

## **Warranty**

### **Limited Warranty**

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### **Warranty Disclaimer**

Remote Data Systems makes every effort to illustrate and describe its products accurately. Such illustrations and descriptions are for the sole purpose of identification, and do not express or imply a warranty that the products are merchantable, or fit for a particular purpose, or that the product(s) will necessarily conform to the illustrations or descriptions. Remote Data Systems does not express or imply any warranty or affirmation of fact other than that in the limited warranty statement made above.

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Many products sold by Remote Data Systems are warranted to "Consumers" by their manufacturer. Copies of such manufacturer's warranties are supplied with the product, or are available from the manufacturer. Products sold by, but not manufactured by Remote Data Systems, will be warranted to the extent of and in accordance to the terms and conditions of the respective equipment manufacturer.

### **Entire Agreement**

No terms, conditions or warranties other than those stated here, and no agreement or understanding, oral or written in any way purporting to modify these terms and conditions, whether contained in buyer's purchase order or elsewhere, shall be binding on Remote Data Systems.

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## WL Series Installation

### Important

- Installation Personnel - **read all instructions** *before* installation.
- Transport WL Series units in the shipping boxes or protective tubes to **protect the unit against accidental damage** which can occur during field transport.
- WL Series **units tend to accumulate static charges** when transported open, which can result in damage to sensitive electronic components.
- **Dropping or rough handling can crack the PVC housing** and expose the electronics to the environment, permanently damaging the instrument.
- **Stepping on the WL Series Probe can crack the PVC housing**, destroying the unit.
- **Install the Optic Port in a North-South orientation**, not East-West, to lessen direct sunlight overriding Infrared Download.
- If the installation requires the unit be tethered or tied into position, **Do not use metal strapping, metal pipe clamps, or 'U' bolts**. We recommend PVC or Polyethylene Duct Strapping, available at local hardware stores.
- **Always position the WL Series Calibration Point at or above expected high water level** to avoid flooding the battery compartment.
- **Always keep the vinyl cover over the Infrared Optics** when not downloading.

### Preparing to go to the installation site

**Carefully open and remove the WL Series and its Well Screen from the shipping box, and remove all packing material from the Probe and inside the Well Screen.**

**Note:** WL Series are sometimes shipped with additional packing inside the Well Screen, depending on location, distance, and/or method of shipping. Every effort is made to ensure these units have been identified on the outside of the Shipping Box, but the installer should inspect the Probe and the inside of the Well Screen prior to installation.

### At installation site

**1 Auger a hole to the desired depth, sufficiently sized to allow the Well Screen to slide in unobstructed.**

**2 Remove the WL Series and its Well Screen from the container.**

- All packing from the Probe or inside the Well Screen should be removed.

**3 Install the Well Screen into the augured hole to the calibration point.**

- Observe same accepted practices required when installing a manual piezometer.
- Check to insure that the calibration point is level with the ground surface or other reference point.

**Note:** The estimated high water level should not go above the "Calibration Point" label on the Well Screen. This point represents "0" for the WL Series calibration and water levels above "0" may not be recorded with reliability. Also, high water above the "Calibration Point" can possibly flood the battery compartment causing premature battery failure.

- Utilize a desired backfill material or native soil to properly pack around the Well Screen.
- Remove all soil and/or debris from the top of the Well Screen.

**4 Place the 11/2 x 3 inch reducer on the Well Screen.** ( 11/2 x 11/2 inch coupling for the WL20).

- Connection should be a firm fit and completely seated against the Well Screen.

**Note:** These reducers have been modified to match the WL Series "*Calibration Point*". Do not use a standard "off the shelf" reducer as a permanent replacement.

**5 Place the WL Series assembly into the installed Well Screen.**

- This connection is loosely fitted, but the WL Series assembly should be firmly seated at the bottom of the socket.
- Verify the level of the calibration point on the Well Screen, as installed.

**6 Using the HP48, confirm proper unit operation by downloading the WL Series using the procedure discussed in Using the HP48 with the WL Series.**

- The HP48 screen should show:

Serial Number  
Time of last Download  
Date of last Download  
Time of Next Scheduled Reading  
Date of Next Scheduled Reading  
Water Level of Last Reading

**Note:** If the display screen shows **S0** followed by erroneous date and time information, this indicates an improper download, usually caused by misalignment or movement during Data Transfer, or, bright reflected sunlight.

- If the unit was scheduled to alarm during transport while the Well Screen and Probe were dry, the last scheduled data reading will most likely be a negative or minus number.

**Example:** -41 for a WL40.

Minus numbers indicate inches below calibration point.

**7 If you experience problems, retry your download procedure.**

- Proper alignment of the HP48 at the optical port is very important. Align the small raised arrow, located above the HP logo on the HP48, flush with the top of the WL Series Optical Port and centered left to right.

**8 Do not allow direct sunlight into the optical port of the WL40.**

- Verify the WL Series is aligned North-South and not East-West.
- During bright sunny days, reflected sunlight from light colored clothing can keep the WLxx from downloading properly to the HP.

**Example:** When attempting to read the unit, the error message **Bad Read Try Again** comes up on the screen.

- In extremely bright conditions, you may need to partially cover the upper and lower open portion of the Optical Port with your fingers, as illustrated.



**9 If you continue to experience difficulty downloading your WL Series, call Tech Support at (910)640-3349.**

## Using the HP48 with the WL Series

### Important - Please read

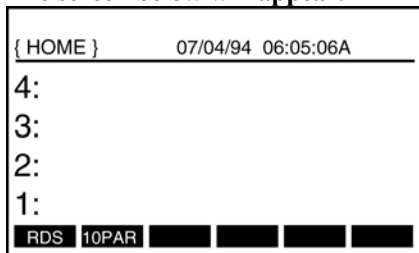
- The **HP48G+** has available memory, 128k, to retain **95** downloads of well data; after that it can give an "Insufficient Memory" message.
- The **HP48GX** has available memory, 128k, to retain **100** downloads of well data.
- **Failure to maintain HP48 working memory can give an insufficient message memory and can result in loss of DATA!**
- **Transfer DATA before you exceed these limits!**
- **Custom User programs may reduce available memory.**
- *Read Purging records from the HP48.*

### Downloading the WL Series

#### Power Up

**1 Start the HP48 by pressing the [ON] key.**  
Bottom-left on keyboard.

**The screen below will appear.**



**2 Check the {HOME} directory.** *Shown at top of screen in braces.*

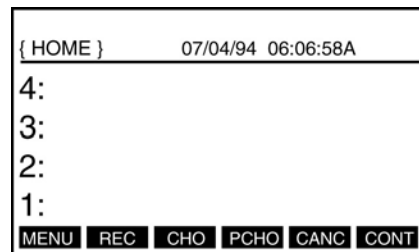
**Note:** The RDS program resides in the **{HOME}** directory. If you are in another sub-directory, getting back to **[HOME]** is done when you press the **[green right-shift]** key followed by pressing the **{HOME}** key (written in green above the 3rd button down on left).

