Forté Technology, Inc.

…World leaders in moisture measurement

Forté Technology, Inc.

Company History

- 1956 - Established to measure moisture in cashmere.
- 1965 - Expanded into pulp industry.
- 2008 - Facility moved to Taunton, MA.
- Present - Serving clients worldwide in over 40 countries.

Experienced in a wide variety of applications including:

- Pulp
- Tobacco
- Textiles
- Food
- Rubber
- More

Forté Technology, Inc.

Why Measure Moisture?

Quality Control

- An even moisture distribution can help prevent sheet breaks.
- Ensure that your customers are shipped pulp that meets their needs.

Increased Profits

- Your customers will never complain if the pulp you sell is dryer than expected.
- They will complain, however, if it is too wet.
- If you never get customer complaints, chances are, you are giving away pulp.

Accurate moisture measurement can increase profits!

Forté Technology, Inc.

Functions Lead to Increased Profit

- Accurate Invoice Weights allow precise billing so you can invoice every kilogram of pulp that you ship.
- Real time measurements allow adjustments to be made within minutes instead of hours.
- Reduce energy costs by not over drying.
- Reduce sample collecting and testing which corresponds to reduced operations labor.

Forté Technology, Inc.

Other Benefits of the Forté System

1. Instantaneous, non-destructive measurement test.
2. Automated testing with minimal human interface.
3. 100% of product tested for accurate determination of Invoice Weight.
4. A reliable solution for delivering more consistent bales to customers.
5. Provides archived data for identifying changes in moisture over time.
6. User friendly and configurable.

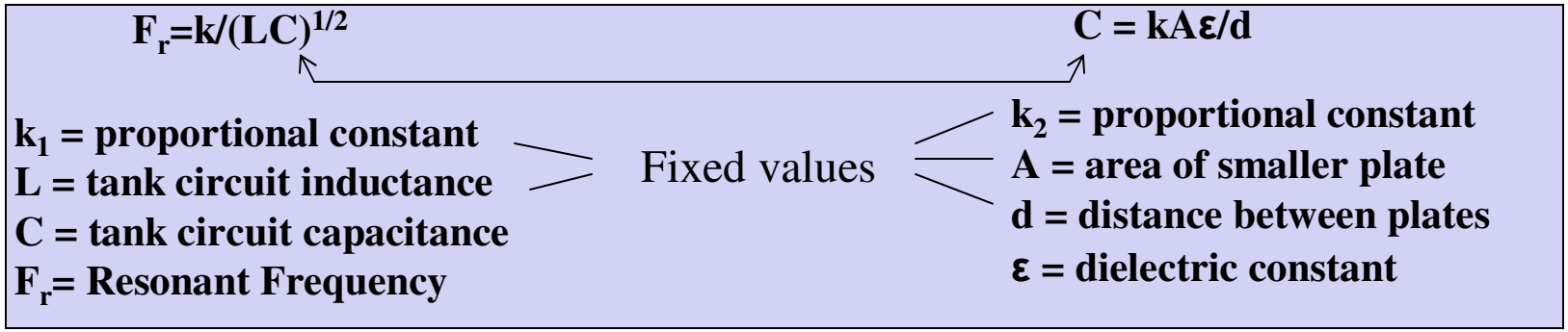
Forté Technology, Inc.

Forté Series 8760 Functions

- Calculates Moisture, Air-dry, and Invoice Weight for every bale produced.
- Builds units and lots to track production.
- Assigns bale serial numbers and lot numbers.
- Tracks bale origin and designates count.
- Records gross and net weights of each bale.
- Provides production reports, graphs and data for trend reports that can be analyzed for future production control.

Forté Technology, Inc.

Principle of Operation



- Bale moisture is determined by the change in resonant frequency (**F_r**).
- The resonant frequency changes based on the dielectric constant of the bale.
- Water has a high dielectric constant of about 80. A dry bale of pulp has a dielectric constant of about 2-7.
- The electrode in the press constitutes a portion of the tank circuit capacitance.
- Forte electronics create a non-destructive RF field. The different dielectric constants create a shift in the resonant frequency. Two frequency readings are taken. The first reading is taken when the bale is slightly compressed. The second reading is taken after the bale has been compressed 4 inches (101.6 mm) more than the first reading.
- The second reading is subtracted from the first reading , obtaining the Forté number. This two step method reduces the effects of oscillator drift.
- The Forté number can be correlated into a moisture reading with these equations and several lab air-dry data points determined by oven tests.

Forté Technology, Inc.

Forté 8760 Hardware

Bale Press Electronics

1. Pulp Oscillator
2. Electrode/Cover plate assembly with Bleeder Resistor
3. Photo Control unit
4. Vane (customer supplied)
5. Photo Reset Switch with reflector
6. Remote Power Supply

Forté Main Console*

1. Industrial Computer
2. DC Power Supply
3. Rack with Opto-isolated Discrete I/O Modules
4. I/O Connectors
5. Communication Interface
6. Uninterruptable Power Supply (UPS)

*Items can be supplied in a console or separately. If separately, industrial computer needs to be kept in a control room.

Forté Technology, Inc.

Forté Main Console

…World leaders in moisture measurement

Forté Technology, Inc.

Forté Main Console - Components

1. Industrial Computer
2. Uninterruptible Power Supply
3. Communications Interface with DC power supply and Opto rack with modules
4. I/O Connectors
5. LCD Display
6. Rocket Port Interface

Forté Technology, Inc.

Bale Press Electronics

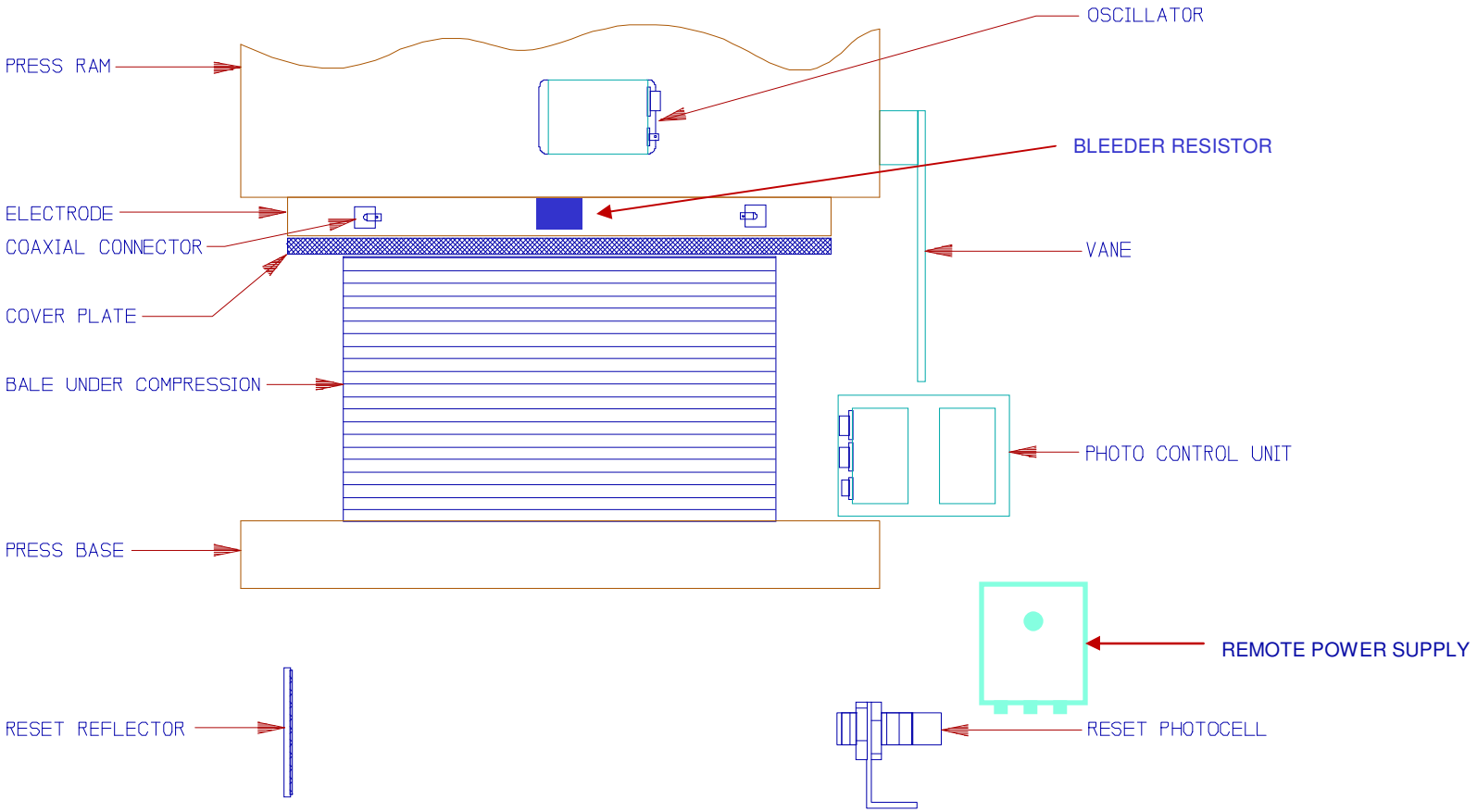
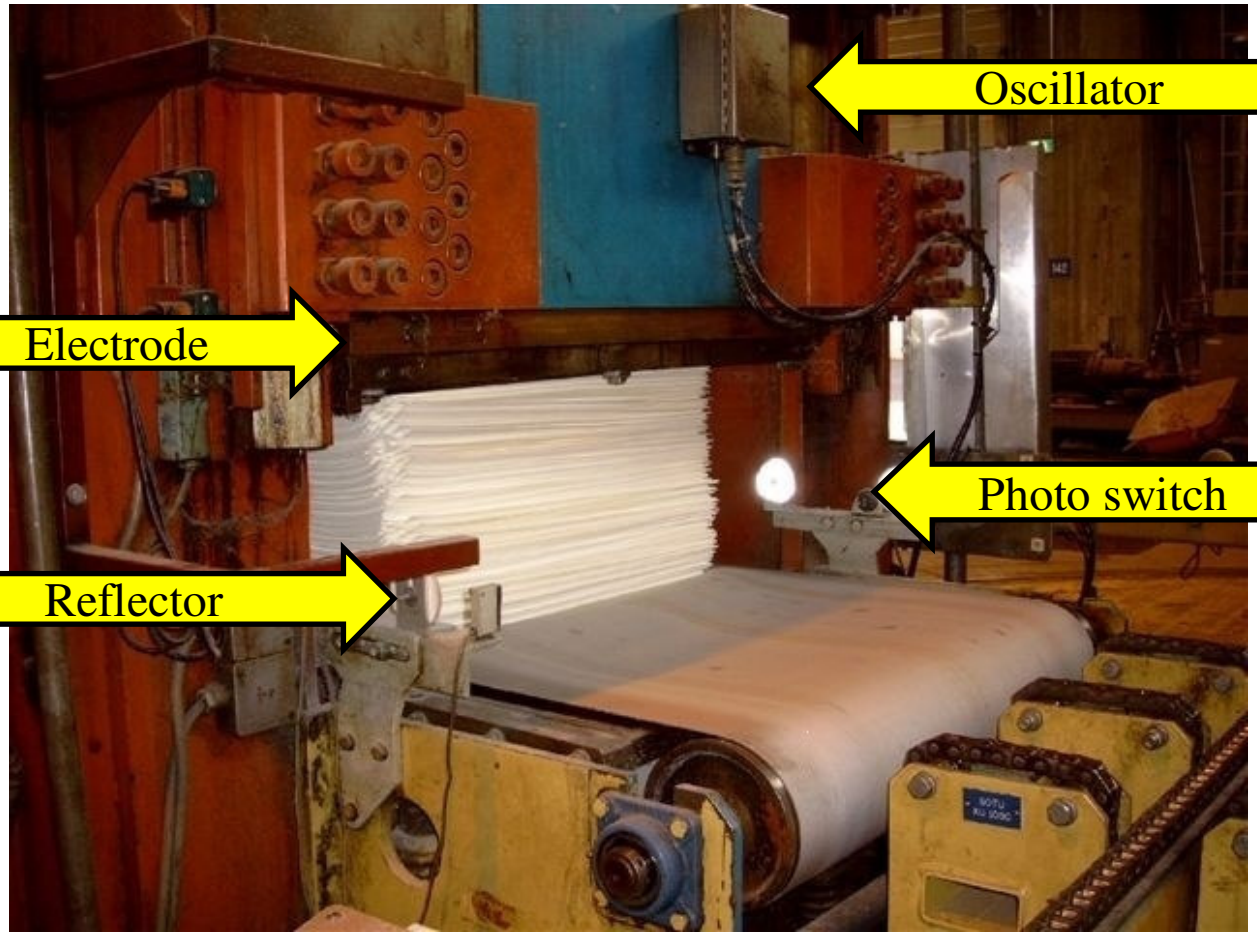


