Application Note
FOR
SMA Calibration Kit for VNA

LCAL06A, LCAL06B, LCAL06C and LCAL09A are precision SMA calibration kits which provide accurate and reliable Short-Open-Load-Thru (SOLT) or Load-Reflect-Match (LRM) calibration of a vector network analyzer (VNA). Each calibration kit is carefully fine tuned and measured to ensure the performance factory guaranteed specifications as described in its data sheet.

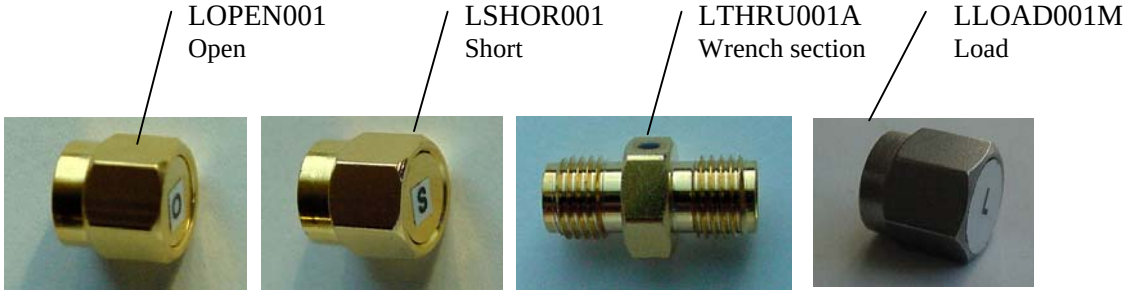
LCAL06A

A female calibration kit and used for DC ~ 6.0 GHz VNA test cable with male end connector.

It includes the following items:

1) Short – SMA Male (Part # LSHOR001).
   This part needs to be used with Thru (Part # LTHRU001A) to form SMA Female Short.
2) Open – SMA Male (Part # LOPEN001).
   This part needs to be used with Thru (Part # LTHRU001A) to form SMA Female Open.
3) Load – SMA Male (Part # LLOAD001M)
   This part needs to be used with Thru (Part # LTHRU001A) to form SMA Female Load.
4) Thru (Part # LTHRU001A) – SMA Female/Female

Below is the example of a female kit LCAL06A:



LCAL06B

A male calibration kit and used for DC ~ 6.0 GHz VNA test cable with female end connector.

It includes the following items:

1) Short (Part # LSHOR001) – SMA Male
2) Open (Part # LOPEN001) – SMA Male
3) Load (Part # LLOAD001M) – SMA Male
4) Thru (Part # LTHRU001B) – SMA Male/Male

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LCAL06C

A combo (female/male) calibration kit and used for DC ~ 6.0 GHz VNA test cable with either male or female end connectors.

It includes the following items:

1) Short (Part # LSHOR001)
    a. SMA Male
    b. SMA Female: *This part needs to be used with Thru (Part # LTHRU001A) to form SMA Female Short.*
2) Open (Part # LOPEN001)
    a. SMA Male
    b. SMA Female: *This part needs to be used with Thru (Part # LTHRU001A) to form SMA Female Open.*
3) Load (Part # LLOAD001M) – SMA Male
    a. SMA Male
    b. SMA Female: *This part needs to be used with Thru (Part # LTHRU001A) to form SMA Female Load.*
4) Thru (Part # LTHRU001A) – SMA Female/Female
5) Thru (Part # LTHRU001B) – SMA Male/Male

LCAL09A

A female calibration kit and used for DC ~ 9.0 GHz VNA test cable with either male or female end connectors.

It includes the following items:

1) Short – SMA Male (Part # L022).
    This part needs to be used with Thru (Part # L020) to form SMA Female Short.
2) Open – SMA Male (Part # L023).
    This part needs to be used with Thru (Part # L020) to form SMA Female Open.
3) Load – SMA Male (Part # L024)
    This part needs to be used with Thru (Part # L020) to form SMA Female Load.
4) Thru (Part # L020) – SMA Female/Female

Connect Cal Kit to Test Cable

In order to maintain the performance of each kit and the accuracy of the calibration, a torque wrench with 5 ~ 6 lb-Inch is *required* to connect or disconnect the kit from a test cable at the cable side SMA mating connector. Never try to turn the kits which may cause the kits to be permanently damaged.