**3 Press and release the WHITE Menu Key directly below the RDS item on the menu bar.**

- This changes to the **{HOME RDS}** sub-directory which contains communications routines for the HP48.

**Note:** All routines for communicating with your automated well are in the **RDS** sub-directory, leaving the **Home** Directory of the Hewlett-Packard available for your custom sub-directories.

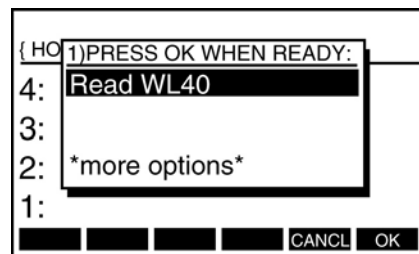
**The bottom of the menu bar display should now read:**



#### Selecting Menu Options (The White Keys)

- The row of white keys at the top of the HP keyboard correspond to the commands displayed in the Menu Bar, across the bottom of the display screen.

**4 Press the white key below the MENU command.** **The screen appears as shown below.**



**5 Remove the cap protecting the infrared Optical Port on the WL Series.**

**6 Locate the molded, raised arrow, at the top of the calculator above the logo and align the arrow center with the top of the Optical Port. While maintaining alignment, press and release the white key that corresponds with the [OK] command.**

**7 For ten seconds, audible tones-one tone for each 128 readings, and an annunciator in the upper right corner of the screen will signal incoming data.**

- A series of rapid tones signal completion and a message prompt will appear on the screen indicating download is complete.

**8 Replace the Vinyl Cover over the Optical Port.**

- Keep the vinyl cover over the Infrared Optics when not downloading.

**Following the series of rapid tones, the display should show:**

Serial number  
Time download occurred  
Date of download  
Time of next scheduled reading  
Date of next reading  
Water level of last WL reading

*A negative water level number indicates inches below calibration point.*

**9 This display remains on the screen approximately 10 seconds. Verify the time and date on the display to ensure a proper down-load.**

**Note:** An **S0** (serial # zero) in the serial number signifies an "Incomplete Download". Also audible tones more than four seconds apart signify an incomplete download operation.

Press the **[ON]** button to CANCEL the operation. Press the **Menu** key, then press the **OK** key to **Read WL40** again and repeat the verification to ensure a proper download.

**10 All 510 data points stored in the WL Series have now been transferred to the HP48.**

This includes the WL serial number, time and date stamp, and 510 well readings. This data remains in the WL Series memory and is not affected or erased by downloading.

**Note:** Downloading during an Alarm can cause the WL unit to stop collecting data.

When a download is attempted during the Alarm or "Read" cycle, the download has priority, causing the WL to miss a timed event cycle. The WL Series continues waiting for that time to arrive. Since this could be an historical event, in the past, the result is stopping the "Time of Next Alarm".

This can be avoided by reading the HP48 display, after download, to verify the "Time of Next Alarm" is dated and timed in the future, not the past.

**11 The HP48 returns to Read WL40 Screen after downloading and may be switched OFF, [green right-shift key] followed by pressing the [ON] key, between downloading wells.**

All downloaded data can be viewed on site or retrieved at a later time. See *Viewing WL40 Data with HP48*.

**Alternate Method:** To view well data without going through the menu pages, press **CHO** to choose a well. Use the arrow keys to select the specific well. As above, use **CONTI** to continue through the data, and **CANC** to cancel the present well in order to select another well or to select the **MENU**.

### How to set Time and Interval on WLxx

**1 Verify that Time and Date are correct.**

• If they are not, refer to **Time Management** in the *Users Guide* or **Starting Time and Date** in the *Quick Start Guide*. Both manuals come with the HP48G(X).

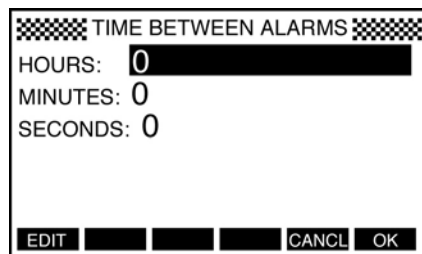
**Note:** When setting the time on the HP, use only **am** or **pm**. **Do not use 24-hour time.**

**2 Proceed to the {Home RDS} sub-directory and press the white key that corresponds to the MENU.**

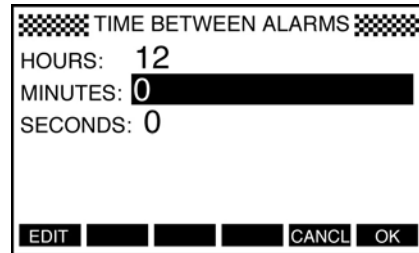
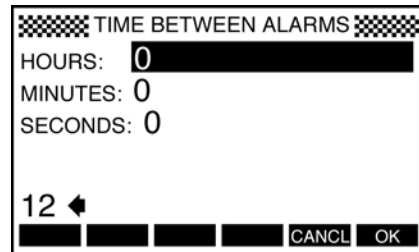
**3 From page 1) arrow down to \*more options\* and press the white key corresponding to OK.**

**4 From screen 2) arrow down to \*more options\* and press OK.**

**5 Again from page 3) arrow down to \*more options\* and press OK. The last options are setting the Time Between Alarms and the Time of Next Alarm.**



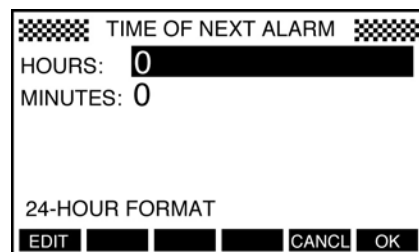
**Example:** With the HP48 set to the correct time and date, assume you would like to set the WL40 for two readings per day at 8 am and 8 pm. Set the **Time Between Alarms** to 12 Hours by entering **12** and pressing **OK**.



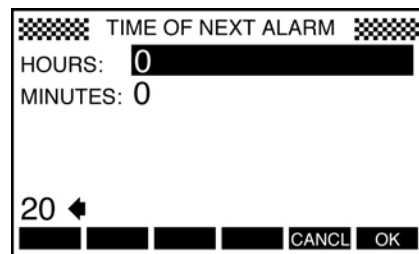
**6 Pressing OK, on Minutes with the default zero, takes you to the next screen Time of Next Alarm.**

**Note:** When you set the **Time Of Next Alarm**, because the WLxx uses 24-hour format, you need only enter the one- or two- digit time in the **Hours** field.