FIGURE 1 : PRESS ELECTRONICS (INTERCONNECTING CABLES OMITTED FOR CLARITY .)

Forté Technology, Inc.

Typical Bale Press



Signal Generator

Passes the signal through the entire bale

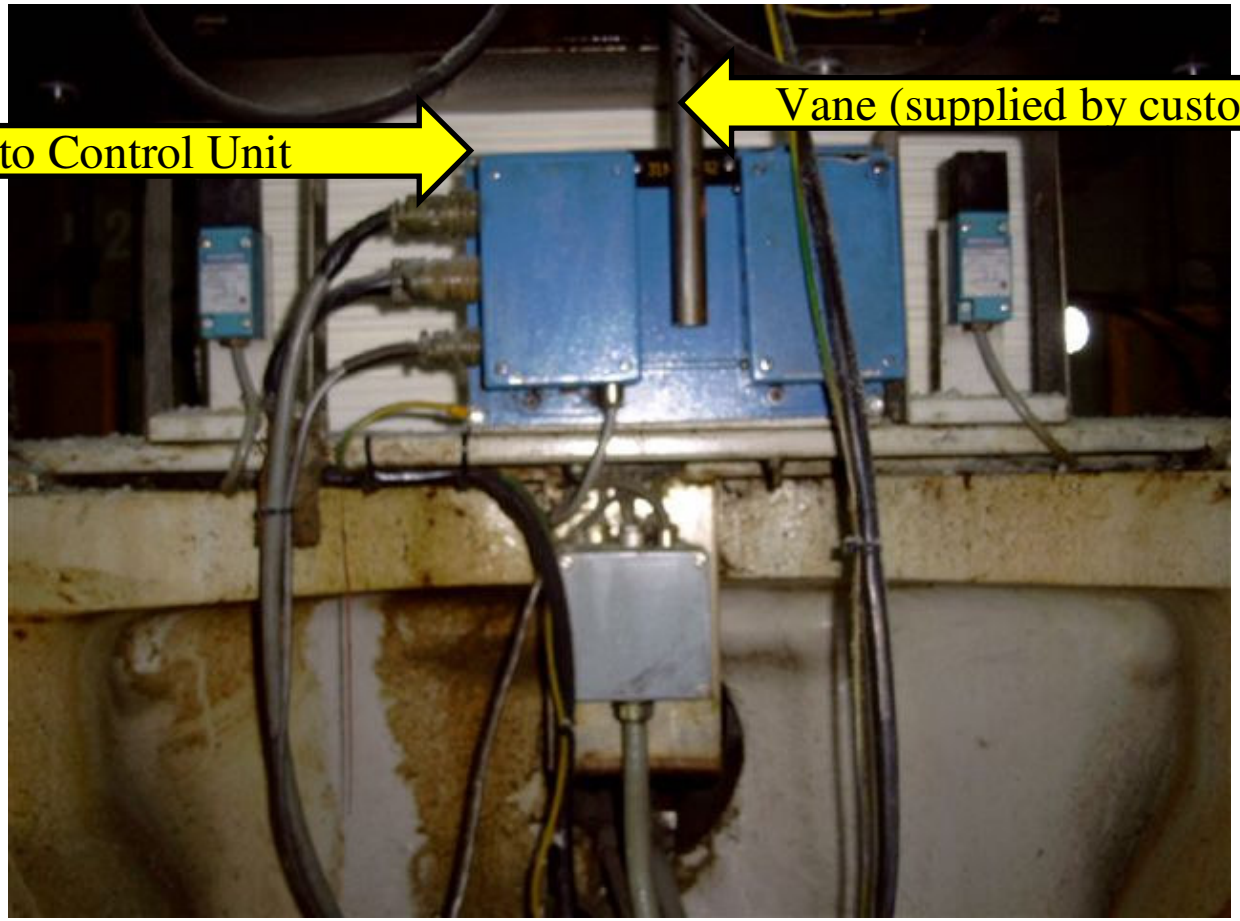
Resets the software so it is ready for the next bale when the beam is broken

Reflects beam of photo switch

…World leaders in moisture measurement

Forté Technology, Inc.

