

Purpose

The Procedure Translator (“ProcTran”) is used to convert MET/CAL® 5500 and 5520 legacy FSC statements in a (previously compiled) procedure text file to the equivalent 5502A, 5502E, or 5522A *name = value* (NVI) FSC.

The ProcTran is intended for translation of meter type procedures that utilize the following functions of the 5500A and 5520A calibrators:

- DC Voltage
- AC Voltage
- DC Current
- AC Current
- Resistance
- Capacitance
- Temperature

The ProcTran *is not* intended for procedures that utilize the following 5500A and 5520A functions. See the [Translating Multiple Procedures section](#) for additional detail.

- Dual DC Voltage
- Dual AC Voltage
- DC Power
- AC Power
- DC offset of AC Voltage
- Duty Cycle of Square Waves
- 5500A-SC, 5500A-SC300, 5500A-SC600, 5520A-SC300, 5520A-SC600, and 5520A-SC1100 Oscilloscope Calibration Options

Installation

The MET/CAL Editor version 8.0 or newer must be installed on the host PC prior to the setup of the procedure ProcTran. This will ensure that all required prerequisites are on the system. Copy the ProcTran.exe into the folder “Program Files\Fluke\METCAL” or “Program Files (x86)\Fluke\METCAL”. The single file copy is all that is required to install the ProcTran. The following sections describe how to use the ProcTran as an external Tool to the MET/CAL Editor and how to use the tool via command line arguments.

Overview

The ProcTran is a command line tool that translates individual procedure files or projects based on the values passed as command line arguments. The ProcTran can be configured to execute from the MET/CAL Editor (8.0 or newer) or directly from Windows by using a Batch file or the Windows Run option.

The ProcTran assumes that the input file has been compiled with no errors. The ProcTran should not be used on procedure files that have not been compiled. The output translation file is not automatically compiled. Based on the details of the original file the resultant file may or may not require additional edits. Any statements that could not be translated will be copied verbatim to the output file followed by a new line beginning with **WARNING**. This line is specifically designed not to compile, so that statements that were not translated can be easily located for manual modification. It is expected that the user will review the translated file for warnings and errors prior to compiling and releasing the modified procedure.

A general flow of the translation process follows:

- The ProcTran scans the procedure passed in via command line. The scan searches for FSC statements that meet the command line criteria. If a procedure project file is used as the command line argument, the ProcTran will access each procedure file associated with the project.
- It is assumed the procedure being translated is a fully functional procedure that has previously been compiled. Procedures that have not been compiled will not be properly translated.
- It is assumed that each 5500 or 5520 statement is independent of other statements in the procedure.
- 5500 and 5520 statements with the following MOD4 fields are translated to a single NVI FSC statement that may be multi-lined:

MOD4	Description
S	Setup Test
N	Nominal Setup Test

- 5500 and 5520 evaluation statements (MOD4 blank) for calibrator source functions are translated to multiple statements:

```

NVI FSC      +evaluation quantity
TARGET    -m
MEMI      Enter UUT reading in specified units:
MEMCX    evaluation quantity    test tolerance
    
```

- 5500 and 5520 evaluation statements (MOD4 blank) for calibrator measurement functions are translated to multiple statements:

```

NVI FSC +evaluation quantity; Setup
TARGET -m
NVI FSC +evaluation quantity; Read
MEMC evaluation quantity test tolerance
    
```

- The ProcTran automatically inserts DISP FSC statements to ensure a correct calibrator connection when translating 5500 current statements. This is necessary since the 5500A has only AUX HI and LO terminals, but the 5502A, 5502E, and 5522A use AUX HI and LO or 20A and AUX LO depending upon the magnitude of the current.
- A new file is generated with the same name as the original file with a suffix based on the type of translation completed; filename.mc => filename_5522A.mc. The translated files are created in the same folder as the source file.
- The translated file is not automatically compiled. The user should search for warnings and errors before releasing the modified procedure.

