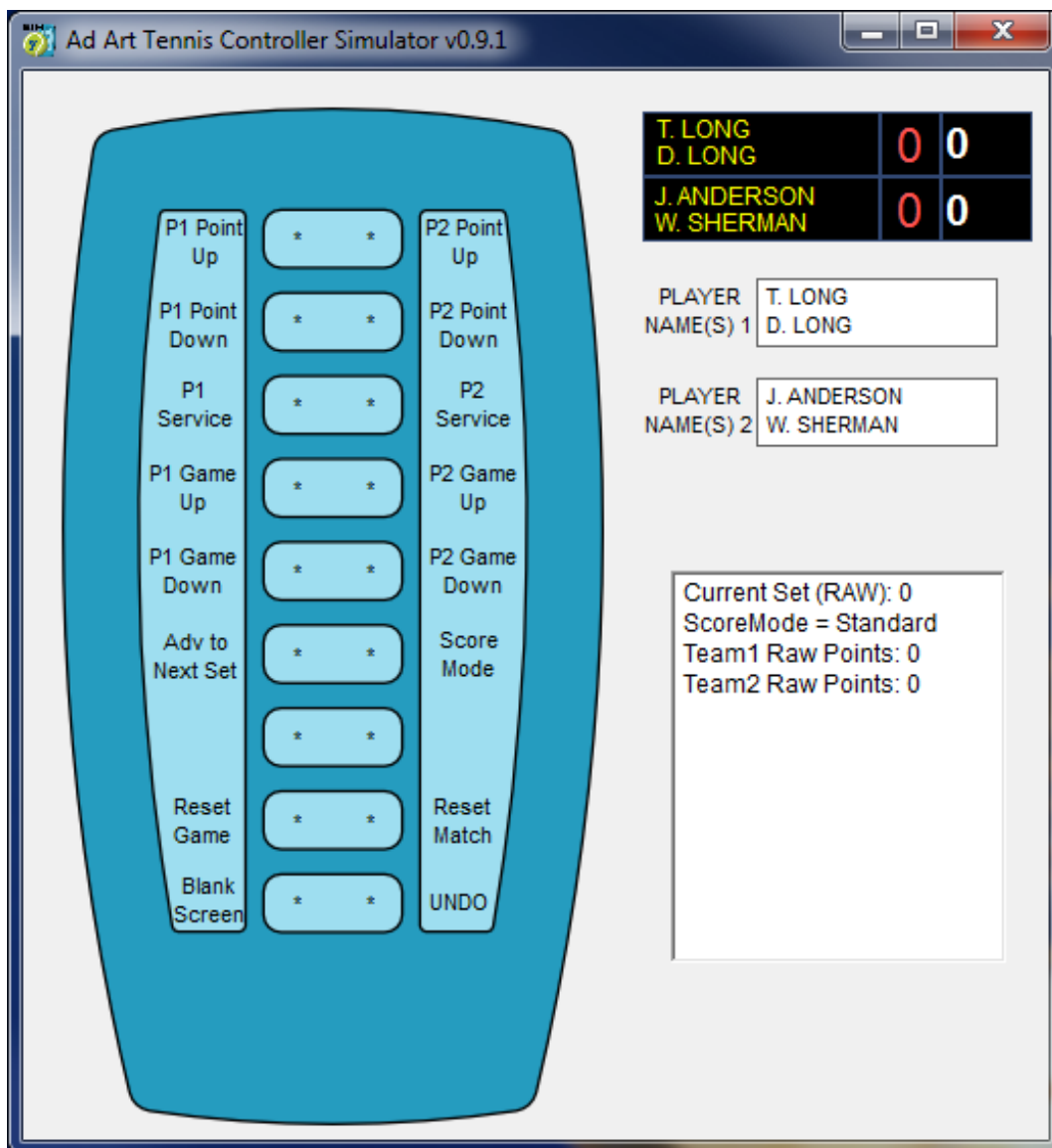


Illustration 20: Ad Art Tennis Controller Simulator

## **Appendix D: Using HTML Templates with Ad Art VS Sports Controller**

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### **HTML Templates:**

Ad Art VS Sports (Tennis) Controller uses HTML templates to define the graphical display of scoreboard data. These HTML files are located in a sub-folder named “html\_templates” that is located in the “AATennisServer” folder. Two files in particular are of interest, because these files serve as both default master templates and as models that can be copied and customized. They are “main\_board\_2\_court\_template.html” and “main\_board\_8\_court\_template.html”. The “main\_board\_2\_court\_template.html” file defines the layout of individual Court Scoreboards and the “main\_board\_8\_court\_template.html” file defines the layout of the Main Scoreboard.

CSS rules located between the <HEAD> tags of these files define colors, spacing, fonts, etc. If different colors or fonts are desired, experienced web developers familiar with HTML and CSS can modify these rules to make changes to the graphical layout. There are three files that must all be modified: “court\_board\_template.html”, “main\_board\_2\_court\_template.html”, and “main\_board\_8\_court\_template.html”. Redundant edits to CSS styles in all three of these templates are required for changes to be consistent.



Only edit CSS code in these template files. Do NOT Modify HTML code in these template files. HTML code is critically placed and includes special data tags required by the program.

One method of customizing templates is to simply edit the CSS in the original files. Another method is to create new templates using “main\_board\_2\_court\_template.html” and “main\_board\_8\_court\_template.html” as a guide. Simply copy these into the same folder and rename them to whatever is desired (make sure to use the “.html” suffix). Then, edit the “AATennisServer.ini” file located in the “AATennisServer” folder such that the “**MainCourtTemplateFile=**” and “**SingleCourtTemplateFile=**” lines point to the newly created and renamed files. One benefit of creating new template files is that the originals are kept intact for future use and as a reference.

