Smart OSMAC® User's Guide
User Interface Software

Introduction and Application

Smart OSMAC provides the user the capability to operate the satellite in stand-alone mode with an independent irrigation program.

Initial grow-in, over-seeding or central software/hardware off-line are some of the general applications for Smart OSMAC. This product is not intended to replace the central software. The E-Series OSMAC and OSMAC RDR products do not have hardware components to maintain time in the event of a power loss. While the scheduled program and day of week will be retained after the power outage, the time will default to either 12:00 midnight or 6:00 a.m. depending on the settings that the user chose on the Power-Up Time selection within the Action menu.

The Smart OSMAC EPROM will only function in narrow-band products. Wide-band products do not have a DB9 connector to upload and download programs.

⚠ **IMPORTANT: The Smart OSMAC EPROM must be installed in the narrow-band decoder module before any download can take place. Use P/N 102-2913 for the RDR model and P/N 102-2915 for the E-OSMAC model.**

Hardware Requirements

The Smart OSMAC user interface can be executed in two platforms:

- Standard desktop or notebook personal computer (PC).

  The PC must have the minimum configuration required to run the Microsoft® Windows® 95, 98, 2000,or XP operating system. In addition, the PC must have at least one free RS232 communications port. The user interface program and its associated files will occupy less than one megabyte of PC disc space.

- Pocket PC

  The recommended pocket PC's are the Compaq iPAQ model 3600 and 3800 series which operate on Microsoft Windows CE or Pocket PC 2002 operating system. For file transfers to and from the PC, the iPAQ cradle/charger must be connected to a serial or USB port. While USB ports are standard in size, shape, and configuration, serial ports are not. Serial ports are all configured with male pins and come in two configurations. The nine pin configuration is about 3/4" wide with one row of four and one row of five pins. The 25-pin configuration is about 1 1/2" wide with one row of 12 and one row of 13 pins. Both ports operate similarly and are interchangeable with the use of an adapter cable.

  If your PC is operating on Windows 95, the iPAQ cradle/charger must be connected to the PC using the serial port. Microsoft ActiveSync does not support USB ports on Windows 95. For Windows 98 and higher, iPAQ software is compatible with either serial or USB port.

  The iPAQ power supply accepts 100–240 V a.c., 50/60 Hz, 0.25–0.35 Amp input voltage. It is not necessary to connect the power supply to a UPS, but it should be surge protected in some manner. The other end of the power supply may be plugged directly into the power jack located at the bottom of the iPAQ, into an adapter connected to the Charging/Communications port on the bottom of the iPAQ or into the iPAQ cradle power jack. It is advisable that the power is plugged into the iPAQ cradle. This ensures that the iPAQ is charging while it is in the cradle for data transfers.

  The iPAQ can fit in the cradle with or without the Style Pack (black protective sleeve). The cradle has edge extensions that can be used if the iPAQ does not have the Style Pack. The iPAQ MUST be in the cradle with the cradle connected to a PC for any data PC/iPAQ data upload and download.

Smart OSMAC Components

Smart OSMAC components consists of two related parts:

- A user interface program that will allow the user to use either a PC or a iPAQ to build and maintain irrigation programs, and a serial cable to connect from the PC (or Pocket PC) to the satellite narrow-band decoder module.

- Firmware that will accept data from the PC or Pocket PC and use the data for irrigation purposes. This firmware is maintained in an EPROM that is sold as a finished goods kit and requires installation into an existing satellite narrow-band receiver module. (Refer to **IMPORTANT** notice above).

Programming Capacity

The area of satellite memory used for irrigation programs will be allocated dynamically to accept programs with differing numbers of start times and stations. This allows optimum use of memory and more flexibility in storing data. In a typical application, 10 programs can be stored if the programs have 12 start times and 12 stations each. There is no specific limit on the number of start times or stations, but the program structure must fit into the memory constraints of the satellite.

The maximum number of programs is based on the capacity of the on-board memory and the complexity of program requirements such as start times, repeats etc. Up to 10 programs can run simultaneously with the on-board memory. The amount of remaining memory is shown in the upper right hand corner of the user interface screen and is updated after each "Save." If the program memory requirements exceed 98% of the available memory, Smart OSMAC will not download the program to the decoder card.

Note: Smart Osmac is not flow managed. Power and water availability must be taken into consideration when writing programs.

Desktop/Notebook PC Installation

To load Smart OSMAC onto a desktop PC, use the following procedures:

⚠ **IMPORTANT: If SitePro software program is installed in the PC that Smart OSMAC is being installed on, make a back-up copy of the SitePro database and make sure that SitePro is properly closed before proceeding with the Smart OSMAC software installation.**

1. Insert the Smart OSMAC CD into the CD-ROM drive. The installation wizard should launch automatically. For Microsoft Windows 95, the installation wizard might not launch automatically. If installation wizard does not launch, click on **Start** and select **Run** from the menu. Type in the drive letter assigned to the CD-ROM followed by a colon mark (e.g. **D:**). A pop-up window will appear that displays all contents of the CD. Double click on the **menu.bat** icon. A pop-up menu should now appear.

2. Click on the menu choice that installs the Smart Osmac on the computer. Follow all the on-screen prompts (accept all of the installation defaults).

3. If the installation wizard prompts you with a message to keep existing files, click **YES**.

4. After a successful installation, double click on the **S_osmac** icon to launch the software. An unlock code will be required the first time you launch Smart OSMAC. Call TORO NSN at **1-800-ASK-TORO** to activate your copy of Smart OSMAC.

5. After inputting the unlock code, restart Smart OSMAC. It should now start with the default programs displayed on the screen.

iPAQ Pocket PC Installation

Microsoft Active Syn

In order for a desktop/notebook PC to interface with iPAQ, Microsoft® ActiveSync® must be installed. Installation of ActiveSync will enable the user to copy, delete and edit files stored in iPAQ with the use of a PC. The user will also have the ability to install programs to iPAQ. After installation, the PC will be able to interact with iPAQ similar to a computer drive. iPAQ will appear in the **PC Explorer** as well as in **My Computer** as another device much like a CD-ROM or a ZIP drive.

A. Install ActiveSync from the Microsoft ActiveSync CD:

1. Turn on the desktop/notebook PC and make sure no other programs are running.

2. Insert the ActiveSync CD in the CD-ROM drive. The CD should launch the installation wizard automatically. If the installation wizard does not launch as expected, click on the **Start** menu and select **Run**. Type in the drive letter assigned to the CD-ROM followed by a colon mark (e.g. **D:**). A pop-up window with the CD contents will be displayed. Double click on the **menu.bat**. The installation wizard should now launch.

