RAIN BIRD®

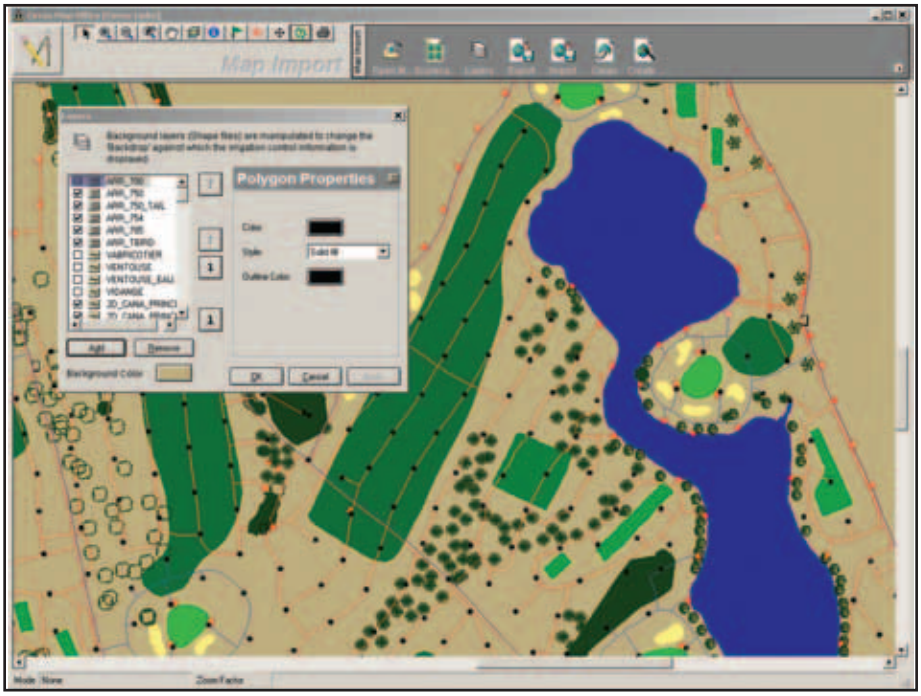
TECH SPECS

Cirrus™ Central Control System

The Golf Industry's Only Full-Featured Central Control System. Now with Rain Watch.™

Cirrus™

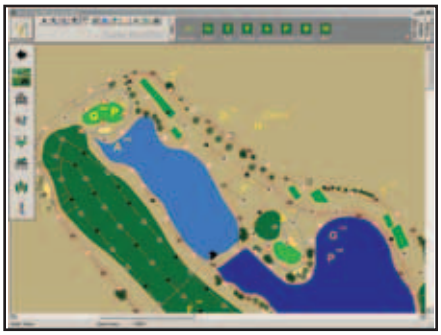
Rain Bird Golf takes a quantum leap in irrigation technology with the easy-to-use Cirrus™ central control system. With more than 3 years of field operation, Cirrus allows you to control your irrigation system with more precision than ever before. Like Rain Bird's Nimbus™ II and Stratus™ II, this multimanagement central control system takes advantage of the newest Microsoft® Windows® operating system with advanced graphics and 32-bit architecture. With state-of-the-art ET-based scheduling, customized course graphics, multiple mapping options and the ability to "see" the placement and operation of individual rotors, Cirrus makes controlling your irrigation system fast and easy. Install Confidence, Install Cirrus.



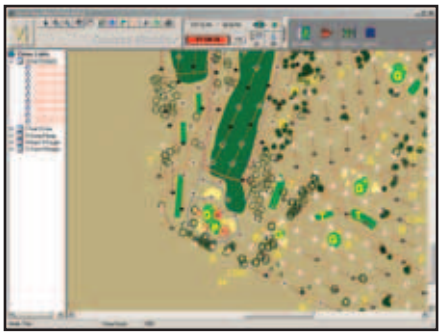
Cirrus allows you to create a custom map of your course, complete with customized layer options.