**Example:** For 8 am, enter **8**, not **800**; for 8 pm, enter **20**, not **2000**.



**7 If the current time is past 8 am, enter 20 in the Hours Field, which represents 8 pm in the 24 hour format or military time. Choose OK.**





TIME OF NEXT ALARM

HOURS: 20

MINUTES: 0

24-HOUR FORMAT

EDIT CANCEL OK

**8 Press OK for the zero in the Minutes Field which brings up the final screen.**

08:00:00 MON 07/04/94

Next Alarm

Correct

Incorrect

CANCEL OK

The final screen shows the time of the next alarm and asks if it is correct.

**9 Before pressing OK, position the HP48 infrared arrow flush with the top of the WL40 infrared port.**

**10 Press OK.**

• For the next 15 seconds, you will see an icon displayed, four short bursts, in the upper right of the screen. The HP48 screen will display **Finished Setting Time, Next Alarm, and Interval** and give an audible signal at completion.

**Note:** This audible beep only indicates the HP48 is complete; there isn't any "Handshake" between the units. Always check the reprogrammed WL Series for correct time, next alarm, and interval, by immediately downloading.

**11 Press the MENU key, position the HP48 infrared arrow flush with the WL Series infrared port and press OK to Read WL40.**

• After downloading, the display screen should show the corrected changes.

### Sampling Interval Change Precautions

When programming the WL Series for *"Time of Next Alarm"*, ensure that the next alarm time is a future event.

Setting the next alarm for a time in the past is an historical event- one which has already occurred, and the WL Series will behave as though the unit has been "switched off", since this event has past and will not occur again.

**Example:** The WL Series references it's next Alarm with a 24-hour clock, starting from the instant past midnight of the current day. Suppose at 8 am you wanted the WL Series to start taking readings at 9 am today, you would enter the **Time of Next Alarm** as 9 hours.

**Example:** If in the same circumstance at 8 am, you wanted to set your **Time of Next Alarm** at 7 am each day, then you would enter 31 hours- the cumulative total of today's 24 hours plus 7 hours the next day.

When downloading data, after the alarm has been changed, data will reflect the new Alarm Time interval. Field notes should record when the interval was changed along with other pertinent information such as well location.

**Note:** Always download the WL-Series prior to changing alarms times. This allows one last recording of the latest data, at the original time interval, with time and date information.

### Purging records from the HP48

Each time you read the WL40, the data file goes into the REC sub-directory on the HP48 and remains in memory, even after downloading to your PC.

To prevent repeated data files from being downloaded each time you transfer data to the PC, and to regain maximum memory for field downloads, it is

a good idea to purge the transferred data files from the **REC** sub-directory.

**Note:** Be sure you have successfully downloaded and processed your data to the graph stage before purging the HP48 REC sub-directory.

Only when you're sure you have a valid copy of your data in your PC and it has been successfully processed, use the following steps to purge your REC sub-directory.

**1** From **{HOME}**, press the **RDS** sub-directory, followed by pressing the **REC** sub-directory. You should see **...ME RDS REC }** across the top of the HP48 screen. Your data files are stored here.

```
...ME RDS REC } 07/04/94 06:50:47A
4:
3:
2:
1:
SC9C7 SC9C8 SC9C7 SA356 SC983
```

•Files listed across the bottom of the screen should all start with S which stands for serial number. If you are not in the **REC** sub-directory, you could erase your programs, analogous to typing **ERASE \*.\*** in the wrong sub-directory on your PC.

**2** From the **REC** sub-directory, change to the Alphabet Lock mode by pressing the Greek letter alpha key twice, **α** (the fourth key up from bottom left). The alpha annunciator appears in the upper part of the screen. Type **V A R S** and press **[Enter]**.

```
...ME RDS REC } 07/04/94 06:52:30A
2:
1: { SC9C73.5 SC9CB1.4
    SC9C73.3 SA356B.2
    SC9B33.1 }
SC9C7 SC9C8 SC9C7 SA356 SC983
```

**3** This displays a list of all your data files on the HP48 screen.

```
...ME RDS REC } 07/04/94 06:51:44A
3:
2:
1:
VAR:
SC9C7 SC9C8 SC9C7 SA356 SC983
```

**4** Press **[purple left-shift]** key followed by the **PURG** key (the **EEX** key), to purge the list of data files.

```
...ME RDS REC } 07/04/94 06:53:23A
4:
3:
2:
1:

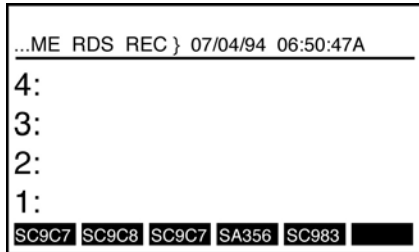
```

Return HOME by pressing the **[green right-shift]** key then the **HOME** key (third key down from top left).

```
{ HOME } 07/04/94 06:05:06A
4:
3:
2:
1:
RDS 10PAR
```

## How to purge a single file from the HP48

1 From {HOME}, press the RDS sub-directory, followed by pressing the REC sub-directory. You should see ...ME RDS REC} across the top of the HP48 screen. Your data files are stored here.



2 From the REC sub-directory, press the {HOME} key and the {Serial Number} you wish to purge. The serial number will appear at the bottom left side of the screen with a flashing arrow beside it. Press the {Enter} key and number will move to the bottom right of the screen.

3 Then press [purple left-shift] key followed by the PURG key (the EEX key). This will remove the one data file you've selected.

4 To return HOME press the [green right-shift] key then the HOME key (third key down from top left).

## Routine Care and Maintenance

### Important

□ **Save these instructions and follow all cautions and instructions in this manual**

□ **The Probe should be minimally cleaned 2x annually, depending on local conditions.**

- Use a damp cloth, clean water, or non-abrasive cleaners to remove loose dirt, debris, and accumulated deposits from the Probe.
- We recommend "409", "Fantastic", "Windex", and/or mild soap and water.
- Never use sandpaper, abrasive cleaners, acetone, or petroleum based products.

□ **This can be followed by an application of "Rain-X".**

- Saturate a soft cloth or paper towel with Rain-X solution. Apply to the PVC Probe section of the WL, avoid the Copper Wire.
- Wipe dry with a clean dry cloth.
- A second application is encouraged to ensure uniform coverage.