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Define the calibration kit parameters for SOLT calibration

The following instruction is used as an example

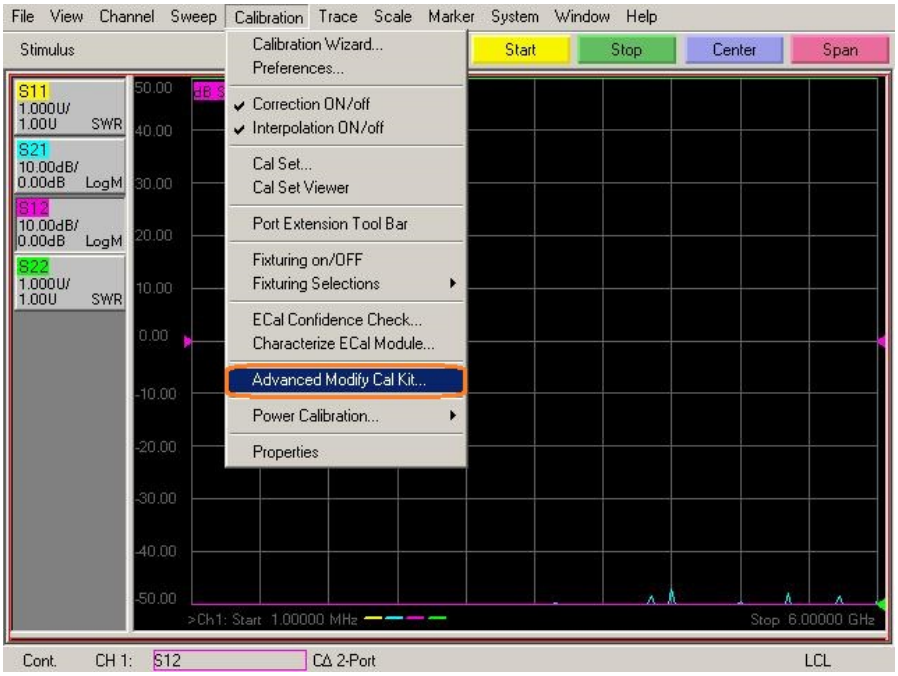
- Agilent E8357A
- A new CalKit file named “demo”
- A female Calibration Kit LCAL06A with the following measured parameters.

	Offset	C0	C1	C2	C3	Offset Loss (Gohm/S)
Short	55.7 ps (16.70 mm)					4.8
Open	55.7 ps (16.70 mm)	45	6	-2.5	0	4.8
Load	0					4.8
Thru	55.70 ps (16.70 mm)					4.8

Legend:
Yellow rounded rectangular means the user needs to select or type;
Blue rounded rectangular means the user needs to pay extra attention.

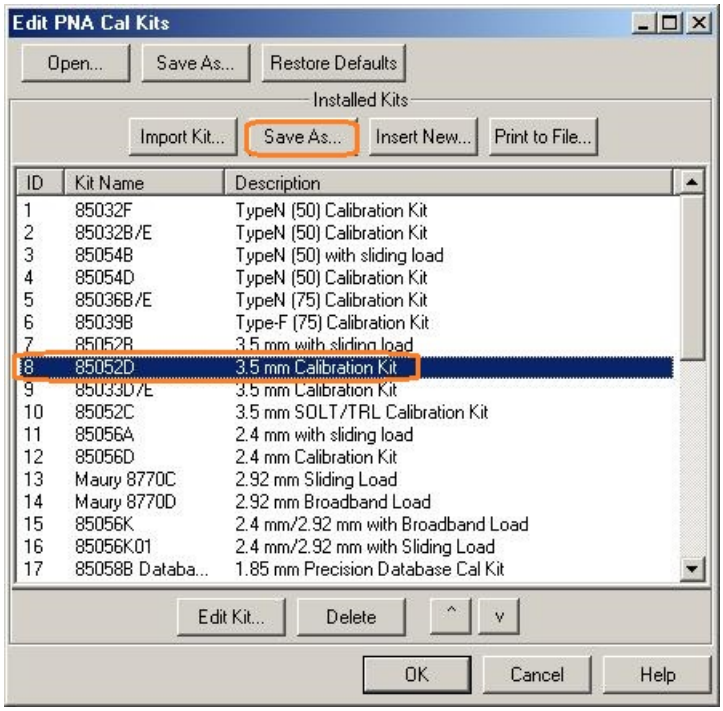
1. Prep Network Analyzer

1) Turn on a network analyzer such as Agilent 8753 ES for at least 2 hours.
2) Load predefined settings like port power.
3) Then Select “Advanced Modify Cal Kit…”