Typical Bale Press

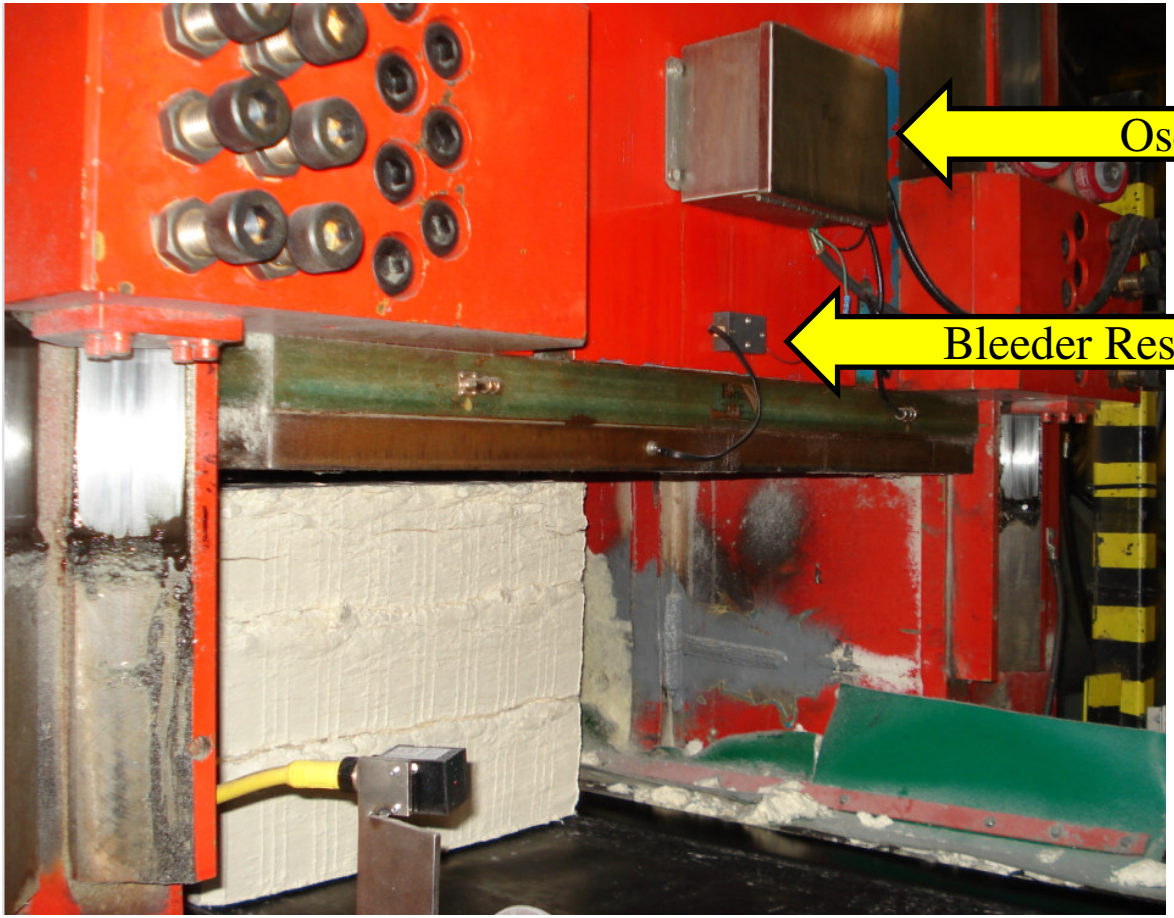


Accepts and transmits the 2 frequency readings

Triggers 2 frequency readings to be taken.

Forté Technology, Inc.

Typical Bale Press



Signal Generator

Discharges any stored up potential energy

Forté Technology, Inc.

Remote Power Supply

Supplies voltage to other Forté Equipment.

…World leaders in moisture measurement

Forté Technology, Inc.

Industrial Computer Components

- Windows XP Professional operating system
- Dual hard drives - RAID 1
- AC5 Interface Card
- Rocket Port Interface Card
- Optional Analog Interface

Forté Technology, Inc.

Rocket Port Interface - RS232/RS422

…World leaders in moisture measurement

Forté Technology, Inc.

Features of the Forte Software Application

- Easy to learn and use.
- Familiar Windows pull down menus.
- User definable fields.
- Configurable summaries, reports, screen displays.
- Several methods of output to mill-wide information system.
- Utilizes SQL databases.
- Archives bale and measurement data for two years.
- Remote displays available.
- Optional input of Quality data.
- System log for ease of troubleshooting.

Forté Technology, Inc.

Mill Interface

Product information transferred manually or automatically

Drop information

Moisture

Weight

Data transfer

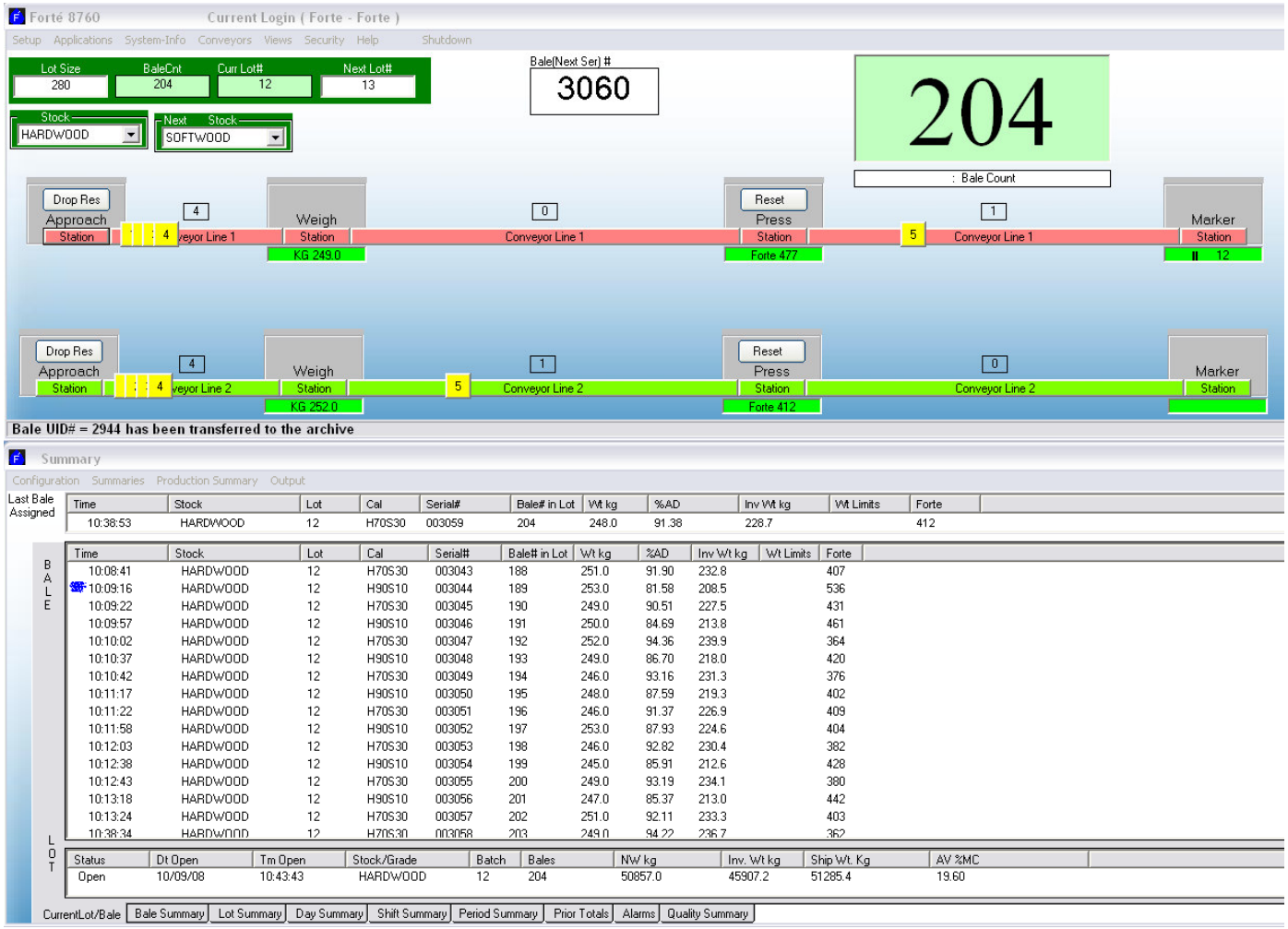
Bale Stenciler

Control Room

…World leaders in moisture measurement

Forté Technology, Inc.

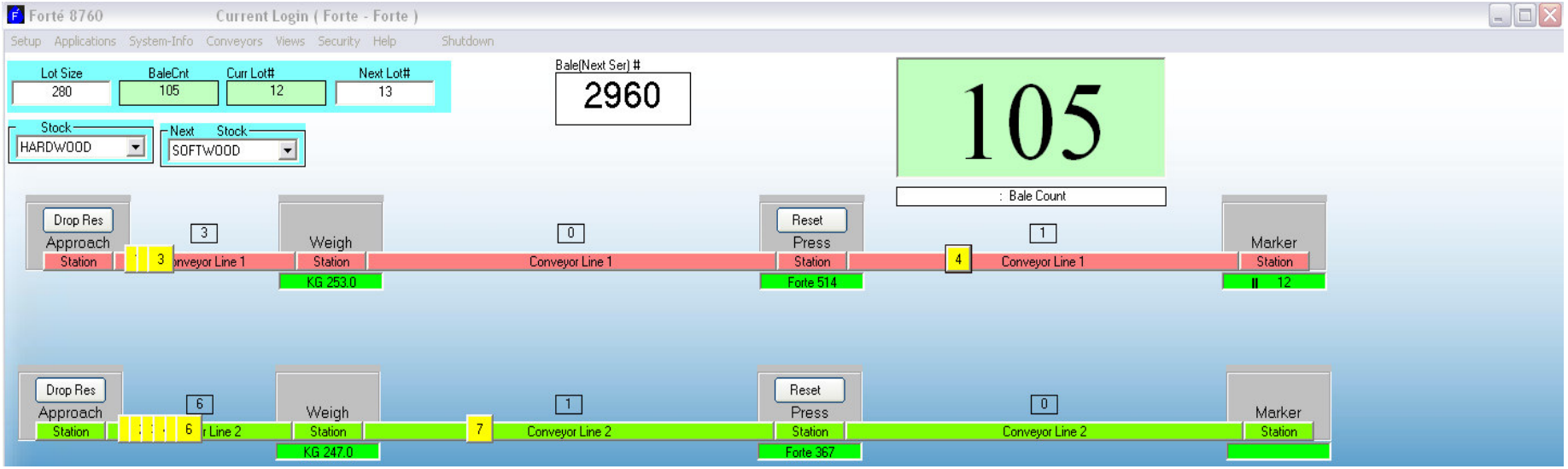
Main Application



…World leaders in moisture measurement

Forté Technology, Inc.