Limitations

- The ProcTran does not change calibrator model number in FSCs, like the DISP statement shown below:

```

1.028 DISP          Connect the 5520A to the UUT as follows:
1.028 DISP
1.028 DISP          [32] 5520A          UUT          DMM
1.028 DISP          [32] NORMAL HI to V/Ohm/Diode
1.028 DISP          [32] NORMAL LO to COM
    
```

The ProcTran inserts “WARNING <explanation>” in the output file for a statement it cannot translate (see below).

- The ProcTran does not support the M550 and M5520 auxiliary FSCs. When a M550 or M5520 Auxiliary FSC statement is executed, settings specified in the auxiliary statement are stored for subsequent use when executing the respective primary FSC, 5500 or 5520. Therefore auxiliary FSCs are not supported for the following reasons:
 1. Auxiliary FSC statements may or may not be executed at run time, based on conditional logic in the procedure.
 2. Auxiliary FSC statements do not have to occur in the same procedure file as the primary FSC statement. For example, an auxiliary FSC may be executed in the main procedure, then a subsequent primary FSC is executed in a subprocedure.

This means the following are not supported because they rely on the auxiliary FSC settings:

1. AC and DC Power Modes

2. Dual AC and Dual DC Voltage Modes
 3. DC Voltage and DC Current range locking
 4. 5520A dBm output impedance
 5. TC reference
 6. Square wave duty cycle
 7. AC voltage DC offset
1. The ProcTran does not support procedures which use slewing for instrument evaluation statements (MOD4 blank and ASK- K) . This is typically only used for analog meters.
 2. The ProcTran does not support procedures which use automatic range messages (ASK+ R).
 3. The ProcTran does not 5500 and 5520 Comparison Tests (MOD4 = "C").
 4. The ProcTran does not support the Oscilloscope Calibration Options are not supported.

MOD3	Description
SC	Specifies 5500A-SC, 5500A-SC300, or 5520A-SC300
S6	Specifies 5500A-SC600, 5520A-SC600, or 5520A-SC1100
OM	50 Ω Input Overload Protection Measurement
ZM	Input Impedance Measurement

5. The ProcTran does not support the 5725A Amplifier. The 5502E, 5502A, and 5522A calibrators do not support the 5725A:

MOD3	Description
BC	Specifies 5500A+5725A Boost Current
BP	Specifies 5500A+5725A Unboosted Current via 5725A CURRENT OUTPUT HI and LO
BV	Specifies 5500A+5725A Boost AC Voltage

