

# M500 SERIES HI- PERFORMANCE DIGITAL THERMOMETERS INSTRUCTION MANUAL

## M525

## M550

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### PRODUCTS AVAILABLE

M500	Thermometer Package: M500 M207 C725 Instruction Manual
M525	Thermometer Package: M525 M207 C725 Instruction Manual
M550	Thermometer Package: M550 M207 C725 Instruction Manual
M207R	Right Angle Probe 4.0" (10cm)
M207S	Straight Probe 4.0" (10cm)
M207R	Right Angle Probe 3.0" (7.6cm)
M207S	Straight Probe 3.0" (7.6cm)

M207S	Straight Probe 2.0" (4.0cm)
C725	Charger 120VAC, 60Hz, plug-in type
C316C	Charger 220VAC, 50Hz, plug-in type
B601	Battery Pack, 5 cell NiCad
F050	Fuse
H300	Leather Belt Holder
H400	Tanera Belt Holder

## **M500HPDT SERIES PRODUCT DESCRIPTION**

### **GLA M500 SERIES OF HI-PERFORMANCE DIGITAL RECHARGEABLE THERMOMETERS**

#### **M525HPDT THERMOMETER PACKAGE INCLUDES:**

- ◆ GLA M525HPDT Thermometer
- ◆ GLA M207R or M207S Probe
- ◆ GLA C725 or C316C Battery Charger
- ◆ GLA M525 Thermometer Instruction Manual

#### **M550HPDT THERMOMETER PACKAGE INCLUDES:**

- ◆ GLA M550HPDT Thermometer
- ◆ GLA M207R or M207S Probe
- ◆ GLA C725 or C316C Battery Charger
- ◆ GLA M550 Thermometer Series Instruction Manual

#### **GLA M207 SERIES OF PROBES**

◆ The M207 Series of Probes have been designed for accurate rectal temperaturing of bovine, equine, swine, sheep, and small animals in an efficient manner. The M207 probe is available in either a right angle (M207R) or straight design (M207S). Sizes available include:

- ◆ M207R Right Angle Probe
  - ◆ 4.0" Right Angle Probe (10cm)
  - ◆ 3.0" Right Angle Probe (7.6cm)
- ◆ M207S Straight Probe
  - ◆ 4.0" Straight Probe (10cm)
  - ◆ 3.0" Straight Probe (7.6cm)
  - ◆ 1.5" Straight Probe (3.85cm)
- ◆ M207C Custom Probe
  - ◆ Call for details

### **GLA C725 AND C316C BATTERY CHARGERS**

- ◆ C725 Charger
  - ◆ US standard, 115VAC 60 cycle, wall plug-in
- ◆ C316C Charger (Adapters available)
  - ◆ International standard, 230VAC 50 cycle, wall plug-in

## OPERATING AND MAINTENANCE INSTRUCTIONS

### M525HPDT / M550HPDT THERMOMETERS

- ◆ The GLA M525 Thermometer is a fast, accurate, and durable rechargeable thermometer. All M525 Thermometers can temperature in either Fahrenheit or Celsius.

## CONTROLS, INITIAL SETUP, AND USE

### M525HPDT / M550 THERMOMETER

**NOTE: PLEASE ATTACH THE M207 PROBE BEFORE PRECEDING.**

#### INITIAL M525 / M55 LED DISPLAY SCREEN

- ◆ The LED display screen contains information that is important to the use of your new M525 / M550 Thermometer. When you turn on the M525 / M550, your LED screen will show in a scrolling display, the following:

**GLA .. HPDT .. 525 (550).. F1.xx (C1.xx) .. BATT .. 6.5 .. INST or HOLD or      PLAY or RCRD**

#### EXPLANATION OF INITIAL DISPLAY

GLA ..	GLA
HPDT ..	Hi-Performance Digital Thermometer
F1.xx ..	F - Fahrenheit (C - Celsius) 1.xx is the software version installed
BATT ..	Is about to display the actual battery voltage, i.e. 6.9 volts, 6.5 volts, etc.
INST ..	Temperature position, or
HOLD ..	Peak Temperature and Hold position, or
PLAY ..	Memory Playback position
RCRD ..	Memory Record position.