Schematic View of Measuring Window

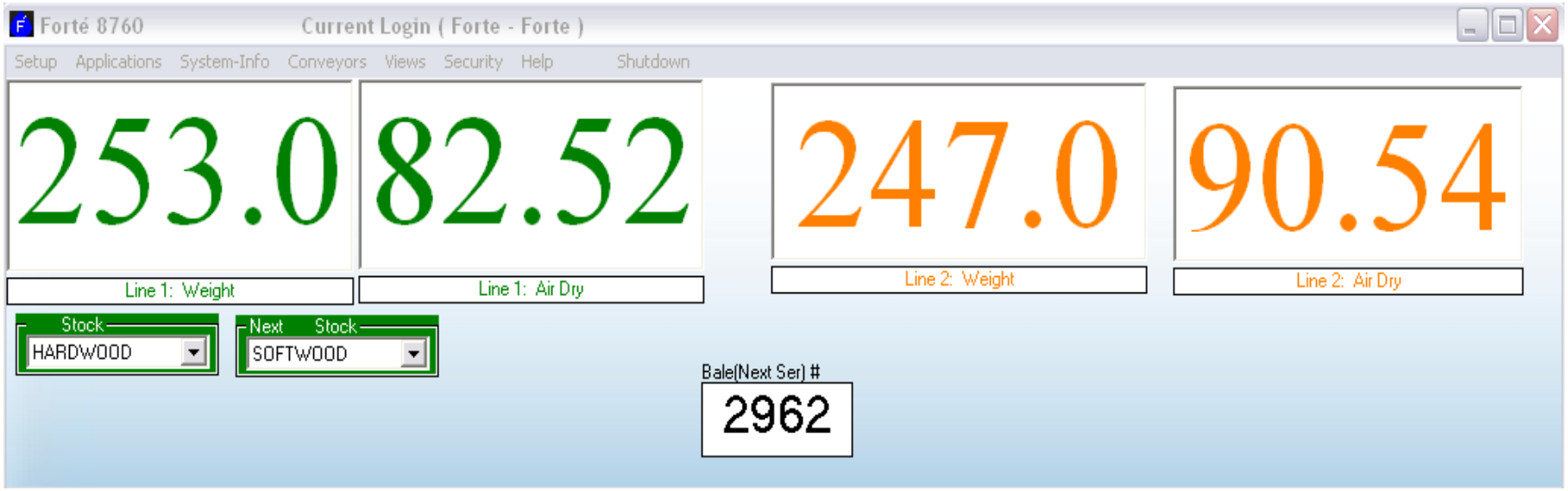


User configurable display includes Stock, Bale and Lot data.

…World leaders in moisture measurement

Forté Technology, Inc.

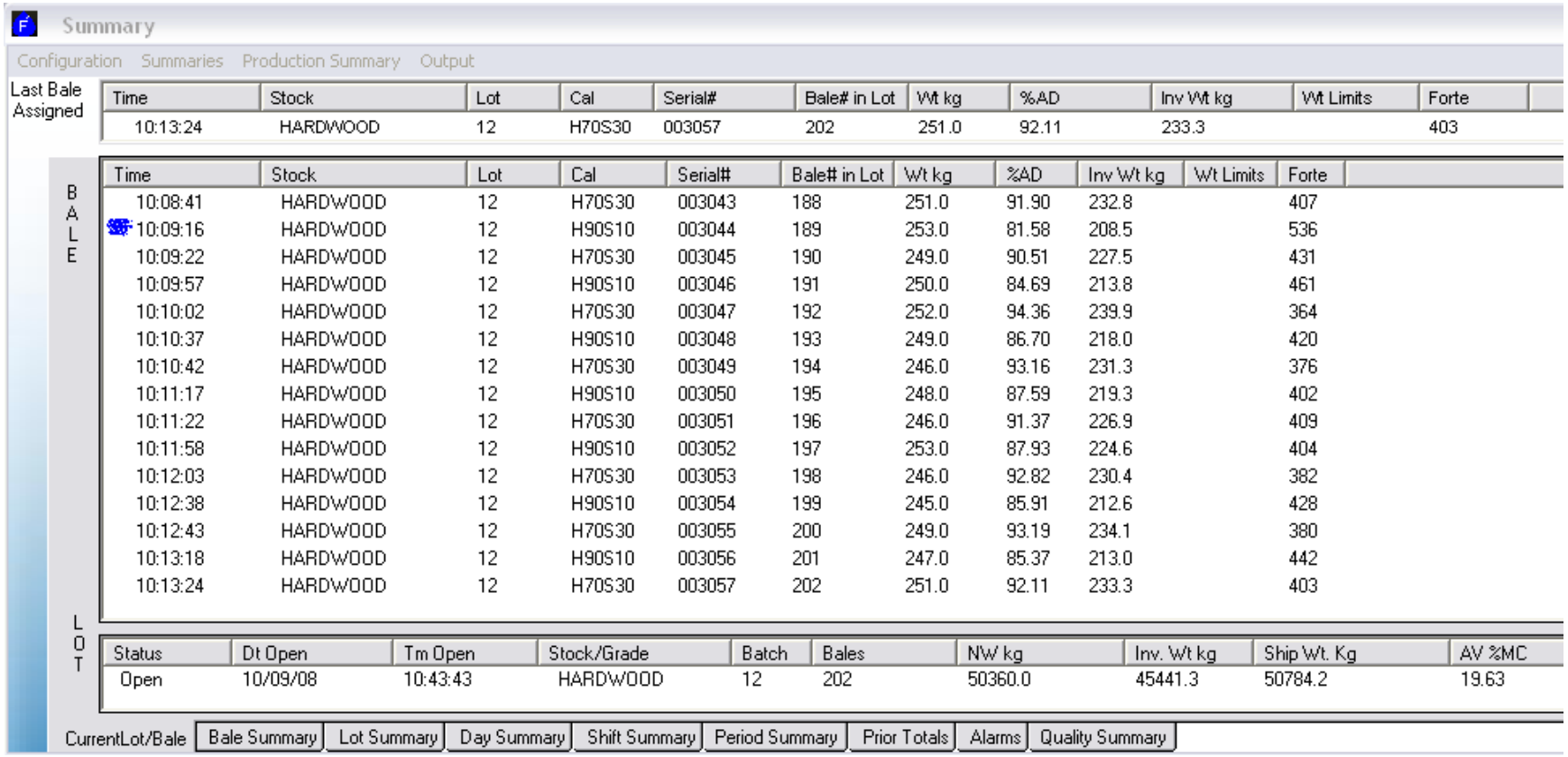
Console View of Measuring Window



Optional view includes large number displays for ease of viewing.

Forté Technology, Inc.

Summary Window

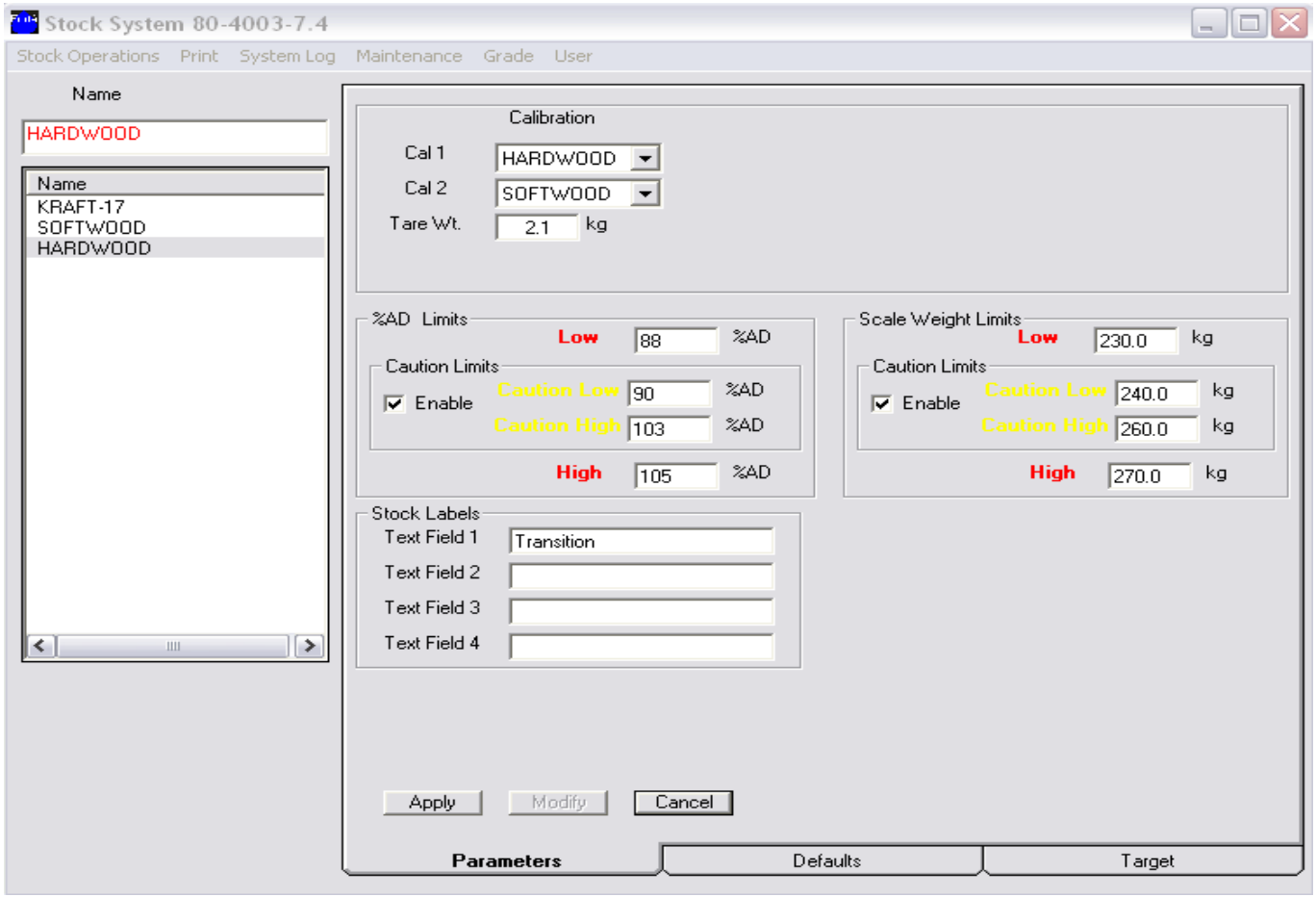


Displays user configurable bale and measurement data.

