FMS Light User's Guide

Overview

FMS Light is a software tool for basic control of FRC robots. It allows the operator to enable and disable robots in Autonomous and Teleoperated modes, as well as set timers for the duration of each mode. The user interface is shown in Figure 1. It can be used to test the operation of the a single robot in both Autonomous and Teleoperated mode, or is can be used to administer a pre-season or post-season FRC event.

Figure 1: FMS Light Main Screen

System Requirements

- Microsoft Windows PC – FMS Light has been tested on Windows XP SP3 and Windows Vista.

- Microsoft .NET Framework 3.5 SP1, available via this link. To determine which version of the .NET Framework is currently installed on your PC, visit this website.

Installation

1. Download the FMS Light installer from the 2009 FRC Control System website.

2. Run the installer

3. Execute FMS Light using the icon on the Desktop, or from the Start menu via Start->Program Files-> FIRST->FMS Light
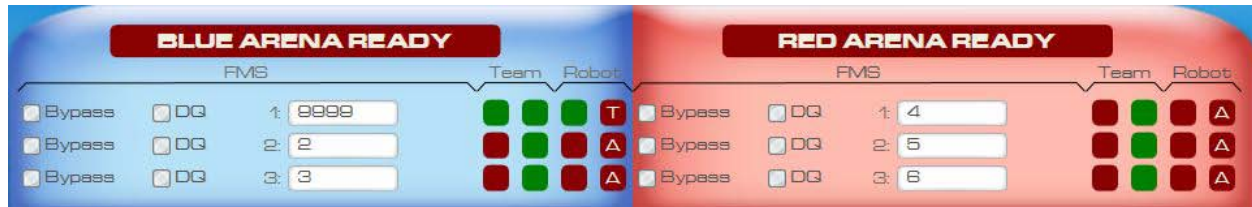
Control Indicators


Figure 2: Control Indicators

The top of the screen indicates the status of the robots at each end of the playing field and are divided according to Alliance color. Each box includes information on the status of the three robots on each Alliance. All bubble indicators include fly outs, simply hover your mouse pointer of the bubble to get details on the information it tells the user.

The information for each Alliance is broken down into three groups, FMS, Team, and Robot.
- FMS – controls to inform FMS Light which robot in the indicated station position and how to handle it.
  - Bypass – Select this box to bypass this particular station and force it to an enable state.
  - DQ – Same functionality as Bypass
  - Team Number – Type in the team number which corresponds with this station. Team numbers need to be in the correct station to ensure the team receives the proper Station ID and Position information from FMS Light.
- Team – indicates the state of the DS.
  - Left bubble – Indicates status of the FMS-to-DS link. If the team number and DS match, this bubble with be green.
  - Right bubble – Indicates status of the DS E-stop state, this bubble will always be green when using FMS Light.
- Robot – indicates the state of the Robot.
  - Left bubble – DS-to-Robot link status. If the DS and Robot are linked, this bubble will be green. If the station has been Bypassed, a "B" will appear in this bubble.

o Right bubble – Mode and System state of the Robot. "A" indicates Autonomous Mode, "T" indicates Teleoperated mode. If the Robot is disabled, the bubble is red, it will be green when the Robot is enabled by FMS Light.