□□ **Be careful when handling a WL product since it is a sensitive instrument.**

- Do not place a WL product on an unstable surface. If the product should fall, it may become seriously damaged.
- Do not allow anything to rest on the exposed probe.
- Do not put this product where the probe could be stepped on.
- The WL should never be placed near or over any objects which produce heat.

□ **This product is powered by a standard "D" cell battery, however, we only recommend the Panasonic Alkaline "D" Cell, P/N AM-1P1X 1.5V as a replacement, rated for industrial use.**

□ **Never drill holes or otherwise puncture the housing, as this may result in moisture intrusion or damage to sensitive wiring and/or electronic components.**

□ **Exterior cleaning, replacing the Battery Clip, and replacing the "D" cell battery are customer serviceable items.**

If you suspect the product is not in proper working order, seek assistance from Customer Service, (910) 640-3349, especially under the following conditions;

- The probe has been damaged; bent, flattened, or has visible signs of leakage, (evidenced by the presence of a light blue-green liquid or salt crystal deposits).
- The product has been dropped or the housing appears to have been damaged.
- There is a distinct deterioration in performance, indicating a need for service.

□ **The WL series is rated for ambient temperatures ranging from -20oF to 115oF. Ice formations on the Probe can result in erroneous data.**

## Transporting the WL Series

If our Customer Service department has learned anything, the WL Series is at the greatest risk while being "safely" transported between data locations. This is when your guard is down, and the WL is most likely to be damaged.

**Please be aware of the following precautions;**

**Stepping on a WL series Probe can bend the Probe or crack the PVC housing.**

- A bent probe can sometimes be straightened, depending on whether or not the PVC housing has ruptured. Broken PVC around the Probe allows the electrolyte to leak and is beyond repair.

**Dropping a WL can crack the upper PVC housing, expose sensitive IR optic electronics to the environment, or break the Battery Clip.**

- The Battery Clip can be replaced but, repairing the PVC housing depends on severity.

**Rough handling can cause the Probe to crack.**

- Especially in cold weather and primarily in the area of transition, from Probe to the Black Sleeve.

**WL series units tend to accumulate static charges when transported open, especially in cold dry air.**

- Although this could result in permanent damage to electronic components, the primary symptoms are missing alarm cycles or premature discharge of the battery.
- Store the unit inside your vehicle or a protective container when transporting

**Just as you would protect any other valuable instrument, please exercise precautions when transporting a WL, to protect against accidental damage.**

☐ **When transporting the WL Series using a public carrier, always; use the original shipping box or a protective tube and**

☐ **stabilize and protect the container interior to guard against rough handling.**

## Changing the WL Series Battery

Your WL Series product is powered by a single "D" cell, 1.5 VDC battery. Field trials and customer history indicate a 1 year interval between changes.

Primary factors that can influence this cycle time are the frequency of downloads, moisture intrusion, and/or extremes of environmental temperature.

We recommend scheduling a battery change annually, between project studies, or if the voltage drops to 1.45V or less. (Check voltage with AC/DC DIGITAL Voltmeter).

**Note:** Battery replacement is a standard "D" cell battery, however, we only recommend the Panasonic Alkaline "D" Cell, AM-1P1X 1.5V as a replacement, rated for industrial use. This has proven less prone to failure and leakage than other manufactured models tested. These can be purchased from **Remote Data Systems** or your local source of quality industrial supplies.

The housing on your WL was designed to isolate the electronics from moisture intrusion opportunity, but failure to properly observe the removal and installation procedure of the battery, gasket, and cover can reduce the expected life of the battery.

**1 With cover and gasket removed, the old battery should be removed by first lifting the positive end, as illustrated. Inspect the compartment and battery clip, clean if necessary.**



**2 Battery replacement is the reversed procedure, starting from the top of the clip, slide the negative (-) end into the clip against the coiled spring. With a rolling motion, the positive end (+) can be pressed into position.**

- The installed battery should appear as in this illustration:



- When completed, use the HP48 and confirm unit operation by downloading. Use the procedure discussed in *Using the HP48 with the WL Series*

### **3 Replacing the cover requires;**

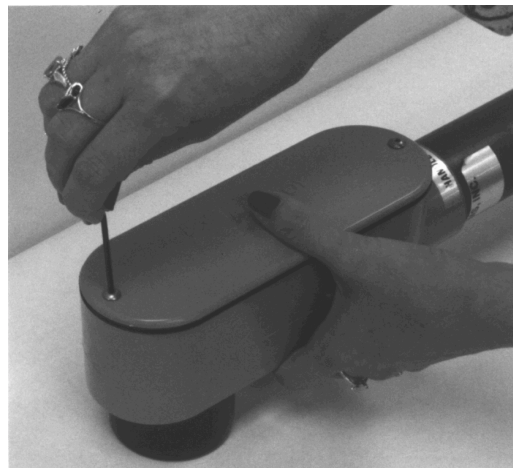
- (1) Cover
- (1) Flat tip screw driver
- (1) Gasket, if the original gasket is torn or damaged a replacement should be used
- (2) #8-32 x 1/2 Brass Screws ( Do Not Use standard Machine Screws )



- The battery compartment cover is secured using the (2) #8-32unc x 1/2 long Brass Screws, which, require a Flat Tip Screw Driver to tighten.

**Note: Do not over-tighten screws!**

Moderate torque is sufficient to seal the compartment from the environment.



**4 Place the gasket on the cover and install the cover over the WL battery compartment. Grasp the cover and unit, placing your thumb in the center as illustrated, and apply pressure with your thumb.**

**5 Use the Flat Tip Screw Driver to tighten both screws to a moderate torque, or pressure.**

**Note:** Over-tightening can cause the cover to lift, or bow, during rapid and extreme temperature changes.

**Hint:** On a closed unit, the gasket edge should appear uniform in thickness.

## Loading Serial Link/RDS Software into your PC

This Section walks you through installation of the software required to exchange Data between your personal computer and the HP48.

The Serial download Software Kit allows communications between the HP48 Calculator and a 100% IBM compatible Personal Computer. Well data can be transferred into your PC and converted to comma delimited ASCII format, allowing easy transport into many of today's popular software packages; ie; Harvard Graphics, Quattro Pro, Excel, MS Works, and others. Using your favorite spreadsheet or modeling software, the user can analyze results, produce graphic illustration, generate reports, and transport data by disk or modem without the errors associated through manual keypunching.