…World leaders in moisture measurement

Forté Technology, Inc.

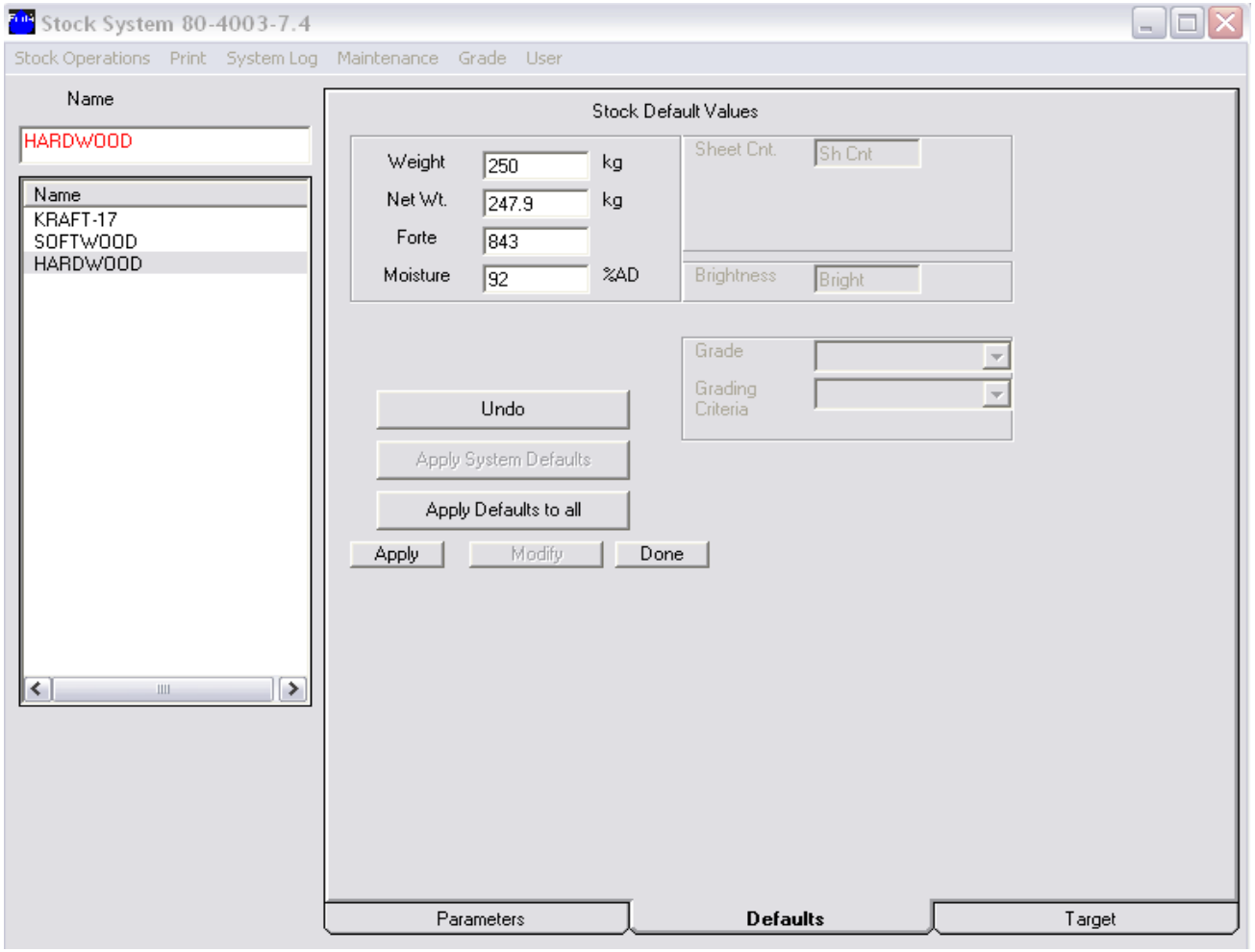
Stock Operations



- Define Stocks.
- Assign calibrations.
- Enter Tare Weights.
- Define %AD and weight cautions and limits for a digital ouput.

Forté Technology, Inc.

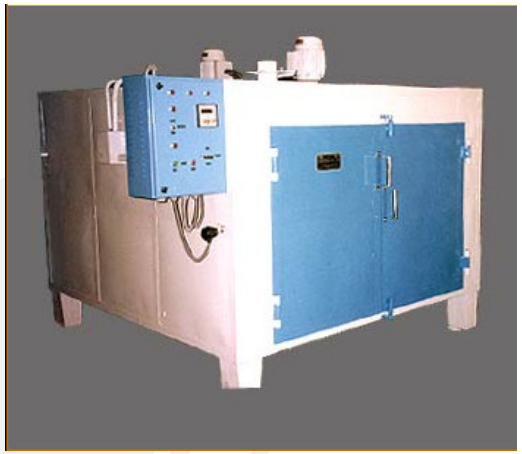
Defaults



Enter default data in the event that communication is lost.

Forté Technology, Inc.

Calibration



Purpose - As with any secondary measurement, the Forte system requires calibration. This is necessary to convert the Forte number to an accurate Air-Dry.

How - The Forte is calibrated using the oven dry method.

Importance – The better the oven-dry data, the more accurate the moisture, air-dry reading determined by the Forté system.

Forté Technology, Inc.

Proper Calibration - Samples

Product - Collect samples from standard bale production.
- Low, medium, and high moisture levels.
- Use new bales that are the same size.

Quantity - At least 10 bales (preferably from different bale positions).
- 5-10 samples per bale (including the outside and center while avoiding the top layer and edges).

Forté Technology, Inc.

Proper Calibration - Procedure

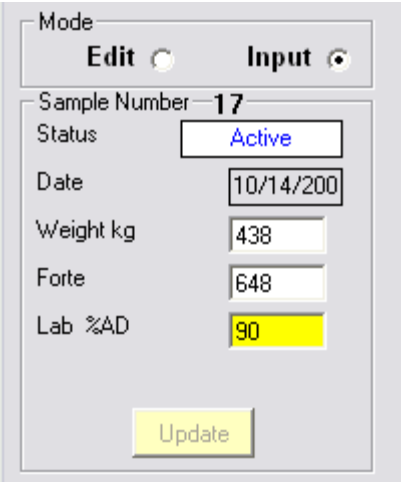
Method - Record Forté Number and Bale Weight for each sample bale.
- Perform standard lab oven-dry tests.
- Enter Forté Number, Bale Weight, and Air-Dry into Forté calibration program.

Type - Each material requires a separate calibration. (Example: hardwood, softwood)
- Calibrations are saved on the hard drive by the Forté software.

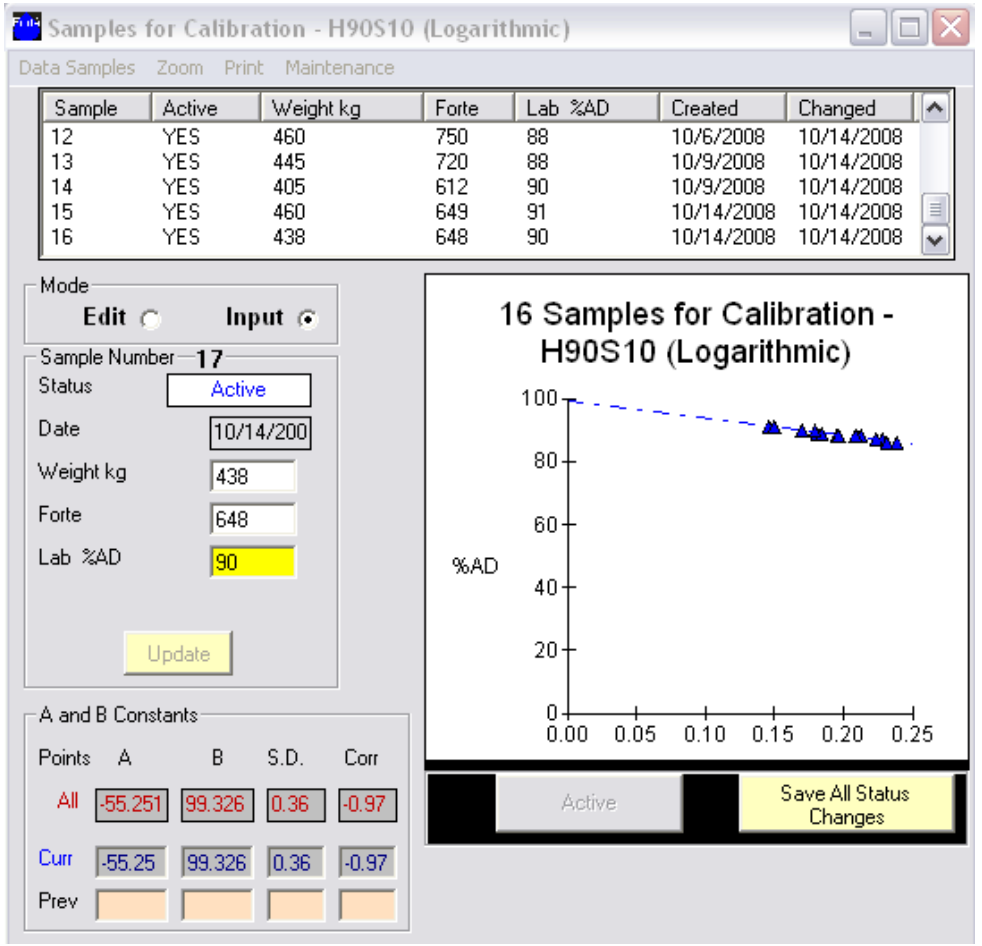
Forté Technology, Inc.