3. Follow the on-screen instructions to install the ActiveSync. Disregard warnings about unlocated devices.

B. Install ActiveSync from the Smart OSMAC CD:

1. Turn on the desktop/notebook PC and make sure no program is running.

2. Insert the Smart OSMAC CD in the CD-ROM drive. The CD should launch the Smart OSMAC installation menu automatically. If the installation wizard does not launch as expected, click on the **Start** menu and select **Run**. Type the drive letter that the CD-ROM is assigned followed by a colon (e.g. **D:**). A pop-up window with the CD contents will be displayed. Double click on the **menu.bat**. The set-up menu should now appear.

3. Follow the on-screen instructions to install the ActiveSync. Disregard warnings about not finding devices.

Installing Compaq Aero USB Drivers

The Compaq Aero USB drivers are necessary for Microsoft Windows to recognize and identify the device interfaced with the computer is an iPAQ pocket PC. Without the drivers, Microsoft Windows will not be able to determine what kind of device is installed in the USB port.

These drivers are copied to the PC during the ActiveSync installation. Once the iPAQ is connected to the computer using the cradle (make sure that the computer and iPAQ are turned on), Windows will detect a new USB device and install the Compaq Aero USB drivers. Successful installation can be verified in the PC device manager. Once these drivers are installed, ActiveSync will connect and synchronize the PC to the iPAQ.

Note: The drivers are located in the **Main\Core\INF** folder in the ActiveSync CD and in the **iPAQDRV** folder in the Smart OSMAC CD.

Finalizing Hardware and ActiveSync Setup

1. Make sure that the ActiveSync installation has been completed.

2. Make sure that the Compaq Aero USB drive installation has been completed.

3. Turn the PC off and connect the cradle to one of its USB or serial ports.

4. Make sure that the iPAQ is turned on and secured in the cradle.

5. Turn on the PC.

6. Windows should be able to find the iPAQ device and install the drivers. If prompted for the drivers location, select either the iPAQDRV folder on the Smart OSMAC CD or the MAIN\CORE\INF folder in the ActiveSync CD.

7. The setup will continue once the drivers are installed.

8. Answer **Yes** if asked to set up a partnership and uncheck any options (**Favorites** may already be checked).

9. If installation is successful, ActiveSync should indicate Connected and Synchronized.

10. If ActiveSync does not indicate **Connected**, shutdown and restart the PC. iPAQ should now connect without any problems.

Smart OSMAC iPAQ User Interface

Smart OSMAC may come pre-installed on the iPAQ upon purchase from Toro. These procedures only have to be accomplished if there was a power loss to the iPAQ, you received an updated version or you need to do an initial installation.

1. Connect the iPAQ cradle to the PC using the appropriate port and turn on the PC.

2. Insert the iPAQ in the cradle and ensure that the iPAQ is powered on. The ActiveSync should show that the iPAQ is connected.

3. Insert the Smart OSMAC CD in the CD-ROM drive. It will start automatically and display the Smart OSMAC installation menu.

4. Click on the menu choice that installs the Smart OSMAC on the iPAQ. Follow the on-screen instructions and accept all the defaults to allow the program to install itself into the proper locations.

5. Check the iPAQ when prompted and follow the on-screen instructions. If this is a new installation, everything will install without any problems. If is this an upgrade, you will have to choose the option to over-write all the files.

6. Once installation is completed on the iPAQ, click **OK** on the prompt screen and remove the CD.

7. An unlock code will be required the first time you launch Smart OSMAC. Call TORO NSN at **1-800-ASK-TORO** to activate your copy of Smart OSMAC.

Using the Smart OSMAC User Interface

PC Interface Overview

To launch the Smart OSMAC program, click on the **Start** menu. Select **Programs** from the Start menu and click on the **S_osmac** the list and click on the **S_osmac** from the sub-menu. Smart OSMAC will launch with the factory default program displayed similar to **Figure 1**.

The currently loaded file name is shown at the top center of the pop-up window. Below the window is a red cell block indicating NO SATELLITE. Upon connecting the PC to the satellite decoder card, this cell block will turn green with SATELLITE ONLINE message.

The primary user interface screen of the Smart OSMAC is shown in **Figure 1** with the default programs displayed.
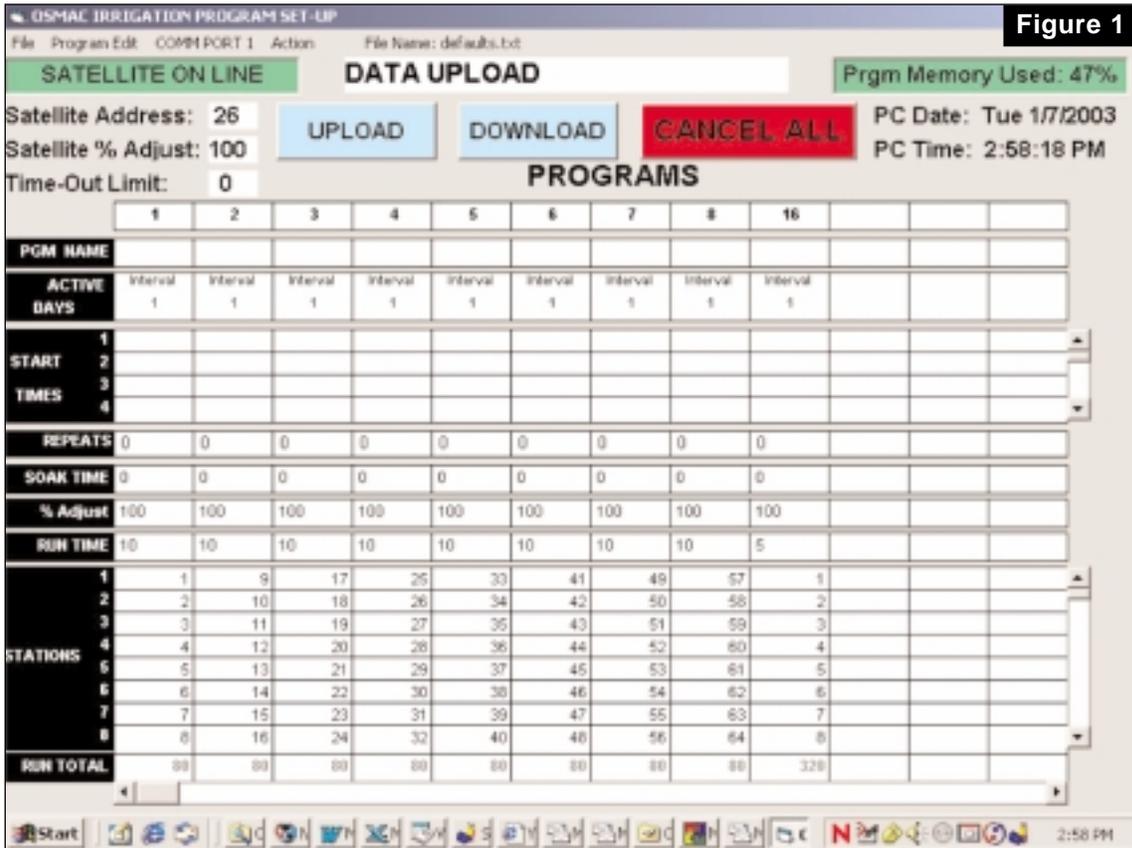
Figure 1