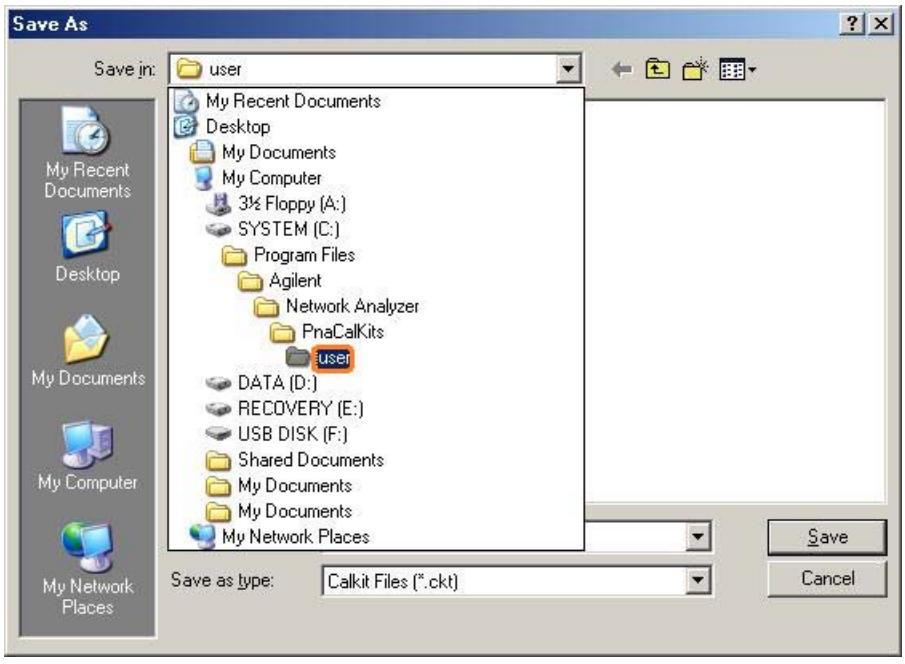


2. Create a baseline Calibration Kit File

1) Open a factory calibration kit file such as Agilent 85052D, and select “Save As…”.



2) Save to Cal Kit user directory:



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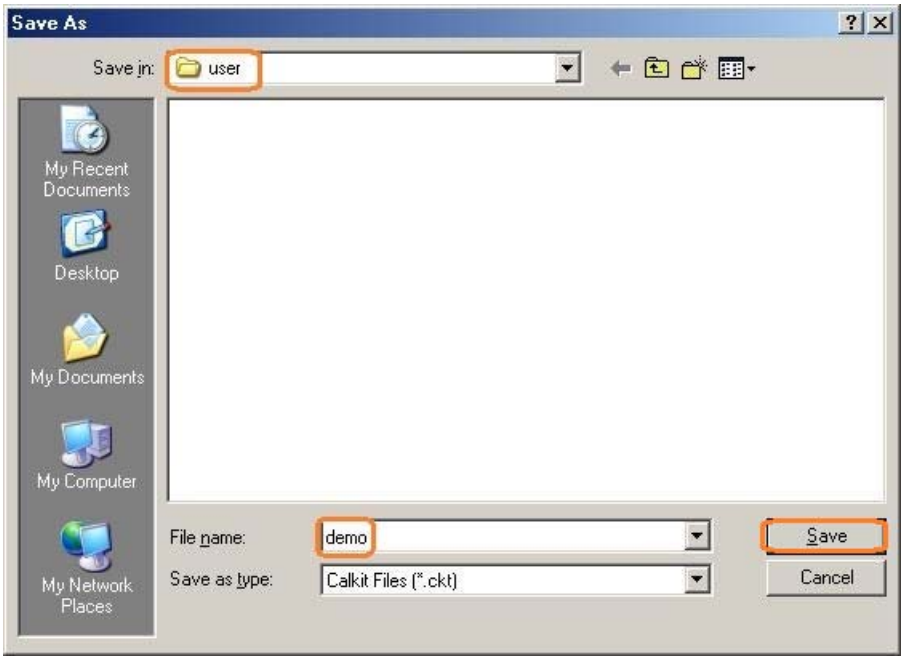
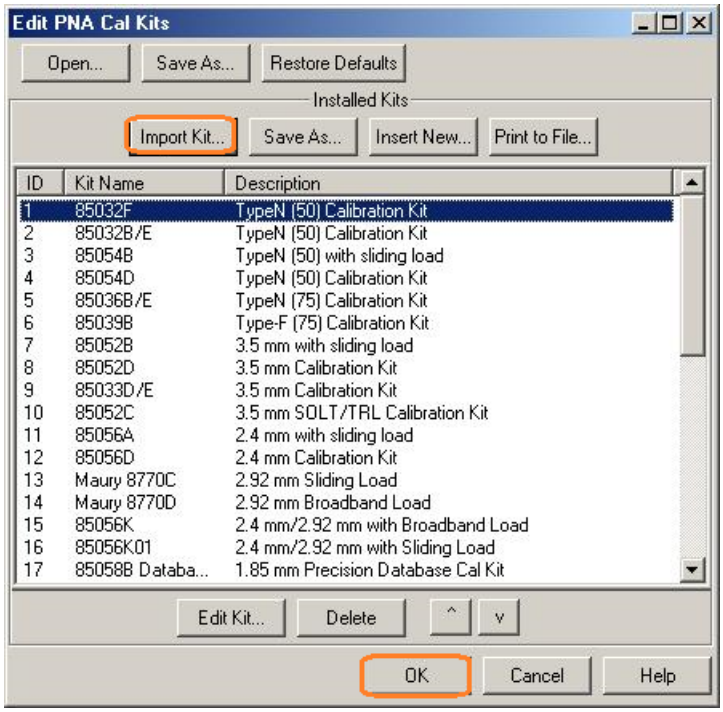
A unique file name shall be used. This example uses “demo” as the file name:



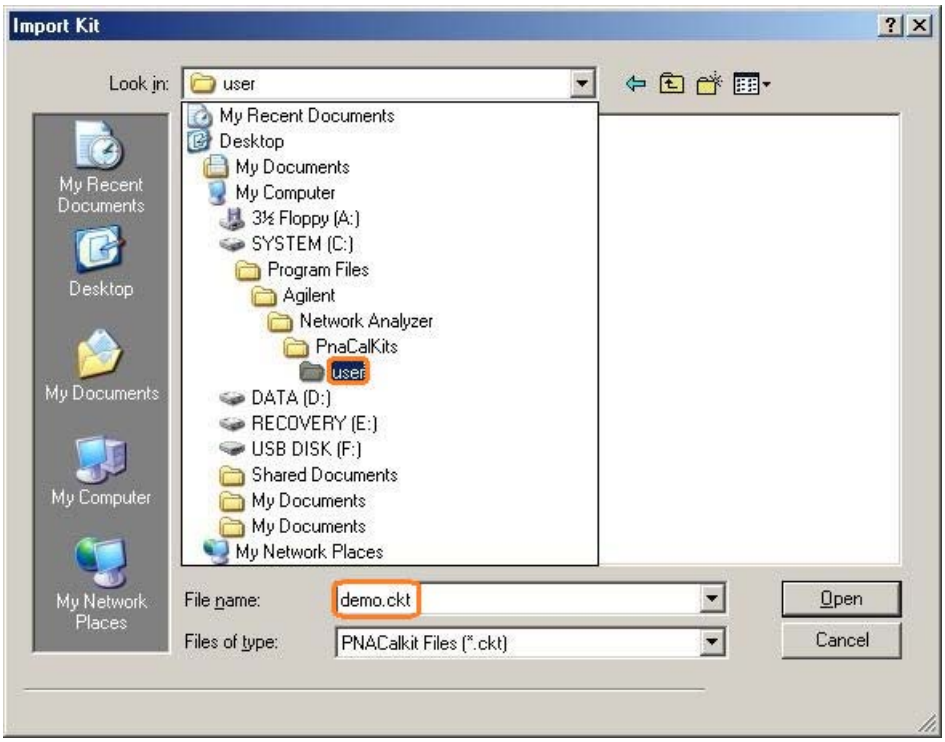
3) Import this newly created Calkit file:

a. Select “Import Kit…”, then “OK” button:

