SCAL for Windows™
Sensor Calibration Program (P/N 189-31)

The TEGAM Sensor Calibration Program (SCAL) is application specific software that runs in the Microsoft Windows™ environment on IBM compatible PC's. The SCAL program significantly enhances the operation of the System IIA by providing the technician with automated measurement, data collection, data display and analysis capability. The capability to save and recall complicated system instrumentation and test configurations coupled with the graphical environment of windows makes SCAL easy to use by any level of personnel. The SCAL program allows the user to perform automatic calibration and transfer of calibration factors for the most commonly used power sensors and power meters. Both analog and digital power meters can be calibrated with or without the IEEE-488 bus options. Typically, a 10 MHz to 18 GHz power sensor can be calibrated at all standard NIST calibration frequencies in less than 5 minutes. This software also performs the direct transfer and storage of calibration factors from a Standard terminating mount to the feedthrough working standard thermistor mount.

Data files may be modified, viewed, listed or graphed and new data files can be created including data files for adapters and attenuators. Complex reflection coefficients can be stored for both the calibrator and the unit under test, so the user can correct for mismatch uncertainties. This software can perform error correction to remove mismatch errors associated with the use of two-port devices such as adapters and/or attenuators used in the test setup during the calibration. Uses two-port scattering (S) parameter data for the device.

This software allows the user to print the final calibration data in tabular form and can also print a graphical representation of the calibration data. Also, the software has the capability to print sensor calibration labels for direct attachment to the device under test. The software will do data averaging of up to 10 calibration runs and give the standard deviation.

MENU BAR: Across the top of the SCAL main window below the title bar and above the toolbar is the menu bar. The menu bar consists of drop down menus that are used to select most of the functions necessary to perform measurements and manipulate data. The following is a list of the menu bar captions and their menu item functions.

File: The File menu allows the operator to create new Data Files; Edit\Open previously saved data files; and Save a new or updated data file. This menu also contains the Printer functions such as Printer Setup, Print Preview, and Print Data & Labels.

Calibrate: Once the system has been configured, this menu item allows the operator to initialize the calibration sequence.

Edit: This menu contains functions that are common to most windows programs such as the ability to copy selected data from a calibration data grid to the clipboard, Cut\Copy selected fields of data, Undo deletions, and the ability to Insert Data from the clipboard into an open Data file Calibration Grid. This menu item also provides the operator with graph editing functions; allows the operator to associate data files; and object linking (OLE) capabilities.

Setup: This menu allows the user to create and define a particular System Setup. Once configured this setup can be easily saved to a file and reloaded when needed using this menu. Other menu items include defining System Operators, Select Transfer Standard file, and setup the test parameters for the calibration to be performed. Label frequencies and System response time can also be defined using this menu item.

Options: This menu allows the operator to select certain program options such as showing the instrument setup dialog box on program start up and auto print labels and calibration after each calibration is complete.

Utilities: This menu contains some of the most versatile features of the SCAL program. Utilities included are a conversion program to convert HTB files to the SCAL Windows™ format; ability to import NIST data; and a file utility to combine calibration files.

Graph: Selecting this menu generates a graphical representation of the tabular data instantly.

Icons   Menu Bar   Real-Time Test Data   Real-Time Data Graph
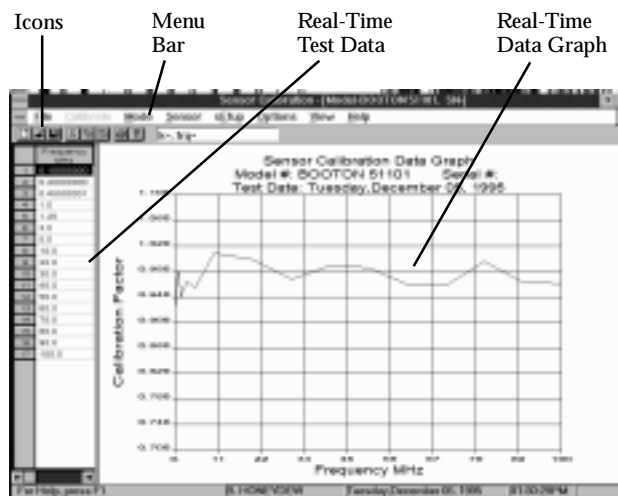
Password: The SCAL program provides the operator with the capability to assign and update password protection for calibration data files.