## CONTROLS

### OPERATING SWITCHES

- ◆ The operating switches on the M525 / M550 HPDT Thermometer are as follows:

#### ON / OFF SWITCH

- ◆ To turn the M525 / M550 ON, depress the ON/OFF Switch.
- ◆ To turn the M525 / M550 OFF, depress and hold the ON/OFF Switch for 3 seconds.
- ◆ You can **only** turn the M525 / M550 OFF in the first two operating positions - INST or HOLD. The M525 will turn OFF in any of the four positions after five minutes of inactivity. The M550 will not turn off automatically when connected to a RS232 port.
- ◆ If the M525 / M550 has been off for more than five minutes or less than two seconds the initial screen display will be activated.
- ◆ If the M525 / M550 has been off for less than five minutes, but more than three

seconds, the initial display will not be activated.

### **FUNCTION SWITCH M525 / M550**

◆ Four position switch selects the operation function of the unit. The pointer indicates the following operations (facing the unit, from right to left:

- INST - Temperature Position,
- HOLD - Peak Temperature and Hold Position,
- PLAY - Memory Playback (25 locations),
- RCRD - Memory Record (25 locations).

◆ To switch the M525 / M550 from Fahrenheit to Celsius, or vice versus you must follow these instructions:

- ◆ Put the Selector switch in the INST position, PRESS and HOLD your ON switch.
- ◆ Wait for the display to go blank, still holding down the ON switch
- ◆ Then turn the Selector switch to the HOLD Position
- ◆ The GLA initial display will appear, then the display will read SET, let go of the ON switch.
- ◆ The Display will then read CELC.
- ◆ Putting the Selector switch back to the INST position selects Fahrenheit (FAHR),
- ◆ Putting the Selector switch in the HOLD position selects Celsius (CELC).
- ◆ Select temperature scale,
- ◆ PUSH the power switch, DONE will appear on the LED display,
- ◆ PUSH the power switch again, and the unit will be in the temperature scale you selected.

◆ Due to the microprocessor construction of the M500 Series of Thermometers, the M525 / M550 does a "self check" and "self calibration" each time the unit is turned on. If the M525 / M550 turns on, it is calibrated properly. If the unit seems to be inaccurate, the cause will more than likely be the M207 Probe attached.

### **CHARGER CONNECTOR**

◆ The C725 or C316C Charger attaches to this connector, the smaller of the two connectors on the top of the unit.

### **INITIAL SETUP AND USE ◆ M525 and M550**

◆ Attach the M207 Probe. To attach the probe, screw the probe connector onto the mating receptacle connector. The probe should be attached FINGER TIGHT ONLY. Do not overtighten. The cord should be able to move freely on the connector.

◆ Make sure the M525 M550 Thermometer is fully charged. Attach the C725 or C316C Charger to the charger post and plug into a wall socket. Charging will be indicted by the scrolling of a decimal point cross the bottom of the LED screen. The battery should be fully charged after 10-14 hours.

◆ After charging, turn the unit ON, the initial display information will be shown. Turn the FUNCTION Switch to the INST Position. The display should read ambient air temperature **(if probe is attached / if no probe attached the display will read PRBE ERR!)**

◆ To take a temperature, turn the FUNCTION Switch to the INST (located at the far right position, facing the unit) or HOLD Position. Insert the probe and the display reading will begin to climb. In approximately 8 to 15 seconds your reading will start to slow.