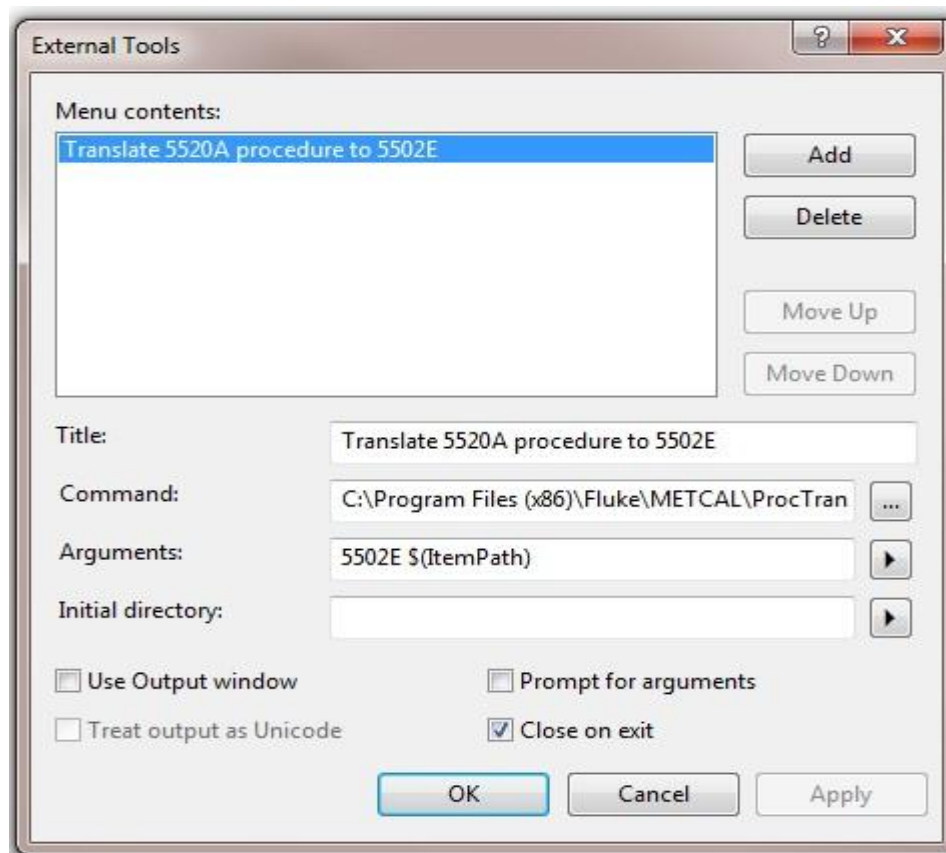
Use in MET/CAL Editor 8.0


Adding the procedure ProcTran as "External Tool" to the MET/CAL Editor can simplify the translation process.


1. Access the Tools, External Tools menu choice.
2. Select the default "[New Tool]" option listed or choose an existing tool for editor.
3. Title: Define an appropriate title for the tool, such as generic "ProcTran" or more specific "Translate 5520A procedure to 5502E".

4. Command: Use the command option to navigate to the location of the procedure ProcTran. By default the program ProcTran.exe should be in the Program Files directory under “\Fluke\METCAL”.
5. Arguments: Add command line arguments as desired. Reference the [“Command Line Usage”](#) section of this document for additional details.

Use the popup options to pass in the active file, the active project or the active folder of the opened procedure. Use the “Item File Name” and “Item Extension” if a single procedure is to be translated. If all the procedures in a project need to be translated, select “Project File Name” instead. If “Item Path” is selected, all the procedure files in the same folder of the file that is opened in Editor will be translated.



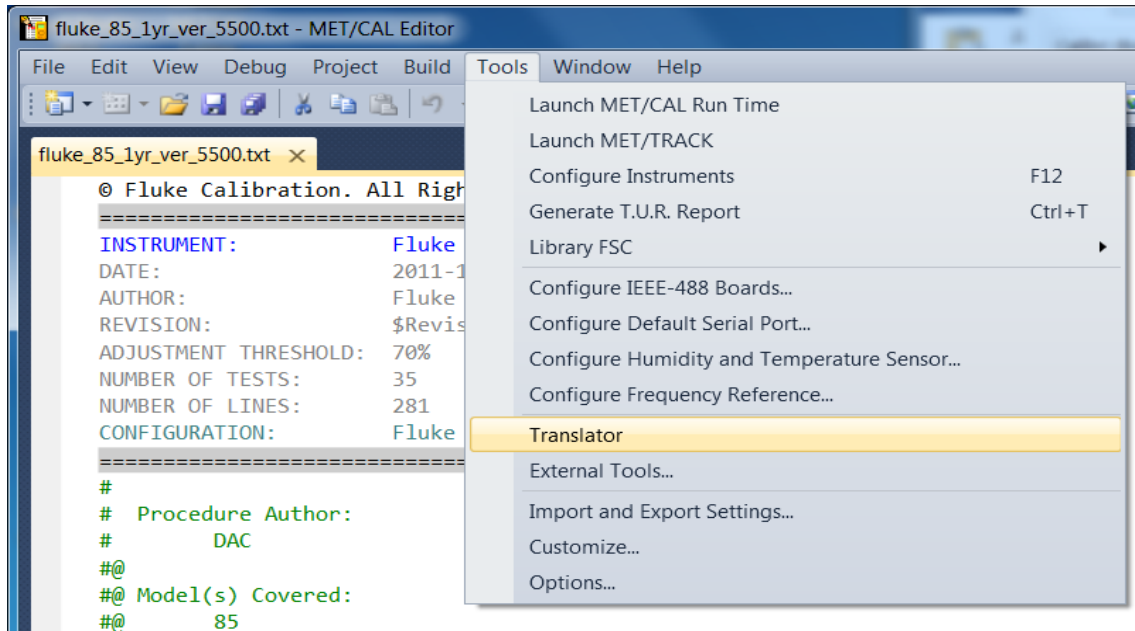
Arguments: 5522A \$(ItemFileName)\$(ItemExt) 