Datalinks: This menu allows the operator to create information links between the calibration data and the report header in the calibration report. Items that can be easily linked are operators name, test date, device tested, Transfer Standard used, and instrumentation used in the setup.
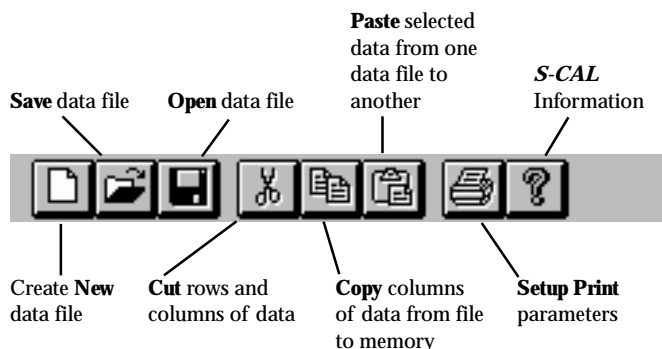
Scale: This menu allows the operator to scale calibration factors to any desired calibration factor percentage (%) or reference dB.

Window: This menu provides the operator with some of the more common features found in a Windows™ program such as quick access to an open data file, tile or cascade arrange open windows, open a new calibration header file, and neatly arrange icons for open files that may be minimized at the bottom of the screen.

View: This menu provides the operator with the ability to control whether the Tool Bar and/or Status bar is displayed on the screen. In the create calibration report mode the view menu provides text editing functions such as setting tab stops, set a desired windows or printer font, and mirror a displayed font.

Help: As with any Windows™ based programs, the SCAL provides the operator with on-line Help services which includes access to the help indexes and Topic Search capabilities.

TOOLBAR ICONS: The SCAL program has a horizontal toolbar, which is always present at the top of the main window, that contains the program Icons. These icons are representative of some of the more commonly used menu functions such as program information, Open\Save Files, Print parameters, and Cut\Copy\Paste functions. The SCAL toolbar is as follows:

Paste selected data from one data file to another

S-CAL Information

Save data file   **Open** data file

Create **New** data file   **Cut** rows and columns of data   **Copy** columns of data from file to memory   **Setup Print** parameters

USE ALMOST ANY PRINTER: SCAL makes use of the Windows™ printer functions to select and set up each printer to meet the specific needs of the user. Windows is supplied with many printer drivers but not all are covered. In this case the user should consult the printer manufacturer for Windows drivers specific to a user's make and model of printer.

MANY COMPATIBLE BUS CONTROLLERS: SCAL requires a Windows based or compatible computer in addition to a National Instruments GPIB interface. Contact TEGAM for further information on requirements, or to order a compatible computer system.

OTHER COMPATIBLE EQUIPMENT: The SCAL program supplies a wide variety of test equipment drivers to operate RF Signal Sources, power meters and voltmeters with the System IIA and SCAL program.

RF Signal Sources Drivers Include:

- Weinschel 4370 & 4380 Series
- Hewlett Packard 8340, 8350, 8360 & 8375
- Rohde & Schwarz SMX
- Rohde & Schwarz (Polarad) SMS-2
- Wiltron 6700, & 6800 Series
- Gigatronics\Fluke 6062A
- Gigatronics GT9000 Series

Power Meters Drivers Include:

- Hewlett Packard 436, 437, & 438
- General Microwave 475
- Boonton 4200, 4220 & 4300 Series
- Gigatronics\WaveTek 8540 & 8542

Voltmeters Drivers Include:

- Fluke 8502, 8505A, 8506A Series
- Hewlett Packard 3455, 3458, & 3478
- Datron 1271 & 1062

SPECIALIZED CALIBRATION REPORTS: The BEST feature of the SCAL program is it provides the operator with the ability to create specialized calibration reports. A Specialized Calibration Report can consist of three parts; a Report Header or cover sheet, tabular data and a graph. Any number of report headers or cover sheets can be created using data links and the text editor within the SCAL program. Company Logos Graphics Files (PCX, TIFF, EPS) can be added by using object Linking (OLE) functions. Once a report header has been created, the operator can associate a number of data files to the saved report header file. Other SCAL tools allow graphs to be easily customized and integrated into the Report of Calibration.