

# **KIL-MO-TROL® *PLUS*** **K-1100 series**

**Technical Reference Manual.  
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# Chapter 1 Introduction

## System overview

The Kil-Mo-Trol PLUS is a MCU based system specifically designed for real time conductivity based moisture content measurements of lumber in dry kilns.

## K-1100 Series Modules

The overall system is of a modular design, consisting of various combinations of interchangeable and removable ***K-1100 system modules*** and ***K-1100 accessory modules***. This feature allows for upgrading, expansion, and easy maintenance.

The fundamental K-1100 series modules for the Kil-Mo-Trol PLUS K-1100 system are as follows:

K-1100 system modules:

**K-1100-MEM1** Main Enclosure Module

**K-1100-PSM1** Power Supply Module

**K-1100-CCM1** Central Control Module

and one K-1100 accessory module:

**K-1100-PAM1** Probe Array Module

By installing **K-1100-EEM1** Expansion Enclosure Modules, the Kil-Mo-Trol K-1100 system can be expanded to accommodate up to 15 additional K-1100-PAM1 accessory modules. Upon power up, the Kil-Mo-Trol PLUS K-1100 system will automatically detect the number of K-1100 accessory modules present in the system. This automatic detection feature allows K-1100 accessory modules to be easily added at any time.

## System Interface

The Kil-Mo-Trol PLUS K-1100 has two means for input and output: the Front Panel Interface and the UART Serial Communication Interface (SCI). The front panel interface of the unit has a simple keypad and a 16 character by 2 line LCD display that allows the user to configure and operate the unit via a menu driven user interface. The SCI features user selectable RS-232 or multi-drop RS-485 line drivers. Utilizing the command line protocol (see Appendix B), users can integrate the Kil-Mo-Trol PLUS K-1100 system with a host computer/controller system.

## Measurements

Wood exhibits the physical property of having predictable conductivity as a function of the wood moisture, wood temperature, and wood species. By using embedded contact pin

**probes** in wood samples, moisture content measurements are achieved by determining the conductivity between the probes. The wood temperature and the wood species are parameters that are set by the user.

With Delmhorst's insulated contact pin probe arrangement, regional conductivity measurements of a wood sample **station** are made possible, thus allowing for **SHELL and CORE** or **CORE ONLY** station measurements.

## Flexible kiln and Station configuration

The Kil-Mo-Trol *PLUS* K-1100 system program allows the user to "custom tailor" the system to best fit their kiln application.

One system can accommodate up to 256 %MC probes. The user assigns these probes as stations to a maximum of 16 individual kilns. Each individual kiln can have its stations configured as a SHELL and CORE or CORE ONLY kiln, with a maximum of 98 stations per kiln.

Users have the flexibility to specify the wood temperature and wood species down to the station level.

## Powering the Unit:

The Power Supply Module can be connected to 115V or 230V AC power sources via standard IEC power cords. This will allow the unit to be powered from virtually any standard AC receptacle.

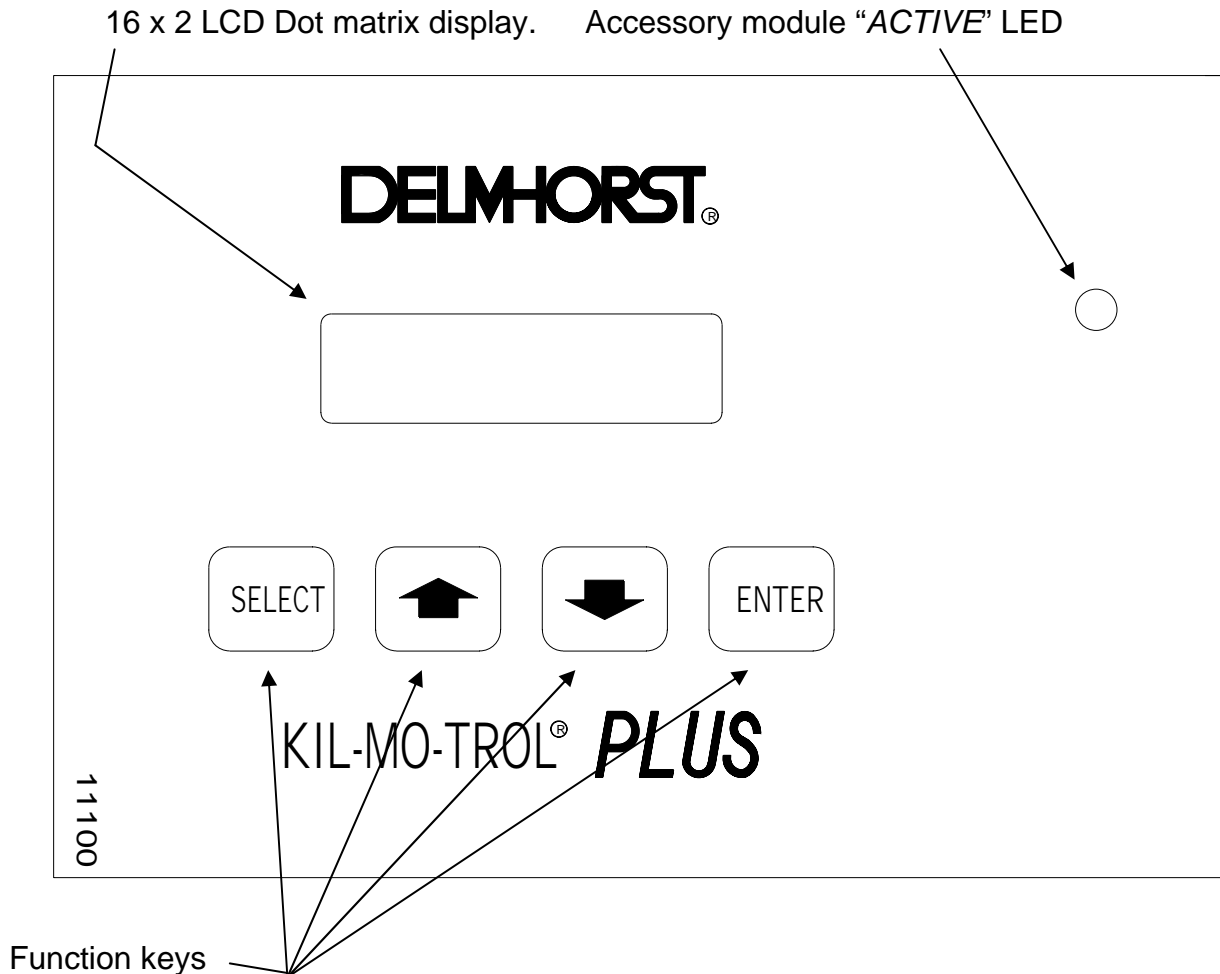
Power Supply Module features includes an EMI line filter, surge suppressor, and fuse protection. The power switch is marked as "0/1".