Robot Control Panel
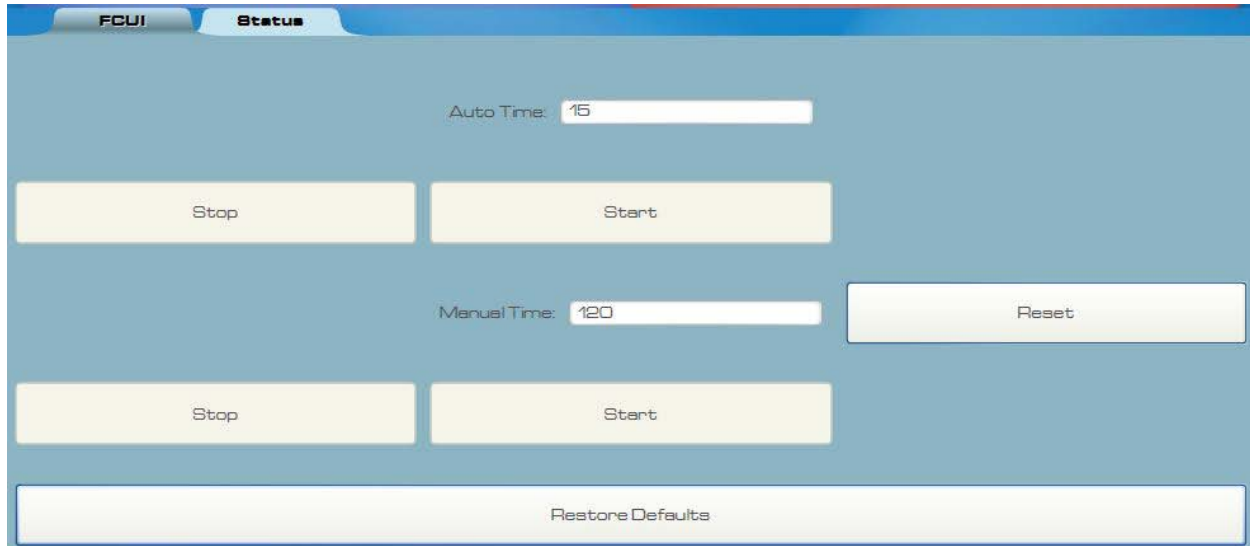
Figure 3: Control Panel

The bottom half of the main FMS Light screen, under the FCUI tab, allows for the control of the Robots. The button functions are:

- Upper Stop – stop Autonomous Mode. All robots are set to Autonomous-Disabled. The timer is stopped. Resume match by pressing Upper Start button.
- Upper Start – start a Full Match. All robots are set to Autonomous-Enable. The timer begins counting down, the duration is determined by the value in the Auto Time field. Robots are set to Autonomous-Disable when the timer stops, then Teleop-Disable, then Teleop-Enable. The timer begins to count down again based on the value in the Manual Time field. When the manual time ends, robots are set to Teleop-Disable.
- Lower Stop - stop Teleoperated Mode. All robots are set to Teleop-Disabled. The timer is stopped. Resume match by pressing Lower Start button.
- Lower Start – start the robot in Teleoperated Mode. Timer will countdown based on the value in the Manual Time field.
- Reset – return the current mode to the default state. All robots are set to Autonomous-Disable state. Pressing Reset requires that the user re-enter any Bypassed station at the top of the screen.
- Restore Defaults – Restore the timers to the default values of 15 seconds (Auto Time) and 120 seconds (Manual Time).

Enter the duration for each operating period. ***The robot control panel will only allow the user to press "Start" once there is a defined state for each station on both Alliances.*** In the case of

Figure 2, there is only 1 robot, in order to start the match the other stations must be Bypassed, as shown in Figure 4.
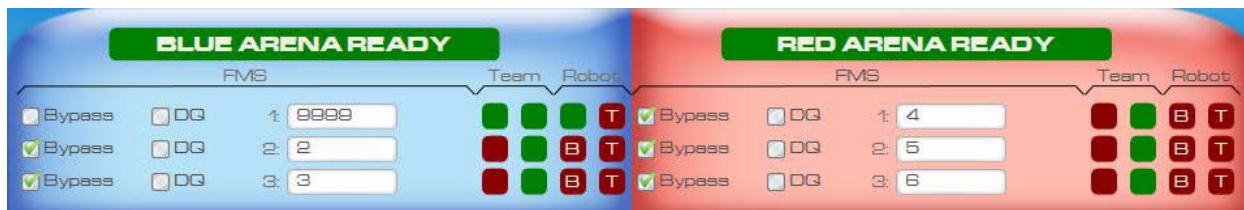

Figure 4: Match Ready State

The Match Ready state for each Alliance is confirmed when each "Arena Ready" changes from red to green.