Arguments: 5522A \$(ProjectFileName) 

Note that more than one instance of the procedure ProcTran can be used as an external tool. Common examples include options for projects independent of individual files as well as options for specific FSCs. Example Titles: “Translate 5520 Project to 5522A”, “Translate 5520 Procedure

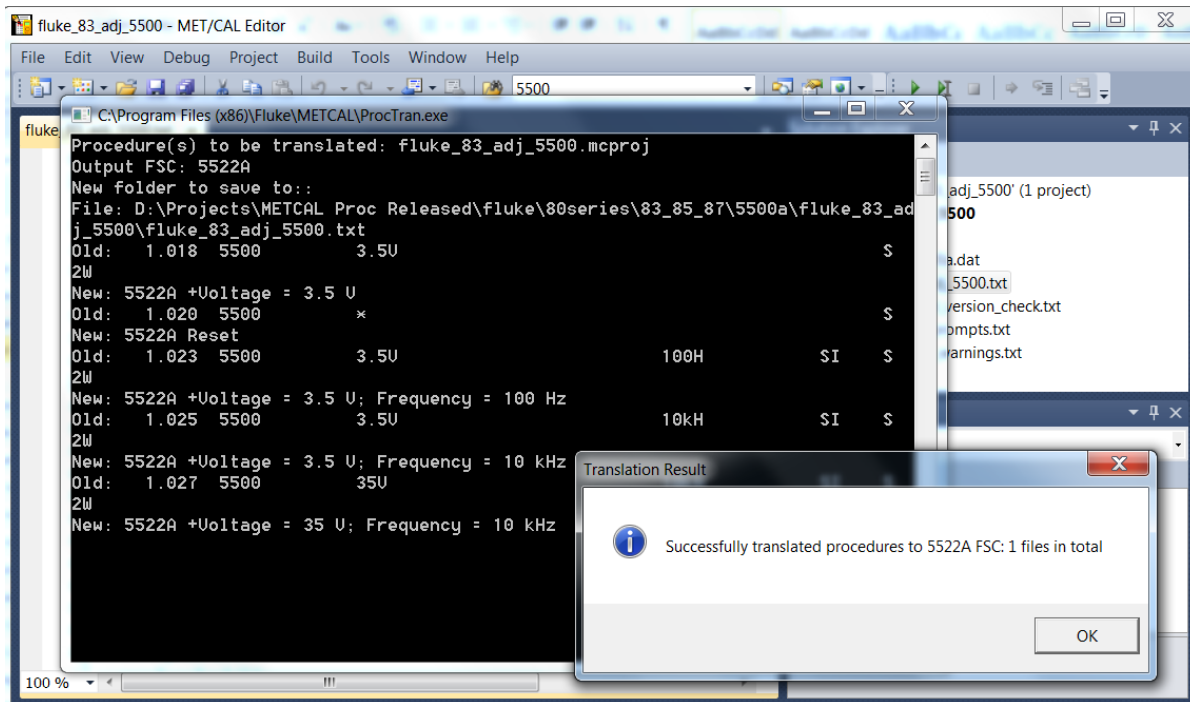
to 5522A". Based on the command line arguments these entries will translate a project or an individual procedure file respectively.

6. After configuring the arguments, click "Add" button to add the item to the Editor [Tools] menu.
7. When editing a procedure or a project, use the newly added menu option for procedure ProcTran in the Editor [Tools] menu to initiate a translation.



Note that the file viewed in the editor is not modified. A new file is created that must be separately opened. When the optional [output folder] argument is omitted, the translated procedures are created in the same directory as the source procedure files. Otherwise the new procedures will be created in the specified [output folder]. It is up to the procedure writer to arrange the project and compile the new procedures.