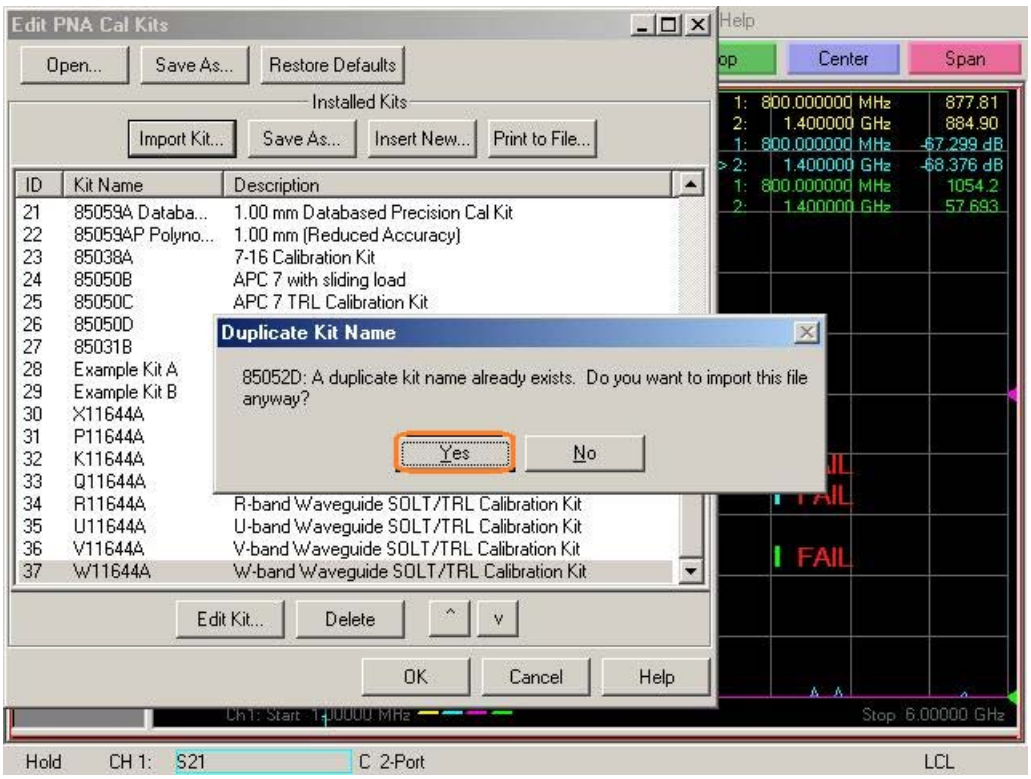
b.



b. Select the newly created CalKit file from “User” folder, then select “Open”.



c. Select “Yes” on the warning screen:



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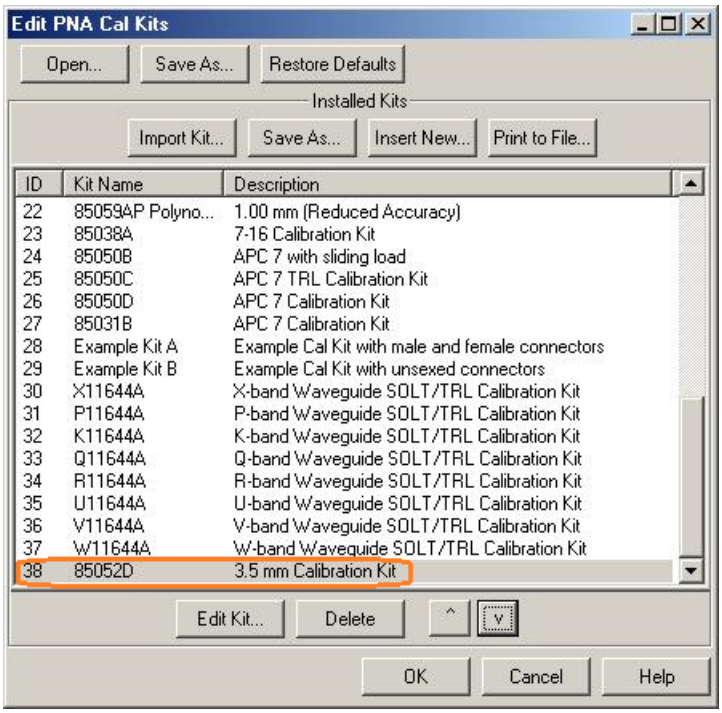
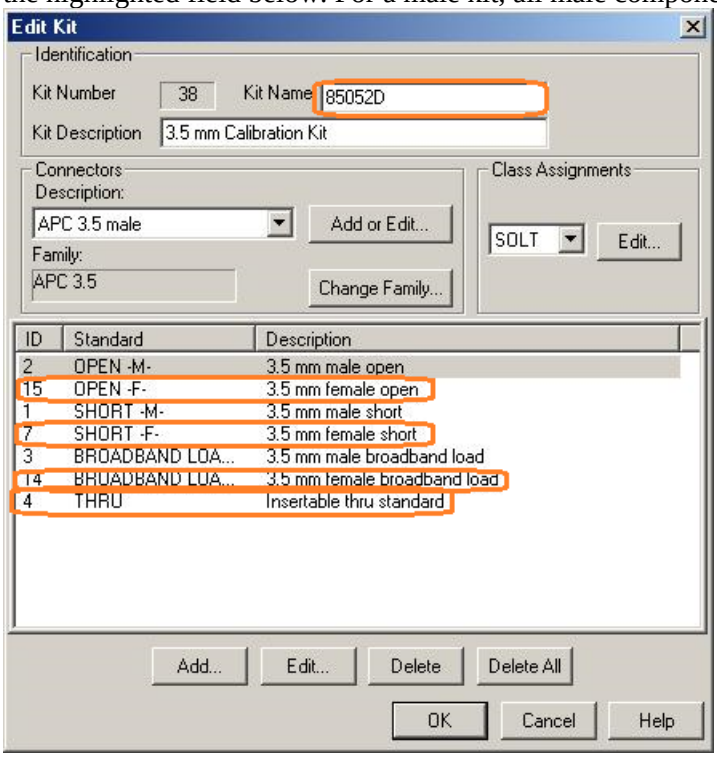
Now the new CalKit file is ready to be edited.

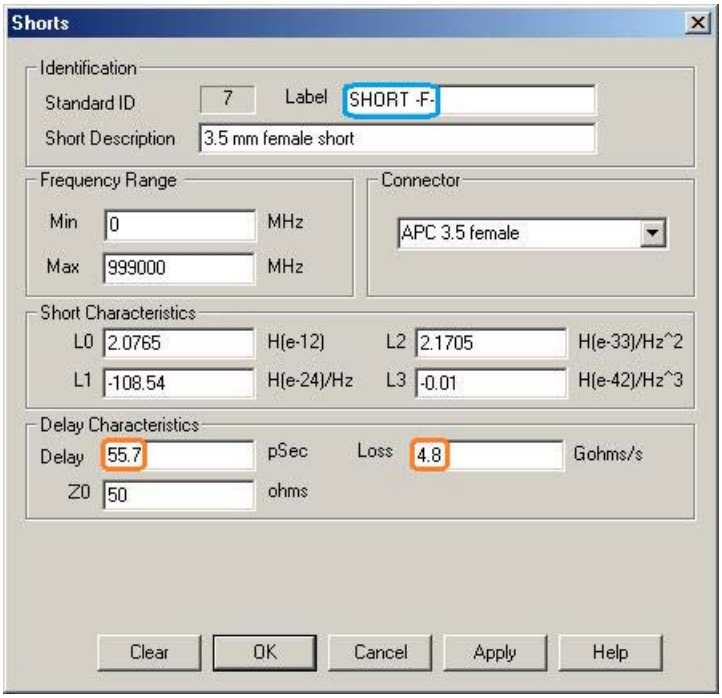


3. Edit The Cal Kit File

For a female kits, all the female components Short, Open, Load and Thru shall be modified. See the highlighted field below. For a male kit, all male components shall be modified.