NOTE: Be sure that the voltage selector switch is in the proper position before applying power. IMPROPER SETTING OF THE VOLTAGE SELECTOR SWITCH WILL DAMAGE THE UNIT!

## Chapter 2 Using the Interface

### Front Panel Interface

The Kil-Mo-Trol *PLUS* front panel has four key switches labeled: **SELECT**, **↑** (UP), **↓** (DOWN), **ENTER**. These keys are used to access all functions and set all parameters in conjunction with the LCD display. There is also a small LED window for each accessory slot that becomes illuminated whenever the accessory card that resides in that slot becomes active.



## Power Up Messages

Immediately after power up, the KMT will display several screens of information:

*Introduction:*

```
Kil-Mo-Trol PLUS
K-1100 series
```

*Program version:*

```
Version 1.0
(C) D.I.C. 1898
```

The KMT will then begin identifying the accessory cards that are installed in each slot, and report the results:

*List and location of accessory modules found:*

```
K1100-PAM1 found
in slot 1
```

*Total number of probes detected in the system:*

```
Number of probes
detected= 16
```

Finally, the serial port that is currently selected will be displayed:

*Current activate SCI port:*

```
RS232 port
enabled
```

## Menus

The KMT front panel interface is driven by a hierarchical menu system. To initially activate the menu, press the SELECT key. The UP and DOWN keys are used to scroll the menu list until the desired menu is displayed. Once the desired menu is displayed, press the ENTER key. Pressing ENTER will either bring you to another menu level, or activate a function. Should you choose the wrong menu by mistake, simply press the SELECT key to “back up” one menu level.

Once a function is activated, the keys are then used to change various operational parameters.

## Menu Timeout

At all times, there is a menu timeout clock that is reset every time a key is hit while in any menu. A timeout occurs if no key is hit

and the timeout clock expires. If a timeout occurs, the menu and/or function is automatically cancelled with no changes made. The timeout value is user programmable.

## Functions and keys

When a function is activated, SELECT will not “back up” to the previous menu. Instead, the SELECT key may be used to allow the user to select a parameter within a menu function, indicated by the cursor under that parameter. In the “Change temp. of station?” function, for example:

*Cursor under “Kiln: 1”*

**Cursor** → **KILN: 1 STN: 1**  
**set @ Temp= 70°F**

Pressing SELECT will move the cursor from the kiln number to the station number.

*Cursor under “STN: 1”*

**KILN: 1 STN: 1**  
**set @ Temp= 70°F**

In cases where SELECT is not used in a function, it will cancel the function.

The UP and DOWN arrow keys are used to change the selected parameter value. Pressing the UP key changes STN: 1 to STN: 2

*Change STN to “2”:*

**KILN: 1 STN: 2**  
**set @ Temp= 70°F**

The ENTER key records or locks in the parameter. No changes are made unless the ENTER key is pressed. Pressing ENTER gives a conformation message:

*Conformation:*

**Change accepted**



**d> USER PAUSE**

A USER PAUSE is a request to temporarily suspend the current cycle activity. In this state, the LCD will display the message:

**Scanning is:  
-USER PAUSED-**

If a USER PAUSE is requested during the cycle count down state, the countdown will continue as normal. When the countdown is complete, the unit will then enter the USER PAUSE state instead of the normal SCANNING state.

The system remains in the USER PAUSE state until it is cancelled by the user.