8. The results of the translating will show like the following.



Command Line Usage

The ProcTran functionality is defined by command line arguments passed to the executable. Use the Run option or a Batch file to launch the ProcTran with command line arguments outside of the Met/CAL Editor environment.

ProcTran.exe *NVIFSC* [**V**] *filename.extension* [*folder*] [*output_folder*]

Where:

NVIFSC is **5502A** | **5502E** | **5522A**

filename.extension is the full path procedure file (.mc or .txt) or procedure project file (.proj or .mcproj) to be translated

folder is the full path folder name that all the procedure files (.mc or .txt) inside this folder will be translated

Key:

“**V**” denotes *verbose* output

“|” (vertical line) denotes *or*

“[“ ”]” (square brackets) enclose an optional command line argument

OUTPUT: *filename_NVIFSC[V].extension*

In verbose mode the original 5500 or 5520 statement is entered as a comment in the output file.

Examples:

```
C:\>ProcTran.exe 5502E fluke_77_iii_1yr_ver_5520.txt
```

Creates the file **fluke_77_iii_1yr_ver_5520_5502E.txt** in the same folder.

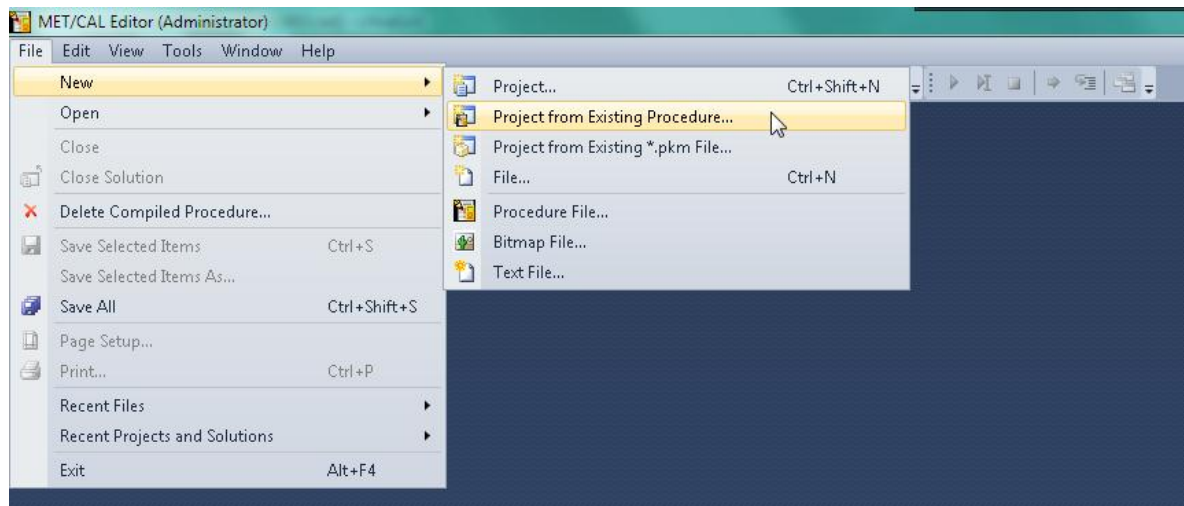
```
C:\>ProcTran.exe 5522AV fluke_77_iii_1yr_ver_5520.mc ..\5502e
```