⚠ **IMPORTANT: Data from the satellite should be UPLOADED prior to any manual operations being performed.**

The contents on **Figure 1** are described as follows:

ROW 1 – Application identification.

Standard Microsoft WINDOWS controls to hide the screen, minimize or maximize the screen, or terminate the application.

ROW 2 – The menu bar.

The name of the current program data file.

ROW 3 – Satellite on-line or off-line indicator.

Program file description, user changeable.

Program memory use measure, 0 to 100%.

ROW 4 – The address read from the attached satellite.

    ⚠ **IMPORTANT: Satellite address can only be changed by reconfiguring the DIP switches on the satellite decoder card.**

    UPLOAD control button, visible only when a satellite is on-line.

    DOWNLOAD control button, visible only when a satellite is on-line and the set of irrigation programs occupies less than 98% of the available space.

    CANCEL ALL control button, visible only when a satellite is on-line.

    The current date and day of week, as maintained by the PC.

ROW 5 – The satellite program adjustment factor, read from the satellite, user changeable

    The current time of day, maintained in real time by the PC.

ROW 6 – The satellite time-out timer limit, in days, read from the satellite, user changeable.

ROW 7 – Program identification numbers.

ROW 8 – Program identification names (not saved in a satellite).

ROW 9 – Program active days, either interval or days-of-week.

ROW 10 – Start times, up to 16 per program. Use the scroll bar at the right to scroll for more than four.

ROW 11 – Number of repeats, 0 to 254, or 255 for unlimited repeats. The default is 0.

ROW 12 – Soak times, 0 to 255 minutes.

ROW 13 – Program percent adjustment factor, 10% to 900% in steps of 10 points.

    ⚠ **IMPORTANT: This percent adjustment only affects run times, not soak times.**

ROW 14 – Program run time, 0 to 255 minutes.

ROW 15 – Stations, up to 64 per program. (E-OSMAC = 64 stations; RDR OSMAC = 48 stations). Use the scroll bar at the right for more than eight.

ROW 16 – Program run time total, computed by the application from adjusted run time.

ROW 17 – A scroll bar used for more than 12 programs in a file.

Editing

Data in most entry fields on the main screen can be changed using normal editing procedures.

- To change the contents of an entry field, click on the entry field then enter the desired changes. Use the ARROW KEYS to navigate between the entry fields.

- Most fields contain simple numeric or alphanumeric entries. Highlight an entry then type new content to completely replace old contents.

- In most cases, the DELETE key operates normally, erasing the character under the cursor. However, for START TIME and STATION selections, striking the DELETE key will remove the entire contents of the selected field and move the remainder of the items in the column up to fill the void, thus deleting the entire start time or station number. To edit one of these fields, highlight the contents and enter the new information.

Active Days Sub-Screen

Program active day entry fields must be treated separately. When one of these fields is selected, a sub-screen will appear similar to **Figure 2**.

Select the interval in days (1–31), or click on a day-of-week letter to toggle that day on or off for a calendar schedule.

Click on OK to complete, or CANCEL to abort changes.

Note: If a number is entered in the Interval (days) field, the Calendar Week Schedule will be ignored.
Leave the Interval (days) blank to activate the Calendar Week Schedule.

Figure 2

SELECT ACTIVE DAYS FOR PROGRAM # 4

Interval (days) - |

-- OR --

Calendar Week 1 - ☐ S ☑ M ☐ T ☑ W ☐ T ☑ F ☐ S

Calendar Week 2 - ☑ S ☐ M ☑ T ☐ W ☑ T ☐ F ☑ S
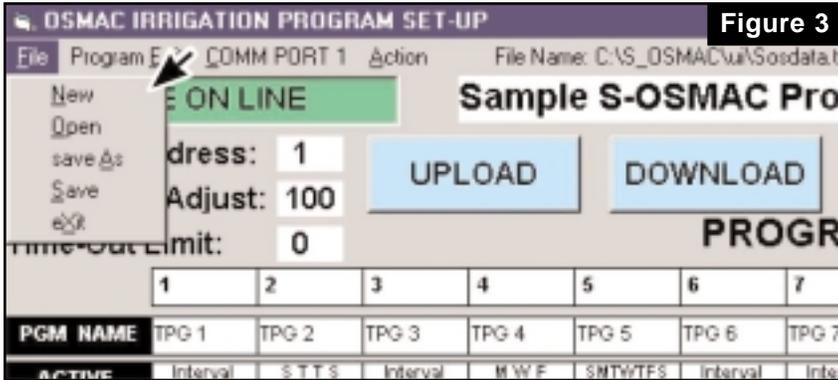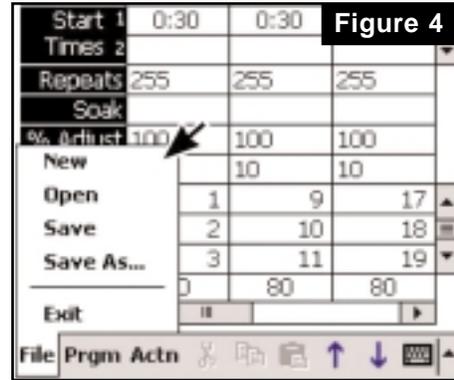
OK   Cancel

Smart OSMAC User Interface File Menu

The File operation menu (**Figure 3** for PC and **Figure 4** for iPAQ) allows the user to save irrigation programs on the PC or iPAQ internal memory or a diskette.