**USER PAUSE  
begins: 00:15:43**

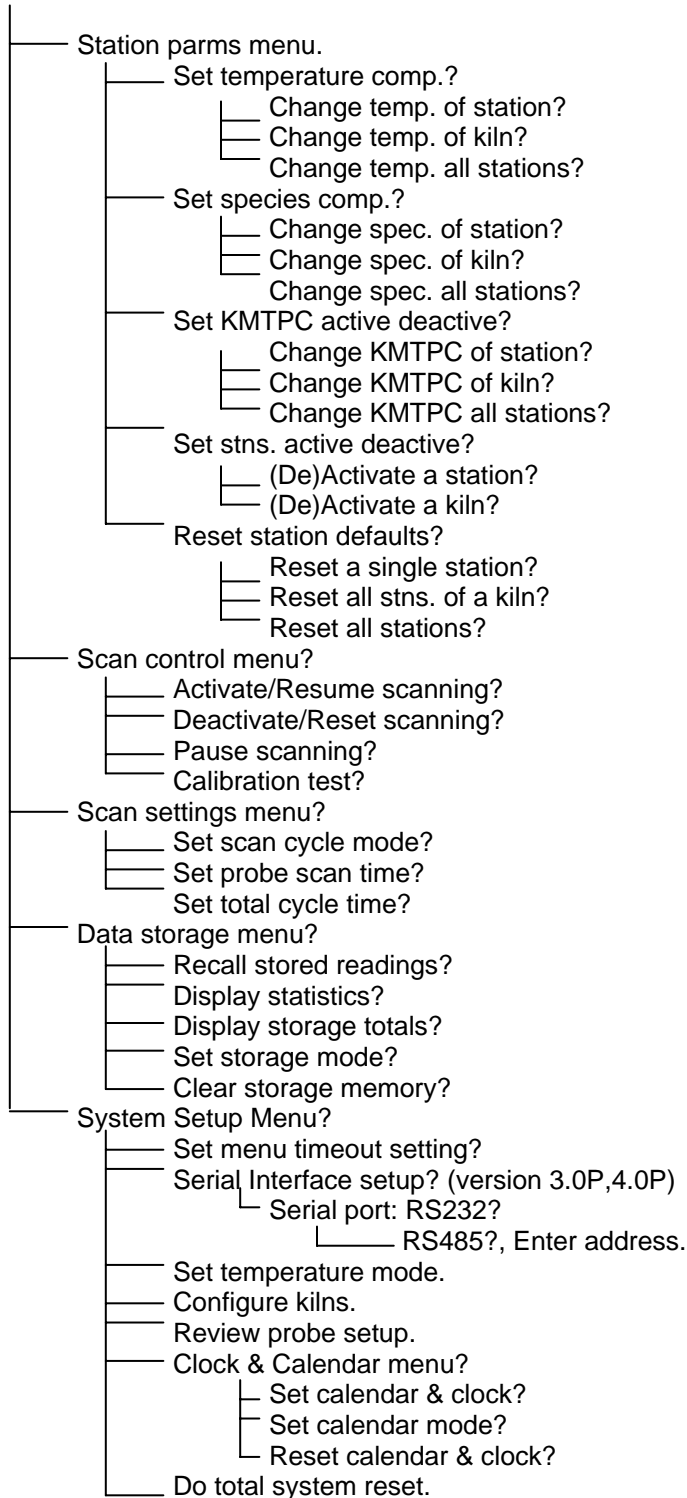
Time remaining until USER PAUSE



# Menu Structure

The menu is structured as follows:

KMT operational status displayed.



## SCI Serial Port System

The Kil-Mo-Trol *PLUS* features a UART serial communication interface system, or *SCI*, that will allow system integration with a host computer system. By using the KMT PLUS protocol, virtually all commands that are available through the Front Panel Interface are also available through the SCI system. For more information, see Appendix B: SCI protocol.

### SCI setup

The Kil-Mo-Trol PLUS K-1100 system uses an addressable serial interface scheme, where a host computer/controller can communicate with multiple systems individually, over a single communication link. This scheme is implemented by including an address parameter in the SCI command string (see appendix B). When a SCI command string is received, the Kil-Mo-Trol K-1100 system will compare the received address parameter to its assigned address.

The SCI setup function will allow the user to select one of two communication line drivers built into the unit: the DB-9F RS232 or the 4-wire RS485 port. RS-485 is useful for multi drop and/or long length communication lines. It will also allow the user to specify the system address from 1 to 255 (RS485 only).

To activate this function, you must:

- a) Power down the unit.
- b) Power up the unit while depressing BOTH the UP and DOWN arrow keys.

The system will display:

```
SCI
setup
```

Then, the user can select one of the two SCI ports:

```
Serial    RS232<
Port      :RS485
```

If RS-485 is selected, the unit will also prompt you for a system address.

```
RS485 port
enabled.
```

```
Enter unit
Address:      1
```

Upon pressing ENTER, the system will respond:

```
Unit address: 1
```

If RS-232 is selected, the system address can not be specified, and automatically becomes 1. Upon pressing ENTER, the system will respond:

```
RS232 port
enabled.
```

## Chapter 3 Menu Functions and Commands

### Station Parameter Menu

**Station parms.  
menu? (ENTER)**

This menu group contains functions to view and change all station parameters.

### Set temperature comp?

**Set temperature  
comp.? (ENTER)**

Wood sample temperature parameters for %M.C. compensation are set through this menu group. The parameter entered for this selection must represent the current temperature of the wood.

The user has a choice to:

- a> set an individual station at a particular temperature (useful in multi-zone kilns),
- b> set all the stations associated with a particular kiln globally to a specific temperature,
- c> set all stations of the unit to a particular temperature.

### Change temp. of station?

**Change temp. of  
station? (ENTER)**

This function allows the temperature compensation value for an individual station of a kiln to be set.

The display will show the current temperature setting for the station that is currently displayed. Move the cursor under the kiln/station number (SELECT key) and change the kiln/station number (UP/DOWN keys) until the desired kiln/station is displayed. Then move the cursor under each digit of the temperature value, and change as needed.

**KILN: 1 STN: 1  
set @ Temp= 70°F**

Each digit of the temperature value can be changed individually to allow speedy temperature changes with the given keypad. Once the desired temperature is reached, press ENTER to program in the change. If ENTER is not pressed, no change is

made. These parameters are stored in non-volatile memory, so even if power is removed, the settings are retained.

### Change temp. of kiln?

**Change temp. of  
kiln? (ENTER)**

This function allows the temperature compensation value for all stations assigned to a kiln to be set.

The display will show the current temperature setting for the first station of the kiln that is currently displayed. Moving the cursor under the kiln number (SELECT key) and change the kiln number (UP/DOWN keys) until the desired kiln displayed. Then move the cursor under each digit of the temperature value, and change as needed.