- ◆ If you are using the HOLD Position, the decimal point will flash until the peak temperature is measured, when the highest temperature is reached, the decimal point will stop flashing. The temperature will remain on the screen for five minutes. To reset the display, press the power switch once.
- ◆ The M525 M550 will shut off automatically after five minutes of inactivity. You must turn it back ON to take another temperature.
- ◆ When the batteries begin to discharge to a low level, the LED display will show LO ...BATT, once per minute. When the batteries are too low to power the unit satisfactorily, the M525 M550 will turn OFF automatically. You must recharge the unit to use the M525 again. Voltage levels are as follows: 6.5 - 6.9 volts indicates a full charge, 6.0 - 6.4 volts is normal, <6.0 volts is low, <5.5 is discharged.
- ◆ To recharge the battery pack, attach the charger connector onto the mating connector on the top left of the M525 M550 Thermometer. Tighten FINGER TIGHT ONLY, to avoid breakage of the connector. Plug charger into wall outlet. Charging will be indicated by a scrolling decimal point. The M525 M550 must be turned OFF when charging. If the battery pack fails to hold a charge after being adequately charged, the battery pack may need to be replaced. If you do not get any indication of the charging display, the charger may need to be replaced.
- ◆ You may use the M525 M550 with the charger attached and plugged in at all times. Using The M525 M550 this way disables the Automatic Off feature. To turn the M525 M550 OFF, depress the ON switch, the initial display is shown, the screen blanks, the initial display is shown again, the unit then turns OFF.
- ◆ To switch the M525 M550 from Fahrenheit to Celsius, or vice versus you must follow these instructions:
  - ◆ Put the Selector switch in the INST position, PRESS and HOLD your ON switch.
  - ◆ Wait for the display to go blank, still holding down the ON switch
  - ◆ Then turn the Selector switch to the HOLD Position
  - ◆ The GLA initial display will appear, then the display will read SET, let go of the ON switch.
  - ◆ The Display will then read CELC.
  - ◆ Putting the Selector switch back to the INST position selects Fahrenheit (FAHR),
  - ◆ Putting the Selector switch in the HOLD position selects Celsius (CELC).
  - ◆ Select temperature scale,
  - ◆ PUSH the power switch, DONE will appear on the LED display, the unit is now in the temperature scale you selected.

## **MEMORY STORAGE AND PLAYBACK FEATURES**

- ◆ The GLA M525 / M550 Thermometers are fast, accurate, and durable rechargeable thermometers. The M525 / M550 also has 25 built in memory storage locations, these locations will allow you to temperature 25 animals, store the temperature, and play them back at a later time. The M525 / M550 will store these temperatures until, you "clear" the memory, or "write" over them, by storing a new set of temperatures.

### **USING THE MEMORY PLAY and RECORD FEATURES**

◆ **To record (RCRD) temperatures in the memory**

◆ Turn the M525 / M550 ON, turn the Selector switch to the RCRD Position (facing the LED display, the position to the far left).

◆ The LED Display will flash RCRD, followed by ambient temperature.

◆ Insert the probe, when the peak temperature is reached, PUSH the ON/OFF switch. This will store the temperature in one of the numbered memory locations (1-25).

◆ When you PUSH the ON/OFF switch, a number will appear on the LED screen, i.e. "n 01" or "n 02". This is the location the temperature is stored at. The next temperature you take, will be stored in the following sequential location.

◆ The temperatures will be stored in a memory location in sequence up to "n 25", at which point the sequence will "wrap around" to "n 01" and continue to store temperatures.

◆ If you start at a number other than "n 01", it will "wrap round" till you fill 25 locations.

◆ **To playback (PLAY) temperatures in the memory**

◆ Turn the selector switch to the PLAY position.

◆ The LED Display will show, PLAY followed by the memory location number, followed by the temperature stored in that location.

◆ To advance sequentially through the storage locations PUSH the ON/OFF switch. The LED display will show the number of the storage location and the temperature stored there.

◆ To scroll through the storage locations, PRESS and HOLD, the ON/OFF switch, this will allow you to scroll sequentially, through the locations.