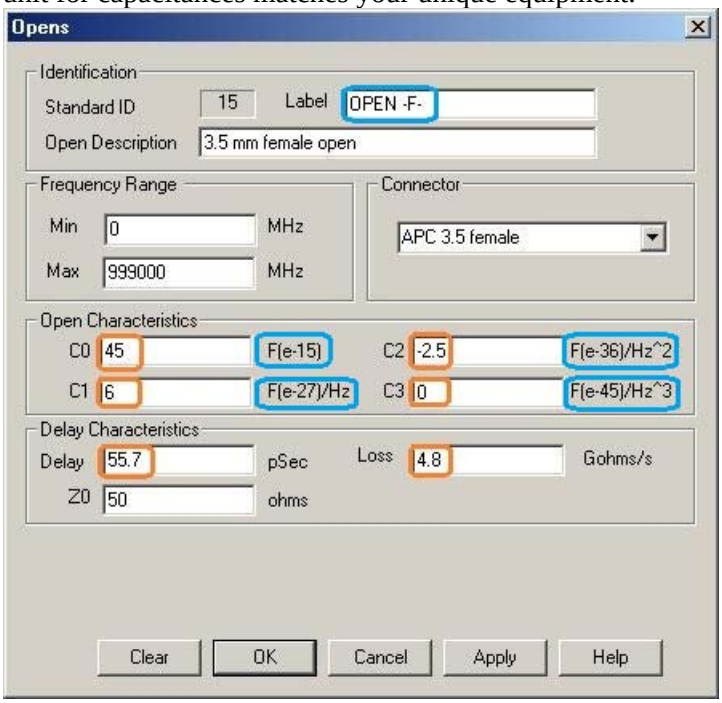


1) **Short:** Modify the **Offset Delay** and **Loss** to the values specified in the table comes with the kit:

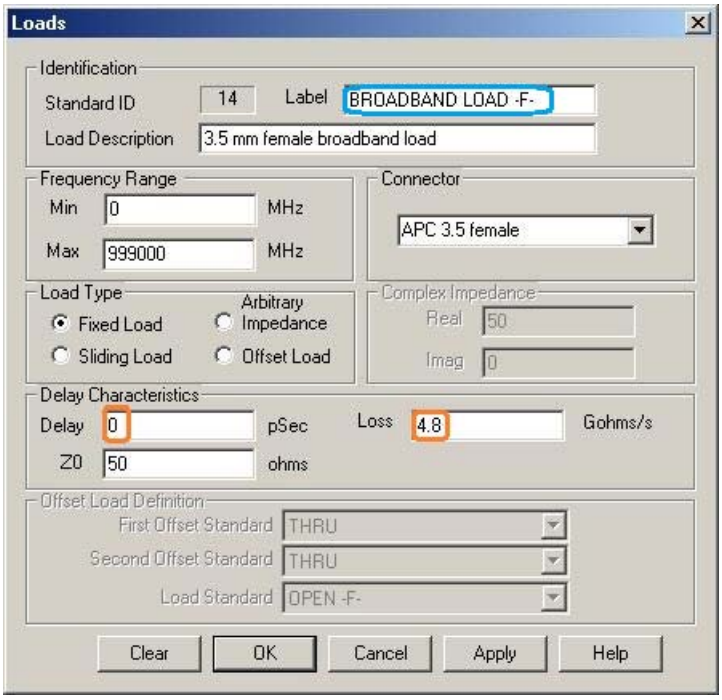


2) **Open**: Modify the **Offset Delay, Loss** and **fringe capacitances** per the specified values in the table come with the kit.

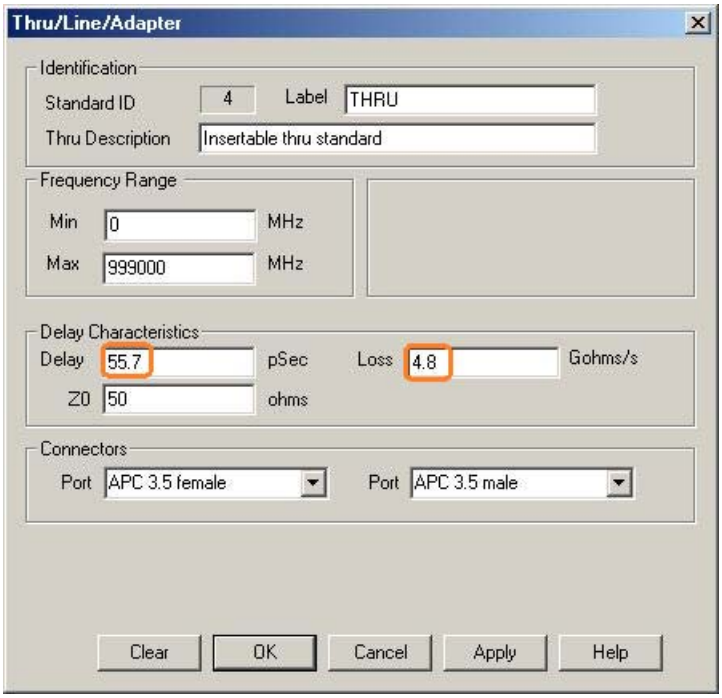
Note: The default units for C0, C1, C2 and C3 are as shown in the screenshot below. Ensure the unit for capacitances matches your unique equipment.