**KILN: 1  
set @ Temp= 70°F**

Each digit of the temperature value can be changed individually to allow speedy temperature changes with the given keypad. Once the desired temperature is reached, press ENTER to program in the change. If ENTER is not pressed, no change is made. These parameters are stored in non-volatile memory, so even if power is removed, the settings are retained.

### Change temp. all stations?

**Change temp. all  
stations? (ENTER)**

This function allows the temperature compensation value for all stations to be set.

The display will show the current temperature setting for the first station of the first kiln. Move the cursor under each digit of the temperature value, and change as needed.

**All stations:  
set @ Temp= 70°F**

Each digit of the temperature value can be changed individually to allow speedy temperature changes with the given keypad. Once the desired temperature is reached, press ENTER to program in the change. If ENTER is not pressed, no change is made. These parameters are stored in non-volatile memory, so even if power is removed, the settings are retained.

## Set species comp?

**Set species  
comp? (ENTER)**

Wood sample species parameters for %M.C. compensation are set through this menu.

The user has a choice to:

- a> set an individual station at a particular species (useful in multi-species kiln charges),
- b> set all the stations associated with a particular kiln to a specific species,
- c> set all stations of the unit to a particular species.

## Change spec. of station?

**Change spec. of  
station? (ENTER)**

This function allows the species compensation value for a single station of a kiln to be set.

The display will show the current species setting for the station that is currently displayed. Move the cursor under the kiln/station number (SELECT key) and change the kiln/station number (UP/DOWN keys) until the desired kiln/station is displayed. Then move the cursor under the species name, and change (UP/DOWN keys) as needed.

**KILN: 1 STN: 1  
DOUGLAS FIR**

Once the desired species is reached, press ENTER to program in the change. If ENTER is not pressed, no change is made. These parameters are stored in non-volatile memory, so even if power is removed, the settings are retained.

## Change spec. of kiln?

**Change spec. of  
kiln? (ENTER)**

This function allows the species compensation value for all stations of a kiln to be set.

The display will show the current species setting for the first station of the kiln that is currently displayed. Move the cursor under the kiln number (SELECT key) and change the kiln number (UP/DOWN keys) until the desired kiln is displayed. Then move the cursor under the species name, and change (UP/DOWN keys) as needed.

**KILN: 1**  
**DOUGLAS FIR**

Once the desired species is reached, press ENTER to program in the change. If ENTER is not pressed, no change is made. These parameters are stored in non-volatile memory, so even if power is removed, the settings are retained.

### **Change spec. all stations?**

**Change spec. all  
stations? (ENTER)**

This function allows the species compensation value for all stations to be set.

The display will show the current species setting for the first station of the first kiln. Change (UP/DOWN keys) as needed.

**All stations:**  
**DOUGLAS FIR**

Once the desired species is reached, press ENTER to program in the change. If ENTER is not pressed, no change is made. These parameters are stored in non-volatile memory, so even if power is removed, the settings are retained.

### **Set KMTPC active/deactive?**

**Set KMTPC active  
deactive? (ENTER)**

Wood sample KMTPC (Kil-Mo-Trol pin correction) status for %M.C. compensation is set through this menu. The KMTPC is a correction that, in some cases, can help compensate the high %MC deviations sometimes associated with embedded contact pins in wood.

The user has a choice to:

- a> set the KMTPC of an individual station ACTIVE or DEACTIVE,
- b> set all the stations associated with a particular kiln to have the KMTPC station ACTIVE or DEACTIVE,
- c> set all stations of the unit to have the KMTPC station ACTIVE or DEACTIVE.

If the KMTPC of a station is active, it overrides any species correction that is set for that station.

### Change KMTPC. of station?

Change KMTPC of  
station? (ENTER)

This function allows the KMTPC status for a single station of a kiln to be set.

Note on KMTPC: The KMTPC is a correction factor that is used to help compensate for drifts that can be associated with contact pins that have been embedded for extended periods of time. **When activated, the KMTPC will override any species compensation.**

The display will show the current KMTPC status for the station that is currently displayed. Move the cursor under the kiln/station number (SELECT key) and change the kiln/station number (UP/DOWN keys) until the desired kiln/station is displayed. Then move the cursor under the KMTPC status, and change (UP/DOWN keys) as needed.

KILN: 1 STN: 1  
KMTPC is Off

Once the desired status is reached, press ENTER to program in the change. If ENTER is not pressed, no change is made. These parameters are stored in non-volatile memory, so even if power is removed, the settings are retained.

### Change KMTPC. of kiln?

Change KMTPC of  
kiln? (ENTER)

This function allows the KMTPC status for all stations of a kiln to be set.

The display will show the current KMTPC status for the first station of the kiln that is currently displayed. Move the cursor under the kiln number (SELECT key) and change the kiln number (UP/DOWN keys) until the desired kiln is displayed. Then move the cursor under the KMTPC status, and change (UP/DOWN keys) as needed.

KILN: 1  
KMTPC is Off

Once the desired status is reached, press ENTER to program in the change. If ENTER is not pressed, no change is made. These

parameters are stored in non-volatile memory, so even if power is removed, the settings are retained.

### **Change KMTPC all stations?**

**Change KMTPC all  
stations? (ENTER)**

This function allows the KMTPC status for all stations to be set.

The display will show the current KMTPC status for the first station of the first kiln. Change the status (UP/DOWN keys) as needed.

**All stations:  
KMTPC is Off**

Once the desired status is reached, press ENTER to program in the change. If ENTER is not pressed, no change is made. These parameters are stored in non-volatile memory, so even if power is removed, the settings are retained.

