SECTION 2 - CALIBRATION/VERIFICATION

2-1 GENERAL

This section provides the maintenance technician with Calibration and Verification Procedures.

The Calibration/Verification Procedures should only be performed by Technicians familiar with the setup and operation of the recommended test equipment.

2-1-1 CALIBRATION/VERIFICATION SCHEDULE

The Calibration/Verification Procedures should be performed as a result of one or more of the following conditions:

- The 2975 fails to meet the performance specifications
- One or more assemblies are replaced
- The recommended 12 month calibration interval is due

2-1-2 CONTROLS AND CONNECTORS

Refer to Appendix C for the location of the controls and connectors specified in the Calibration/ Verification Procedures.

2-1-3 TEST EQUIPMENT REQUIREMENTS

Appendix E contains a list of Test Equipment suitable for performing the Calibration/ Verifications Procedures. Other equipment meeting the Test Equipment specifications listed in Appendix E may be substituted in place of the recommended models.

2-1-4 TEST RECORD

Make copies of the Calibration and Verification Data Sheets to record results obtained while performing the Calibration and Verification Procedures.

NOTE: Calibration Results for the Generator and Analyzer Calibration process are stored in an electronic file on the PC.

2-1-5 VERIFICATION SETUP FILES

There are 28 Verification Setup Files stored in the 2975. When performing the Verification Procedures, the Recall feature of the 2975 is used to recall the Verification Setup File needed.

NOTE: The Verification Setup Files are also included on the Calibration Software CD-ROM.

2-1-6 CALIBRATION SOFTWARE

The Calibration Software CD-ROM includes the Calibration Software, Verification Setup Files and System Software.

NOTE: The 2975 should be running System Software Version 1.9 or higher before the Calibration is performed.

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2-2 PRECAUTIONS

2-2-1 SAFETY

As with any piece of electronic equipment, take extreme caution when working with “live” circuits. Observe the following precautions when performing the Calibration/Verification Procedures:

WARNING: REMOVE ALL JEWELRY OR OTHER COSMETIC APPAREL BEFORE PERFORMING ANY PROCEDURES INVOLVING “LIVE” CIRCUITS.

WHEN WORKING WITH LIVE CIRCUITS OF HIGH POTENTIAL, KEEP ONE HAND IN POCKET OR BEHIND BACK TO AVOID SERIOUS SHOCK HAZARD.

USE ONLY INSULATED TROUBLESHOOTING TOOLS WHEN WORKING WITH LIVE CIRCUITS.

FOR ADDED INSULATION, PLACE RUBBER BENCH MATS UNDER ALL POWERED BENCH EQUIPMENT AND TECHNICIAN CHAIRS.

HEED ALL WARNINGS AND CAUTIONS CONCERNING MAXIMUM VOLTAGES AND POWER INPUTS.

2-2-2 ESD

CAUTION: ONLY PERFORM CALIBRATION/VERIFICATION PROCEDURES IN AN ESD ENVIRONMENT. ALL PERSONNEL PERFORMING THE CALIBRATION/ VERIFICATION PROCEDURES SHOULD HAVE KNOWLEDGE OF ACCEPTED ESD PRACTICES AND/OR BE ESD CERTIFIED.

2-3 DISASSEMBLY REQUIREMENTS

Remove the Case Assy from the 2975 to perform the Power Supply Voltages Calibration Procedures.

Refer to the individual Calibration Procedures for additional disassembly requirements.

The Case Assy should be reassembled prior to performing the TXCO and Generator / Analyzer Calibration Procedures.

2-4 VERIFICATION PROCEDURES

To perform a Calibration Verification, perform para 2-4-2 through 2-4-9.

To perform a System Verification, perform para 2-4-2 through 2-4-29.

2-4-1 INITIAL SETUP

PREREQUISITES: None

EQUIPMENT REQUIRED: 10 MHz Frequency Standard

STEP	PROCEDURE

1. Connect the 2975 to an appropriate external power source.
2. Set the MAIN POWER Switch (Rear Panel) to the ON position.
3. Connect the 10 MHz Frequency Standard to the EXTERNAL RF I/O Connector.
4. When the Opening Screen is displayed, press **MODE** Key, "**7**" Key and "**1**" Key to display the Configuration Screen.
5. Press **MODE** Key, "**7**" Key and "**7**" Key to display the Recall Menu.

The 2975 system parameters are now ready to be verified.

2-4-2 GENERATOR OUTPUT FREQUENCY

PREREQUISITES: 2-4-1 Initial Setup

EQUIPMENT REQUIRED: Universal Counter

STEP PROCEDURE

1. Recall Verification Setup File #1.
2. Disconnect the 10 MHz Frequency Standard from the EXTERNAL RF I/O Connector.
3. Connect the Universal Counter to the GEN Connector.
4. Verify 1 GHz (±10 Hz) on the Universal Counter.
   - If reading is correct, go to Step 5.
   - If reading is out of tolerance, perform the 2975 Calibration Procedures (para 2-6).
5. Perform one of the following:
   - If this procedure is performed as a stand-alone procedure, perform the following key sequences to reset Factory Default Settings, then remove power from the Unit and disconnect the test equipment.