◆ If you return to Record (RCRD) after Playback, the first memory storage location available to store a temperature will be the number sequentially following the last number viewed in the playback position.

◆ **To clear the memory locations on the M525 / M550**

- ◆ Put the Selector switch in the INST position, PRESS and HOLD your ON switch.
- ◆ Wait for the display to go blank, still holding down the ON switch
- ◆ Then turn the Selector switch to the HOLD Position
- ◆ The GLA initial display will appear, then the display will read SET, let go of the ON switch.
- ◆ The Display will then read CELC.
- ◆ Return to the temperature scale of your choice.
  - INST - Fahrenheit
  - HOLD - Celsius
- ◆ PUSH the power switch, DONE will appear on the LED display, and the memory will be cleared.
- ◆ **NOTE:** This does not reset the storage locations to "n 01".

**IF NEED FURTHER INFORMATION, PLEASE CALL US AT  
800 346-1182 AND A TECHNICIAN WILL BE GLAD TO ANSWER YOUR QUESTIONS.**

### **BASIC CARE AND MAINTENANCE**

- ◆ To extend the life of your batteries, do not overcharge the battery pack. Use your battery voltage reading to guide your recharge levels, 6.5 -6.9 volts indicates a full charge, 6.0 - 6.4 volts is normal, <6.0 volts is low, <5.5 is discharged. When recharging your M525 Series Thermometer, please be sure it is OFF. If your batteries fail to hold a charge, it usually indicates a dead cell in the battery pack, which will need to be replaced. With proper care, your battery pack should last longer than the year warranted by the battery manufacturer. Normally it will last 2 to 4 years before needing to be replaced.
- ◆ When your battery pack (B601) does need replacing, you may send it to GLA and we will replace it for a nominal charge, order a new battery pack directly from GLA, or from an authorized GLA distributor. When you order a battery pack directly from GLA, installation instructions and a spare fuse will be included. **NOTE:** Soldering is required to replace the battery pack. It may also be necessary to replace the fuse when replacing the battery pack. **It is very important to follow the battery installation directions, very carefully, step by step.**
- ◆ Treat your probe and cord assembly with care. Over-stretching the retractile cord will inevitably break the internal wires. If the probe tip is allowed to strike a hard surface such as concrete, the high impact pressure will often destroy the sensing element. **DO NOT EXPOSE PROBES TO TEMPERATURES ABOVE 200° FAHRENHEIT (95° CELSIUS), AND DO NOT AUTOCLAVE OR HEAT STERILIZE YOUR PROBES.** High temperatures such as these will damage the probe tip and require its replacement. If your Probe, or connector is damaged your LED Display will indicate a **PRBE ERR!** display.
- ◆ When using your M500 Series Thermometer outside, protect the unit from rain or extreme water exposure. The thermometer housing is splash-proof, but it is not designed to be continually exposed to high moisture situations or drenching.
- ◆ Should your thermometer become wet inside, carefully remove the bottom four screws and bottom plate, (trying not to damage the bottom gasket). Let any water in the unit drain out and allow the unit to dry overnight in a warm dry location. **NO OTHER DISASSEMBLY SHOULD BE ATTEMPTED. DUE TO THE MICROPROCESSOR OPERATION, IT IS IMPORTANT THAT ANY FURTHER REPAIR BE DONE ONLY BY A QUALIFIED ELECTRONICS**

## **TECHNICIAN, PREFERABLY A GLA REPAIR TECHNICIAN.**

- ◆ Do not store your M500 Series Thermometer in vehicles or in outdoor sheds where temperatures may become very high. Ideally the thermometer should be stored in locations that do not exceed 115° Fahrenheit (45° Celsius).
- ◆ Most GLA M500 Series Thermometers and M207 Probes can be repaired when feasible. If you feel that you have a damaged unit, please send it to the factory for repair.
- ◆ With a minimum of care and maintenance, your M500 Series Thermometer should give you many years of service. We are always available to answer any questions you may have regarding our products.