### **Set stations active/deactive?**

**Set stns. active  
deactive? (ENTER)**

Individual stations of a kiln or all stations of a kiln can be activated or deactivated.

A station that is set "ACTIVE" means that that station will be included during a cycle. A station that is set "DEACTIVE" means that that station will not be included during a cycle.

This feature can be useful in a multi kiln installation where not all of the kilns or kiln stations configured in a KMT system require monitoring at a particular time. By deactivating stations the system "skips over" those deactivated stations during the cycle.

### **Deactivate/Activate a station?**

**(De)Activate a  
station? (ENTER)**

This function allows the KMTPC status for a single station of a kiln to be set.

The display will show the current status for the station that is currently displayed. Move the cursor under the kiln/station number (SELECT key) and change the kiln/station number (UP/DOWN keys) until the desired kiln/station is displayed. Then

move the cursor under the status, and change (UP/DOWN keys) as needed.

**KILN: 1 STN: 1**  
**Station ACTIVE**

Once the desired status is reached, press ENTER to program in the change. If ENTER is not pressed, no change is made. These parameters are stored in non-volatile memory, so even if power is removed, the settings are retained.

### Deactivate/Activate a kiln?

**(De)Activate a  
kiln? (ENTER)**

This function allows the status for all stations of a kiln to be set.

The display will show the current status for the first station of the kiln that is currently displayed. Move the cursor under the kiln number (SELECT key) and change the kiln number (UP/DOWN keys) until the desired kiln is displayed. Then move the cursor under the status, and change (UP/DOWN keys) as needed.

**KILN: 1**  
**Station ACTIVE**

Once the desired status is reached, press ENTER to program in the change. If ENTER is not pressed, no change is made. These parameters are stored in non-volatile memory, so even if power is removed, the settings are retained.

### Reset station defaults?

**Reset stations  
defaults? (ENTER)**

Station default parameters for %M.C. compensation are set through this menu. The user has a choice to reset to the default parameters of an individual station, or reset all the stations associated with a particular kiln, or all stations of the unit. The default parameters are:

Temperature = 70°F (or 20°C if in Celsius mode)  
Species = Douglas Fir  
KMTPC = OFF.

This function will not change the active/deactive status of stations.

### Reset a single station?

**Reset a single  
station? (ENTER)**

This function allows the parameters of a single station of a kiln to be reset.

Move the cursor under the kiln/station number (SELECT key) and change the kiln/station number (UP/DOWN keys) until the desired kiln/station is displayed.

**KILN: 1 STN: 1  
Set To Default**

Once the desired station is reached, press ENTER to reset the station parameters. If ENTER is not pressed, no change is made.

### Reset all stns. of a kiln?

**Reset all stns.  
of kiln? (ENTER)**

This function allows the parameters of all stations of a kiln to be reset.

Move the cursor under the kiln number (SELECT key) and change the kiln number (UP/DOWN keys) until the desired kiln is displayed.

**KILN: 1  
Set To Default**

Once the desired kiln is reached, press ENTER to reset the station parameters. If ENTER is not pressed, no change is made.

### Reset all stations?

This function allows the parameters of all stations to be reset.

**Reset all  
stations? (ENTER)**

Press ENTER to reset the station parameters. If ENTER is not pressed, no change is made.

## Scan Control Menu

**Scan control  
menu? (ENTER)**

This menu group contains functions to control the scanning operations.

## Activate/Resume Scanning?

**Activate/Resume  
scanning? (ENTER)**

This function will activate or resume the scanning, depending on the current operational status of the unit.

If the unit is in the "KMT Idle" state a new cycle will be initiated. The first station configured as "ACTIVE" will be scanned.

If the unit was in "USER PAUSE" mode (explained later), this function will resume scanning where it left off.

For each Probe Array Module in the system, an auto zero "self calibration" will be performed each time a Probe Array Module is first activated for a cycle. The unit will display:

**Calibrating:  
card..... 1**

This corrects for small circuit drifts that can result over time and with changes in ambient temperature.

At this point, the system will also check:

*a>The number of probes assigned to kilns.* If no probes are assigned to kilns, the KMT will display:

**Cannot scan:**

**No kilns are  
configured.**

*b>The number of active stations.* If no stations are set as active, the KMT will display:

**Cannot scan:**

**No stations are  
active.**

*c>The settings of scan and cycle time against the minimum time needed for one cycle given the current number of active stations. The minimum cycle time is the current probe scan time multiplied by the current number of active probes, plus the automatic calibration time for each Probe Array Module. Remember that a CORE/SHELL station consists of two probes. If the cycle time is inadequate, the KMT will display:*

**Cannot scan:**

**Insufficient  
cycle time.**

**Min cycle time  
x min., y sec.**

where “x” and “y” will be the time in minutes and seconds.

### **Deactivate/Reset scanning?**

**Deactivate/Reset  
scanning? (ENTER)**

This function will deactivate scanning. The next time that the *Activate/Resume scanning* function is executed, a new cycle will begin with the first active station.

### **Pause scanning?**

**Pause  
scanning? (ENTER)**

This function temporarily suspends the scanning, placing the system in the *USER PAUSE* state.

The unit will remain in this mode until the *Activate/Resume scanning* function is executed. When the *Activate/Resume scanning* function is executed, the unit will “pick up where it left off”, and resume scanning starting from the station that was being scanned prior to the *USER PAUSE* state.