Advanced Graphical Tracking

Cirrus lets you see your course like no other central control system can. Incorporating maps generated by GPS technology and CAD,* Cirrus can graphically recreate your course with actual irrigation system layouts down to individual rotors. Then, with true 32-bit graphics, you can "zoom-in" to monitor every detail of your course. Just double-click on a rotor for a complete status report. A tree-view control allows you to visualize and manipulate programs and schedules with the support of visual graphics, colorized text and color references. Map utilities provide measurement and area calculations from the map.



Place pumps, rotors and water distribution equipment on your map as they appear on your course.



Monitor system activity using the Cirrus Course Monitor™ screen.

Rain Watch™

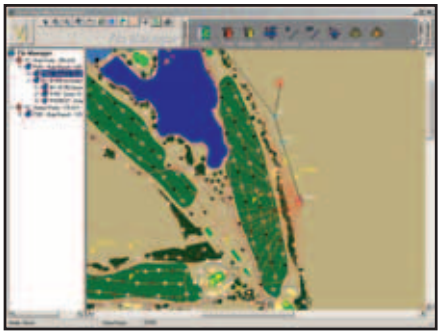
Rain Watch is an exclusive new feature that is so unique it has a patent pending. Rain Watch is an intelligent rainfall reaction system that uses up to four tipping bucket rain cans to detect and react to local rainfall. For short duration cloudbursts, Rain Watch suspends irrigation while simultaneously measuring the real time rainfall. When the storm passes, irrigation is resumed with station runtimes reduced by an amount equivalent to the measured rain. In case of extended rainy weather, irrigation will be cancelled for a user-definable period of time.

Minimum ET™

Minimum ET is another new feature that helps promote healthy turf by supporting advanced ET management techniques. With the Minimum ET feature a superintendent can define a minimum ET threshold value that must be met before irrigation will take place. Minimum ET values can be assigned globally so they affect all programs, or individually by program for the ultimate in ET management.

**In order to create GPS and AutoCAD maps, it may require a designer.*

Create scorecard images of every hole on your course.

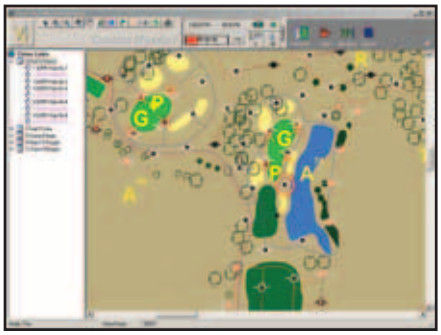


Control the flow of irrigation using the Flo-Manager® screen.

Modify irrigation schedules based on evapotranspiration rates and other Weather Station data.

Conserve water with built-in water saving features.

Easily manage your system with the intuitive programming functions in Cirrus.



"Zoom-in" on the Course Monitor™ screen to check on individual rotor activity.

Smart Weather™

Designed to take complete advantage of Rain Bird's most advanced line of weather stations, Cirrus is able to monitor and respond to climactic conditions as they occur. By tracking evapotranspiration (ET) rates and other sensory inputs, the industry's top central control system is able to quickly modify watering schedules to conserve water and reduce irrigation costs. Smart Weather™ also tracks weather conditions for future reference. The advanced warning system accepts user-defined sensor thresholds. If these thresholds are exceeded, the superintendent will be alerted that conditions are favorable for disease and pestilence.

Smart Pump™

Rain Bird's Smart Pump Software links your pump station to your central control system providing real time communication and optimizing your irrigation cycle. Smart Pump also has the ability to monitor and react to changes in station capacity. Should the pump station capacity increase or decrease, the software adjusts the irrigation cycle based on this change.

Expanded System Compatibility

Utilizing some of the most advanced software development tools in the industry, Cirrus offers excellent performance and software/hardware compatibility. The new system architecture is designed to speed performance with future Microsoft® Windows® operating systems.

Remote System Control

Operate the Cirrus central control system from anywhere on the course using a Rain Bird FREEDOM™ System, or add the FREEDOM-Pad to get map-based field control. With a handheld, two-way radio or PDA Device you can communicate directly with Cirrus and take control of your system as conditions dictate.