     Press **MODE** Key, **7** Key, **1** Key to display the Configuration Screen.

     Press **10 MHz REFERENCE** to select Internal reference.

     Press **FACTORY DEFAULT** (F2) to restore the Unit to Factory Defaults.
   - If this procedure is performed as part of a complete Verification, reconnect the 10 MHz Frequency Standard to the EXTERNAL RF I/O Connector and proceed with the next Verification Procedure.

2-4-3 GENERATOR OUTPUT POWER

PREREQUISITES: 2-4-1 Initial Setup

EQUIPMENT REQUIRED: Power Meter

STEP PROCEDURE

1. Recall Verification Setup File #2.
2. Connect the Power Meter to the GEN Connector.
3. Set the Power Meter to 501 MHz at +10.0 dBm.
4. Verify the following levels on the Power Meter:

2975 GENERATOR LEVEL	POWER METER LEVEL
+10 dBm	+10 dBm (±1.5 dB)
0 dBm	0 dBm (±1.5 dB)
-10 dBm	-10 dBm (±1.5 dB)
-20 dBm	-20 dBm (±1.5 dB)
-30 dBm	-30 dBm (±1.5 dB)
-40 dBm	-40 dBm (±1.5 dB)
-50 dBm	-50 dBm (±1.5 dB)
-60 dBm	-60 dBm (±1.5 dB)

- If all readings are correct, go to Step 5.
- If any reading is out of tolerance, perform the 2975 Calibration Procedures (para 2-6).

5. Perform one of the following:

- If this procedure is performed as a stand-alone procedure, perform the following key sequences to reset Factory Default Settings, then remove power from the Unit and disconnect the test equipment.

  Press **MODE** Key, **7** Key, **1** Key to display the Configuration Screen.

  Press **10 MHz REFERENCE** to select Internal reference.

  Press **FACTORY DEFAULT** (F2) to restore the Unit to Factory Defaults.

- If this procedure is performed as part of a complete Verification, proceed with the next Verification Procedure.

2-4-4 GENERATOR LEVEL FLATNESS

PREREQUISITES: 2-4-1 Initial Setup

EQUIPMENT REQUIRED: Power Meter

STEP PROCEDURE

1. Recall Verification Setup File #3.
2. Connect the Power Meter to the GEN Connector.
3. Set the 2975 to the following frequencies and verify 0 dBm (±1.5 dB) on the Power Meter:

170 MHz	1470 MHz
220 MHz	1520 MHz
270 MHz	1570 MHz
320 MHz	1620 MHz
370 MHz	1670 MHz
420 MHz	1720 MHz
470 MHz	1770 MHz
520 MHz	1820 MHz
570 MHz	1870 MHz
620 MHz	1920 MHz
670 MHz	1970 MHz
720 MHz	2020 MHz
770 MHz	2070 MHz
820 MHz	2120 MHz
870 MHz	2170 MHz
920 MHz	2220 MHz
970 MHz	2270 MHz
1020 MHz	2320 MHz
1070 MHz	2370 MHz
1120 MHz	2420 MHz
1170 MHz	2470 MHz
1220 MHz	2520 MHz
1270 MHz	2570 MHz
1320 MHz	2620 MHz
1370 MHz	2670 MHz
1420 MHz	2700 MHz

- If all readings are correct, go to Step 4.
- If any reading is out of tolerance, perform the 2975 Calibration Procedures (para 2-6).

4. Perform one of the following:
   - If this procedure is performed as a stand-alone procedure, perform the following key sequences to reset Factory Default Settings, then remove power from the Unit and disconnect the test equipment.

     Press **MODE** Key, **7** Key, **1** Key to display the Configuration Screen.

     Press **10 MHz REFERENCE** to select Internal reference.

     Press **FACTORY DEFAULT** (F2) to restore the Unit to Factory Defaults.

   - If this procedure is performed as part of a complete Verification, proceed with the next Verification Procedure.

2-4-5 GENERATOR T/R POWER LEVEL ACCURACY

PREREQUISITES: 2-4-1 Initial Setup

EQUIPMENT REQUIRED: Power Meter

STEP PROCEDURE

1. Recall Verification Setup File #4.
2. Connect the Power Meter to the T/R Connector.
3. Verify the following levels on the Power Meter:

2975 POWER LEVEL	POWER METER LEVEL
-30.0 dBm	-30 dBm (±1 dB)
-40.0 dBm	-40 dBm (±1 dB)
-50.0 dBm	-50 dBm (±1 dB)
-60.0 dBm	-60 dBm (±1 dB)

- If all readings are correct, go to Step 4.
- If any reading is out of tolerance, perform the 2975 Calibration Procedures (para 2-6).