Calibration

Input lab data for each sample.



Calibration coefficients are automatically calculated or can be entered manually.



…World leaders in moisture measurement

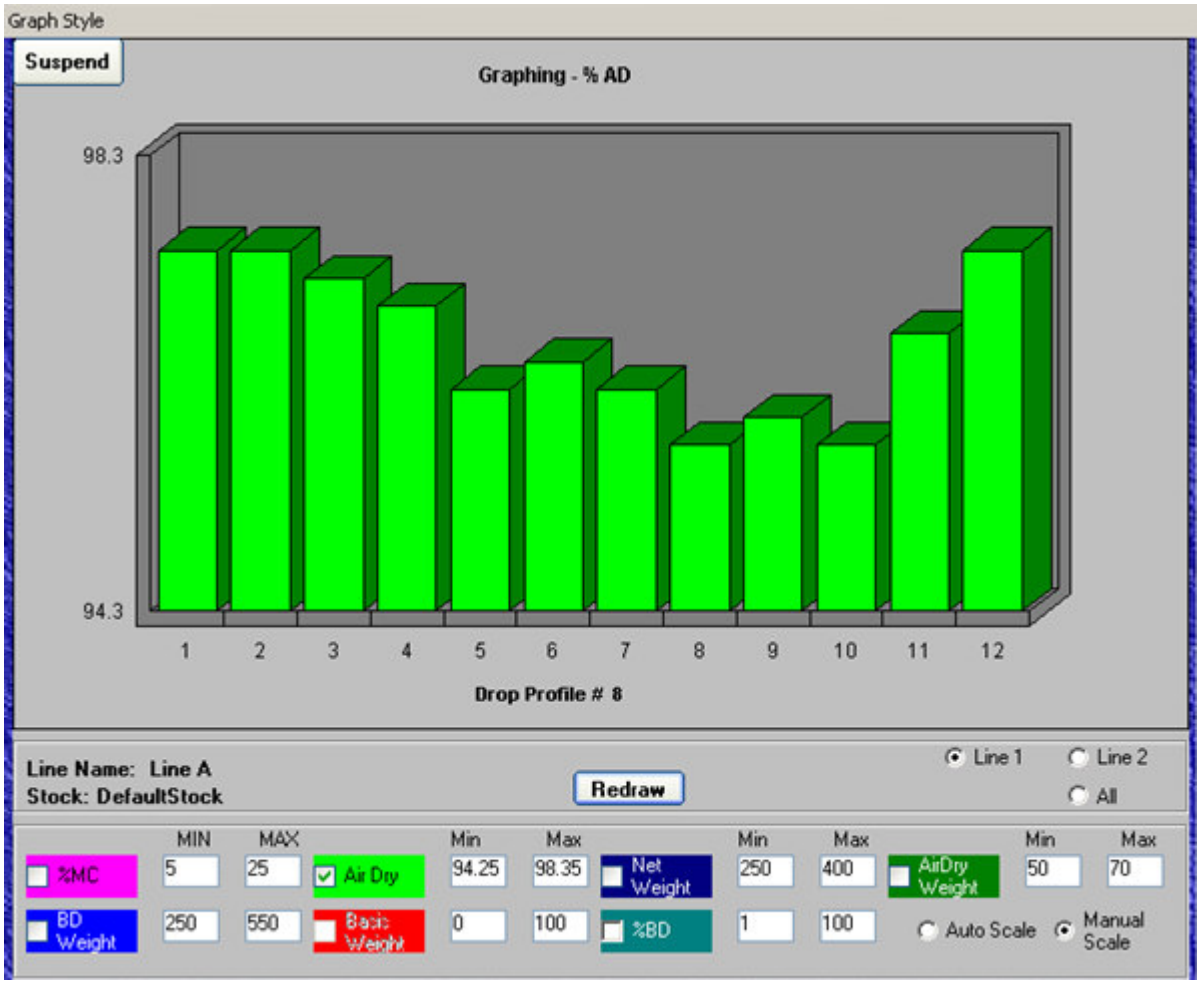
Forté Technology, Inc.

Calibration - Recommendation

- The Forté engineer will help with the initial calibration during the system installation.
- Forté recommends two calibration samples be collected every month for the first year to verify that the calibration continues to be accurate.
- After the first year, a verification calibration once a year is sufficient.
- The additional samples added to the calibration, reduce the standard deviation, ensuring the most accurate moisture content readings.

Forté Technology, Inc.

% Air-Dry Graph across a Drop

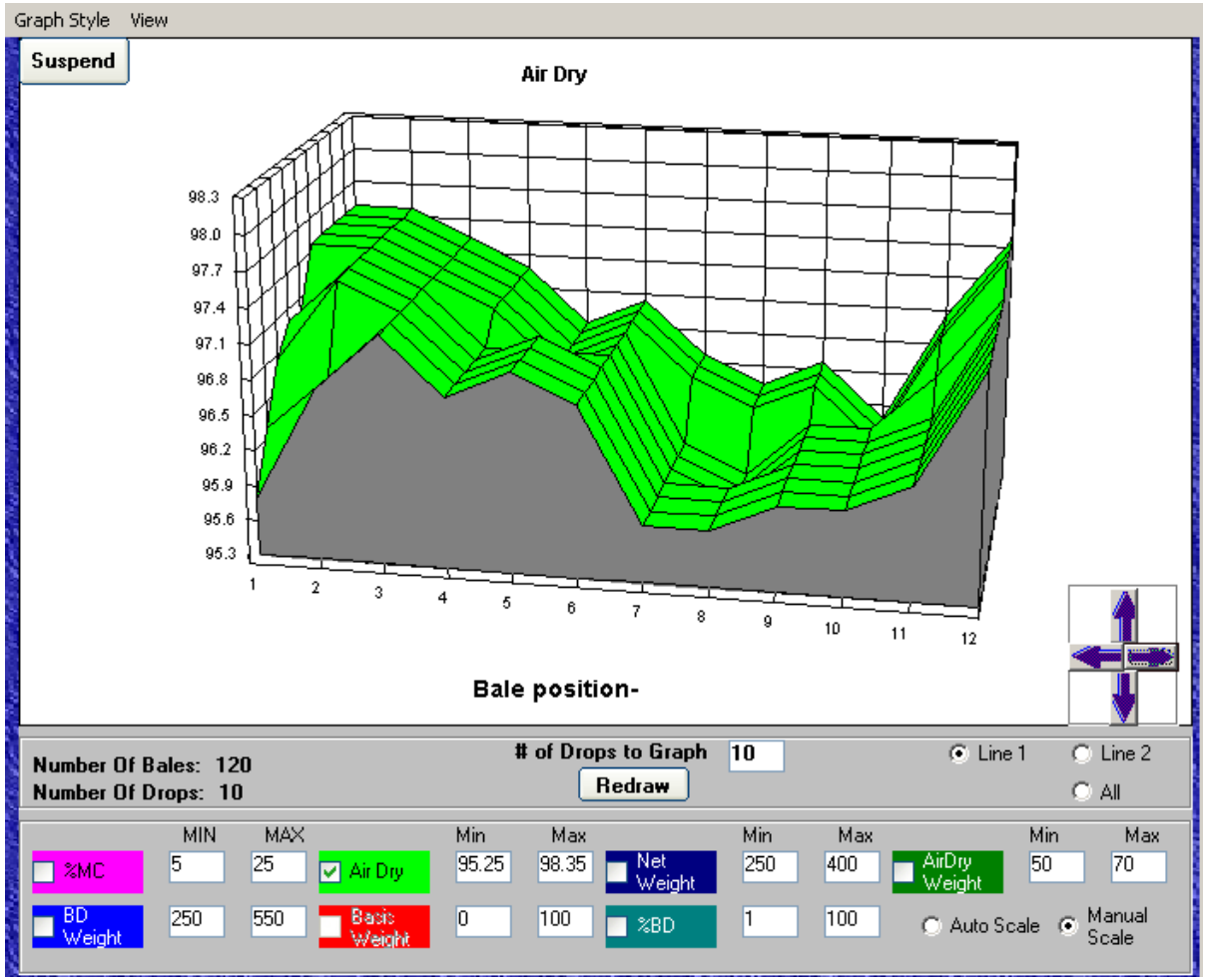


This graph displays a drop of twelve bales.