Superior Monitoring

With all of the new features found in Cirrus, it's easy to overlook many of the features shared with the popular Nimbus II central control system. These include:

Flo Graph™ allows visibility of real-time graphics with individual station information presented in colorful charts. This feature monitors each or all pumps for reliable results.

Flo-Manager®—This patented feature balances system demand at maximum capacity with the efficiency of the pump station and delivery network. Flo-Manager maximizes system output without causing undue stress to your pump system and components when coupled with Smart Pump. It helps lower water demand, reduce system wear and tear and save energy—year after year.

Cycle + Soak™ works with Flo-Manager to achieve maximum efficiency and water conservation. It helps you control water application on slopes and in areas with poor drainage. Cycle + Soak maintains the pumping station demands while preventing over application in those challenging areas of the course.

QuickIRR™ will get you up and running in no time by creating schedules based on your parameters. This feature is enhanced in Cirrus by providing the ability to program multiple courses. Select the course, hole, area, sequence and run time and Cirrus will do the rest.

Smart Pump™—Rain Bird's Smart Pump Software links your pump station to your central control system providing real time communication and user interaction. The Smart Pump feature has the ability to monitor and react to changes in the pump station flow. Should the flow increase or decrease, the software can adjust the

Rain Bird's WS PRO Weather Stations allow Cirrus users to automatically modify their watering schedules based on actual environmental conditions.

irrigation cycle automatically based on user-definable thresholds.

Simple Upgrade Path

Those currently using Rain Bird's older central control systems can quickly and easily transfer the control of their irrigation systems over to Cirrus. Thanks to the graphic Cirrus interface, once your information is transferred, learning to use the Cirrus central control system is simple and easy. For the easiest upgrade in the industry, count on Cirrus central control and be confident you made the right choice.

Specifications

The computerized central control system shall be the Rain Bird Cirrus as hereinafter specified. It shall be capable of controlling three (3) independent, 18-hole golf courses, each consisting of greens, tees, fairways, approaches, perimeters, roughs and miscellaneous areas. The central shall include the Rain Bird "P" Series computer system, as hereinafter specified. The central equipment shall include a satellite or decoder interface unit, an uninterruptible power source, a power circuit surge arrestor and a grounding network grid with surge arrestors, all as hereinafter specified.

All Cirrus central control systems shall be "Hybrid" compatible. The Cirrus Hybrid systems will have the ability to control up to four interface devices which can be any combination of 2-wire, wireless or decoder. In addition to these items, an additional Interface (MIM, MIM LINK or LDI) must be ordered.

Cirrus Software– The Cirrus software shall operate in the Microsoft® Windows 98 SE, 2000 or XP Professional environments. Cirrus shall be capable of controlling any one or up to three (3) types of field unit systems; (1) "hard-wired" satellite field units; (2) "radio" operated, LINK satellite field units, or (3) "hard-wired" decoder field units. The hard–wired satellite based systems shall be capable of controlling 28 channels, on each of eight (8) different two-wire communication paths. Each channel shall be capable of controlling a maximum of 672 satellite stations, or a total of 8064 (using 3 MIM interface units in Hybrid mode) satellite controller stations. The radio LINK type satellite system shall be capable of controlling four (4) different groups of LINK

satellites. A total of 112 LINK satellites shall be capable of controlling 24 stations (max.) each. Total system capacity shall be 8,064 (using 3 MIM-LINK interface units in Hybrid mode) LINK satellite stations. The two-wire satellites and LINK satellites shall be capable of expanding to 72 stations maximum, using modules of 8 stations. Total number of station outputs, for each satellite, shall be as shown on the drawings and/or as directed. The decoder-based system shall have the capacity to control a maximum of 2,000 (using 4 LDI interface units in Hybrid mode) single decoders and activate up to 4,000 solenoids.