Use standard Microsoft WINDOWS techniques to create a new file, open a different file, save data in a different or same file or quit the application.
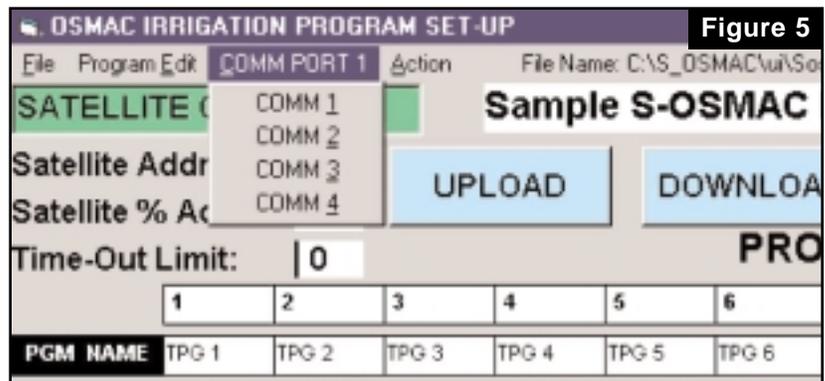

Figure 3

Figure 4

⚠ **IMPORTANT: When saving files to the iPAQ folder on the PC, make sure they are of .txt type. The Smart Osmac software on iPAQ cannot recognize files that are not of .txt type.**

It is recommended to save each satellite program data file with a descriptive name for easy identification. For example: "Satellite1.txt" or "Sat_1_OS.txt" (satellite 1 overseed program).

Smart OSMAC Comm Port Select Menu

A satellite must be attached to a PC communication port using a standard RS232 cable. Since individual PC have varying COMM port configurations, the Smart OSMAC user interface program provides a menu to select the correct COMM port designation.

Click on the **COMM PORT** menu and select the correct port designator. See **Figure 5**.

Figure 5

iPAQ Interface Overview

To launch Smart OSMAC in iPAQ, tap Start on the main screen and tap on Programs from the menu. See **Figure 6**.

The Smart OSMAC program has a red Toro logo icon labeled **S_osmac Interface**. See **Figure 7**. Tap on the icon and the software should launch with the factory default program displayed.

The currently loaded File Name is indicated at top left corner of the screen. Below this is a red cell block indicating NO SATELLITE. See **Figure 8**. Upon connecting iPAQ to the satellite decoder card, iPAQ will make a short, chirping sound and this cell block will turn green. See **Figure 9**. Tapping on this cell block will display the satellite properties screen.

There will be three status items in the satellite properties screen: Address, Satellite % Adjust, and Time-Out Limit. See **Figure 10**. You can adjust the Time-Out duration and % Adjust by tapping on these cell block.

Note: Keep in mind that just like the PC version, satellite address can only be changed through DIP switches on satellite decoder card.

The File Menu and Program Edit features (located at the lower left of the screen) are the same as PC version. See **Figure 11** and **Figure 12**. When saving files to the iPAQ folder from a PC, make sure they are saved as text files (**.txt**). The Smart OSMAC program on iPAQ cannot recognize files that are not of a text file type (**.txt**).

Note: Before upload and download options can be executed, iPAQ must be connected to the satellite using the supplied data cable. See **Figure 19**.

The Action Menu (Actn) is similar to the PC version except after completion of the upload and download commands, a pop-up window will appear on the screen to confirm completion. See **Figure 13, 14 & 15**.
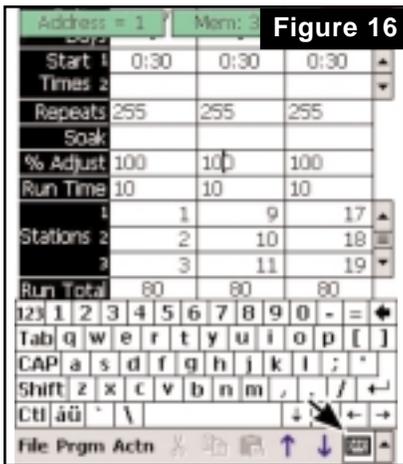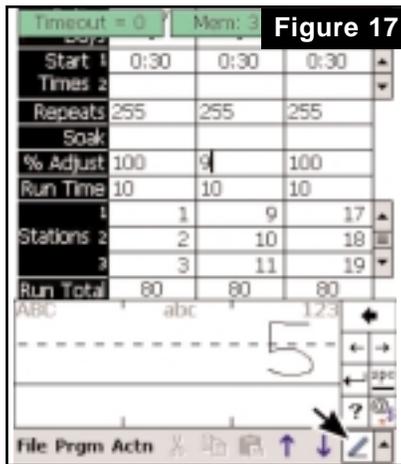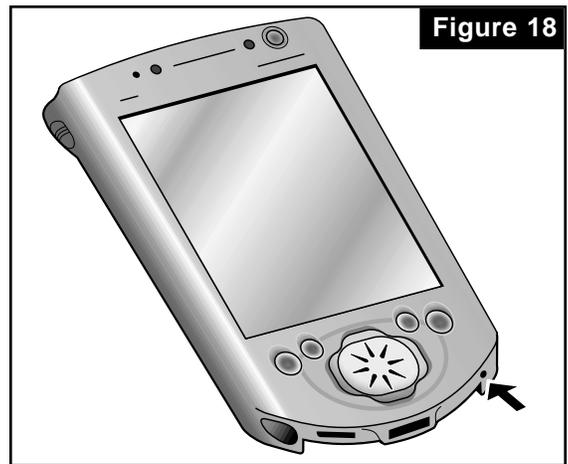