### **Calibration Test?**

**Calibration  
test? (ENTER)**

Each K1100-PAMx accessory module has its own moisture detection circuitry, and its own built in calibration standards. The calibration test consists of three test points:

- a> "open" or "no load" test which should read < 6.0%.  
The unit will display:

```
Card 1      %MC<
NOM. < 6.2 : 6.0
```

```
Card 1      %MC<
NOM. < 6.2 :PASS
```

- b> 12.2% Douglas Fir @ 70°F nominal standard.

```
Card 1      %MC=
NOM. =12.2 :12.2
```

```
Card 1      %MC<
NOM. =12.2 :PASS
```

- c> 22.0% Douglas Fir @ 70°F nominal standard.

```
Card 1      %MC<
NOM. =22.0 :22.0
```

```
Card 1      %MC<
NOM. =22.0 :PASS
```

The nominal values are displayed on the LCD and the unit compares the converted %MC values to the nominal, along with the position number of the card under test. If the converted value is within acceptable limits, the unit will display "PASS". If the converted value is not within acceptable limits, the unit will display "FAIL".

This test is performed on each Probe Array module that is installed in the system.

## Scan settings menu?

**Scan settings  
Menu? (ENTER)**

This menu group contains all the functions to set or change scanning related parameters. These functions are described below.

## Set scan cycle mode?

**Set scan cycle  
mode? (ENTER)**

There are two cycle modes that the system performs: **SINGLE CYCLE** and **LOOP CYCLE**.

In SINGLE CYCLE mode, the unit will automatically deactivate the scanning when one complete cycle has been completed. In LOOP CYCLE mode, the unit will continue to scan indefinitely until deactivated by the user.

**Scan            SINGLE<  
Cycle mode: LOOP**

Once in this menu, use the UP/DOWN arrow keys to move the cursor next to the desired mode

**Scan            SINGLE  
Cycle mode: LOOP<**

and press ENTER to lock in the choice. The unit will verify the selection.

**Unit is LOOP  
scan cycle mode**

## Set probe scan time?

**Set probe scan  
time? (ENTER)**

This menu will allow the user to set the probe scan time, in seconds. Once in this menu, the current setting of the scan time will be displayed, and can be increased or decreased by using the UP/DOWN arrow keys. . The probe scan time can be varied from 5 to 30 seconds.

**Scan time is set  
=10 sec. (ENTER)**

Pressing ENTER locks in the value.

**Scan time is set  
to 10 seconds.**

### **Set total cycle time?**

**Set total cycle  
time? (ENTER)**

This menu will allow the user to set the total cycle time (to a maximum of 175 minutes). Once in this menu, the current setting of the cycle time will be displayed.

**Cycle time  
15min, 0sec (EN)**

Each digit can be individually increased or decreased by using the SELECT key to choose a particular digit (identified by the cursor under the digit), and then the UP/DOWN arrow keys to change the value of the digit. Pressing ENTER locks in the value.

**Cycle time is:  
15 min, 0sec.**

## Data storage menu?

**Scan settings  
Menu? (ENTER)**

This menu group contains all the functions to recall stored data to the LCD display, to do statistical processing, and set data storage options. These functions are described below.

## Recall stored readings?

**Scan settings  
Menu? (ENTER)**

This function will allow access to the data point storage. First, the cycle must be selected.

**Cycle Date Time  
1 2/22 12:00**

Use the UP/DOWN arrow keys to find the desired cycle number. Each cycle number will be displayed with the time and date that the cycle began. When the desired cycle is found, press ENTER. The next screen will display the station readings for all stations that were logged in that cycle.

**Kn Stn %MC  
1 1c 28.1**

Use the UP/DOWN arrow keys to scroll through each data point in the list. Press SELECT to return to the last screen, or Press ENTER when done.

## Display storage totals?

**Display storage  
totals? (ENTER)**

This will display the storage status of the number of cycles currently stored, the number of total data points stored, and the number of data points that are empty.

**Total number of  
Cycles = 0**

**Total number of  
datapoints= 0**

```
Number of free
datapoints= 2728
```

## Display statistics?

```
Display (ENTER)
statistics?
```

This function calculates several statistical parameters. They are:

- a> total samples in sample pool
- b> total valid samples in sample pool
- c> average
- d> standard deviation
- e> coefficient of variation
- f> High and low reading of the pool, along with their station locations

Calculations are based on the **VALID SAMPLE POOL** of moisture content readings, taken from the **TOTAL SAMPLE POOL**.

The system will prompt the user for two to three pieces of additional information to calculate the valid sample pool:

- a> KILN NUMBER

```
Enter kiln
number: 1
```

- b> PROBE TYPE

```
Process on:
CORE AND SHELL
```

- c> PERCENTAGE INCLUSION WINDOW

```
Enter inclusion
window: 20.0 %
```

The KILN NUMBER is the particular kiln that you wish to process on. A prompt for the **PROBE TYPE** will be issued if that kiln is a CORE and SHELL kiln. You can specify to process on the CORE readings only, the SHELL readings only or both the CORE and SHELL readings. Next, a prompt for the **PERCENTAGE INCLUSION WINDOW** will be issued. A percentage from 5% to 200% can be specified. This will determine the range of %MC readings from the total sample pool to be included in the valid sample pool.

After the above information has been entered, the system will display the statistics as follows:

- a> The total number of samples in the total sample pool, total number of samples in the valid sample pool, and the %MC average of the readings in the valid sample pool.

<b>Total Valid Avg%</b>
16 16 28.2

- b> The standard deviation and the coefficient of variation of the valid sample pool,

<b>Std.Dev.</b>	<b>Co.Var</b>
0.20	0.01

- c> The high and the low reading in the valid sample pool, along with their station location:

<b>HI:</b>	<b>1c=28.3%</b>
<b>LO:</b>	<b>5s=12.5%</b>

### Set storage mode?

<b>Set storage mode? (ENTER)</b>
--------------------------------------

The system can be set in one of two storage modes:

- a> APPEND  
b> OVERWRITE

APPEND storage mode will cause data points to be added to any pre existing set(s) of data points stored in memory. Since every %MC reading gets logged in this mode, APPEND storage mode results in the total number of cycles and data points stored at a given time to increase with each %MC reading.