Continuous on-line two-way communication, between central computer/interface unit and the field satellite or decoder units, shall provide true central control. Continuous field unit feedback status information shall be registered at the computer and also at the satellite interface unit. Cirrus shall be a program/schedule-based system providing maximum flexibility of programming and giving the operator absolute and full control of the entire system. The Cirrus system shall be capable of unlimited programs residing in the system at one time. Each program shall be further defined by a number of smaller schedules. A maximum of fifty (50) programs and up to 50 schedules may be operated simultaneously. All programming shall be maintained in the computer memory and on the hard drive, from which they shall be executed. Programming shall NOT be downloaded to the field units. It shall NOT be possible to change or reprogram from the field thus assuring the operator full control at all times. A time window may be defined for each individual program, confining its operation to this specific time period. Individual schedules shall be capable of being designated for up to 12 start times within the specified time window for their program. Individual programs shall be capable of being designated for up to 6 start times. It shall be possible to designate the sequence of operation of areas and the sequence of operation of stations in these areas, within a given schedule.

The Cirrus system shall provide for the selection of three (3) different flow measurement units —U.S. gallons per minute, cubic meters per hour or liters per second. It shall also provide for the selection of any one of eight (8) different languages for display.

A built-in Flo-Manager® feature shall automatically distribute and limit flow within the system, to eliminate hydraulic overload while maintaining maximum system operating efficiency. The system shall also be capable of entering complete flow management database information for up to six (6) independent pump stations; up to 250 piping network branches and up to 500 flow zones for each pump station. The system shall allow the use of a pump station monitoring software capable of providing real time data exchange with the Smart Pump feature. This shall result in the highest efficiency of pump station operation, shortest watering cycle time and conservation of water and energy. During operation, individual flow graphs shall be automatically generated, for each of the three (3) courses, with individual station activity information being presented in colorful charts. Flow graphs shall be automatically maintained on file for future access and reference.

A Rain Watch feature shall provide an intelligent rainfall reaction. The Rain Watch feature shall be capable of suspending irrigation during intermittent rainfall, and then resume irrigation with station runtimes reduced an amount equivalent to the rain that has fallen. The Rain Watch feature shall also be capable of canceling irrigation for a user definable time in the event of extended rainy conditions. To use the Rain Watch feature up to four tipping bucket rains shall be installed with one Rain Bird pulse decoder for each rain can.

The Cirrus SmartWeather™ scheduling shall monitor and respond to climactic conditions as they occur by tracking evapotranspiration (ET) rates and other sensory inputs. SmartWeather shall also track weather conditions for future reference. SmartWeather shall provide automatic response from user defined thresholds on up to 5 Weather Stations. The SmartWeather responses shall be provided to the computer for programmed response and shall be capable of sending an alphanumeric page email or text message to the user for alarm conditions.

In addition to calculating runtimes based on measured weather parameters, a Minimum ET function shall be provided which can delay program activation until a user-determined minimum ET threshold has accumulated.

The Cirrus system shall also provide for programs to be set to adhere to manual water budgeting; at the system level, at the individual program level and/or at the individual schedule level. A Watersaver™ feature shall provide water budgeting capabilities from 0 to 300% in 1% increments. Automatic rain shutdown shall be possible with the integration of a rain sensor.

The Cirrus CYCLE + SOAK™ feature should achieve maximum efficiency and water conservation. It helps control water application on slopes and in areas with poor drainage.

A dry run feature shall provide for testing of a program and will allow the user the ability to make necessary adjustments before actual operation. A printout of the dry run results shall be possible, as well as being displayed on the monitor.