## **REPAIR PRACTICES**

- ◆ GLA has been manufacturing animal health thermometers and probes since 1969. Most GLA Thermometers and Probes can be repaired when necessary. Battery chargers, since they are not manufactured by GLA, must be replaced when necessary. When you send us a thermometer/probe for repair, we request that you follow these guidelines:
  - ◆ Include your thermometer, probe, and charger. This allows us to check the entire "package" and ensure that the repair is correct and complete.
  - ◆ Include a note describing the problem you are experiencing, and in what situation the problem occurs.
  - ◆ Include your complete name, address, and telephone number with area code so that we may contact you with any questions.
  - ◆ Repairs can be sent to GLA from any authorized GLA distributor, or directly to the GLA factory.
- ◆ By following these guidelines, you will make it easier for us to repair your thermometer efficiently and correctly. If you would like an estimate on the cost of a repair, or if you wish to discuss any repair, please contact us toll free at **800 346-1182**. Our staff of repair technicians can usually advise you of the best steps to take.

## **TROUBLE - SHOOTING GUIDE**

### **NO DISPLAY:**

- ◆ If there is no display, attach the charger unit and plug it into a wall outlet. If the initial display appears, turn the unit off and allow it to charge fully. If the battery will not hold a charge and the charger appears to be working (indicated by the scrolling decimal point), the battery is probably in need of replacement. See BATTERY REPLACEMENT.
- ◆ If there is no display when you attach the charger, the fuse may have been blown. This will require the M500 Series Thermometer to be sent in for repair to determine the cause of the short.
- ◆ If there is no indication of charging (no scrolling decimal point) the charger will need to be replaced.

### **DAMAGED OR SHORTED M207 PROBE:**

- ◆ If you receive a reading of **PRBE ERR!**, you have a damaged probe or connector. You will need to either replace your M207 Probe or have it repaired by GLA.

### **IF YOU ARE EXPERIENCING PROBLEMS NOT DISCUSSED HERE, OR YOU NEED FURTHER**

**INFORMATION, PLEASE CALL US AT  
800 346-1182 AND A TECHNICIAN WILL BE GLAD TO ANSWER YOUR QUESTIONS.**

## **BATTERY REPLACEMENT**

◆ All M500 Series Thermometers operate on a five-cell NiCad battery pack. We recommend that you send your M500 Series Thermometer in for battery replacement and general maintenance. You may, however, purchase B601 Battery packs and fuses from GLA or your local distributor. Installation instructions are available.

**NOTE: Soldering is required to replace the battery pack. It may also be necessary to replace the fuse when replacing the battery pack. It is very important to follow the battery installation directions, very carefully, step by step. NO OTHER DISASSEMBLY SHOULD BE ATTEMPTED. DUE TO THE MICROPROCESSOR OPERATION, IT IS IMPORTANT THAT ANY FURTHER REPAIR BE DONE ONLY BY A QUALIFIED ELECTRONICS TECHNICIAN, PREFERABLY A GLA REPAIR TECHNICIAN.**

## **GUARANTEE, WARRANTY, AND LIABILITY LIMIT**

◆ All GLA products are warranted against defects in materials and workmanship for two years from date of purchase. If, during the warranty period, the product is defective in material and/or workmanship (excluding battery pack deterioration, non-factory repairs, battery charger deterioration, moisture damage, or abuse), GLA will make the necessary adjustments and repairs. Other than expressly stated herein, GLA Agricultural Electronics makes no warranties, expressed or implied, with regard to the M525 Series of Thermometers and M207 Series of Probes, including any warranty of merchantability of fitness for a particular purpose, and no claim of any kind against GLA Agricultural Electronics arising out of the use of the M500 Series of Thermometers shall be for more than the price paid to GLA Agricultural Electronics for the price of the GLA Thermometer. GLA shall not be liable for any special, incidental, or consequential damages, whether arising in contract or tort, resulting from the use of a GLA Thermometer.

