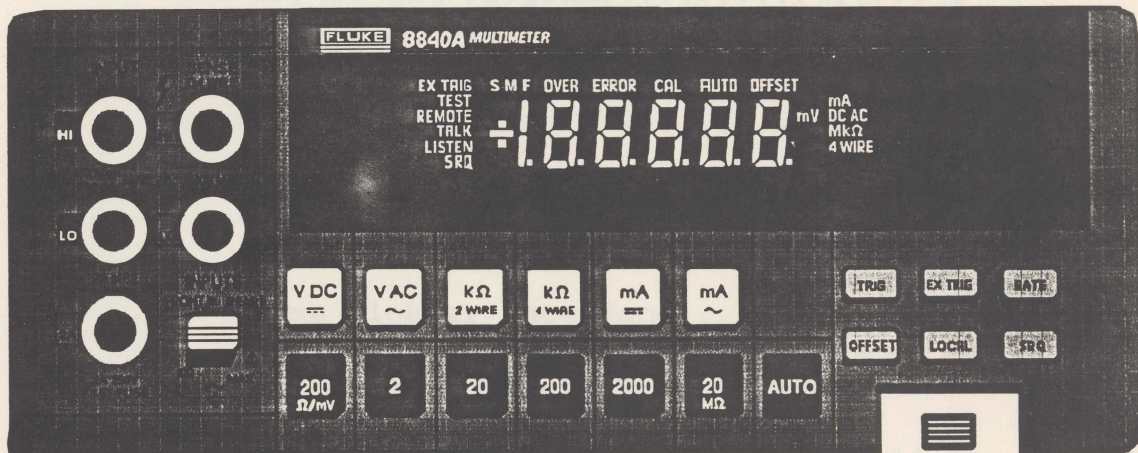


FLUKE MULTIMETER Interface Program



Computer Science Seminar
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INTRODUCTION

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HISTORY OF THE PROGRAM

This program was developed by the Computer Science Seminar class in the Spring of 1991. It began development early that semester as our class project. The project was split up into

INTRODUCTION

This program was designed by Neal Heidel, Ross Bolejack, and Sam Sparks to work with a FLUKE 8840A Multimeter and a IEEE CEC-488 bus. With this program, the user will be able to interface with the meter and take readings. The program is intended to be used with someone that is using the FLUKE Multimeter, would like to take readings for over a period of time; and wants to be able to import the file into a Lotus file. The user will be able to set all ranges and all functions on the meter. It will be assumed throughout this manual that the user will have some knowledge of what the multimeter does and how it operates. To install this software, go to the next section, Getting Started and Installation.

The system requirements are as follows:

1. MS-DOS Version 3.xx
2. Color Graphics Adapter Monitor
3. IEEE CEC-488 bus
4. IBM compatible computer with 640K of memory
5. FLUKE 8840A Multimeter

GETTING STARTED AND INSTALLATION

The first thing the user needs to do is to install the IEEE CEC-488 bus. To do this, please refer to you IEEE CEC-488 Manual. After the user has the bus hooked up to the computer, connect the FLUKE meter to the bus you just installed. If you have any questions about this procedure, please refer to the FLUKE 8840A Multimeter or the IEEE CEC-488 Interface manuals. On the back of the FLUKE 8840A Multimeter, you will have to set the dip switches of the meter to be address to "1". This is the default address the program uses to talk with the meter. If you fail to do this you will have to get the address from the back of the meter and set the address in the program. Now you are ready to install the software. Insert your program disk into a floppy drive and at the DOS prompt, type "INSTALL" <return>. The program will make a directory called "C:\FLUKE" and copy all the program files into that directory. After the program is completely installed, if you wish, refer to "TEST RUN" later in this manual for a sample run through the program.

HISTORY OF THE PROGRAM

This program was developed by the Computer Science Seminar class in the Spring of 1991. It began development early that semester as our class project. The project was split up into

two programming teams that each developed the same program simultaneously. The programmers that developed this particular program are as follows: Neal Heidel, Ross Bolejack, and Sam Sparks. Neal Heidel's responsibility was to develop a Main Menu for the program and to initialize the address of the IEEE CEC-488 bus. Ross Bolejack's responsibility was communicating with the FLUKE 8840A Multimeter to obtain single readings and timed readings. Sam Sparks' responsibility was to develop the graphical interface to set up the meter as to setting the Functions and Ranges.

EXPANSIONS

This program was designed be able to be expanded later for the use of adding the option of using an oscilloscope. Considering the time frame we had to work with, we did not have ample time to complete these expansions. Therefore, we made this program to where it could be easily expanded by altering the program's source code. To do this you will need a version of Turbo Pascal version 4.0 or better. We also took in to consideration the use of a Plotter. We inserted the Plotter option in the Main Menu, but the implementation has not begun yet.

MAIN MENU

To select something from the Main Menu, you will have to use the the up and down arrow key to highlight the menu option you wish to execute. After highlighting the option, just simply press the return key to execute. If you enter an invalid value the program will sound an alarm and let you try again. If you are in need of some assistance, press F1 for help. Under this menu the user has the following options:

1.) SET UP IEEE-488 BUS

This option will initialize the IEEE CEC-488 bus and allow the user to communicate with the FLUKE Multimeter. This is the address on the back of the FLUKE Multimeter. This address can be changed by switching dip switches on the back of the FLUKE Multimeter. You can bypass the option if you set the dip switches on the back of the FLUKE Multimeter to be addressed at 1, which is the default value. If you choose not to use the default value of 1, then you will have to get the address on the back of the meter and select this option and enter the number when it prompts you.