Figure 6

Figure 7

Figure 8

Figure 9

Figure 10

Figure 11

Figure 12

Figure 13
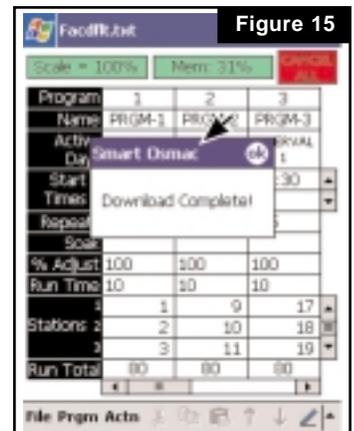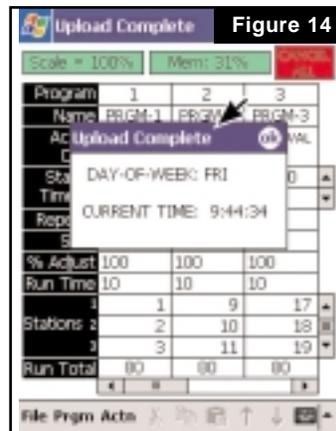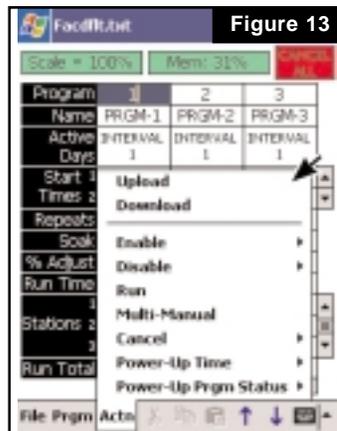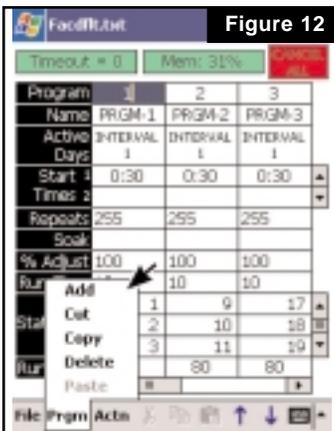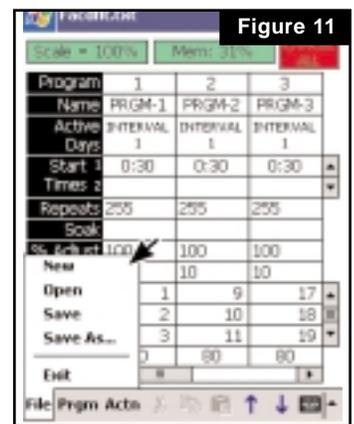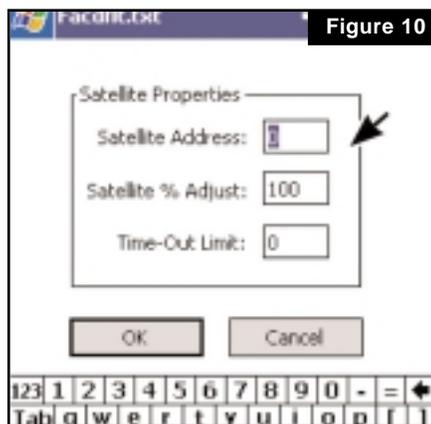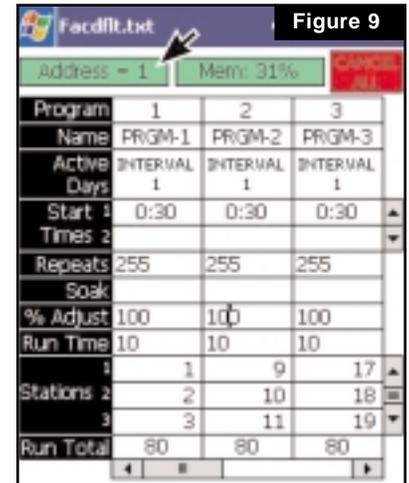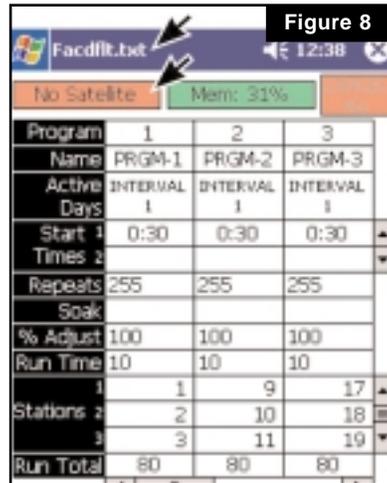
Figure 14

Figure 15

Figure 16

Figure 17

Figure 18

Creating and Editing Programs

The programs can be created or edited by tapping the cell block being edited and tapping the keyboard or pencil symbol at bottom right of screen. See **Figure 16 & 17**. Entries can be made by using either the keypad or the stylus.

Troubleshooting iPAQ

If the iPAQ locks up, press the reset button at bottom right side of the unit using the stylus. See **Figure 18**. After pressing the button, Smart OSMAC must be restarted.

Smart OSMAC Edit Menu

In addition to editing individual fields, the user interface program has several editing options that work on entire programs, such as copy, delete and insert. These options are available on the Program Edit menu (PC) or Prgm (iPAQ).

To insert a program into a position among the existing programs, click on the ID number of the program in the desired position, then click on **Program Edit** menu (PC) or **Prgm** (iPAQ) and select **Add**. To add a new column to the list, click on **Program Edit** menu (PC) or **Prgm** (iPAQ) and select **Add** when no program has been selected. The new program column will be added with the next unused program number. It will not reuse numbers of previously deleted programs.

To copy a program, click on a program ID number to select it, then click on **Program Edit** menu (PC) or **Prgm** (iPAQ) and select **Copy**. Select the new location for the program and click on **Program Edit** menu (PC) or **Prgm** (iPAQ) and select **Paste**.

To move a program, click on a program ID number to select it, then click on **Program Edit** menu (PC) or **Prgm** (iPAQ) and select **Cut**. Click on the new location for the program, then click on **Program Edit** menu (PC) or **Prgm** (iPAQ) and select **Paste**.

To delete a program, click on the program ID number to select it, then click on **Program Edit** menu (PC) or **Prgm** (iPAQ) and select **Delete**.

Smart OSMAC Action Menu

When the PC or iPAQ is connected to a satellite, the **Action** (PC) or **Actn** (iPAQ) menu of the Smart OSMAC user interface can be used to control irrigation program actions. In addition to the action menu (PC version only), three large command buttons, for UPLOAD, DOWNLOAD, and CANCEL ALL appear on the main screen to simplify operation.

Figure 19

The satellite must be powered up and connected to the PC (SATELLITE ONLINE indicated) or iPAQ (satellite properties indicated). See **Figure 19**. If connection is not established, all of the options on this menu will be inactive, the options on the menu will be grayed out in the background, and the command buttons will not appear at all.
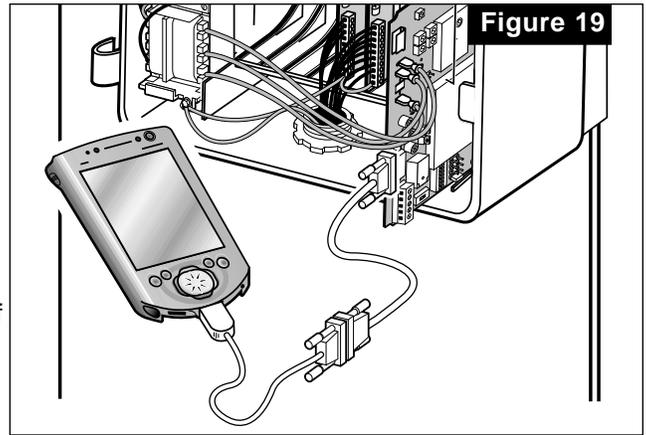
Select **Download** from the **Action** (PC) or **Actn** (iPAQ) menu to send the current program indicated by the main screen to the satellite. This procedure will also synchronize the satellite clock and day-of-week with the PC or iPAQ current time and date.