Field Status

Figure 5: FMS Light Field Status Display

Click on the Status tab shows detailed information for each robot linked to FMS Light. The top half of the screen includes these details:

- Station: Alliance station
- Robot IP: FMS – The IP that FMS expects based on the team number entered.
- Robot IP: DS – The robot IP reported to FMS Light.
- Robot MAC: FMS – unused currently
- Robot MAX: DS – The MAC address of the robot reported to FMS Light.
- Status: DS – Indicates the status of the DS (link active, in competition mode, enable/disable, etc.) Each bubble includes a fly out with details on what it is indicating.
- Status: Robot – Indicates the status of the Robot (link active, mode, enable/disable, and battery voltage). Each bubble includes a fly out with details on what it is indicating. Note that battery voltage is only indicated if the appropriate jumper is connected on the Analog Breakout in slot 1 of the cRIO.

The bottom half of the Status screen indicates these details:

- Team ID – Team number as indicated on FMS Light, and the status message from the DS.
- DS Comm Version – The communications protocol version as expected by FMS Light, and reported by the DS. If these do not match, FMS Light will not enable the Robot.
- Errors – Various errors as reported by the DS to FMS Light. Fly over the bubbles to see more details of each error.

Event Setup when using FMS Light
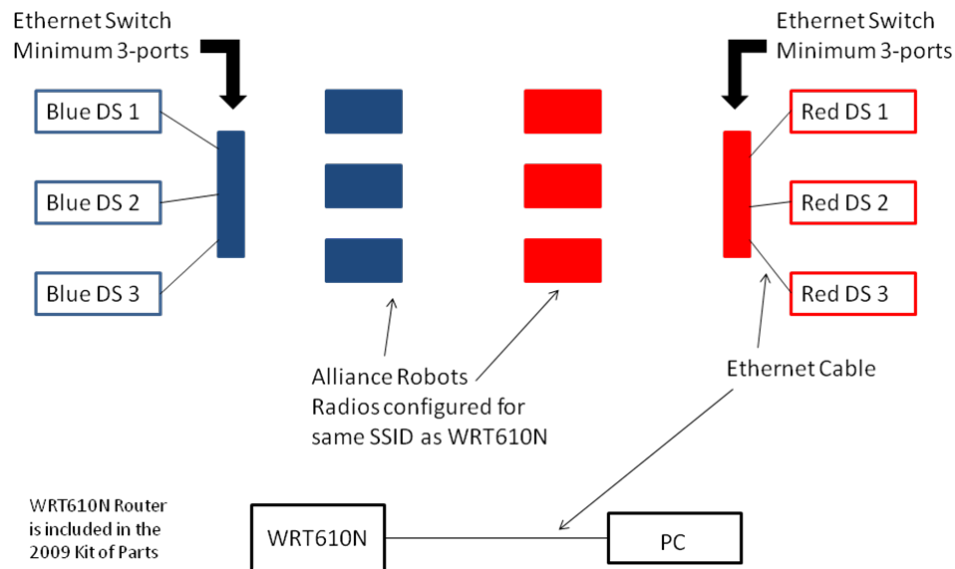
Figure 6: FMS Light field setup

FMS Light requires minimal field hardware when used to administer an FRC pre-season or post-season event. The recommended minimum list of hardware includes:

- 6 Driver Stations w/ power supplies
- 6 Robots with WGA600N radios
- 2 Ethernet switches (1 Ethernet switch could be used, but will require longer lengths of Ethernet cable to reach each DS)
- 1 WRT610N
- 1 PC running FMS Light (see minimum requirements above)
- 7 Ethernet cables (6 to connect DS's to field end switches and 1 to connect PC to WRT610N)

Configuration of the WGA600N and WRT610N is at the discretion of the event organizer. *FIRST* recommends that these radios be set to operate in the 5GHz frequency band, using the 802.11n standard, as is shown in the 2009 FRC Control System manual. Note that that a single SSID will need to chosen for the WRT610N and this SSID will need to be programmed into each WGA600N radio.