2.) *USE FLUKE METER INTERFACE*

This option will be used to actually communicate with the FLUKE 8840A Multimeter. Before you can use this option, you must indicate the address of the meter you are using. To do this you must select SET UP IEEE-488 BUS, and enter the address of the FLUKE Multimeter. If you have set the dip switches on the back of the FLUKE Multimeter to 1 then, the program will initialize the buss and enter the METER MENU. In this option you will set the functions and ranges of the meter and take readings. This will be explained later in this manual.

3.) *USE PLOTTER INTERFACE*

Do the to our time frame, this option was not able to be implemented and is currently under development.

4.) *EXIT FROM THIS PROGRAM*

This option will allow you to exit the program and return control back to DOS.

USE FLUKE METER INTERFACE

If you have not selected an address of the meter, the program will default to 1. If the address of the FLUKE Multimeter and the address you enter, be it default or user defined, do not match, the program will not function properly. After selecting this option, there will appear another menu called "METER MENU". To select anything in this menu, you will have to use the up and down arrow keys to highlight the option you wish to execute. After highlighting the menu option you wish to use, just simply press the return key. If you press a wrong key, the program will sound a bell to let you know of your mistake and allow you to try again. This option is used to actually communicate with the FLUKE meter and setup the meter by allowing the user to select the function they wish to use and the range they want to use it in. Under this menu, if you are in need of some assistance, press F1 for help. Under this menu there are the following options:

1.) *METER SETUP*

This menu option is mandatory to talking with the meter. Before you can take a reading, you will have to set a function and a range. Once you have selected this option, there will appear a graphical interface on the screen. The first thing you will have to do is to select a function. Use the right arrow

and the left arrow keys to highlight the function that you wish to select and press the return key. After selecting a function, you will have to select a range in the same fashion as you did with the functions. Here again, if you press a wrong key the program will sound a bell, letting you know of your mistake. After you have selected a function and a range, you will return back to the METER MENU where you will have the option to select single readings or timed readings. If you encounter any errors, write down the error and refer to your FLUKE 8840A Multimeter. If you need assistance, press F1 for help. If you bypass this option, the readings you get from the Single Readings or the Timed Readings are from the setting the meter is already set at. It is advised that you use this option to make sure that you are getting the Function and range you want. If you get an error of "Device not ready", this means that the FLUKE Multimeter is not ON. Turn on the machine and try again.

2.) SINGLE READING

After going through METER SETUP, you can select this option to get one reading from the circuit you are connected to. The reading will be displayed on the screen until you press the return key. After pressing the return key, you will return back to the METER MENU where you will have the option of reselecting a new function and range, take a second reading, or adjusting the circuit that you are presently working on. If you select this option without setting up the meter, the reading display will be taken from the default settings which are: VAC and Auto Range. If you select this option and you get the error "Device not ready", this means that the FLUKE Multimeter is not ON. Turn on the machine and try again.

3.) TIMED READINGS

When you select this option, the first thing you will be prompted is on how many readings you want to take. You will have to enter an integer value between 2 to 64. The next thing is to tell the program how long you want to delay in seconds between each reading. You will have to enter an integer value greater than or equal to 1. Do not use decimal

numbers, just how many seconds you want to delay in whole numbers. For example, if you want to delay for two seconds between each reading just enter, "2". The last thing is to enter the path and the file name you want the data to be written to. Do not enter the extension, because the program will insert its own extension. An example of this would be as follows: "A:\DATA\TEST2". This would store the data on the A drive under the directory DATA in the file TEST2.PRN. If you want the file to be created in the current directory, you need only to enter the file name. Example, "TEST2". After entering the number of readings, the time delay, and the path and filename, the program will display the graphical interface on the screen and begin to take readings. If an error occurs, the program will display the error on the screen and wait for the user to press the return key. This will allow you to write down the error message and reference the FLUKE 8840A Multimeter. After all the readings are taken, the option will return you back the METER MENU. This will allow you to reset the meter, take more readings or let you return to the MAIN MENU to allow you to leave the program where you can take your file and load it into a Lotus file to manipulate the data to your needs. If an error occurs while entering the three prompts, the program will sound an alarm and prompt you to enter a value again.

4.) MAIN MENU

This menu option will return you back to the MAIN MENU to allow you to exit the program and return back to DOS.

PROCEDURE FOR RUNNING THIS PROGRAM

- 1.) At the DOS prompt and in the directory "C:\FLUKE", type FLUKE <Return>.
- 2.) Turn on the FLUKE 8840A Multimeter.
- 3.) Connect the probes to your circuit for the measurements you want.
- 4.) Select SET UP IEEE-488 BUS from the MAIN MENU to initialize the bus. (Unless you want to use the default value.)
- 5.) Select USE FLUKE METER INTERFACE from the MAIN MENU.
- 6.) Select the METER SETUP option from the METER MENU and select the function and range you wish to test for.

- 7.) Select Single or Timed readings to get a reading from the meter.

TEST RUN

This section is a test run so you can get more familiar with the FLUKE Interface program. Follow these steps as follows:

- 1.) Execute the program by type FLUKE and press the return key.
- 2.) Connect a 100 ohm resistor to the FLUKE.
- 3.) Turn on the meter.
- 4.) Select SET UP IEEE-488 BUS to initialize the bus.
- 5.) Select USE FLUKE METER INTERFACE.
- 6.) Select METER SETUP from METER MENU.
- 7.) Use the arrow keys to Highlight KOHM 2 wire and press Return.
- 8.) Highlight AUTO range and press Return.
- 9.) Select Single Reading.
- 10.) Select Timed Reading.
- 11.) Enter "5" for "How many Readings."
- 12.) Enter "2" for time delay.
- 13.) Enter "test" for the file to create.

This will create the file in the current directory.