Select **Upload** from the **Action** (PC) or **Actn** (iPAQ) menu to read the satellite's current program data. The program will be displayed on the screen. This will be a "snap-shot" of the satellite's current condition, including its day-of-week and time. Uploading the satellite data will overwrite the data that was on the main screen. It will not affect any saved files.

The status of each program will be indicated by the background color of the program number field, and the status of each station will be indicated by the background color in the station number field. The color code is as follows:

Color	Status
Pink	Program disabled.
White	Program enabled. Station not running.
Green	Station running.
Blue	Program running multi-station mode.

The **ACTIVE DAYS** field for all interval-based programs will be indicated inside the parentheses the number of days remaining before the next watering day. Use **Figure 20**, program# **2** as an example.

Figure 20

Current day of week = Thursday
Current time = 3:16:51 PM
Start time = 14:00 (2:00pm)
Interval = 2 (2)

This would be mean two more days (or midnights) will pass before the next watering cycle. Next watering time will be on Saturday at 14:00 (2:00 PM).

The snap-shot screen will be static. Click on any field to switch to standard data editing. The data on the screen can then be changed as desired and saved in a file.

Click on a program ID number to select that program, then ENABLE, DISABLE, RUN, or STOP. The user can also run that program as a MULTI-STATION MANUAL.

In addition, the user can ENABLE, DISABLE or STOP all programs in the satellite.

Note: If a program has no start time(s), it will show as disabled (pink), even if the program has been designated as enable.

Downloading and Uploading a Program

To download a program, a satellite must be powered from a temporary or permanent power source.

1. Connect the PC to a narrow-band card in a field satellite with the provided serial cable. See **Figure 19**.

2. Ensure that the selector switch on the decoder card is set in the **NORMAL** position. See **Figure 21**.

3. Select **Action** and choose **Download** from the menu to send the programs (currently displayed by the main screen) to the satellite. This also sets the satellite clock and day-of-week to be the same as the PC/Pocket PC.

4. When downloading is complete, click **File** and **New** to clear the screen. Then click **UPLOAD** to verify the program was downloaded properly. The current satellite program data will be displayed on the screen. It can then be saved and edited if necessary.

Figure 21

RESET   TEST

NORMAL
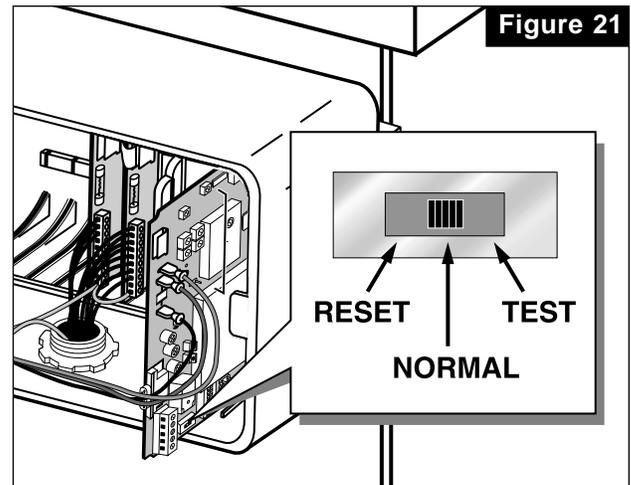
Smart OSMAC File Transfer Procedure

PC to Ipaq File Transfer Procedure

1. Ensure that the iPAQ is firmly seated in the cradle.

2. Start the ActiveSync (if it is not already running) and ensure that the display shows **Connected**.

3. Start Windows Explorer.

4. Scroll to the folder on your computer where your Smart OSMAC data files are stored (usually located in **C:\Program Files\S_osmac**.

5. Select all the **.txt** files you want to transfer to the iPAQ.

6. Click on Edit and choose Copy from the menu.

7. Scroll to the Mobile Device and left-click on the **+**.

8. Right-click on the Mobile Device and left-click on Paste from the drop down menu.

   Note: Smart OSMAC stores and retrieves the data files from the root directory of the iPAQ default. We recommend making the sub-directory called S_osmac to store and retrieve your data files. You would then paste the files from the PC to the newly created folder in iPAQ.

9. You will be notified that the file already exist and the computer will prompt to overwrite the existing files.

   Note: Choosing **Yes** will copy the files from the PC and paste it into the iPAQ folder. Clicking **No** will stop the copy and paste procedure and the original files will remain untouched.

10. Close the explorer. The data files have been successfully transferred from the PC to the iPAQ.

iPAQ to PC File Transfer Procedure

1. Ensure that the iPAQ is firmly seated in the cradle.

2. Start the ActiveSync (if it is not already running) and ensure that the display shows **Connected**.

3. Start Windows Explorer.

4. Scroll to Mobile Device and highlight it.

   Note: Smart OSMAC stores and retrieves the data files from the root directory of the iPAQ by default. If you have created a new sub-directory to store your Smart OSMAC files, you will have to double click on the folder to reveal the files.

5. Select all the **.txt** files that need to be transferred to the computer and click on **Edit** and choose **Copy** from the menu.

6. Scroll to the folder on your computer where the Smart OSMAC data files are stored (usually located in **C:\Program Files\S_osmac** and left-click on the file to select.

7. Right-click on the folder and select **Paste** from the drop-down menu.

8. You will be notified that the file already exist and the computer will prompt to overwrite the existing files.

   Note: Choosing **Yes** will copy the files from the PC and paste it into the iPAQ folder. Clicking **No** will stop the copy and paste procedure and the original files will remain untouched.

9. Close the explorer. The data files have been successfully transferred from the iPAQ to the PC.

How to override an Existing Program

When transferring an irrigation program directly from the PC or iPAQ to the satellite, and the satellite irrigation program differs from the data in the PC or iPAQ, you will need to choose whether or not to overwrite the existing satellite program. Once the procedure is done, you can then use the manual control features of the satellite. You may upload programs into the iPAQ from the satellite and then download the program data from the iPAQ into a PC.

The PC or iPAQ will set the time of a satellite from its own system clock whenever it downloads a program to the satellite. This will assure that all satellites in a system are synchronous. Additionally, satellite times will reset upon an over-the-air command from the central or from a separate PC command.