### Minimum System Requirements

- 100% IBM compatible Personal Computer
- MS-DOS ver 3.1 or { optional } MS Windows ver 3.xx or Windows 95 640 kB RAM
- Hard Disk Drive with 2MB of available storage 3.5 DS/HD Floppy Disk Drive
- Available COM\_ Port with 9 or 25 Pin male connector
- Hewlett-Packard HP48G+ or HP48GX
- 4 to 9 Pin Serial Adapter Cable (optional 25 to 9 Pin converter may be required)
- 3.5 DS/HD diskette with PC Serial Link / RDS software

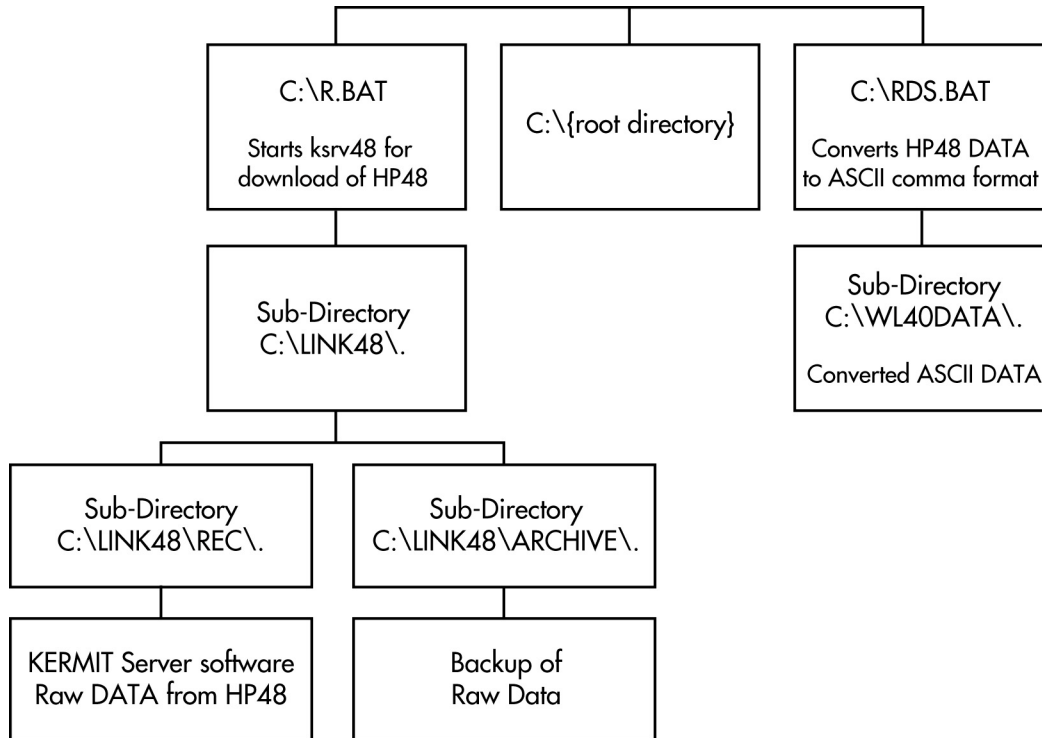
**Note:** A majority of manufacturers, desktop and laptop, provide a 9 Pin Connector for the COM\_ Port and we assume your system is similarly equipped. Our software interface Kit provides a standard 4 to 9 Pin Serial Interconnect Cable configuration.

**Note:** Customers using a network system, may encounter some difficulty, establishing communications with the HP48 and their PC. We have found that the software works better on a "stand alone" PC.

If you have the 25 Pin Connector, 25 Pin to 9 Pin converters are available from quality suppliers of electronic parts and services, purchased at retail electronic stores such as Radio Shack, Walmart, etc., or if you prefer, call our Tech Support at (910) 640-3349 and we'll help you locate one.

## How the Remote Data Systems installation disk works

The 3.5 DS/HD diskette provided with your Serial Communications Kit creates the necessary sub-directories and copies these required files during installation.



### Loading software under MSDOS ver3.xx

#### 1 Insert the 3.5 DS/HD Serial Link Software Diskette into disk drive A: or B:

- Only (1) diskette is required.
- Serial Link Software will set up the HP communications capability and RDS Software (converts Digital Data stored in the HP48 to Comma Delimited ASCII Text).

#### 2 Change the default drive to A:\ or B:\ depending on which drive you are using by typing A:(or B:) and press **[ENTER]**.

- Setup will prompt you that installation of software is complete and you will be returned to the MS-DOS prompt. Store diskette in a safe place.

#### 3 Installation complete.

- Remove Setup Disk from Drive A:\ {or B:\} and store in a safe location!
- Press any key when complete....

**Note:** Instructions on using the installed software are titled; *Downloading HP48 data into your Personal Computer*.



### Loading software under Windows ver3.xx

#### 1 Insert the 3.5 DS/HD Serial Link Software Diskette into disk drive A: or B:

- Only (1) diskette is required.
- Serial Link Software will set up the HP communications capability and RDS Software (converts Digital Data stored in the HP48 to Comma Delimited ASCII Text).

#### 2 From MS Windows Program Manager level, select [Start] from the menu bar, then select Run. Windows will prompt you for the File Name.

#### 3 Type a:\SETUP, and press [ENTER]. This setup routine will install the necessary communications software onto your hard disk drive.

#### 4 Installation complete.

- You will be returned to the MS-DOS prompt. Store diskette in a safe place.

**Note:** Instructions on using the installed software are titled; *Downloading HP48 data into your Personal Computer*.

### Loading software under Windows 95

#### 1 Insert the 3.5 DS/HD Serial Link Software Diskette into disk drive A: or B:

- Only (1) diskette is required.
- Serial Link Software will set up the HP communications capability and RDS Software (converts Digital Data stored in the HP48 to Comma Delimited ASCII Text).

#### 2 From MS Windows Program Manager level, select [Start], then select Run. Windows will prompt you for the File Name.

#### 3 Type a:\SETUP, and press [ENTER]. This setup routine will install the necessary communications software onto your hard disk drive.

#### 4 Installation complete.

- You will be returned to the MS-DOS prompt. Store diskette in a safe place.