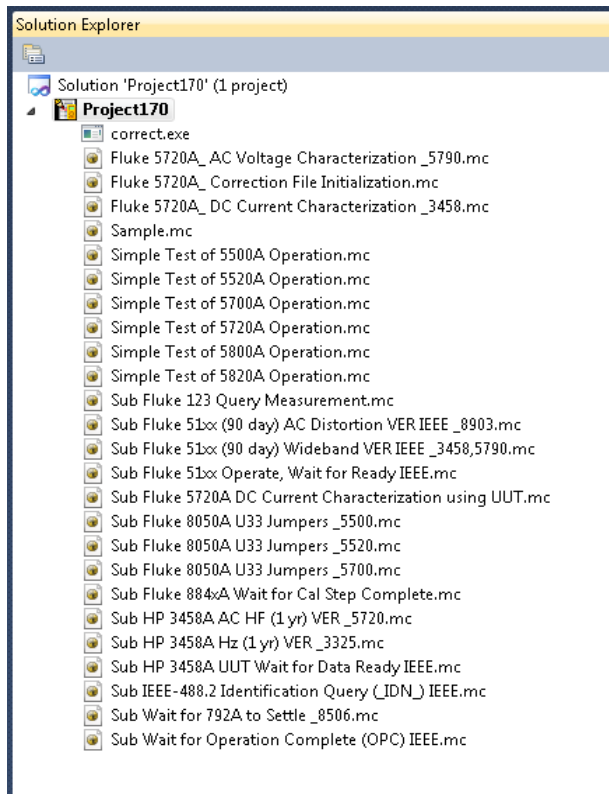
Creates the file **fluke_77_iii_1yr_ver_5520_5522AV.mc** in the 5502e subfolder of the parent.

Translating Multiple Procedures

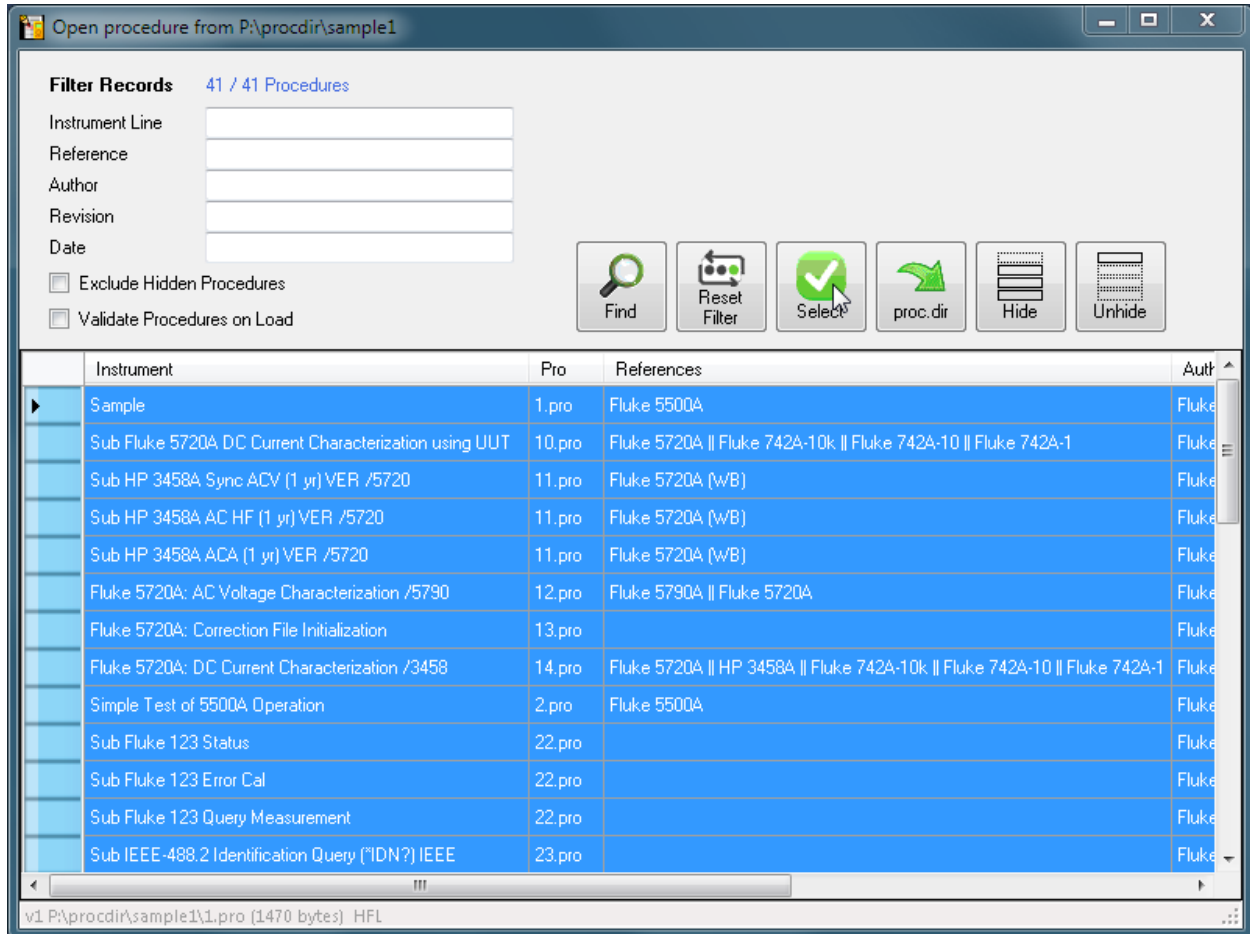
The procedure ProcTran operates on procedures stored in the *.mc text format. Procedures stored in the compiled procedure folder, proc.dir, cannot be directly translated by the procedure ProcTran. A first step to translating these files is to open procedures as individual files or projects in the procedure editor. Reference the MET/CAL Editor help system topic “Migrating Procedures from 7.X to 8.0” topic for additional details on converting compiled procedures to text file equivalents.

