# Memorandum

**To:** A. R. Kerr
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**cc:** J. Webber

**From:** J. Effland

**Date:** 15 January 1999

**Subject:** Status Report for Automating SIS Mixer Measurements

## 1. Summary

The spreadsheet results program can now retrieve and plot data with either LO power or Magnet current as a parameter from simulated bias measurement data in the database. Both rectilinear and 3-D plotting options are available.

The three printed circuit boards required for the first coax switch control chassis have been completed and are mounted in the first chassis. Point-to-point wiring is currently being installed in that chassis.

Effort over the next week will concentrate on:

1. Integrating the existing hardware interface code, and
2. completing the first coax switch control chassis and digital interface and refrigerator chassis.

I intend to divide my time equally between these two tasks.

## 2. Software

This phase of the Access-based system is focusing on measuring, storing, and retrieving pumped and unpumped bias data. Bias measurements as a function of magnet current is a straight-forward extension of the pumped and unpumped measurements and will be developed after them, because a programmable power supply is available.

The software phase consists of three main areas:

3. Measurement user interface
4. Hardware interface
5. Spreadsheet results program

The measurement user interface is the program that allows the user to set up and run a measurement. This task includes coding to store and retrieve data from the database, and was discussed in last week's report.

The hardware interface is that section of the program that deals with controlling the instruments. We will concentrate on this area over the next week.

The spreadsheet results program is the mechanism used to retrieve, plot, and analyze measured data using Microsoft Excel.

Software effort during this last week has focused on building the spreadsheet results program. Figure 1 shows the dialog box that is presented to the user in Excel when the appropriate menu item is selected. The layout is similar to the Visual Basic Measurement User Interface and the functions are detailed in Table 1.

**Table 1: Spreadsheet Results Program Dialog Description**

| Section Title | Important Widgets | Function |
|---|---|---|
| Mixer Info | Device ID | A drop-down box providing for the selection of a mixer ID. Entries in the list are arranged alphabetically. |
| | Date | A drop-down box allows selection of a particular mixer by the date it was entered. Entries in the list are arranged chronologically, with the most recent date at the top of the list. |
| Measurement Info | Date/Description | A list-box showing all the measurements for the selected mixer arranged by measurement date with the most recent measurement listed first. |
| Graphing Details | Rectilinear/3-D Chart | Allows data to be plotted using one of these charting types. Plot examples are shown in Figure 2 and Figure 3. |
| | Plot ... | Allows for the selection of the dependant variable to be plotted, depending on the measurement type. This section also identifies the independent variable and parameter values. |

# 3. Hardware

## 3.1 Chassis Construction

Several chassis are currently being constructed for use in Pan's rack and the new JT-1 rack. Most of the chassis contain a number of printed circuit boards (PCB's) that are also being built. The status of each chassis is documented in Table 3 below.

Noise levels on the voltages in the Power Supply and Noise Diode Source were measured from the voltage converter that boosts +20V to +30V to drive the noise diode. The noise from the Power One voltage converter, used in the new design, was compared to the existing unit, which uses a Burr-Brown converter (and is no longer available). The results tabulated in Table 2 show that the new design has about the same or better noise levels than the existing design.

**Table 2 : Measured Noise Levels for Power Supply and Noise Diode Source**

| | Peak-to-Peak Voltage Levels | |
|---|---|---|
| **Measurement Location** | **Existing Design** | **New Design** |
| Noise diode drive voltage | 375 mV @ 2 µS period | 200 mV @ 7 µS period |
| -17.5V input line (source of this noise is voltage converter input circuit) | 150 mV (same period) | 150 mV (same period) |

## 3.2 Computer Replacement

The computer originally assigned to the JT-2 rack was a Gateway P5-120 in a tower case, but the motherboard was irreparably damaged when we tried to upgrade this machine to 200 MHz. Replacement motherboards are not available from Gateway, and the motherboard in that machine is an Intel-built "OEM-Zappa" board that cannot be purchased outside of Gateway. Additionally, the mouse and keyboard connectors interface for that motherboard is apparently unique, which means that if the motherboard is replaced, the case must also be replaced. Two options were investigated to replace this system:

1. Replace just the case and motherboard (since we have RAM, floppy drives, and hard disk):

| | |
|---|---|
| Tyan S1573 Pentium board (uses the older 430 TX chipset) | $130 from RC Systems |
| 200 MHz MMX chip (only 60% of the cost of a 233 MHz chip) | $135 "" |
| Antec KS-780 ATX Premium Desktop Case with 250W power supply | $89 |
| **Total** | **$354** |

2. Replace the entire system for **$599** (from PC Connections) with an Inteva Midtower that includes the following:

   K6-2 333MHz CPU
   32 MB RAM
   3.2GB Hard Drive
   Windows 95 Pre-Installed.