◆ The warranty period for GLA products (excluding negligence), is as follows:

M500 Series Thermometers-	2 years from date of purchase
M207 Probes	- 2 years from date of purchase
B601 Battery Packs	- 1 year from date of purchase
C725/316C Chargers	- 90 days from date of purchase.

◆ The use or purchase of GLA Agricultural Electronics products to the general public is restricted. GLA products are intended for professional users only, including, but not limited to, animal health or livestock suppliers, veterinarians, physicians, or other professionals and qualified users. GLA products are surrendered by GLA with the understanding that it assumes no responsibility for resale or safe and knowledgeable handling. Neither GLA, its owners, nor its employees shall be held liable in any way for any personal or property damages resulting from, or relating, to the use of GLA products. Diagnostic errors resulting from malfunctioning GLA products remain the responsibility of the user.

Other than expressly stated herein, GLA Agricultural Electronics makes no warranties, express or implied, with regard to the M525 Series of Thermometers and M207 Series of Probes, including any warranty of merchantability of fitness for a particular purpose, and no claim of any kind against GLA Agricultural Electronics arising out of the use of the M525 Series of Thermometers shall be for more than the price paid to GLA Agricultural Electronics for the price of the GLA Thermometer. GLA shall not be liable for any special, incidental, or consequential damages, whether arising in contract or tort, resulting from the use of a GLA Thermometer.

**For users in the state of California**, the passage of Proposition 65 requires that we advise you that the GLA M525 Series of Thermometers contain a standard rechargeable NiCad battery pack which, if not handled properly, could conceivably be considered toxic. Should it have to be replaced, please take precautions not to expose it to heat or flames, and not to let it come in contact with food or drink. Please use reasonable care in handling the battery pack.

◆ GLA's liability is limited to replacement or the repair of the GLA products purchased, or to the refund on undamaged items returned within 15 days. Returned items may be subject to a re-stocking fee.

## **WARRANTY FORMS**

◆ Returning your warranty form allows us to serve you better and ensures validation of your warranty. It also allows us to contact you with any changes or updated

information about your new GLA M525 Thermometer. Please, take a moment to fill out the form and return it to us.

## WHY TEMPERATURE YOUR ANIMALS?

- ◆ To monitor herd health and identify health problems early.
- ◆ To be able to correctly sort animals into the hospital pen.
- ◆ To know when to administer pharmaceutical products.
- ◆ To know when to stop administering pharmaceutical products.

## RECTAL TEMPERATURES OF SELECTED ANIMALS

ANIMAL	FAHRENHEIT	CELSIUS
Horse*	100.5°	38.0°
Beef Cattle	101.0°	38.5°
Dairy Cattle	101.5°	38.5°
Sheep**	103.0°	39.0°
Swine	102.5°	39.0°
Dog	102.0°	39.0°
Cat	101.5°	38.5°
Goat	102.0°	39.0°

\* Body temperature is higher in young animals and lower in older animals

\*\* Sheep with fleece (s) have a higher body temperature

The temperatures listed above are average rectal temperatures under ideal conditions. Outside temperature, time of day, age of animal, infection, ovulation, estrus, or pregnancy may affect actual temperature.

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FEATURES	M500	M525	M550
Temperatures in 8 to 15 seconds	◆	◆	◆
Accurate to within 0.1	◆	◆	◆
Fahrenheit and Celsius mode	◆	◆	◆
Peak Temperature and Hold Mode - displayed on screen	◆	◆	◆
Fast & continual charging mode	◆	◆	◆
Charging indicator - actual battery voltage	◆	◆	◆
Low battery warning display	◆	◆	◆
Automatic shut-off after 5 minutes	◆	◆	◆
Red LED display with ambient light adjustment	◆	◆	◆
Operation modes displayed on LED	◆	◆	◆
Initial display information screen	◆	◆	◆
Interchangeable with all GLA probes	◆	◆	◆
Microprocessor controlled	◆	◆	◆
25 Memory storage locations		◆	◆
Separate Storage & Playback operating positions		◆	◆
Quick scroll of memory locations		◆	◆
RS232 Port output connector and cable			◆
Thermometer comes with M207 Probe and C710 Charger	◆	◆	◆
Two year warranty	◆	◆	◆
Made In USA	◆	◆	◆