4. Perform one of the following:

- If this procedure is performed as a stand-alone procedure, perform the following key sequences to reset Factory Default Settings, then remove power from the Unit and disconnect the test equipment.

  Press **MODE** Key, **7** Key, **1** Key to display the Configuration Screen.

  Press **10 MHz REFERENCE** to select Internal reference.

  Press **FACTORY DEFAULT** (F2) to restore the Unit to Factory Defaults.

- If this procedure is performed as part of a complete Verification, proceed with the next Verification Procedure.

2-4-6 GENERATOR T/R POWER LEVEL FLATNESS

PREREQUISITES: 2-4-1 Initial Setup

EQUIPMENT REQUIRED: Power Meter

STEP PROCEDURE

1. Recall Verification Setup File #5.
2. Connect the Power Meter to the T/R Connector.
3. Set the 2975 to the following frequencies and verify -30 dBm (±1 dB) on the Power Meter:

50 MHz	1400 MHz
100 MHz	1450 MHz
150 MHz	1500 MHz
200 MHz	1550 MHz
250 MHz	1600 MHz
300 MHz	1650 MHz
350 MHz	1700 MHz
400 MHz	1750 MHz
450 MHz	1800 MHz
500 MHz	1850 MHz
550 MHz	1900 MHz
600 MHz	1950 MHz
650 MHz	2000 MHz
700 MHz	2050 MHz
750 MHz	2100 MHz
800 MHz	2150 MHz
850 MHz	2200 MHz
900 MHz	2250 MHz
950 MHz	2300 MHz
1000 MHz	2350 MHz
1050 MHz	2400 MHz
1100 MHz	2450 MHz
1150 MHz	2500 MHz
1200 MHz	2550 MHz
1250 MHz	2600 MHz
1300 MHz	2650 MHz
1350 MHz	2700 MHz

- If all readings are correct, go to Step 4.
- If any reading is out of tolerance, perform the 2975 Calibration Procedures (para 2-6).

4. Perform one of the following:

- If this procedure is performed as a stand-alone procedure, perform the following key sequences to reset Factory Default Settings, then remove power from the Unit and disconnect the test equipment.

  Press **MODE** Key, **7** Key, **1** Key to display the Configuration Screen.

  Press **10 MHz REFERENCE** to select Internal reference.

  Press **FACTORY DEFAULT** (F2) to restore the Unit to Factory Defaults.

- If this procedure is performed as part of a complete Verification, proceed with the next Verification Procedure.

2-4-7 RF POWER METER ACCURACY

PREREQUISITES: 2-4-1 Initial Setup

EQUIPMENT REQUIRED: RF Generator

STEP PROCEDURE

1. Recall Verification Setup File #6.
2. Press **ZERO** on the 2975 Power Meter.
3. Connect the RF Generator to the T/R Connector.
4. Set the RF Generator to 500 MHz at 10.5 dBm.
5. Verify 10.5 dBm (±1.05 dB) on the 2975 Power Meter.
   - If reading is correct, go to Step 5.
   - If reading is out of tolerance, perform the 2975 Calibration Procedures (para 2-6).
6. Perform one of the following:
   - If this procedure is performed as a stand-alone procedure, perform the following key sequences to reset Factory Default Settings, then remove power from the Unit and disconnect the test equipment.

     Press **MODE** Key, **7** Key, **1** Key to display the Configuration Screen.

     Press **10 MHz REFERENCE** to select Internal reference.

     Press **FACTORY DEFAULT** (F2) to restore the Unit to Factory Defaults.
   - If this procedure is performed as part of a complete Verification, proceed with the next Verification Procedure.

2-4-8 RSSI METER ACCURACY

PREREQUISITES: 2-4-1 Initial Setup

EQUIPMENT REQUIRED: RF Generator

STEP PROCEDURE

1. Recall Verification Setup File #7.
2. Calibrate the 2975 RSSI Meter (press the RSSI Meter CAL Button and follow the on-screen prompts).
3. Connect the RF Generator to the ANT Connector.
4. Verify the following levels on the 2975 RSSI Meter:

RF GENERATOR SETTINGS	2975 RSSI METER
10 MHz at -70 dBm	-70.0 dBm (±2.5 dB)
10 MHz at -60 dBm	-60.0 dBm (±2.5 dB)
10 MHz at -50 dBm	-50.0 dBm (±2.5 dB)
10 MHz at -40 dBm	-40.0 dBm (±2.5 dB)
10 MHz at -30 dBm	-30.0 dBm (±2.5 dB)
10 MHz at -20 dBm	-20.0 dBm (±2.5 dB)

- If all readings are correct, go to Step 5.
- If any reading is out of tolerance, perform the 2975 Calibration Procedures (para 2-6).