3) **Load**: Modify the **Offset Delay** and **Loss** per the specified values in the table come with the kit.



4) **Thru**: Modify the **Offset Delay** and **Loss** per the specified values in the table come with the kit.



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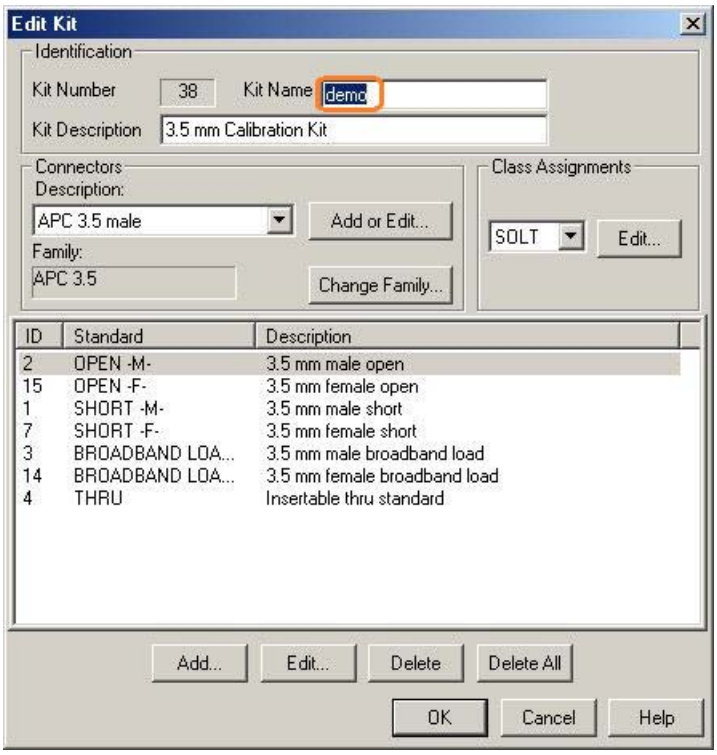
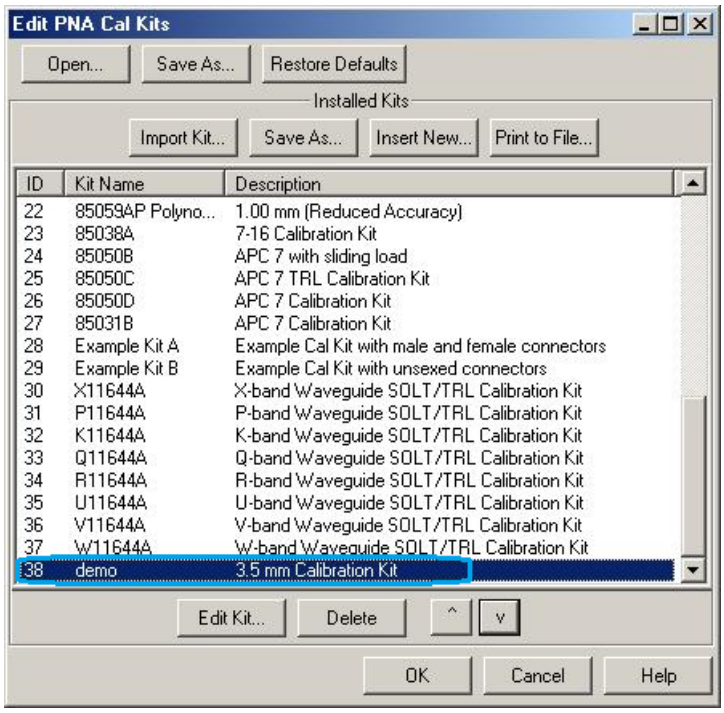
5) **Kit Name**: Modify the **Kit Name** field to a unique identifier, and then select “OK”.



6) **Now the Cal Kit file is completed and ready for calibration.**



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