This can be used by the Wet End operator to control the dryer and prevent sheet breaks.

Forté Technology, Inc.

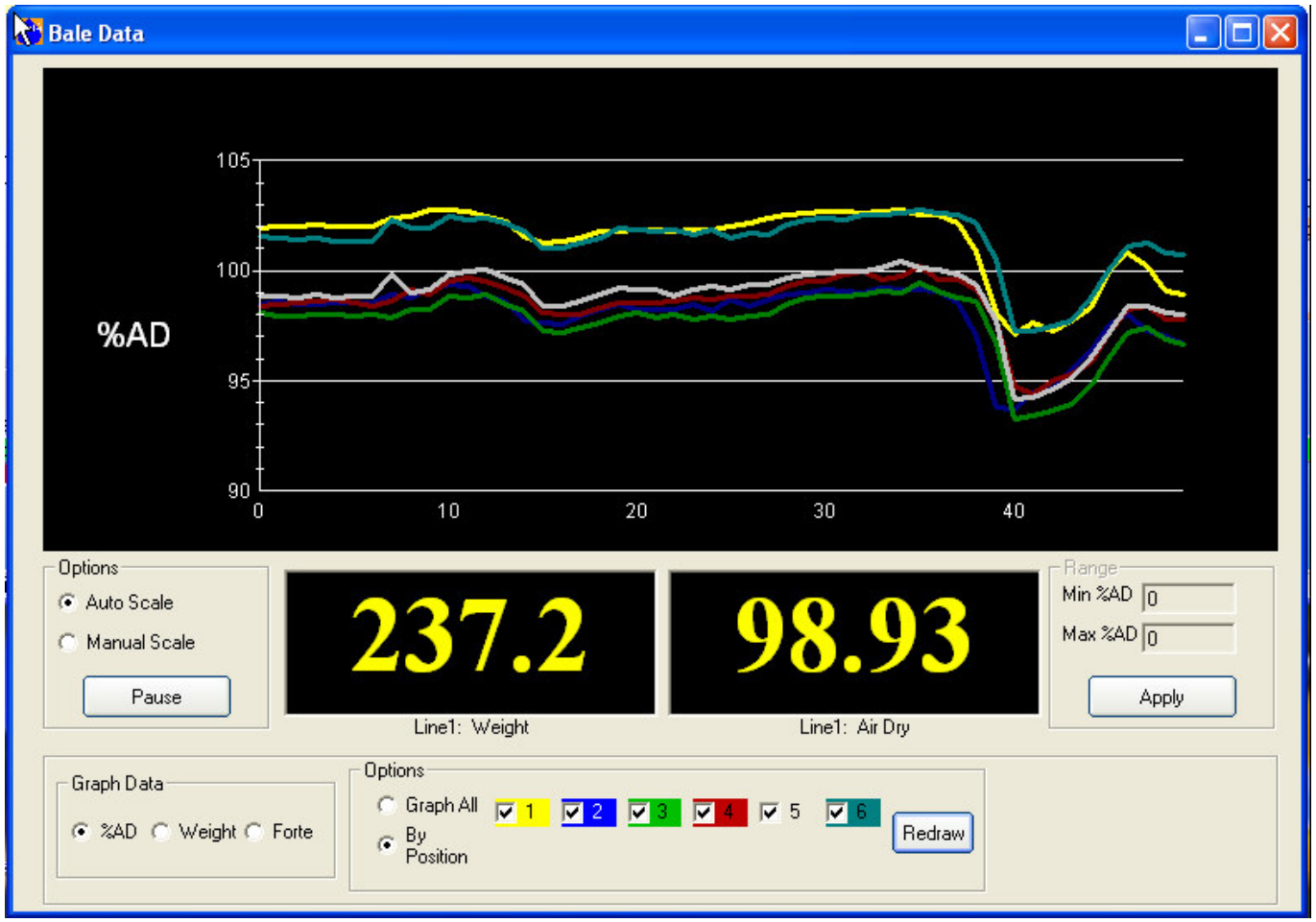
% Air-Dry Graph by Bale Position and Drop



This carpet graph displays several drops

Forté Technology, Inc.

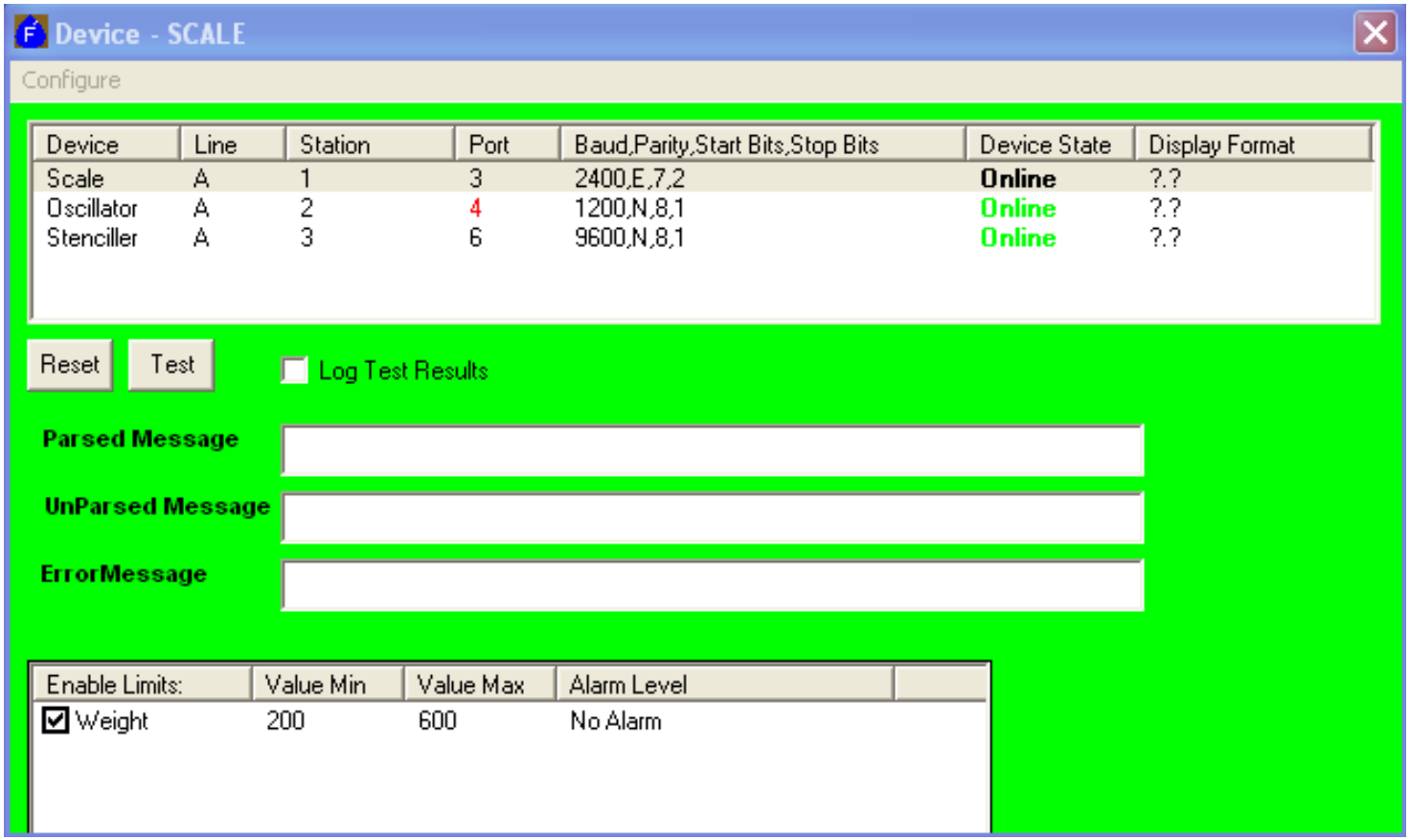
Trends by Drop Position



The last 300 bales are displayed by drop position. This allows the user to view trends in moisture or weight both horizontally and vertically across the pulp web.

Forté Technology, Inc.

Devices



View the status of connected devices.

Forté Technology, Inc.

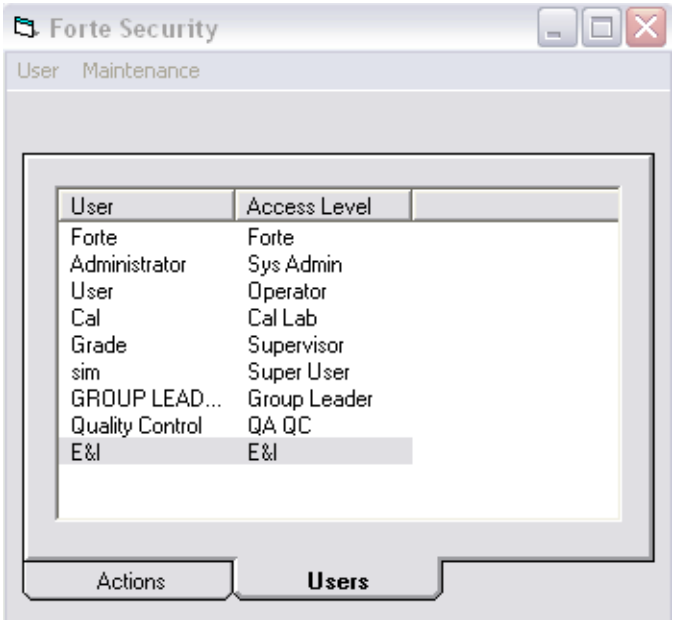
Alarm

The on screen alarm alerts the user to any system malfunction or, optionally, the alarm will display if bale weight or %AD exceeds the defined limits.