This requires discussion and a decision

**Table 3: SIS Measurement System Project Status**

| Area | Details | Notes and Status |
|---|---|---|
| | | |
| **Software Development** | | |
| General Access-Based Measurement System | | |
| Measurement user interface | | Code written for the following measurements:<br>1. Bias Measurement with manual stepping of LO power<br>2. Bias Measurement with stepping of Magnet current |
| Hardware Interface | | Will use most drivers from the interim Excel-based measurement system, but this remains untested. Driver code needs to be written for the HP programmable power supply and the Lake Shore temperature monitor. |
| Spreadsheet results program | | Code written for the following measurements:<br>1. Bias Measurement with manual stepping of LO power<br>2. Bias Measurement with stepping of Magnet current |
| Interim Measurement System using Excel Interface | | Ready to be tested with real mixers. |
| **Hardware Development** | | |
| Coax Switch Control Chassis | | |
| | Power Supply and Noise Diode Source PCB | Assembly for one board complete. Board tested OK. |
| | Switch Controller PCB | Assembly for one board complete. Board tested OK. Second board awaits delivery of IC sockets that permit soldering to pins from both sides of boards. |
| | Switch Driver PCB | Assembly for one board complete but it remains to be tested. Second board awaits delivery of 22 uF capacitors. |
| | Chassis wiring and construction | All boards have been mounted in one chassis. Beginning point-to-point wiring of that chassis. |
| Digital Interface and Refrigerator Chassis | | |
| | Multiplexer & Refrig Control PCB | Assembly for two boards started, but awaiting delivery of IC sockets that permit soldering to pins from both sides of boards. |
| | VLBA Sensor Card | Complete board obtained from Socorro |
| | Chassis wiring and construction | |
| **Rack Construction** | | |
| Pan's Rack | | |
| JT-1 | | |