5. Perform one of the following:

- If this procedure is performed as a stand-alone procedure, perform the following key sequences to reset Factory Default Settings, then remove power from the Unit and disconnect the test equipment.

  Press **MODE** Key, **7** Key, **1** Key to display the Configuration Screen.

  Press **10 MHz REFERENCE** to select Internal reference.

  Press **FACTORY DEFAULT** (F2) to restore the Unit to Factory Defaults.

- If this procedure is performed as part of a complete Verification, proceed with the next Verification Procedure.

2-4-9 ANALYZER LEVEL ACCURACY

PREREQUISITES: 2-4-1 Initial Setup

EQUIPMENT REQUIRED: RF Generator

STEP PROCEDURE

1. Recall Verification Setup File #8.
2. Press **NORMAL** (F5) on the 2975 Spectrum Analyzer to normalize the 2975 Spectrum Analyzer. (This may take a few minutes.)
3. Connect the RF Generator to the ANT Connector.
4. Set the RF Generator to 1 MHz at -30.0 dBm.
5. Set the RF Generator and the 2975 to the following frequencies and verify -30 dBm (±2 dB) Analyzer peak level on the 2975 Spectrum Analyzer:

1 MHz	1400 MHz
50 MHz	1450 MHz
100 MHz	1500 MHz
150 MHz	1550 MHz
200 MHz	1600 MHz
250 MHz	1650 MHz
300 MHz	1700 MHz
350 MHz	1750 MHz
400 MHz	1800 MHz
450 MHz	1850 MHz
500 MHz	1900 MHz
550 MHz	1950 MHz
600 MHz	2000 MHz
650 MHz	2050 MHz
700 MHz	2100 MHz
750 MHz	2150 MHz
800 MHz	2200 MHz
850 MHz	2250 MHz
900 MHz	2300 MHz
950 MHz	2350 MHz
1000 MHz	2400 MHz
1050 MHz	2450 MHz
1100 MHz	2500 MHz
1150 MHz	2550 MHz
1200 MHz	2600 MHz
1250 MHz	2650 MHz
1300 MHz	2700 MHz
1350 MHz	

- If all readings are correct, go to Step 5.
- If any reading is out of tolerance, perform the 2975 Calibration Procedures (para 2-6).

6. Perform one of the following:

   - If this procedure is performed as a stand-alone procedure, perform the following key sequences to reset Factory Default Settings, then remove power from the Unit and disconnect the test equipment.

     Press **MODE** Key, **7** Key, **1** Key to display the Configuration Screen.

     Press **10 MHz REFERENCE** to select Internal reference.

     Press **FACTORY DEFAULT** (F2) to restore the Unit to Factory Defaults.

   - If this procedure is performed as part of a complete Verification, proceed with the next Verification Procedure.

2-4-10 GENERATOR FM RESIDUAL

PREREQUISITES: 2-4-1 Initial Setup

EQUIPMENT REQUIRED: Modulation Analyzer

STEP	PROCEDURE

1. Recall Verification Setup File #9.
2. Connect the Modulation Analyzer to the GEN Connector.
3. Set the Modulation Analyzer for 300 Hz to 3 kHz post-detection filtering. Measure FM level.
4. Verify <15 Hz RMS on the Modulation Analyzer. Record level.

   - If reading is correct, go to Step 5.
   - If reading is out of tolerance, this indicates a hardware failure in the 2975. Probable source of failure: Generator Assy. Return the 2975 to Aeroflex for repair.

5. Perform one of the following:

   - If this procedure is performed as a stand-alone procedure, perform the following key sequences to reset Factory Default Settings, then remove power from the Unit and disconnect the test equipment.

     Press **MODE** Key, **7** Key, **1** Key to display the Configuration Screen.

     Press **10 MHz REFERENCE** to select Internal reference.

     Press **FACTORY DEFAULT** (F2) to restore the Unit to Factory Defaults.

   - If this procedure is performed as part of a complete Verification, proceed with the next Verification Procedure.

2-4-11 GENERATOR AM RESIDUAL

PREREQUISITES: 2-4-1 Initial Setup

EQUIPMENT REQUIRED: Modulation Analyzer

STEP PROCEDURE

1. Recall Verification Setup File #10.
2. Connect the Modulation Analyzer to the GEN Connector.
3. Set the Modulation Analyzer for 300 Hz to 3 kHz post-detection filtering. Measure AM level.
4. Verify <0.1% on the Modulation Analyzer. Record level.

   - If reading is correct, go to Step 5.
   - If reading is out of tolerance, this indicates a hardware failure in the 2975. Probable source of failure: Generator Assy. Return the 2975 to Aeroflex for repair.

5. Perform one of the following:

   - If this procedure is performed as a stand-alone procedure, perform the following key sequences to reset Factory Default Settings, then remove power from the Unit and disconnect the test equipment.

     Press **MODE** Key, **7** Key, **1** Key to display the Configuration Screen.