OVERWRITE storage mode will only store one set of data points associated with the current active CYCLE in storage memory. When the system is set in LOOP CYCLE mode, OVERWRITE storage mode will result in each subsequent %MC reading to be stored to overwrite the previous reading. This will result in the total number of cycles logged in memory to remain at one, and the total number of data points stored in memory to remain fixed.

### Clear storage memory?

<b>Clear storage memory? (ENTER)</b>
--

This will clear all data points that are stored in memory. The system will prompt you to confirm this action:

**ARE YOU SURE?**  
**Press (ENTER)**

## System Setup menu

```
System setup  
menu? (ENTER)
```

This menu group contains the functions that allow the user to best configure the system to their application. Most of these menu functions will be typically used at initial installation, and when hardware upgrades are made.

### Set menu timeout setting?

```
Set menu timeout  
setting? (ENTER)
```

The menu timeout setting is the time that the unit will wait for a key hit during a menu/function before automatically canceling the menu/function. It can be set from 1 to 60 seconds.

```
Menu timeout is  
=60 sec. (ENTER)
```

Pressing enter locks in the change:

```
Timeout is set  
to 60 seconds.
```

### Set temperature mode?

```
Set temperature  
mode? (ENTER)
```

This function allows the user to select the desired temperature scale of Fahrenheit or Celsius. The selected scale will be used for the entire system.

```
Temp FAHRENHEIT<  
mode:    CELSIUS
```

Once in this menu, use the UP/DOWN arrow keys to move the cursor next to the desired mode.

```
Temp FAHRENHEIT  
mode:    CELSIUS<
```

and press ENTER to lock in the choice. The unit will verify the selection. All values are set to the default for the selected scale, 70 °F or 20 °C.

**Temperature mode  
is CELSIUS**

## Configure kilns?

**Configure kilns?  
(ENTER)**

This function allows the user to allocate probes to kilns. The LCD display will show the kiln number, the station type (SHELL/CORE or CORE ONLY) and the number of stations currently assigned to that kiln. After a *system parameter reset* (factory settings), there are no probes assigned to any kilns.

Kiln number → # 1 SHELL 0  
Station type →  
Number of stations →

To allocate stations to a kiln, first choose the kiln number by moving the cursor under the kiln number (using the SELECT key) and increase or decrease the number (UP/DOWN arrow keys) until the desired kiln number is reached. Note that the first kiln does not have to be kiln #1. You can enter the kilns in any order. You can allocate, for example, stations first to kiln 8, then to kiln 5. The system will assign the first available probe to the kiln that you are selecting, and maintain a contiguous series of probes, so that there are no "gaps" in probes between kilns.

**Kiln CORE #Stns.  
# 1 SHELL 0**

Once the desired kiln number is reached, press the SELECT key to move the cursor under the station type field. This field can be changed between CORE and SHELL and CORE ONLY by using the UP and DOWN arrow keys. All stations assigned to the kiln will be of the same type defined here.

**Kiln CORE #Stns.  
# 1 SHELL 8**

Use the Up and Down arrow keys to set the number of stations that are to be assigned to the kiln. Press ENTER to lock in the values.

**Change accepted.**

**Change another  
kiln? (ENTER)**

The system will then ask if you would like to continue with probe assignments. Press enter to continue, or any other key to exit.

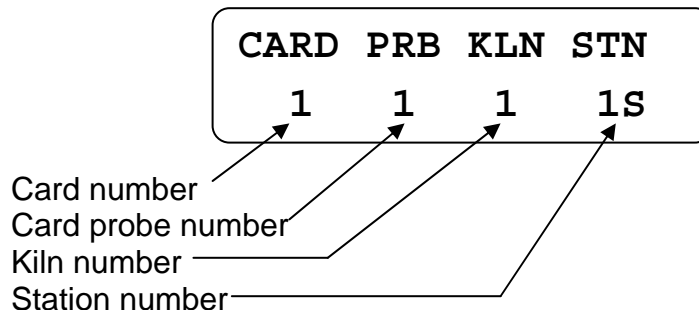
There are several restrictions placed on probe assignment. First, you can only allocate up to the maximum number of probes available in a system. This maximum number is a function of the number of K-1100-PAMx series modules detected, and is displayed at power up. The second is restriction on CORE ONLY kilns: they must be configured with an even number of stations to a kiln. This restriction is handled by the system. Third, once a probe is allocated to a kiln, it can not be de-allocated or re-allocated to another kiln.

If an error is made in probe allocation, you must initiate the **system parameter reset** function, which will clear all the probe assignments.