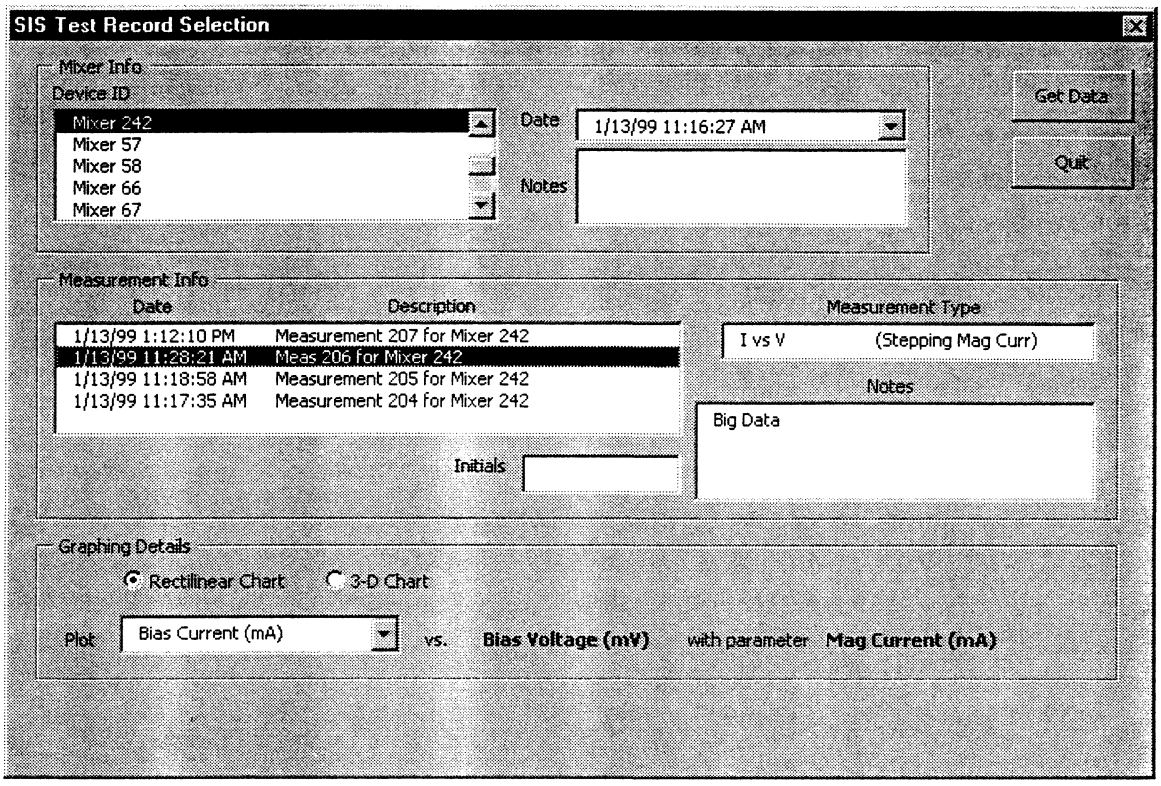


**Figure 1 : Dialog Box for Spreadsheet Results Program**

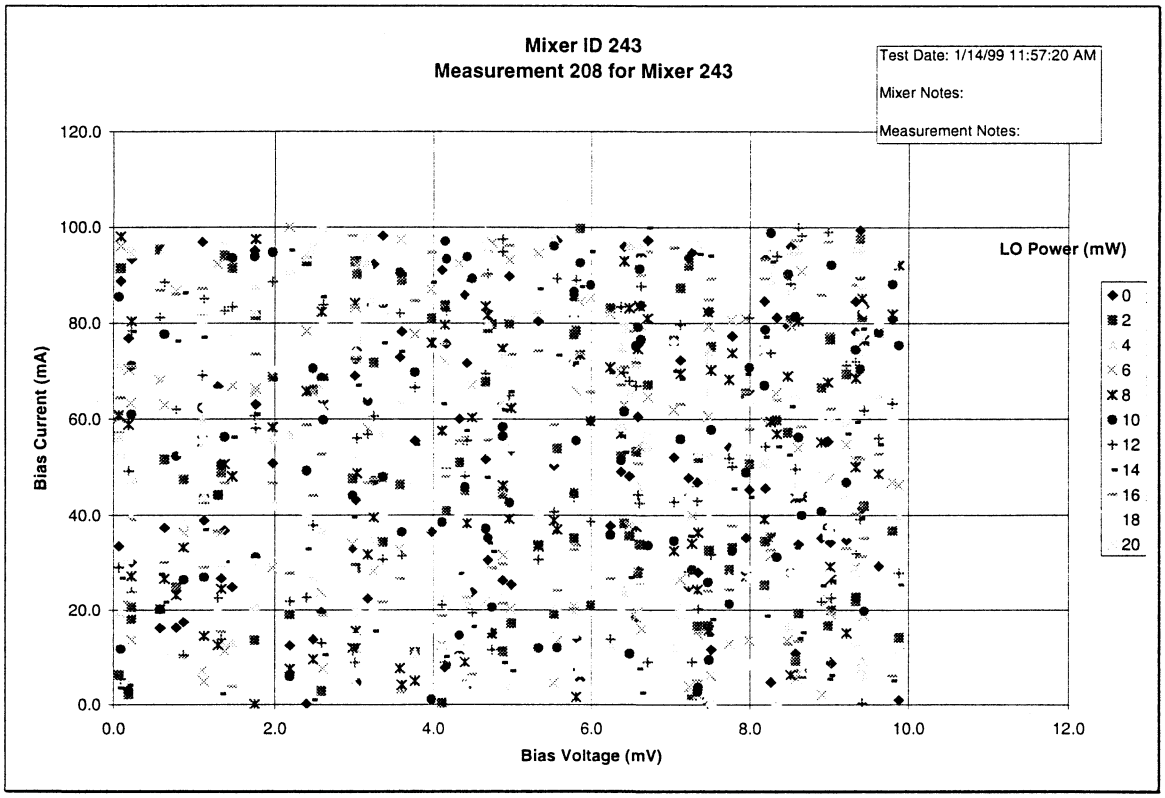