## SERIAL PORT INTERFACE PROTOCOL M550HPDT THERMOMETER

### ELECTRICAL INTERFACE

- ◆ Interface type: Quasi RS232 (0 - 5V swing only)
- ◆ Interface rate: 1200 bps
- ◆ Connector: DB9P Male
- ◆ Pinout: Pin 2 - RX  
Pin 3 - TX  
Pin 5 - GND
- ◆ Cable: DB9 Female/Female - Pins 3>2, 2>3, 5>5

### INTERFACE PROTOCOL AND COMMAND SET

- ◆ The monitor program (for enabling temperature reports on the serial port) is accessed by sending ASCII space characters to the M550 and waiting for a response (see the notes and code snippet below). The response at sign-on is:

cr lf cr lf HPDT 105 cr lf

(note: 105 is the software version and may change as software is updated)

- ◆ The monitor program will prompt for commands by issuing the ASCII character ">". Three commands are supported (invalid commands will be answered with an ASCII bell (07h)).

'E' - enable serial reporting  
'D' - disable serial reporting  
'X' - return to normal operation  
- code snippets showing suitable usage of these commands are presented below

### DATA REPORT FORMAT

- ◆ The following string is output by the M550 approximately 3 times per second (if output is enabled):

FAHR space NNN.N cr lf

NNN.N is the temperature. In the Celsius mode the string FAHR will be replaced by CELC. An ASCII space character appears between the FAHR and the first character of the temperature. If the temperature is less than 100.00, the format is NN.N and two ASCII space characters will appear.

### PSEUDO-CODE FOR CONNECTION

- ◆ Sign\_on: // get the thermometer's attention  
send(""); // send an ASCII space  
delay(0.25); // wait 1/4 second  
send(""); // send another space  
receive(buffer, 12); // get 12 characters (typical signon length)  
if(contains\_string(buffer, "HPDT")) // test for proper substring

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return(true);           // exit if on-line
goto sign-on;          // else try forever

◆ enable-232:           // turn on temperature
    reporting
send('E');
receive(buffer,4);      // get the character echo,
    next prompt
if(contains_string(buffer,
    "E\r\n>"))
    return(true)        // aok - expected string
else return(false)     // didn't get it

◆ disable_232:         // turn off temperature
    reporting
send('D');
receive(buffer, 4);    // get the character echo,
    next prompt
if(contains_string(buffer,
    "D\r\n>"))
    return(true)        // aok - expected string
else return(false)     // didn't get it

```

```

◆ exit_monitor:                                // go back to normal
                                                operation, start
reporting                                       temperature
send('X');
receive(buffer, 1);                            // get the character echo
if(contains_string(buffer, "X"))
    return(true);                             // aok - expected string
else return(false);                           // didn't get it

```

#### ◆ NOTES

◆ The program in the M550 polls the RX data pin at about 20 Hz during normal operation as a thermometer. A few attempts may be needed to sign on initially. when the monitor program is running, no other tasks are enabled and no characters are missed.

◆ The M550 does not have a hardware UART. Some commands sent to the M550 require 10 mS or so processing time. It is a good idea to pace all character transmissions to the M550 with a 20 mS (0.020 second) delay (approximately) between characters.

◆ The monitor program will time-out 100 seconds after the last command is received.

◆ The enable/disable state of the serial data report output is stored in nvram. Once it is activated (via the 'E' command) the serial port will report the temperature during any normal operating mode.