     Press **10 MHz REFERENCE** to select Internal reference.

     Press **FACTORY DEFAULT** (F2) to restore the Unit to Factory Defaults.

   - If this procedure is performed as part of a complete Verification, proceed with the next Verification Procedure.

2-4-12 GENERATOR FM DEVIATION ACCURACY

PREREQUISITES: 2-4-1 Initial Setup
2-4-5 Generator FM Residual

EQUIPMENT REQUIRED: Modulation Analyzer

STEP PROCEDURE

1. Recall Verification Setup File #11.
2. Connect the Modulation Analyzer to the GEN Connector.
3. Set the Modulation Analyzer to measure FM with the 15 kHz LP Filter selected.
4. Record the FM deviation shown on the Modulation Analyzer.
5. Subtract the reading recorded in para 2-4-10 from the reading recorded in Step 4. Verify FM deviation is 10 kHz (±0.30 kHz).

   - If reading is correct, go to Step 5.
   - If reading is out of tolerance, this indicates a hardware failure in the 2975. Probable source of failure: Multifunction I/O PCB Assy or Generator Assy. Return the 2975 to Aeroflex for repair.

6. Perform one of the following:

   - If this procedure is performed as a stand-alone procedure, perform the following key sequences to reset Factory Default Settings, then remove power from the Unit and disconnect the test equipment.

     Press **MODE** Key, **7** Key, **1** Key to display the Configuration Screen.

     Press **10 MHz REFERENCE** to select Internal reference.

     Press **FACTORY DEFAULT** (F2) to restore the Unit to Factory Defaults.

   - If this procedure is performed as part of a complete Verification, proceed with the next Verification Procedure.

2-4-13 GENERATOR FM MODULATION RATE

PREREQUISITES: 2-4-1 Initial Setup

EQUIPMENT REQUIRED: Modulation Analyzer

STEP PROCEDURE

1. Recall Verification Setup File #12.
2. Connect the Modulation Analyzer to the GEN Connector.
3. Set the Modulation Analyzer to measure FM with the 15 kHz LP Filter selected.
4. Record the FM deviation level for the following AF Field settings. Subtract the FM Residual reading recorded in para 2-4-10 and verify the FM deviation for the following AF Field settings on the Modulation Analyzer:

2975 (M1) AF FIELD	FM DEVIATION
50.0 Hz	6 kHz (±0.18 kHz)
300.0 Hz	6 kHz (±0.18 kHz)
10000.0 Hz	6 kHz (±0.18 kHz)

- If all readings are correct, go to Step 5.
- If reading is out of tolerance, this indicates a hardware failure in the 2975. Probable source of failure: Multifunction I/O PCB Assy or Generator Assy. Return the 2975 to Aeroflex for repair.

5. Perform one of the following:

- If this procedure is performed as a stand-alone procedure, perform the following key sequences to reset Factory Default Settings, then remove power from the Unit and disconnect the test equipment.

  Press **MODE** Key, **7** Key, **1** Key to display the Configuration Screen.

  Press **10 MHz REFERENCE** to select Internal reference.

  Press **FACTORY DEFAULT** (F2) to restore the Unit to Factory Defaults.

- If this procedure is performed as part of a complete Verification, proceed with the next Verification Procedure.

2-4-14 GENERATOR FM MODULATION DISTORTION

PREREQUISITES: 2-4-1 Initial Setup

EQUIPMENT REQUIRED: Modulation Analyzer
Audio Analyzer

STEP	PROCEDURE

1. Recall Verification Setup File #13.
2. Connect the Modulation Analyzer to the GEN Connector.
3. Set the Modulation Analyzer to measure FM with the 3 kHz LP Filter selected.
4. Connect the Audio Analyzer to the Modulation Analyzer Modulation Output Connector.
5. Verify the modulation distortion is <1% on the Audio Analyzer.
   - If reading is correct, go to Step 6.
   - If reading is out of tolerance, this indicates a hardware failure in the 2975. Probable source of failure: Multifunction I/O PCB Assy or Generator Assy. Return the 2975 to Aeroflex for repair.
6. Perform one of the following:
   - If this procedure is performed as a stand-alone procedure, perform the following key sequences to reset Factory Default Settings, then remove power from the Unit and disconnect the test equipment.

     Press **MODE** Key, **7** Key, **1** Key to display the Configuration Screen.

     Press **10 MHz REFERENCE** to select Internal reference.

     Press **FACTORY DEFAULT** (F2) to restore the Unit to Factory Defaults.
   - If this procedure is performed as part of a complete Verification, proceed with the next Verification Procedure.