A guided initialization and start-up programming method in Cirrus shall result in a customized Quick Start™ program that gets the system up and operating in a short time. Built-in rotor database tables shall provide for easy specification of station sprinklers for custom irrigation scheduling. Precipitation rates for each station shall be automatically calculated with the selection of sprinkler model, pattern and spacing. A graphic display of the golf course can be achieved using any of three (3) methods: (1) Import GPS and AutoCAD as-built drawings, (2) Create a map using the Scorecard function, or (3) Import a picture of the course as a bmp or tif drawing file. When importing AutoCAD as-built drawings, all layers of the original AutoCAD files shall be available to the user as layers in Cirrus. The layers shall provide the user the ability to measure distance and calculate areas using Rain Bird's map utilities. Each hole can be defined to indicate the areas to be irrigated such as green, tees, fairways, approaches, perimeters, roughs and miscellaneous areas. Alternatively, if you prefer, user-defined names may be used. The system shall provide for multistation programming and operation of satellite stations. A station data table shall give complete database information for each individual station. A unique QuickIRR™ method of programming shall provide for a quick and easy method to automatically build programs to meet all irrigation challenges and allow programming by specific areas and designating sequence of operation of these areas.

The Cirrus system shall be capable of direct manual access of any station, at any time. Full system remote control shall be possible with the integration of The FREEDOM™ System as well as the FREEDOM-Pad. The Cirrus system shall provide for individual course, daily and seasonal logs for record keeping and easy compliance with regulatory requirements regarding water usage. A unique Cost Estimator feature shall provide projections of water and power costs for specific irrigation cycles.

The Cirrus decoder-based system shall provide an automatic decoder and line condition testing program, for easy check-out and troubleshooting of the system.

Hardware—Computer-Furnish and install at the central location a Rain Bird "P" Series computer system, consisting of the following minimum specifications:

2.4 GHz Pentium® 4 processor
512 MB SDRAM
20 GB EIDE Hard Drive
1.44 MB floppy disk drive
Microsoft® PS2 Intellimouse
56K Internal Modem
DVD/CD ROM–R/W
32 MB Video Card
Sound card
Speakers
Quiet Key 104 keyboard
USB to Serial Adapter
Color monitor

Preinstalled software shall consist of:
The Rain Bird Cirrus program
Map Import Software
PcAnywhere Communication software
Microsoft® Windows® XP Professional

Voltage Stabilizer—At the central location, furnish and install a combination voltage stabilizer and uninterruptible power source unit. Unit shall have a rated output of 600VA and 400 Watts. It shall be suitable for 50/60 Hz operation with input power of 120VAC. Battery back-up shall have a minimum time of approximately 12 minutes minimum at half load capacity. The unit shall have four (4) electrical outlets.

Power Surge Arrestor—At the main electrical panel and on the circuit supplying the central equipment. Furnish and install a Model "Z1" Zap Trap surge arrestor. Unit shall be for 120 Volt, single-phase power rated for 100 Amps. It shall have a discharge capacity of 15,000 Amps at an 8 x 20 second pulse. It shall have a clamping voltage of 130 Volts and a response time of 1.5 N/sec. Surge arrestor shall be as manufactured by Tytewadd Power Filters, www.tytewadd.com; phone 417-887-3770.

System Grounding System—At the central control location, as close to the Interface unit as possible, install a grounding system. Install a standard 12" x 18" x 12" rectangular valve box around the top of any connections in the grounding system to a surge arrestor, the grounding lug of a piece of equipment or an MGP-1 grounding plate assembly. This shall provide future access to inspect and/or maintain it properly.

A #10 gauge or larger bare copper ground wire shall be run from the grounding lug of the MIM or MIM LINK interface unit or from the LDI in a decoder-based system, out and attached to the grounding system. On each two-wire path, coming from the interface unit or line termination box and going out to the field satellite units or the field decoders. Furnish and install an MSP-1 surge arrestor, which is to be mounted in an MGP-1 grounding plate assembly that is securely attached to the grounding system. Connect

the MSP-1 arrestor into the two-wire path. A 10 OHMS or less resistance shall be maintained at the grounding system.