**Figure 2: Rectilinear Data Plot**

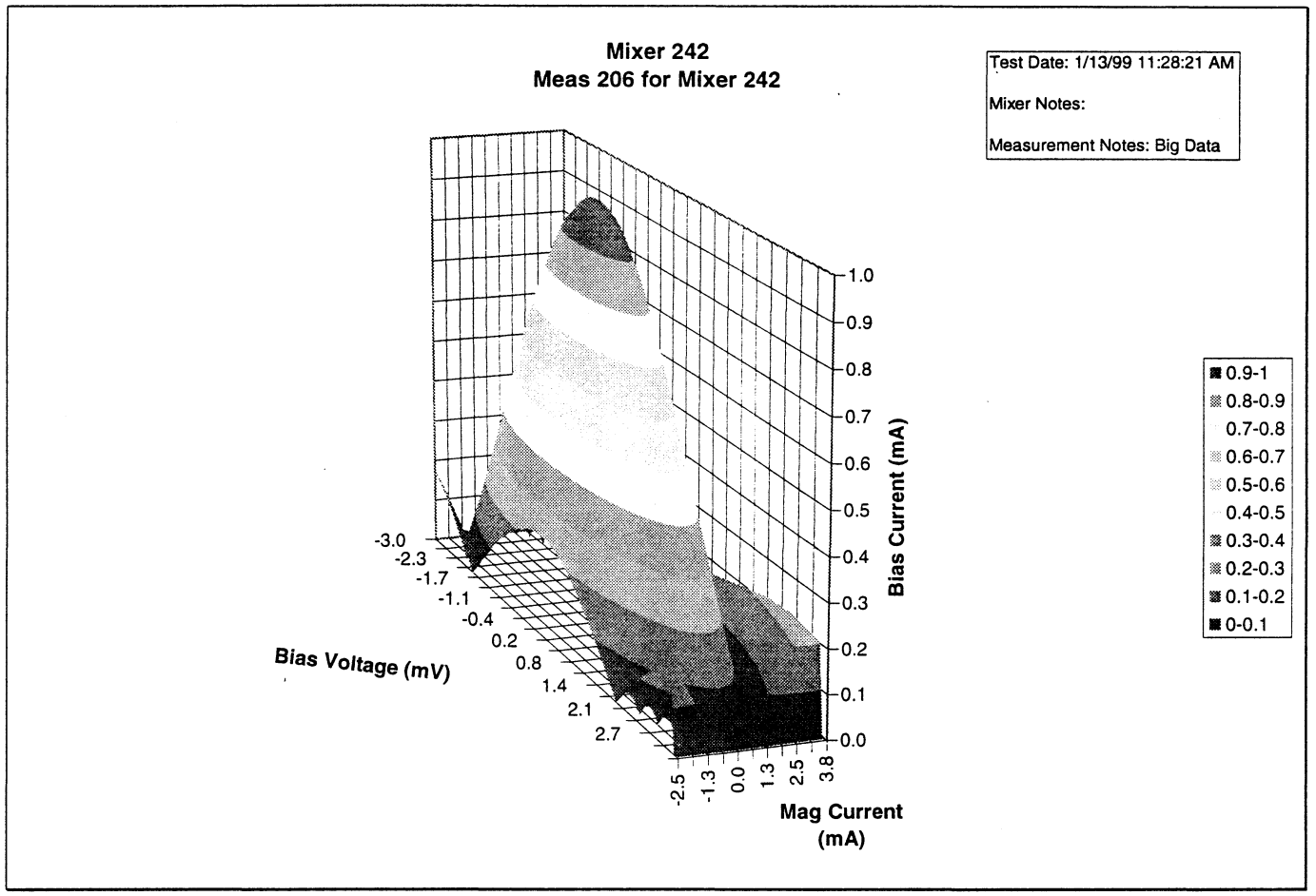


**Figure 3 : 3-D Data Plot**