**Note:** Instructions on using the installed software are titled; *Downloading HP48 data into your Personal Computer*.

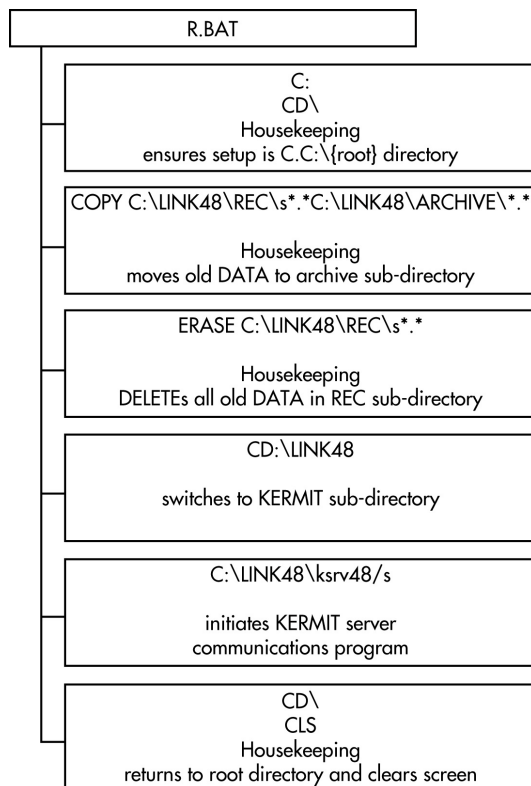
## Downloading HP48 data to your PC

☐ You must complete **Loading Serial Link/RDS Software into your PC**, before any data transfers can be initiated.

☐ File transfers, between your HP48 and PC requires the Kermit file-transfer protocol developed at Columbia University Center for Computing Activities. This protocol is built into the HP 48, only when you have Kermit on your computer can they "talk to each other."

**Note:** Connect the 4-pin end of the serial interface cable to your HP 48 and the 9-pin connector to the COM1 or COM2 port on your computer. (This may require a 25-pin adapter.) Start Kermit on your PC, Exit Windows, if required type C:\ and press [Enter]. From the MS-DOS C:\ prompt, type r.bat and press [Enter] to execute your KERMIT file transfer program.

## How R.B.A.T. Operates



**1 Configure the Kermit port setting to match the port to which the serial cable is connected, and configure the Kermit baud setting to match the PC's setting.**

- You can use the Kermit SET command to do both of these.
- You may need to refer to your calculator and computer manuals to help you follow this procedure.

**Note:** The default baud for the HP 48 is 9600. So, unless you need to use another setting for your system, you should set your PC and Kermit to 9600 baud.

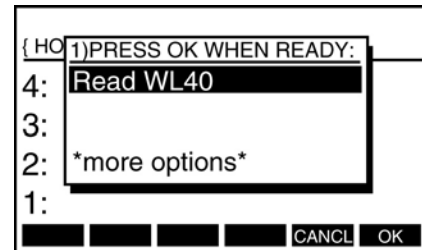
**2 Make sure the HP 48 baud matches the PC setting and the IR/wire transmission mode is set to "wire."**

- Both parameters can be viewed and set using the I/O SETUP menu on the HP 48.

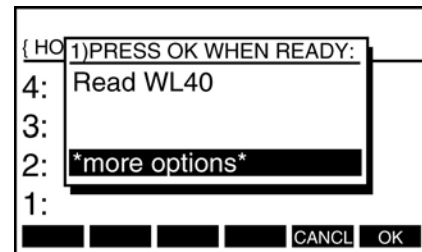
**3 From the HP48, go to the {HOME RDS} directory.**

**4 Press the white key that corresponds to MENU on the screen.**

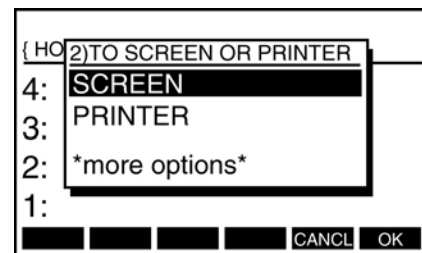
- The first page of the menu is the Read WL40 command.



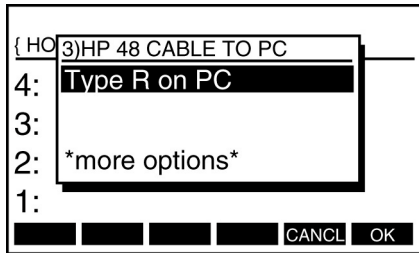
**5 Arrow down to \*more options\* and press OK.**



**6 Again, arrow down to \*more options\* and press OK.**



This presents the third page, 3) **HP 48 CABLE TO PC**, which reminds you to install the 4 to 9 Pin Serial Link cable between the HP48 and your PC Serial Communications Port, Com1 or Com2.



#### 7 With the KERMIT communications program up and running on the PC, Press **OK** on the HP48.

- All well readings are sent from the HP and temporarily stored in the PC sub-directory c:\LINK48\REC\{filenames}.

#### 8 Transfer is complete.

- The connection activity ceases on the HP screen while the PC screen remains the same as during down-loading.

#### 9 You may now quit the Kermit program by pressing **[Ctrl][C]** and choosing **EXIT** or type **Q** and press **[Enter]**.

Additional instructions, for transferring data between an HP 48 and a PC, can be found in the *HP 48 Owner's Manual*.

**Note:** For help in Kermit, type [?] and press [Enter]. Kermit displays a list of commands. To get help on specific commands, type the command followed by a space and then [?], then press [ENTER]. Example, typing [ SET ? ] and [ENTER] gives help on the SET command.

#### Importing ASCII Data Files from c:\WL40DATA

You must complete **Loading Serial Link/RDS Software into your PC** and **Downloading HP48 data to your Personal Computer** before any data can be converted and imported into your software package.

**1 At the C:\> prompt, type RDS and press [Enter], which starts the BATch file RDS.BAT to process data files into the following format:**

- This converts the data files, from the HP48, into an ASCII comma delimited format which can be readily imported into other software packages.

The processed files will reside in the C:\WL40DATA sub-directory and these filenames are displayed at the close of the RDS program. The processed files may be viewed or printed in tabular form using a word processor. DOS function called TYPE filename or PRINT filename can also be used and the converted data should appear in this format:

Read			
#	DATA	Time	Date
1	-28.7	07:00:00	10-NOV-93
2	-28.6	07:00:00	11-NOV-93
3	-28.5	07:00:00	12-NOV-93
509	-23.4	07:00:00	.date
510	-23.4	07:00:00	.date
Notice the file is delimited by commas.			

Each file will contain the serial number of the well and the time and date the data was logged.

Because of the great variety of excellent software and different methods available for importing standard Comma Delimited Data, it is impossible to address this subject in this Manual. The user should refer to their software User's Manual for specific instructions on importing Comma Delimited ASCII Data.

**Note:** Each use of RDS.BAT, translating HP48 data to comma delimited ASCII files, stores data in the c:\WL40DATA sub-directory. Unless moved to another location, stored on a floppy disk, or erased, the c:\WL40DATA sub-directory will become difficult to manage. To avoid accidental overwriting or loss of valuable data files, the user should read Erasing Files from the c:\WL40DATA sub-directory.