Product Attributes

⚠ **IMPORTANT: Changing status between central mode and stand-alone can be done by the following:**
- **Disable all programs to go into the Central mode.**
- **Enable one or more programs to go into Stand-alone mode.**

When in Stand-alone mode, the satellite will ignore any commands from SitePro.

The independent stand-alone program will be activated automatically if the central computer or base station fails. You can determine this time-out period from 1 to 99 days. If the central computer or base station fails to communicate with a satellite within this pre-determined time period, the satellite will revert to its independent stand-alone program. You can disable the time-out by setting the period value to 0, for example, during periods of extended wet weather when the central may be purposely shut off or during winter shutdown.

You can activate and de-activate independent programs through the following modes:

- A hand-held radio and base station

- The base station keypad

- At the satellite, using a PC or iPAQ interfaced directly to the decoder card

While operating in either central or stand-alone mode, the satellite will be able to accept commands issued via a hand-held radio if the base station is operational.

Every Smart OSMAC EPROM comes with a factory default irrigation program. See **Appendix A**. There are six programs with eight stations each. Each station has 10-minute run times starting with Station 1–8 on P1, 7–6 on P2, and so on through P6. All days are active, but with no start times. To initiate watering, a start time must be programmed and the program downloaded. Additionally, a seventh program, P7 has all 64 stations with a five minute run time.

⚠ **IMPORTANT: Since irrigation program operation may depend on day-of-week and time-of-day, the OSMAC RDR decoder card maintains a day marker and clock. The clock is accurate to approximately three seconds per day. It should be noted that in case of power failure, the OSMAC RDR will lose time of day information, since it does not have a mechanism for preserving or maintaining this information. Upon power-up, the time will reset to either midnight (default) or 6:00 a.m. You have the option to select either time. Time and day will be synchronized with the PC or iPAQ clock whenever programs are downloaded via the user interface program.**

Manual Operation

Semi-Automatic Operation

Programs can be started manually with a PC or iPAQ when connected to the decoder card or by commands from a hand-held radio. These starts will use the programmed run-times as adjusted by the Satellite and Program % Adjusts.

Multi-Station Operation

Any program can be activated multi-station manually, either from the PC or iPAQ that is connected to the decoder card or the hand-held radio. In multi-station manual operation, several individual stations can run simultaneously, in contrast to normal, sequential running under standard operation. The maximum number of stations that can run at any time is based on the type of satellite, system capacity, and limit entered by the over-the-air 8010 command. If the user selects a run time when commanding multi-station manual, that value will be used with no percent adjustment. If no run time is selected, the program run time will be adjusted by the normal factors and used. The stations in a program will run once for the selected time, with no repeats or soak time.

Note: There is a 5-second lag time when turning stations on or off to ensure the stations do not all shut on or off at the same time.

Cancel Operation

Specific programs can be stopped upon command by clicking on Cancel Selected Program or through an over-the-air command.

All running programs on a satellite can be terminated upon command using Cancel All. The Cancel All button on the user interface is very prominent to allow the user to find and execute this command quickly. Cancel All can also be activated via the hand-held radio.

Hand-Held Radio Commands

To allow hand-held radio control of satellites that operate under independent irrigation programs, while avoiding conflicts with commands issued by a Central, an additional set of commands have been added to the OSMAC repertoire. These commands have the same structure as the original OSMAC commands, but use the two-digit command code 68 instead of the original 75. See **Appendix B** for details.

APPENDIX A – Smart OSMAC Default Irrigation Program

Note: The default program shown in **Figure 1** is for an E-OSMAC satellite. Program #16 contains all satellite stations available for operation.

APPENDIX B - OSMAC Station Commands (Central & Stand-Alone)

The commands in this class govern turning on and off stations. These can be originated by a Central computer, a hand-held radio or the base station keypad. Two different command codes (cc), 68 or 75, will be recognized. The central computer generates 75 prefixed commands while commands entered on hand-held radio or base station keypad use the 68 prefix. If the satellite is in central mode, it will take either 75 or 68 prefixed commands. If in stand-alone mode, it will only take the 68 commands.

Note: As a general rule, only use the **68** commands for the hand-held radio or base station keypad commands and entering **256** as the pager number designates all satellites.

CC	FF	Description
cc	10	Turn off individual stations. Following the function code will be a list of stations to be turned off. For example, 681024262830 turns off stations 24, 26, 28, and 30.
cc	11	Turn on the individual stations. Following the function code will be a list of stations to be turned on. For example, 6811313334 turns on stations 31, 33, and 34.
cc	12	Syringe the individual stations for a predetermined time. Use command 8006 01 to set the syringe time. For example, 6812233543 turns on stations 23, 35, and 43 for the specified time.
cc	13	Disable individual stations. The stations indicated in the list attached to the command will be disabled, that is, commands to turn them on will be ignored until they are re-enabled. For example, 6813444546 disables stations 44, 45, and 46.
cc	14	Enable the stations in the list following the command. For example, 68144546 enables stations 45 and 46.
cc	15	Sequentially syringe from the first station specified to the last station specified. For example, 68151225 will syringe stations 12 through 25 individually in sequence for the period of time specified by the 800601 command. Multiple ranges can be selected using this command. For example, 6815102040485564 will run three sequential syringes, on stations 10 through 20, 40 through 48, and 55 through 64. All three will run concurrently.
cc	16	Sequentially syringe the individual stations specified after the function code. e.g., 751615202530. Multiple sequential syringes can be run; separate groups of station numbers with two dash characters (--) followed by more station numbers. For example, 681605070911---22242628 will run two syringes at the same time, the first on stations 5, 7, 9, and 11 and the second on stations 22, 24, 26, and 28.
cc	17	Turn on stations for the amount of time given in hours, minutes, and seconds. The time follows the function code, and station numbers follow the time in this command. For example, 681701150023252729 will turn on stations 23, 25, 27, and 29 for one hour and 15 minutes.
cc	18	Turn on stations for the amount of time given in minutes. The number of minutes follows the function code and the list of station numbers follows the time. For example, 68182501030507 will turn on stations 1, 3, 5, and 7 for 25 minutes.
cc	20	Terminate an increment/decrement sequential run, if one is running.
cc	21	Start an increment/decrement sequential run. An initial station can be included in the command; if none is given, the sequence will start at station 1. For example, 682115.
cc	22	Increment to the next station in a sequential run. If a number is attached to the command, that number will be added to the ID of the currently running station so stations between will be skipped. For example, 682202 will skip the next station and turn on the station after that. The sequential run will terminate when the new station number exceeds 64.
cc	23	Decrement to the previous station in a sequential run. If a number is attached to the command, that number will be subtracted from the ID of the currently running station to form the number of the new station to be run. For example, 682303 will run the station that is three stations before the one currently turned on. The sequential run will stop when the new station number is less than one.