## Review probe setup?

**Review probe  
Setup? (ENTER)**

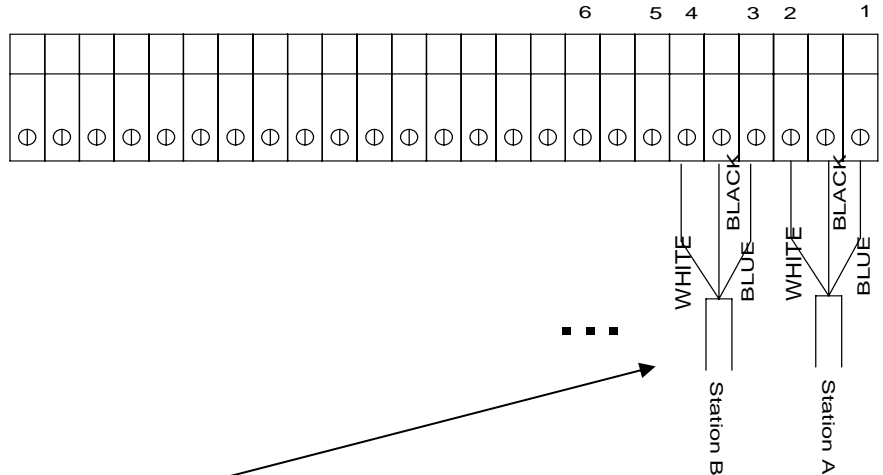
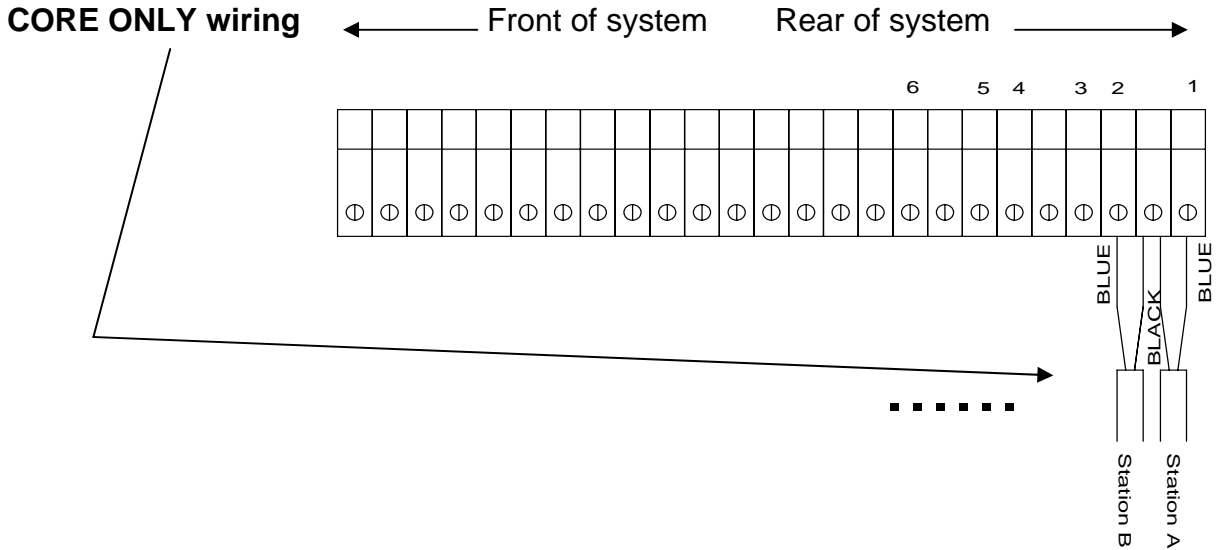
This function will display the assignment of probes to kilns. The information given is the card number, the probe number, the kiln number, and the station number.



Card numbers are determined by order of detection, from left to right. Card number 1 refers to the first card (leftmost position) detected by the system. Card 2 refers to the second card detected by the system, and so on.

The card probe number refers to each individual K-1100-PAMx module probe, from 1 to 16 (typical). Probe number 1 is located at the rear of the card. See the following diagram for more detail on wiring instructions.

The kiln number and station number displayed identifies the kiln and kiln station that the displayed card number and card probe number is assigned to. In the above example, station 1S ( "S" indicates SHELL) of kiln 1 is assigned probe 1 of card 1.



**SHELL and CORE wiring**

**Clock and calendar menu?**

**Clock & Calendar menu? (ENTER)**

This menu group has the functions that control the clock and calendar settings.

### Set calendar and clock?

**Set calendar &  
clock? (ENTER)**

This function allows you to set the time and date. The time is expressed as a 24 hour clock only (no a.m. or p.m.). The date is expressed in one of two selectable formats: month/day/year or day/month/year (see Set calendar mode).

Use the SELECT key to move the cursor under the desired digit or item, then use the UP/DOWN arrow keys to change the item.

**Time: 12:00:00  
Mon 01/01/98**

When the proper time and date is set, press ENTER to lock in the setting. The time is maintained by the K-1100-CCMx with a replaceable 2/3A lithium battery, which should last for several years.

### Set calendar mode?

**Set calendar  
mode? (ENTER)**

The calendar mode can be set to either "US" or "EURO" mode. In US mode, the date format is month/day/year. In EURO mode, it is day/month/year.

**Calendar US<  
Mode: EURO**

Once in this menu, use the UP/DOWN arrow keys to move the cursor next to the desired mode

**Calendar US  
Mode: EURO<**

and press ENTER to lock in the choice. The unit will verify the selection.

**Unit in EURO  
calendar mode**

**Reset clock and calendar?**

**Reset calendar &  
clock? (ENTER)**

This resets the time and date settings to the release time and date of the version of the system firmware, and sets the calendar mode to US.

**Do Total system reset?**

**Do total system  
Reset? (ENTER)**

This function will restore all the factory default system settings. Choosing this selection will cause all previous configuration information to be lost, effectively making you “start from scratch” with your configuration. The unit will ask you to confirm the operation before beginning.

**System Reset  
Request!**

**ALL SETTINGS  
WILL BE ERASED!!**

**ARE YOU SURE?  
Press (ENTER)**

**Actions taken during reset:**

System card detection.  
Storage memory size detection and test.  
Clock/Calendar reset.  
Clearing of all kiln assignments.  
Resetting of all station parameters to the defaults.  
Temperature scale set to Fahrenheit.  
Scan mode to LOOP mode.  
Storage mode set to APPEND.  
SCAN TIME set to 10 seconds.  
Menu timeout set to 10 seconds.  
Cycle time set to 15 minutes  
Memory storage cleared.