Use the File, New, Project from Existing Procedure menu choice to convert a single compiled procedure into a complete procedure project referencing all required files (See figure below). The completed project or individual files associated with the newly created project can now be translated.





It is not required to convert the compiled procedure to a project. Alternatively the compiled procedure can be simply opened in the editor to create a text file equivalent of the procedure. Use the File, Open, Procedure menu choice to access the procedure selector. One or more procedures can be selected at a time. Use CTRL+A to open all procedure files, or hold down the CTRL key and select more than one procedure at a time. Monitor the status bar to determine the progress of the open operation. Any of the newly created files added to the solution explorer can be translated.



Example Translations

Reset

```
1.001 5520 * S
1.001 5502E Reset
```

DC Voltage (evaluation statement)

```
1.002 5520 3.2 2.700V 0.3% 0.001U 2W
1.002 5502E +Voltage = 2.700 V
1.002 TARGET -m
1.002 MEMI Enter UUT reading in volts DC:
1.002 MEMCX 3.2 2.700V 0.3% 0.001U
```

AC Voltage (voltage evaluation statement)

```
2.001 5520 3.2 2.700V 2.0% 0.002U 500H SI 2W
2.001 5502E +Voltage = 2.700 V; Frequency = 500 Hz
2.001 TARGET -m
```

```
2.001 MEMI Enter UUT reading in volts AC:
2.001 MEMCX 3.2 2.700V 2.0% 0.002U 500Hz
```

AC Voltage (frequency evaluation statement)

```
3.001 5520 999.9 800.0H 0.01% 0.1U 300mV SI 2W

3.001 5502E +Frequency = 800.0 Hz; Voltage = 300 mV
3.001 TARGET -m
3.001 MEMI Enter UUT reading in hertz:
3.001 MEMCX 999.9 800.0H 0.01% 0.1U 300mV
```

Resistance (evaluation statement)

External Sense Off, Compensation 2-Wire

```
4.001 5520 32 27.00kZ 0.5% 0.01U CW

4.001 5502E LeadCompensation = 2Wire;
4.001 5502E +Resistance = 27.00 kOhms
4.001 TARGET -m
4.001 MEMI Enter UUT reading in kilohms:
4.001 MEMCX 32 27.00kZ 0.5% 0.01U
```

External Sense Off, Compensation Off

```
5.001 5520 320 270.0MZ 0.5% 0.1U 2W

5.001 5502E +Resistance = 270.0 MOhms
5.001 TARGET -m
5.001 MEMI Enter UUT reading in megohms:
5.001 MEMCX 320 270.0MZ 0.5% 0.1U
```

Capacitance (evaluation statement)

```
6.001 5520 999.9 800.0nF 1.9% 0.2U 2W

6.001 5502E +Capacitance = 800.0 nF
6.001 TARGET -m
6.001 MEMI Enter UUT reading in nanofarads:
6.001 MEMCX 999.9 800.0nF 1.9% 0.2U
```

