Team 17
User Guide

1. INTRODUCTION

Thank you for your recent purchase of the Team Action Noun Wireless Scoreboard. This document will give you an overview of all the features found in our fantastic product. If you are setting up the product for the first time, please take a moment to look over the quick start guide as it contains all the information needed to start using this product right away. This guide will first discuss features found on our wireless scoreboard. Continue reading for additional descriptions about the functionality behind the Team Action Noun Expandable Remote Control.

The first step is to locate the on switches on both the scoreboard and the remote control. If either fails to power on, ensure that the 12 V battery is plugged into the scoreboard and the 9 V battery is connected to the remote.

2. SCOREBOARD

There are many exciting features found on your new scoreboard, each of which is broken down according to subsection.
2.1 Scoring
2.2 Timing
2.3 Stop Indicators
2.4 Tripod Mounting
2.5 Batteries

2.1 SCORING

This Scoreboard is capable of keeping track of two scores at a single time. Each score can range from 00 to 99. Teams are listed as Home and Away on both the board itself and the remote control. The up arrow buttons increase the score for the respective teams while the down arrow lowers the score. A single reset button can be used to set both scores back to 00. If the score manages to reach 99 during a game, pressing the button again will make it repeat back to 00. A redundant read out of the scoring section is included on the remote control so that the user can ensure that the scoreboard is being updated from any angle, even if the board is placed behind them.

2.2 TIMING

The Team Action Noun Wireless Scoreboard comes with a timing functionality that will meet all your clock based needs. A toggle switch can be used to set an upwards count from 00:00 for games such as European Football, or downwards from a preset time for games such as American Football. Two sets of up and down arrows are used to set the score higher and lower. They are labeled minutes and seconds and adjust accordingly. The switch in the middle can be used to start and stop the progression of time. When Counting up, if the timer reaches 99:59, the clock will roll over and continue counting up from 00:00. However, if counting down when the timer reaches 00:00 the clock progression will stop and various indicators will be

activated to effectively communicate to the players that play should stop. The system can also use these indicators anytime the play clock is manually stopped as well. A redundant display on the remote control is also provided for the timer.

Please See Section 2.3 for More Information On Stop Indicators

2.3 STOP INDICATORS

The Stop Indicators are made up of a system of bright LED lights at each of the corners plus an audible buzzer. If the Timer reaches 00:00 the buzzer will ring momentarily and the indicator lights will turn on. If the play clock is paused at any time this event will also occur. A toggle switch can be used on the scoreboard itself to turn on both features, turn off just the buzzer, and turn off the lights and buzzer. This will ensure that these features will only be used if needed and will otherwise not effect the use of the scoreboard. No other features are affected by turning these functions on or off.

2.4 TRIPOD MOUNTING

For the user's conveniences, there are two universal tripod mounts on the bottom of the scoreboard. This allows the scoreboard to be attached to any tripod using this standard. There are two tripods included in with the product in order to allow immediate use. If either breaks any other tripod could be used to replace it. The two tripods do not need to be of the same variety, as long as they can be adjusted to a level height.

2.5 BATTERY

Included with your new Scoreboard is a 12 V Battery. This battery is compact yet long lasting. The battery can be removed for easy charging, or to swap in a different battery. **BEFORE PROCEEDING ENSURE SCOREBOARD IS TURNED OFF.** To remove the battery simply remove the panel on the back of the scoreboard labeled BATTERY COMPARTMENT. Unhook the connectors and then attach the battery to the included battery charger. *Note: Do NOT mix batteries, if battery fails please buy an exact copy of the included battery.* The battery charger will have an indicator light to alert the user that charging is complete. Reconnect the battery inside the Scoreboard making sure to connect the cables together in the proper manner. Please close the battery compartment before turning the unit back on.

3. WIRELESS SCOREBOARD REMOTE CONTROLLER

Your scoreboard has been shipped with a JM²S Adapatable Wireless Controller. It has been designed to be robust and modular in nature. The Scoreboard is designed to work with this controller specifically, however the remote can be used as a basis to drive other machines without needing significant changes in its design. The controller is able to send and receive data. The buttons themselves have been designed to be easily used regardless of motor skills.

3.1 POWER

The remote requires a 9V battery to operate correctly, which must be installed prior to powering on the remote. After installing the battery, move the switch on the side of the remote to the ON position. This will initialize the controller, and allow it to communicate with the scoreboard. When the remote is powered on, the screen should illuminate and show the current time of the scoreboard, if this does not happen, verify the remote is on channel 4.

For more information on setting the channel of the remote, see section 3.
See the quickstart guide for a visual layout of the controls

4 EXPANDABLE WIRELESS REMOTE FEATURES

The wireless Remote includes many features, these include:
4.1 Expandable I/O
4.2 Multiple Channels
4.3 Open Communication Format
4.4 Reliable Communication
4.5 Reprogram-able
4.6 Redundant Information Display

4.1 EXPANDABLE I/O

The Action Noun wireless Controller can easily be interfaced with many different electronic devices, and allows for a very large number of signals to be sent to a remote device. This is accomplished through the use of shift registers. By adding additional shift registers, more outputs can be utilized by the receiving end. This minimizes the number of I/O pins required on the microcontroller , and makes expanding I/O inexpensive. On the board, extra slots for shift registers are available, as well as extra output points.

On the input side, the microcontroller uses a multiplexer based polling scheme to scan a bank of buttons or other digital inputs. This allows for a large number of inputs to be transmitted using very few I/O lines on the microcontroller in a similar manner to the expandability of the output.

4.2 MULTIPLE CHANNELS

The wireless module used is capable of begin configured for multiple different channels to prevent interference with other modules used in the same area. The wireless standard used by the transceiver is the IEEE 802.15.4. This specifies frequencies ranges which can be used, and the remote can be configured to use any of these frequencies using a set of piano switches on the remote.

4.3 OPEN COMMUNICATION FORMAT

The wireless transceiver module uses an IEEE 802.15.4 wireless stack, which is an open format. This allows for easy communication between devices, and means the wireless remote can be used to interface with any product using this communication interface. This

makes the Action Noun wireless receiver and transmitter truly modular.

4.4 RELIABLE COMMUNICATION

The wireless receiver will respond to all communication from the wireless transmitter by default. This creates a very robust and reliable communication system, as reception of the signal can be verified by the remote. This also allows for a remote to verify data integrity, as the data transmitted is returned to the device. If anything went wrong during transmission, this would allow the transmitter to re-transmit bad data to resolve data corruption problems.

4.5 REPROGRAMABLE

The transmitter and receiver board each come with an ISP header to allow for easy re-programming. This allows the transceiver hardware to be re-used for any device. The ISP header is compatible with any AVR programming system, such as the STK500 or AVR Dragon. Information on the hardware and software used on the system is provided with the Team Action Noun wireless device. The wireless module has a serial interface to control all aspects of the module, and can be found in the Xbee documentation.

4.6 REDUNDANT INFORMATION DISPLAY

The transmitter included with the wireless controller also has a redundant information display. This display by default shows the time on the scoreboard, which is reported over the 2-way link. This display can be used to display any information, and the chip can be re-programmed to use these displays in any manner that the user sees fit.