2-4-15 GENERATOR AM MODULATION ACCURACY

PREREQUISITES: 2-4-1 Initial Setup
2-4-6 Generator AM Residual

EQUIPMENT REQUIRED: Modulation Analyzer

STEP PROCEDURE

1. Recall Verification Setup File #14.
2. Connect the Modulation Analyzer to the GEN Connector.
3. Set the Modulation Analyzer to measure AM.
4. Record the AM Modulation shown on the Modulation Analyzer.
5. Subtract the reading recorded in para 2-4-11 from the reading recorded in Step 4. Verify the AM Modulation is 30% (±5%).

   - If reading is correct, go to Step 6.
   - If reading is out of tolerance, this indicates a hardware failure in the 2975. Probable source of failure: Multifunction I/O PCB Assy or Generator Assy. Return the 2975 to Aeroflex for repair.

6. Perform one of the following:

   - If this procedure is performed as a stand-alone procedure, perform the following key sequences to reset Factory Default Settings, then remove power from the Unit and disconnect the test equipment.

     Press **MODE** Key, **7** Key, **1** Key to display the Configuration Screen.

     Press **10 MHz REFERENCE** to select Internal reference.

     Press **FACTORY DEFAULT** (F2) to restore the Unit to Factory Defaults.

   - If this procedure is performed as part of a complete Verification, proceed with the next Verification Procedure.

2-4-16 RF ERROR METER ACCURACY

PREREQUISITES: 2-4-1 Initial Setup

EQUIPMENT REQUIRED: RF Generator

STEP PROCEDURE

1. Recall Verification Setup File #15.
2. Connect the RF Generator to the T/R Connector.
3. Set the RF Generator to the following settings and verify the following readings on the 2975 RF Error Meter:

RF GENERATOR SETTINGS	2975 RF ERROR METER
1000.01 MHz at -20 dBm	+10000 Hz (±1 Hz)
999.99 MHz at -20 dBm	-10000 Hz (±1 Hz)

- If all readings are correct, go to Step 4.
- If reading is out of tolerance, this indicates a hardware failure in the 2975. Probable source of failure: Multifunction I/O PCB Assy or Receiver Assy. Return the 2975 to Aeroflex for repair.

4. Perform one of the following:

- If this procedure is performed as a stand-alone procedure, perform the following key sequences to reset Factory Default Settings, then remove power from the Unit and disconnect the test equipment.

  Press **MODE** Key, **7** Key, **1** Key to display the Configuration Screen.

  Press **10 MHz REFERENCE** to select Internal reference.

  Press **FACTORY DEFAULT** (F2) to restore the Unit to Factory Defaults.

- If this procedure is performed as part of a complete Verification, proceed with the next Verification Procedure.

2-4-17 AF METER ACCURACY

PREREQUISITES: 2-4-1 Initial Setup

EQUIPMENT REQUIRED: RF Generator

STEP PROCEDURE

1. Recall Verification Setup File #16.
2. Connect the RF Generator to the ANT Connector.
3. Set the RF Generator to 100 MHz at -10.0 dBm.
4. Set the RF Generator to output a 6 kHz FM signal at a 1 kHz rate.
5. Verify 1000 Hz (±1 Hz) on the 2975 AF Counter.
   - If reading is correct, go to Step 6.
   - If reading is out of tolerance, this indicates a hardware failure in the 2975. Probable source of failure: Multifunction I/O PCB Assy or Receiver Assy. Return the 2975 to Aeroflex for repair.
6. Perform one of the following:
   - If this procedure is performed as a stand-alone procedure, perform the following key sequences to reset Factory Default Settings, then remove power from the Unit and disconnect the test equipment.

     Press **MODE** Key, **7** Key, **1** Key to display the Configuration Screen.

     Press **10 MHz REFERENCE** to select Internal reference.

     Press **FACTORY DEFAULT** (F2) to restore the Unit to Factory Defaults.
   - If this procedure is performed as part of a complete Verification, proceed with the next Verification Procedure.

2-4-18 FM DEVIATION METER ACCURACY

PREREQUISITES: 2-4-1 Initial Setup

EQUIPMENT REQUIRED: RF Generator

STEP PROCEDURE

1. Recall Verification Setup File #17.
2. Connect the RF Generator to the ANT Connector.
3. Set the RF Generator to 100 MHz at -10.0 dBm.
4. Record the level on the 2975 Deviation Meter.
5. Set the RF Generator to output a 10 kHz FM signal at a 1 kHz rate.
6. Record the level on the 2975 Deviation Meter.
7. Subtract the deviation level in Step 4 from the deviation level in Step 6 and verify the deviation level is 10 kHz (±0.52 kHz).

   - If reading is correct, go to Step 8.
   - If reading is out of tolerance, this indicates a hardware failure in the 2975. Probable source of failure: Multifunction I/O PCB Assy or Receiver Assy. Return the 2975 to Aeroflex for repair.

8. Perform one of the following:

   - If this procedure is performed as a stand-alone procedure, perform the following key sequences to reset Factory Default Settings, then remove power from the Unit and disconnect the test equipment.

     Press **MODE** Key, **7** Key, **1** Key to display the Configuration Screen.