CC	FF	Description
cc	24	Turn on individual stations as switches, i.e., do not simultaneously turn on the pump (unless an irrigation station is also energized). For example, 6824253545 turns on stations 25, 35, and 45 without energizing the pump.
cc	25	Turn on stations as switches for the time given in minutes. The time follows the function code and the station numbers follow the time. For example, 6825254205 will turn on stations 42 and 5 for 25 minutes, but the pump will not be turned on unless an irrigation station is also on.
cc	26	Turn on stations as switches for the time given in hours, minutes, and seconds. The time follows the command code and station numbers follow the time. For example, 682602303045464748 will turn on stations 45, 46, 47, and 48 for two hours, 30 minutes, and 30 seconds.
cc	40	Turn off all stations.
cc	42	Turn off all stations with sequential shutdown.
cc	43	Disable all stations with sequential shutdown. Commands to turn on stations subsequent to this one will be ignored.
cc	44	Enable all stations. All stations can be turned on after this command.
cc	46	Sequentially syringe all stations.

APPENDIX C - Over-the-Air Commands (Central & Stand-Alone)

The commands in this class allow changing system control values. They are:

CC	FF	PP	Description
80	01	nn	Set the pump station ID value to the number nn. Examples: 800125 without a password or 8001pppp25 with a password.
80	03	00	Disable all stations, i.e., commands to turn on any station will be ignored until they are re-enabled, either individually or all. Examples: 800300 without a password, 8003pppp00 with.
80	03	01	Enable all stations. This one will allow all stations to respond to subsequent commands. Examples: 800301 without a password or 8003pppp01 with password.
80	04		Change passwords. The old password must follow the function code and the new password must follow the old. For example, 800475316108 will change the password from 7531 (the factory default) to 6108.
80	06	01	Set the syringe time, in 30-second intervals. For example, 8006010100 without a password, 8006pppp0100 with, will set the syringe time to 100 intervals, or 50 minutes. The number of intervals must be given as four digits, with leading zeros, but can be no greater than 255.
80	06	02HH	Set time-out time value for default stand-alone control, in hours, where HH is 0 to 99 hours; 0 disables the watchdog.
80	07	03	Password enable flag. Command 80070301 to require passwords with other over-the-air commands, or 80070300 to cancel the requirement.
80	07	06NN	Controls irrigation programs upon power up (after power failure). If NN is 00, programs will be undisturbed. If NN is 01, all programs will be disabled (satellite in central mode).
80	07	07NN	Controls clock time on satellite upon power up (after power failure). If NN is 00, the clock revert to midnight. If NN is 01, the clock will revert to 6:00 AM.
80	08		Configure as switches the stations following the command. Stations can be specified individually or in a range, and both specifications can occur in the same page. For example, 8008011250-60 will configure stations 1, 12, and 50 through 60 as switches. Note, only a single dash character is used here.
80	09		Configure the stations identified in the command for irrigation. Stations can be given individually or as a range in the same command. For example, 800901-204546 will set stations 1 to 20, and also 45 and 46 as Irrigation stations.
80	10	NN	Set the maximum number of stations that can run at any one time. For example, 801009 will set the maximum so that only nine stations can run simultaneously.

80	11		Reset the EEPROM to factory defaults.
80	12	HHMMFF	Set the current time, where HH is the hour value, MM is the minute value, and FF is 01 for AM, 02 for PM, or 00 or missing for 24-hour notation. The default is12 midnight, 24-hour notation.
80	13	DD	Set day-of-week to DD ; Sunday = 01, Monday = 02, etc. The default will be 01, Sunday.
80	14	PPP	Set satellite percent adjust to the value PPP, 0 to 900 in steps of 10 points.
*1			Sends command 752201 or 682201 to satellite. Shuts off current station being tested and increments station number in test mode by one.
*1n or *10n			Sends command 75220n or 68220n to satellite. Shuts off current station being tested and increments station number in test mode by n.
*2			Sends command 752301 or 682301 to satellite. Shuts off current station being tested and decrement the station number in test mode by one.
*2n or *20n			Sends command 75230n or 68230n to satellite. Shuts off current station being tested and decrement the station number in test mode by n.
*4			Shuts off all stations to satellite.

APPENDIX D – Irrigation Program Commands (Stand-Alone)

CC	FF	Description
70	10 NN	Disable program NN (To disable all programs, NN=99. For example, 701099)
70	11 NN	Enable program NN (To enable all programs, NN=99. For example, 701199)

⚠ **IMPORTANT: Changing status between central mode and stand-alone can be done by the following:**
- **Disable all programs to go into the Central mode.**
- **Enable one or more programs to go into Stand-alone mode.**

When in Stand-alone mode, the satellite will ignore any commands from SitePro.

70	12 NN PPP	Change the percent adjust factor for program NN to PPP, where PPP is between 010 and 900. The adjust factor must be given in three digits.
70	13 NN TT	Change the run time for program NN to TT, where TT is between 1 and 99 minutes.
70	20 NN	Stop program NN, if it is running.
70	21 NN	Program NN manual start.
70	22 TT NN	Program NN Multi-Station manual start; multi-station start program NN for time TT (minutes). For using program's current run time, use TT=99. All stations within specified program will turn on simultaneously unless otherwise specified (see command 8010NN).

APPENDIX E – Changes and Additions to OSMAC Architecture

In addition to resident programs and the new commands described above, the following changes have been made to OSMAC architecture in the Smart OSMAC implementation.

- Previously it was necessary to turn off power to the decoder card before resetting processor memory items to their factory defaults. For Smart OSMAC it is only necessary to move the card's slide switch to the RESET position while power is on. The processor will turn the LED off, reset data in the memory then turn the LED on again. This process can take as long as 10 seconds. The slide switch can be returned to its center position at any time. If the slide switch is left in the RESET position, memory will be reset each time power is cycled. Memory will be reset only once when the switch is placed in the RESET position. The over-the-air memory reset command, 8011, still operates as it did in earlier versions.

- In all prior versions of OSMAC, satellite address was computed from the decoder 8-bit switch-pack only when power first came on. In order to change address, it was necessary to recycle power. For Smart OSMAC, the processor monitors the switches constantly, and recomputes the address whenever the switch setting changes.

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