Forté Technology, Inc.

Security

Standard operation does not require anyone to be logged into the system. There are 5 windows that require a user to be logged on in order to access restricted areas. There are 9 different access levels. The Forté system automatically logs every user off after 15 minutes to help prevent unauthorized changes to the Forté system. A user with sufficient access needs to be logged on in order to shut down the Forté system.



Forté Technology, Inc.

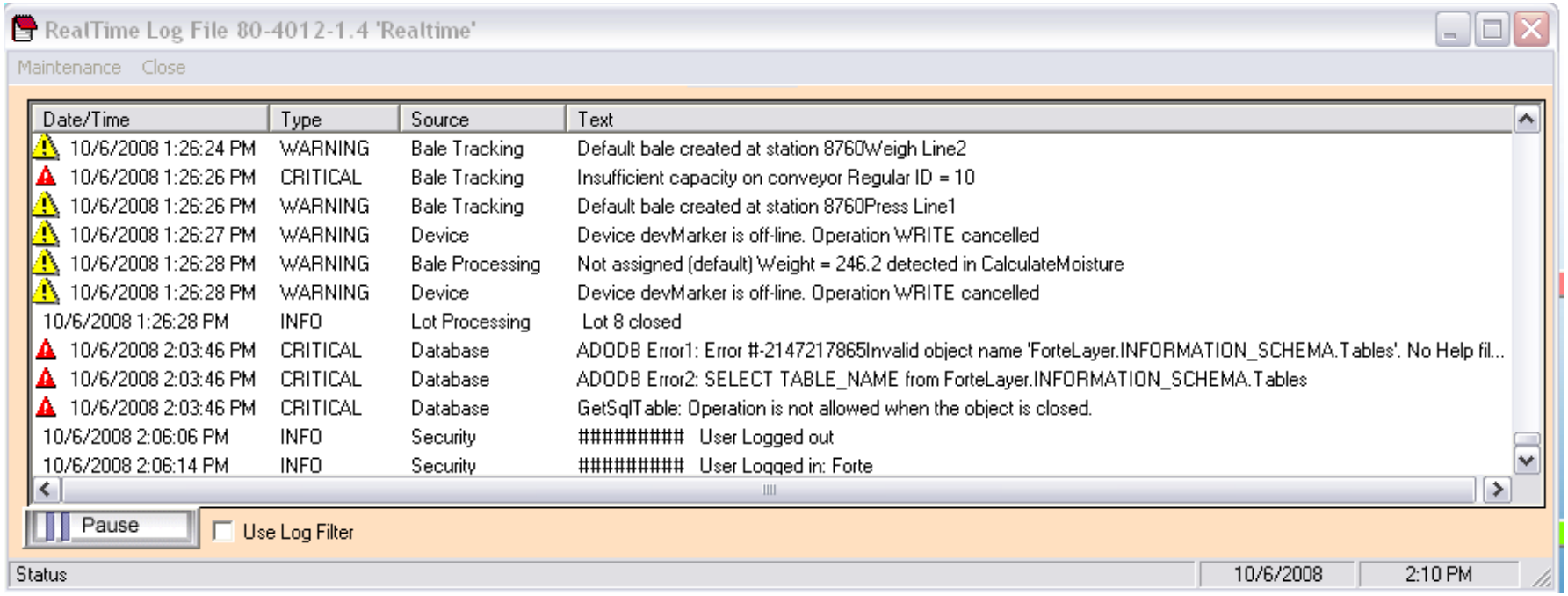
Maintenance

- Electrode and cover plate should be cleaned with ammonium chloride or isopropyl alcohol at least once a year, more often if hydraulic fluid and grease are prevalent at bale press.
- Reset photo switch and reflector need to be kept aligned and free from contaminates.
- Inspect all external cables and ground connections for wear and abuse.
- Clean the conveyor passageway through the test cell, removing stray pieces of product and wrapper material.

Forté Technology, Inc.

Troubleshooting

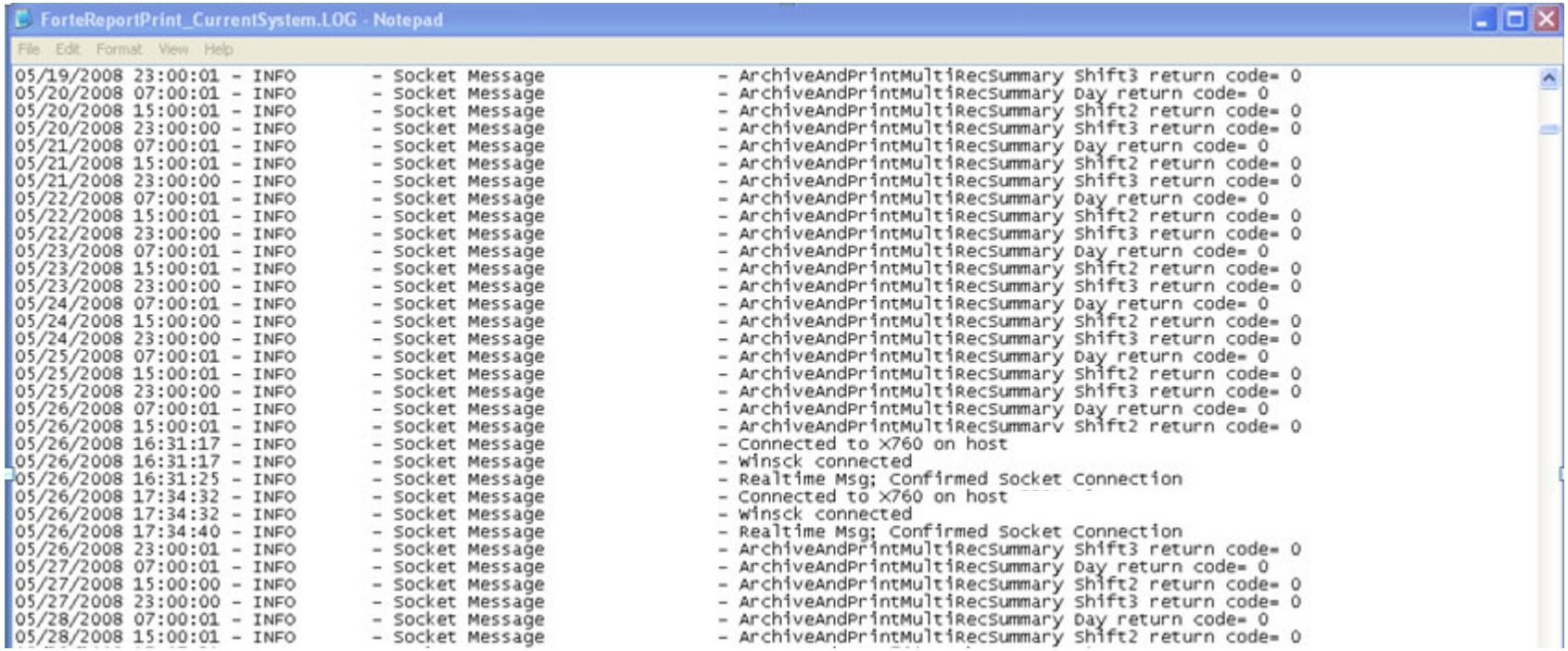
The first place to look if a problem arises is in the System Info Log. This Log shows all of the steps the system has gone through, and any warnings that have occurred. The log may help determine the cause of the problem.



Forté Technology, Inc.

Troubleshooting

If the System info log does not go back far enough, or the Forté software will not boot up at all, go into the ASCII Log. The ASCII Log can be found in C:\ForteSystem\Realtime\ASCIIlog. The ASCII Log goes back further than the Systems log to help determine the root cause of a problem.



Forté Technology, Inc.

Recommendations

- Shut the program and computer down properly, do not just power off or the Forte databases may become corrupted.
- If the “B” value in the calibration needs to be adjusted frequently, there may be another problem. Check to see if the electrode needs to be cleaned.
- Wipe down the photo switch, reflector, and sides of electrode every couple of weeks.
- Create back ups.

Forté Technology, Inc.

Are you using all of the features the Forté system offers?

1. Production data input to Forté manually or via barcode, ethernet, etc.
2. Output of Forté data to a remote database through a shared file (text or Excel) or through ODBC interface.
3. Output of data to existing stenciller device.
4. Output to remote display or external alarm.
5. SQL database for process control.

FORTÉ SAVES YOU TIME & MONEY BY PROVIDING A RELIABLE SOLUTION FOR FULLY INTEGRATING MOISTURE MEASUREMENT INTO YOUR PRODUCTION AND SALES PROCESSES.

…World leaders in moisture measurement

Forté Technology, Inc.

Contact Information

Forté Technology, Inc.
125 John Hancock Road
Suite 9
Taunton, MA 02780

Phone: 1-508-802-9634
Fax: 1-508-824-2085
Web: www.forte-tec.com
Email: info@forte-tec.com

…World leaders in moisture measurement