Hard-Wired Interface Unit–(two-wire satellite system)—The interface unit shall be a Rain Bird Interface Module (MIM) unit with all solid-state electronic circuitry. It shall provide the necessary interface between the computer and the field satellite units. The interface unit shall provide both communication from the computer out to the field satellite units and feedback communication from the field satellite units to the computer. It shall be capable of controlling four (4) two-wire paths of 28 independent channels each. Status lights shall indicate activity on the two-wire paths, as well as to channels being operated on the various two-wire paths and the individual stations in operation on each of these channels. A memory switch shall provide for past performance data. The MIM unit shall be complete with a power supply cord and an RS-232-C communication cable to be connected between it and the serial port of the computer. The unit shall be mounted near the central computer. A #10 gauge or larger bare copper ground wire from the ground lug of the MIM unit shall be attached to the grounding system.

LINK Interface Unit–(radio LINK satellite system)**—**The interface unit shall be a Rain Bird MIM LINK unit with all solid-state electronic circuitry and two-way radio and receiver, with _____ radio frequency. It shall provide the necessary interface between the computer and the LINK field satellite units. The interface unit shall provide true two-way radio communication from the computer out to the LINK field satellite units and feedback radio communication from the Link field satellite units to the computer. It shall be capable of controlling up to 112 LINK satellites within a maximum of four (4) groups. The MIM LINK unit shall be complete with a power supply cord and an RS-232-C communication cable to be connected between it and the serial port of the computer. The unit shall be mounted near the central computer.

Furnish and install, outside on the building or on an antenna tower, near the central equipment location a Rain Bird model "ANT-02", "ANT-03" or Yagi type antenna. An RG8 type coaxial cable shall be attached to the antenna and routed into the building near the floor and near the MIM LINK unit location. Furnish and install, inside the building on the wall near the floor, a PolyPhaser Model IS-IE50LU-C1 surge arrestor to which the coaxial cable shall be connected to the antenna terminal on this surge arrestor. Furnish and install from the equipment terminal of the surge arrestor an RG8 type coaxial cable and connect it to the coaxial cable connection on the MIM LINK interface unit. Connect a #10 gauge or larger bare copper ground wire to the antenna and a second ground wire to the ground lug on the surge arrestor. Route each of these ground wires and connect them to the grounding system. Furnish and install all necessary mounting clamps, brackets, etc. as may be required for the antenna, coaxial cable, ground wires and the surge arrestor. A #10 gauge or larger bare copper ground wire from the ground lug of the MIM LINK interface shall be attached to the grounding system

Decoder Interface Unit–(decoder-based system)—The interface unit shall be a Rain Bird Large Decoder Interface (LDI) unit with all solid-state electronic circuitry. It shall provide the necessary interface between the computer and the field decoder units. The interface unit shall provide both communication from the computer out to the field decoder units and feedback communication from the field decoder units to the computer. It shall be capable of controlling, over a two-wire path, up to 500 (max.) single decoders and up to 1,000 (max.) solenoids. The LDI unit shall be complete with 117 VAC power supply cord and a communication cable, which shall be connected between the LDI interface unit and the serial port of the computer.

Connect a #10 gauge or larger bare copper ground wire to the ground lug of the LDI and route it out and connect it to the grounding system.

PAR+ES Field Satellite Units–(hard wired PAR+ES satellite system)—Furnish and install where shown on the drawings and/or where directed, Rain Bird model PAR+ES two-wire field satellite controllers. Furnish and install each basic satellite field unit for the total number of station outputs indicated on the drawings.

PAR+ Field Satellite Units–(hard-wired PAR+ satellite system)—Furnish and install where shown on the drawings and/or where directed, Rain Bird Model PAR+ PP (plastic pedestal) or PAR+ SS (stainless steel pedestal), two-wire field satellite controllers. Furnish and install each basic satellite field unit for the total number of station outputs indicated on the drawings and/or as directed.

MSC+ Field Satellite Units–(hard-wired MSC+ satellite system)—Furnish and install, where shown on the drawings and/or where directed, Rain Bird Model MSC+ PP (plastic pedestal) or MSC+ SS (stainless steel pedestal), two-wire field satellite controllers. Furnish and install each basic satellite field unit for the total number of station outputs indicated on the drawings and/or as directed.