**Note:** Each use of R.BAT moves previous raw data from c:\LINK48\REC to the c:\LINK48\ARCHIVE sub-directory. Unless moved or erased, this sub-directory will become difficult to manage. Once data has been converted through RDS.BAT, and the user has confirmed a successful transfer, these archived data files may be erased.

#### **Erasing Files from the c:\WL40DATA subdirectory**

Each time you use the RDS conversion file to translate HP48 data to comma delimited ASCII files, the new data files are stored in c:\WL40DATA sub-directory for your use. In time, the c:\WL40DATA sub-directory can become crowded and contribute to accidental overwriting of valuable data files.

**Example:** The HP48G memory holds approximately 100 data downloads. When these are converted using the RDS conversion file, you will have 100 individual filenames to track. If you perform another download from your HP48G+, the number increases to 200, etc.

We suggest data files from the c:\WL40DATA sub-directory be copied into another sub-directory or diskette prior to additional HP48 downloads and conversion, keeping the c:\WL40DATA sub-directory uncluttered and data files easier to locate and import into your preferred modeling software.

**Hint:** Make a directory such as MAR22\_94 and copy the WL40DATA files into this sub-directory. Using dates as sub-directories keeps all your data in time-stamped clusters, and allows searching for data from a certain time period easier. Worksheets and Graphs created, using your preferred software can also be stored, with the original data, in the same sub-directory or diskette keeping all of the related data in the same location and chronological order. As with any magnetic medium, backup copies should always be stored in an alternate safe location.

**Caution:** We assume the user has basic familiarity with MicroSoft file commands in either MS-DOS or Windows. If you are unfamiliar with these commands, before attempting these functions you should consult your PC Manufacturers manual or the appropriate MicroSoft manual for the applicable command structure.

#### **Example of creating a new sub-directory using MS-DOS:**

- Type MD c:\{dir\_name} and press [Enter].
- Type COPY c:\WL40DATA\S\*.\* c:\{dir\_name} and press [Enter].
- Type DIR/P c:\{dir\_name} and press [Enter].

This directory listing allows you to verify your data files have been successfully copied to your new sub-directory or diskette. After you have reviewed the transferred data files,

- Type Erase c:\WL40DATA\S\*.\* and press [Enter].

The c:\WL40DATA sub-directory has now been cleared for the next HP48 download.

### **Example of creating a new sub-directory using Windows:**

**Caution:** We assume the user has basic familiarity with MicroSoft Windows commands. If you are unfamiliar with these commands, before attempting these functions you should consult your PC Manufacturers manual or the appropriate MicroSoft manual for the applicable command structure.

- From Program Manager select the File Manager icon
- Pull down the File item from the menu bar
- Select **Create Directory**

**Hint:** Make a directory such as MAR22\_94 and copy the WL40DATA files into this sub-directory. Using dates as sub-directories keeps all your data in time-stamped clusters, and allows searching for data from a certain time period easier. Worksheets and Graphs created, using your preferred software can also be stored, with the original data, in the same sub-directory or diskette keeping all of the related data in the same location and chronological order. As with any magnetic medium, additional backup copies of data should always be stored in an alternate safe location.

- Type c:\WL40DATA\new\_path\{dir\_name} and press [Enter].
- Highlight your data files.
- Press [F7].
- Type c:\WL40DATA\new\_path\{file\_name} and press [Enter].

These commands will move your files to the new sub-directory, clearing the c:\WL40DATA sub-directory for the next HP48 download.

## RG20 Rain Gage Installation

The RG-20 Rain Gage option requires a WL-20 monitor, not included, for operation.

RG-20 Rain Gage Option provides valuable rainfall data, up to 18 inches, from inaccessible sites. Using a standard WL-20, the Rain Gage can provide direct 1:1 output of collected rainfall without use of any moving parts.

### We advise:

- ☐ Installation Personnel- **read all instructions** before installation.
- ☐ **Dropping or rough handling can crack the PVC housing** and expose the electronics to the environment, permanently damaging the instrument.
- ☐ **Stepping on the WL Series Probe can crack the PVC housing**, destroying the unit.
- ☐ **Install the Optic Port in a North-South orientation**, not East-West, to lessen direct sunlight overriding Infrared Download.
- ☐ If the installation requires the unit be tethered or tied into position, **Do not use metal strapping, metal pipe clamps, or 'U' bolts**. We recommend PVC or Polyethylene Duct Strapping, available at local hardware stores.
- ☐ **Always keep the vinyl cover over the Infrared Optics** when not downloading.

### At installation site

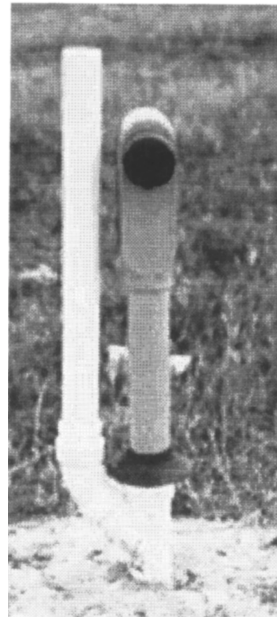
**1 Select an open area with minimum forest canopy.**

**2 Auger a hole to the desired depth, sufficiently sized to allow the Well Screen to slide in unobstructed.**

**3 Remove the RG-20 Option from its packaging.**

**4 The Rain Gage reservoir should be buried to a depth of 20 inches, preferable in contact with ground water.**

- Direct burial of the Gage reservoir, as illustrated, can aid in reducing evaporative effects, and stabilizes any temperature/condensate effect from differences between ground and air temperature.



*Unit must be perpendicular and uprightly installed.*

**Note:** Units may be post mounted, as requirements demand, but this method is discouraged. Post mounted units should have the Orifice located a minimum of 2 inches (51 mm) above the top of the mounting post to

avoid possible splashover into the device. We recommend using only PVC strapping material and wood for post mounting the Rain Gage, use of metal clamps or fasteners is discouraged.

## RG20 Rain Gage Setup

### At installation site

**1 Slip the Drip Shield onto the body of the WL-20 and move it approximately 2 inches up the sleeve, as illustrated.**

**2 Install the WL-20 assembly, not included, into the RG20 reservoir as shown in the illustration, DO NOT GLUE.**

- This connection is loosely fitted, but, the WL Series assembly should be firmly seated at the bottom of the socket.
- Connection may require a slight twisting motion to completely seat against the bottom of the socket fitting.