     Press **10 MHz REFERENCE** to select Internal reference.

     Press **FACTORY DEFAULT** (F2) to restore the Unit to Factory Defaults.

   - If this procedure is performed as part of a complete Verification, proceed with the next Verification Procedure.

2-4-19 AM MODULATION METER ACCURACY

PREREQUISITES: 2-4-1 Initial Setup

EQUIPMENT REQUIRED: RF Generator

STEP	PROCEDURE

1. Recall Verification Setup File #18.
2. Connect the RF Generator to the ANT Connector.
3. Set the RF Generator to 100 MHz at -20.0 dBm.
4. Record the level on the 2975 Modulation Meter.
5. Set the RF Generator to output an AM signal at 50% depth.
6. Record the level on the 2975 Modulation Meter.
7. Subtract the modulation level in Step 4 from the modulation level in Step 6 and verify the modulation level is 50% (±5%).

   - If reading is correct, go to Step 8.
   - If reading is out of tolerance, this indicates a hardware failure in the 2975. Probable source of failure: Multifunction I/O PCB Assy or Receiver Assy. Return the 2975 to Aeroflex for repair.

8. Perform one of the following:

   - If this procedure is performed as a stand-alone procedure, perform the following key sequences to reset Factory Default Settings, then remove power from the Unit and disconnect the test equipment.

     Press **MODE** Key, **7** Key, **1** Key to display the Configuration Screen.

     Press **10 MHz REFERENCE** to select Internal reference.

     Press **FACTORY DEFAULT** (F2) to restore the Unit to Factory Defaults.

   - If this procedure is performed as part of a complete Verification, proceed with the next Verification Procedure.

2-4-20 ANALYZER FREQUENCY AND SPAN ACCURACY

PREREQUISITES: 2-4-1 Initial Setup

EQUIPMENT REQUIRED: RF Generator

STEP PROCEDURE

1. Recall Verification Setup File #19.
2. Connect the RF Generator to the ANT Connector.
3. Set the RF Generator to 1.5 GHz at -20.0 dBm.
4. Measure the 20 dB bandwidth of the displayed signal; calculate the center frequency and record the peak frequency of the displayed signal.
5. Subtract 1.5 GHz from the peak frequency in Step 4 and verify the peak frequency is 0 kHz (±2.5 kHz).

   - If reading is correct, go to Step 6.
   - If reading is out of tolerance, this indicates a hardware failure in the 2975. Probable source of failure: IF/Video PCB Assy or Receiver Assy. Return the 2975 to Aeroflex for repair.

6. Adjust the RF Generator frequency until the -30 dBm point on the left side of the signal response rests on the 1st major division from the left of the display.
7. Increase the RF Generator frequency 80 kHz and verify the -30 dBm point is within 1/2 minor division of the 9th major division from the left of the display.

   - If reading is correct, go to Step 8.
   - If reading is out of tolerance, this indicates a hardware failure in the 2975. Probable source of failure: IF/Video PCB Assy or Receiver Assy. Return the 2975 to Aeroflex for repair.

8. Perform one of the following:

   - If this procedure is performed as a stand-alone procedure, perform the following key sequences to reset Factory Default Settings, then remove power from the Unit and disconnect the test equipment.

     Press **MODE** Key, **7** Key, **1** Key to display the Configuration Screen.

     Press **10 MHz REFERENCE** to select Internal reference.

     Press **FACTORY DEFAULT** (F2) to restore the Unit to Factory Defaults.

   - If this procedure is performed as part of a complete Verification, proceed with the next Verification Procedure.

2-4-21 ANALYZER BANDWIDTH SWITCHING ERROR

PREREQUISITES: 2-4-1 Initial Setup

EQUIPMENT REQUIRED: RF Generator

STEP PROCEDURE

1. Recall Verification Setup File #20.
2. Press **NORMAL** (F5) on the 2975 Spectrum Analyzer to normalize the 2975 Spectrum Analyzer. (This may take a few minutes.)
3. Connect the RF Generator to the ANT Connector.
4. Set the RF Generator to 500 MHz at -30.0 dBm.
5. Set the AUTO/MAN Field to MAN (to switch the 2975 Spectrum Analyzer to Manual Mode.
6. Using the following settings, record the peak level of the trace data for each RBW Filter and verify the absolute difference between the maximum and minimum levels is ≤2 dB:

SPAN	RBW	VBW
5 kHz	300 Hz	100 Hz
50 kHz	3 kHz	100 Hz
500 kHz	30 kHz	3 kHz
1 MHz	60 kHz	3 kHz
5 MHz	300 kHz	3 kHz
20 MHz	6 MHz	3 kHz

- If all readings are correct, go to Step 7.
- If reading is out of tolerance, this indicates a hardware failure in the 2975. Probable source of failure: IF/Video PCB Assy or Receiver Assy. Return the 2975 to Aeroflex for repair.