PAR+ ES LINK Field Satellite Units–(radio PAR+ES LINK satellite system)—Furnish and install where shown on the drawings and/or where directed, Rain Bird Model PAR+ES LINK, radio LINK type field satellite units. Those satellite units with radio modem units shall be furnished with dome hood type antennas. Furnish and install each basic satellite field unit for the total number of station outputs indicated on the drawings. For those units indicated on the drawings, furnish and install CAM LINK units.

PAR+ LINK Field Satellite Units–(radio PAR+ LINK satellite system)—Furnish and install, where shown on the drawings and/or where directed, Rain Bird Model PAR+ LINK PP or PAR+ LINK/R PP (plastic pedestal) or PAR+ LINK SS or PAR+ LINK/R SS (stainless steel pedestal), radio LINK type field satellite controllers. Those satellite units, with radio/modem units, shall be furnished with dome hood type antennas. Furnish and install each basic satellite field unit for the total number of station outputs indicated on the drawings and/or as directed. For those units indicated on the drawings, furnish and install CAM LINK units.

MSC+ LINK Field Satellite Units–(radio MSC+ LINK satellite system)—Furnish and install, where shown on the drawings and/or where directed, Rain Bird Model MSC+ LINK PP or MSC+ LINK/R PP (plastic pedestal) or MSC+ LINK SS or MSC+ LINK/R SS (stainless steel pedestal), radio LINK type field satellite controllers. Those satellite units, with radio/modem units, shall be furnished with dome hood type antennas. Furnish and install each basic satellite field unit for the total number of station outputs indicated on the drawings and/or as directed. For those units indicated on the drawings, furnish and install CAM LINK units.

Field Decoder Units–(decoder-based system)—Furnish and install, where shown on the drawings and/or where directed, Rain Bird Model FD-101, 102, single decoders, FD-202, double address decoders, FD-401, four address decoders, or FD-601, six-pack decoders. All types of decoders shall be solid-state electronic circuitry and epoxy potted in a sturdy plastic case suitable for direct burial. Each decoder shall be factory set for a specific response code with code number permanently and prominently marked on the decoder case. Also furnish and install in the two-wire path, where shown on the drawings, Rain Bird Model LSP-1 surge arrestors. One LSP-1 ground wire shall be attached to the solenoid core tube and the other to a 4' copper ground rod, installed near the LSP-1 surge arrestor.

Wire—(hard-wired satellite system and decoder-based system)-Furnish and install, for the two-wire communication paths, double jacketed type wire, consisting of two tin-coated type UF insulated (4/64" PVC), soft drawn, annealed solid copper conductors. The two conductors shall be color-coded (one RED the other BLACK). The second outer jacket shall be a solid color, high density, polyethylene insulation. Jacket colors and conductor sizes shall be as shown on the drawings.

Weather Station—Furnish and install, where shown on the drawings, a Rain Bird Model WS PRO SH, direct hard-wired, Model WS PRO PH remote telephone operated or WS PRO LT radio operated, On-Site Weather Station. The station shall monitor the following daily critical weather conditions: wind direction, wind speed, solar radiation, air temperature, relative humidity and rainfall. In the SH and PH stations, sensors shall be polled every 5 seconds and the data recorded in a micrologger located in the Weather Station mast. The SH and PH weather stations shall be furnished complete with a transformer and a 12-Volt battery. The WS PRO SH shall also include calling and answering modems. The WS PRO PH shall include an answering modem. The WS PRO LT shall include calling and answering radio transceivers. For the WS PRO PH unit, furnish and install a modem and a dedicated phone line at both the computer location and the Weather Station location. For the WS PRO SH unit, the communication wire between Weather Station and central computer shall be Belden #9883 direct burial type cable, consisting of three twisted wire pairs and with metal shield. Furnish and install the necessary MSP-1 surge arrestors, to be wired into the communication wire paths and power wires, at both the Weather Station location and at the central equipment location, as well as the required MGP-1 grounding plate assemblies.

Furnish and install a grounding system, at the Weather Station location, the same as previously specified for the central grounding system.

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