**3 Install the Orifice into the remaining socket of the RG20 reservoir, DO NOT GLUE, as shown.**

- This connection is a firm fit, but, the WL Series assembly should seat at the bottom of the socket by using a slight downward twisting motion, against the socket fitting when installing.

**Note:** These PVC components start as standard "off the shelf" items, but, have been modified to match the WL Series "Calibration Point". Do not use standard "off the shelf" components as permanent replacements without first consulting the factory.



**4 Add 5 ounces (150 cc) of water by pouring through the orifice. This should provide an initial reading between -19 & -18 inches (-483 mm & -457 mm).**

- Alarm times between 12 am and 4 am are recommended, since, this tends to agree with National Weather Service results, if available in your area.

**Note:** Alarm times on new WL-20's are factory preset to 7 am daily. To change this setting; refer to the "Set Alarm Time" section in the WL Series Manual section of *Set Current Time, Alarm Interval, Next Alarm Time*.

**5 Using the HP48, confirm proper unit operation by downloading the WL Series using the procedure discussed in the WL Series Manual section of *Downloading the WL Series*.**

**Do not allow direct sunlight into the optical port of the WL40.**

- Verify the WL Series is aligned North-South and not East-West.
- During bright sunny days, reflected sunlight from light colored clothing can cause false readings, you may need to partially cover the upper and lower open portion of the Optical Port with your fingers, as illustrated.



**Data from the WL-20 is a direct relationship of 1:1, indicating rain Fall amount.**

## RG20 Rain Gage Maintenance

□ The unit will need to be removed from its mounting location and water removed when the likelihood of overfilling may occur between downloading visits.

- This frequency will vary, depending on local conditions. Failure to comply may result in under-estimating or missing significant rainfall.

□ Evaporative effects from ambient conditions are difficult to predict. The WL-20 should be checked, as local conditions may require, and small amounts of water added to ensure covering the bottom of the WL-20 probe to a depth of between -19 inches and -18 inches (-483 mm and -457 mm).

- Failure to comply may result in under-estimating or missing significant rainfall.

□ The Orifice should be removed and leaf litter and/or insects removed from the wire mesh covering as frequently as conditions may require.

□ Periodically, 2x per year, the probe should be cleaned with a non-abrasive household cleaner, i.e.; 409(r), Fantastic(r), etc., and Rain-X(r) applied.

- This removes accumulated mold, fungi, and other debris, which can be detrimental to the performance characteristics of the WL Series product.



## Printing WLxx Data with the Portable Infrared Printer

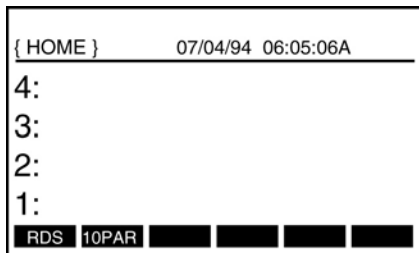
This battery powered printer provides data hard copy capability in the field. All communications between the HP48 and the Hand Held Printer is via Infrared, eliminating cumbersome wires, cable, and connectors.

### Power Up

**1 Start the HP48 by pressing the [ON] key.**

*Bottom-left on keyboard.*

**The screen below will appear.**



**2 Check the {HOME} directory. Shown at top of screen in braces.**

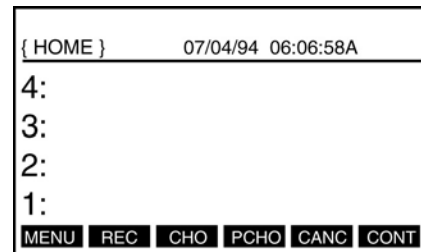
**Note:** The RDS program resides in the {HOME} directory. If you are in another sub-directory, getting back to [HOME] is done when you press the [green right-shift] key followed by pressing the {HOME} key (written in green above the 3rd button down on left).

**3 Press and release the WHITE Menu Key directly below the RDS item on the menu bar.**

- This changes to the {HOME RDS} sub-directory which contains communications routines for the HP48.

**Note:** All routines for communicating with your automated well are in the RDS sub-directory, leaving the Home Directory of the Hewlett-Packard available for your custom sub-directories.

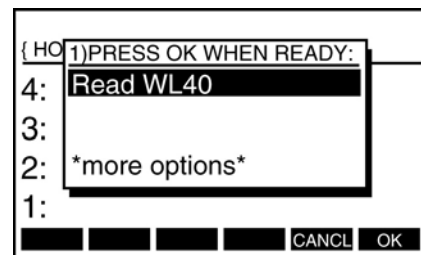
**The bottom of the menu bar display should now read:**



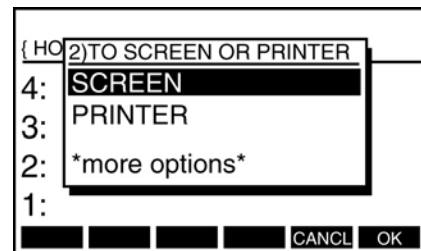
### Selecting Menu Options (The White Keys)

- The row of white keys at the top of the HP keyboard correspond to the commands displayed in the Menu Bar, across the bottom of the display screen.

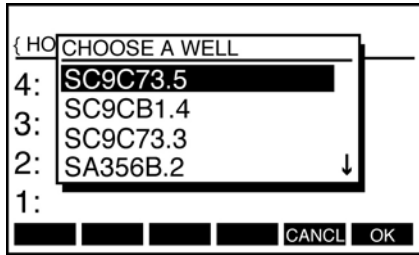
**4 Press the white key below the MENU command. The screen appears as shown below.**



**5 From the Read WL40 Screen, choose \*more options\*. The TO SCREEN OR PRINTER screen appears with SCREEN highlighted.**



6 Arrow down to **PRINTER** and press **OK**.  
Here the **CHOOSE A WELL** screen appears.



7 Switch the infrared printer **ON** (switch on the left is On/Off, indicated by a red LED).

8 Position the HP48 in front of the HP Infrared Printer and Arrow down on the HP48 to choose a well, press the white key corresponding to **OK**.

- Printing proceeds with the well name followed by seven of the most recent readings including the date and time the readings were taken.

9 To continue printing, 7 more readings, progressing back in time, use **CONTI**.

10 Use **CANC** to **CANCEL** out of printing and to cancel the HALT annunciator.

11 To continue printing, 7 more readings, progressing back in time, use **CONTI**.

12 Press **PCHO** to choose a new well's data to print on the IR Printer well without going through the menu pages.

13 Use the arrow keys to select the specific well. As before, use **CONTI** to continue through the data, and **CANC** to cancel the present well in order to select another well or exit.

**Reminder:** Switch Off the Infrared Printer to conserve battery life.