DC Current (evaluation statement)

```
7.001 5520 320 200.0mA 1.5% 0.2U 2W

7.001 5502E CurrentTerminal = Aux;
7.001 5502E +Current = 200.0 mA
7.001 TARGET -m
7.001 MEMI Enter UUT reading in milliamps DC:
7.001 MEMCX 320 200.0mA 1.5% 0.2U
```

Note auto inserted DISP statements for 5500 FSC.

```
7.001 5500 320 200.0mA 1.5% 0.2U 2W

7.001 7.001 5502E CurrentTerminal = Aux;
7.001 7.001 5502E +Current = 200.0 mA; Setup
7.001 5502E Standby
7.001 DISP Ensure high connection at calibrator is "Aux".
7.001
7.001 7.001 5502E CurrentTerminal = Aux;
7.001 7.001 5502E +Current = 200.0 mA; Operate
7.001 TARGET -m
```

```
7.001 MEMI Enter UUT reading in milliamps DC:
7.001 MEMCX 320 200.0mA 1.5% 0.2U
```

AC Current (current evaluation statement)

```
8.001 5520 10 10.00A 1.5% 0.02U 60H SI HC 2W

8.001 5502E CurrentTerminal = 20A;
8.001 5502E +Current = 10.00 A; Frequency = 60 Hz
8.001 TARGET -m
8.001 MEMI Enter UUT reading in amps AC:
8.001 MEMCX 10 10.00A 1.5% 0.02U 60Hz
```

Note auto inserted DISP statements for 5500 FSC.

```
8.001 5500 10 10.00A 1.5% 0.02U 60H SI 2W

8.001 8.001 5502E CurrentTerminal = 20A;
8.001 8.001 5502E +Current = 10.00 A; Frequency = 60 Hz; Setup
8.001 5502E Standby
8.001 DISP Ensure high connection at calibrator is "20A".
8.001
8.001 8.001 5502E CurrentTerminal = 20A;
8.001 8.001 5502E +Current = 10.00 A; Frequency = 60 Hz; Operate
8.001 TARGET -m
8.001 MEMI Enter UUT reading in amps AC:
8.001 MEMCX 10 10.00A 1.5% 0.02U 60Hz
```

Temperature (evaluation statement), 100 Ω Pt385 RTD

```
9.001 5520 1372 -100.0degC 1.0U R1 4W

9.001 5502E LeadCompensation = 4Wire;
9.001 5502E RTD_Type = Pt385; NominalResistance = 100 Ohms;
9.001 5502E +Temperature = -100.0 degC
9.001 TARGET -m
9.001 MEMI Enter UUT reading in degrees Celsius:
9.001 MEMCX 1372 -100.0degC 1.0U
```

Temperature (evaluation statement) Type K Thermocouple Simulation

```
10.001 5520 720 0.0degC 1.0U _K TC 2W

10.001 5502E TC_Type = K;
10.001 5502E +Temperature = 0.0 degC
10.001 TARGET -m
10.001 MEMI Enter UUT reading in degrees Celsius:
10.001 MEMCX 720 0.0degC 1.0U
```

Temperature (evaluation statement) Type J Thermocouple Measurement

```
11.001 5520 720 200.0degC 1.0U _J TM 2W

11.001 5502E Mode = TC_Measurement; OTCD = ON;
11.001 5502E TC_Type = J;
11.001 5502E +Temperature = 200.0 degC; Setup
11.001 TARGET -m
11.001 5502E Mode = TC_Measurement; OTCD = ON;
11.001 5502E TC_Type = J;
11.001 5502E +Temperature = 200.0 degC; Read
11.001 MEMC 720 200.0degC 1.0U
```

Humidity (evaluation statement)

12.001	5520	80.0pct	1.0U	PB HM	2W
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```
12.001 5502E Mode = HumidityMeasurement;  
12.001 5502E +Humidity = 80.0 %; Setup  
12.001 TARGET -m  
12.001 5502E Mode = HumidityMeasurement;  
12.001 5502E +Humidity = 80.0 %; Read  
12.001 MEMC 80.0pct 1.0U
```