Another use for HTML template files is to help web developers integrate scoreboard output into custom web pages hosted on the Internet. These templates can be used as a guide for developers who want to mimic the exact display of Ad Art tennis scoreboards on any web page. Details related to setting up external web sites using scoreboard data is beyond the scope of this manual. See Ad Art technical staff for more information.

## Appendix E: Ad Art VS Sports Controller Configuration Files

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### **Installation Overview:**

The Installation program will place all needed Ad Art VS Sports Controller software files in the default installation folder chosen at the time of install. These files include the application executable files (“Tennis\_Controller.exe”, “Tennis\_Controller\_Test.exe”, Tennis\_Master\_Control.exe, and “AATennisServer.exe”), this software manual document file, log files (in a “logs” sub-folder) saved game files (in a “gamesaves” sub-folder), and several HTML template files (in an “html\_templates” sub-folder). Several font files are also installed in the default installation and computer system's “fonts” sub-folder (CAFETA\_.TTF, ArialN.TTF, ArialNb.TTF, and FUTURAMC.TTF).

### **Ad Art Tennis Master Control / Ad Art Tennis Controller Configuration:**

Ad Art Tennis Master Control software and Ad Art Tennis Controller software are client applications that run on most computers. They are designed to communicate with their server software component (AATennisServer.exe) over the TCP/IP network protocol. The configuration settings for Ad Art Tennis Master Control software and Ad Art Tennis Controller software are stored in INI files (Tennis\_Master\_Control.ini and Tennis\_Controller.ini) located in the same directory as their respective programs.



When Ad Art VS Sports Controller software is run for the first time, it automatically generates its INI files using default values. It is best to leave these files alone under most circumstances. However, all settings stored in the INI files may be edited manually, as the INI files are merely ASCII text files. Only manually edit the INI files when the software is not running.

Setting keys for Ad Art Tennis Master Control software and Ad Art Tennis Controller software are identical, while key values may differ. Content from a sample of both INI files with example settings is provided below:

```
[Settings]
FormVersion=0
Flags=0
PixelsPerInch=96
MinMaxPos(1280x1024)=-1,-1,-1,-1
MinMaxPos=-1,-1,-1,-1
NormPos(1280x1024)=245,310,559,872
NormPos=699,357,1013,919
TennisServerHost_Or_IP=192.168.1.141
TennisServerPort=38240
MinMaxPos(1364x768)=-1,-1,-1,-1
NormPos(1364x768)=874,146,1188,708
MinMaxPos(1920x1080)=-1,-1,-1,-1
NormPos(1920x1080)=699,357,1013,919
```

Most of these settings should be left alone, however two settings merit special attention. These settings will need to be configured correctly, or Ad Art Tennis Master Control software and Ad Art Tennis Controller software will not be able to communicate with AATennisServer. These settings are:

1. **TennisServerHost\_Or\_IP=** This setting should be set to the server computer's valid DNS host name or LAN/Internet IP address that is accessible to the client computer.
2. **TennisServerPort=** This setting should be set to a valid TCP port that corresponds with the port configured for AATennisServer. The default port number is 38240. This port should also be kept open on any firewall software that may be running on the client computer.

### **AATennisServer Configuration:**

AATennisServer is the server-side software component of the Ad Art VS Sports Controller. This software runs on a dedicated computer connected to the actual scoreboard. The server software formats and displays the game state in an Output Display window which is positioned in the sign's screen capture area.

AATennisServer.exe software is designed to keep the state of the game current, even if the application should accidentally be closed out. After re-starting the application, all game values will display and resume just as it was before being closed. This is possible, in part, because saved game-state settings are stored in a local sub-folder of the server's install directory named "gamesaves".

AATennisServer.exe software will also keep a log of all major server activity for historical and troubleshooting purposes. Log files are stored in a local sub-folder of the server's install directory named "logs". These are ASCII text files that are human readable in any text editor.

An INI file that contains configuration settings for the server software is located in the same directory as the AATennisServer.exe program. Most of these settings define the graphical layout of the scoreboard – these should be left alone.



When AATennisServer.exe is run for the first time, it automatically generates this INI file. It is typically not necessary to manually edit this file. Only qualified Ad Art technicians should configure this file, so contact them if there is a need to re-configure AATennisServer.exe.

Content from a sample INI file with examples of the remainder of settings is provided below:

```
[Settings]
FormVersion=0
TennisCourtCount=8
CourtNames=Y, A, L, E, 1, 2, 3, 4
ControllerCourtMap=01:1, 02:2, 03:3, 04:4, 05:5, 06:6, 07:7, 08:8
MainCourtTemplateFile=main_board_8_court_template.html
SingleCourtTemplateFile=court_board_template.html
```

```
[frmSignOutput]
FormVersion=0
Flags=0
PixelsPerInch=96
MinMaxPos(1280x1024)=-1,-1,0,0
MinMaxPos=-1,-1,0,0
NormPos(1280x1024)=0,0,768,256
NormPos=0,0,768,256
```

Two settings merit attention. These settings will need to be configured correctly to define the Output Display window and to customize the Ad Art Tennis Master Control application. These settings are:

1. **CourtNames=** These comma separated values should be set to the Names of each of eight individual tennis court scoreboards. They equate to the label names given to individual courts in the Ad Art Tennis Master Control application.
2. **NormPos(####x####)=** This setting should be set to define the Output Display window pixel area in comma separated notation – the first two values indicate the x and y pixel coordinates defining the upper left corner of the rectangle, while the last two values indicate the x and y pixel coordinates defining the lower right corner of the rectangle.