7. Perform one of the following:

- If this procedure is performed as a stand-alone procedure, perform the following key sequences to reset Factory Default Settings, then remove power from the Unit and disconnect the test equipment.

  Press **MODE** Key, **7** Key, **1** Key to display the Configuration Screen.

  Press **10 MHz REFERENCE** to select Internal reference.

  Press **FACTORY DEFAULT** (F2) to restore the Unit to Factory Defaults.

- If this procedure is performed as part of a complete Verification, proceed with the next Verification Procedure.

2-4-22 OSCILLOSCOPE AMPLITUDE ACCURACY

PREREQUISITES: 2-4-1 Initial Setup

EQUIPMENT REQUIRED: Arbitrary Waveform Generator

STEP PROCEDURE

1. Recall Verification Setup File #21.
2. Connect the Arbitrary Waveform Generator to the SCOPE CH1 Connector.
3. Set the Arbitrary Waveform Generator frequency to 1 kHz Sinewave.
4. Using the following settings, verify the peak to peak level on the 2975 Oscilloscope is between 7 to 9 major divisions. Select VPOS (Vertical Position) and use the Spinner to position the no-signal trace on the center graticule.

ARBITRARY WAVEFORM GENERATOR LEVEL	2975 OSCILLOSCOPE VOLTS/DIV
160 mVp-p	0.02 V/Div
400 mVp-p	0.05 V/Div
800 mVp-p	0.1 V/Div
1.6 Vp-p	0.2 V/Div
4 Vp-p	0.5 V/Div
8 Vp-p	1.0 V/Div
16 Vp-p	2.0 V/Div

- If all readings are correct, go to Step 5.
- If reading is out of tolerance, this indicates a hardware failure in the 2975. Probable source of failure: Multifunction I/O PCB Assy. Return the 2975 to Aeroflex for repair.

5. Disconnect the Arbitrary Waveform Generator from the SCOPE CH1 Connector. Connect the Arbitrary Waveform Generator to the SCOPE CH2 Connector.
6. Set the SOURCE Field on the 2975 Oscilloscope to CH2.

7. Using the following settings, verify the peak to peak level on the 2975 Oscilloscope is between 7 to 9 major divisions. Select VPOS (Vertical Position) and use the Spinner to position the no-signal trace on the center graticule.

FUNCTION GENERATOR LEVEL	2975 OSCILLOSCOPE VOLTS/DIV
160 mVp-p	0.02 V/Div
400 mVp-p	0.05 V/Div
800 mVp-p	0.1 V/Div
1.6 Vp-p	0.2 V/Div
4 Vp-p	0.5 V/Div
8 Vp-p	1.0 V/Div
16 Vp-p	2.0 V/Div

- If all readings are correct, go to Step 8.
- If reading is out of tolerance, this indicates a hardware failure in the 2975. Probable source of failure: Multifunction I/O PCB Assy. Return the 2975 to Aeroflex for repair.

8. Perform one of the following:

- If this procedure is performed as a stand-alone procedure, perform the following key sequences to reset Factory Default Settings, then remove power from the Unit and disconnect the test equipment.

  Press **MODE** Key, **7** Key, **1** Key to display the Configuration Screen.

  Press **10 MHz REFERENCE** to select Internal reference.

  Press **FACTORY DEFAULT** (F2) to restore the Unit to Factory Defaults.

- If this procedure is performed as part of a complete Verification, proceed with the next Verification Procedure.

2-4-23 DIGITAL VOLTMETER DC ACCURACY

PREREQUISITES: 2-4-1 Initial Setup

EQUIPMENT REQUIRED: Voltage Calibrator

STEP	PROCEDURE

1. Recall Verification Setup File #22.
2. Connect the Voltage Calibrator to the DVM Connector.
3. Set the Voltage Calibrator to 200 mV.
4. Verify 200 mV (±10 mV) on the 2975 Digital Voltmeter.
   - If reading is correct, go to Step 5.
   - If reading is out of tolerance, this indicates a hardware failure in the 2975. Probable source of failure: Multifunction I/O PCB Assy. Return the 2975 to Aeroflex for repair.
5. Perform one of the following:
   - If this procedure is performed as a stand-alone procedure, perform the following key sequences to reset Factory Default Settings, then remove power from the Unit and disconnect the test equipment.

     Press **MODE** Key, **7** Key, **1** Key to display the Configuration Screen.

     Press **10 MHz REFERENCE** to select Internal reference.

     Press **FACTORY DEFAULT** (F2) to restore the Unit to Factory Defaults.
   - If this procedure is performed as part of a complete Verification, proceed with the next Verification Procedure.

2-4-24 DIGITAL VOLTMETER AC ACCURACY

PREREQUISITES: 2-4-1 Initial Setup

EQUIPMENT REQUIRED: Voltage Calibrator

STEP PROCEDURE

1. Recall Verification Setup File #23.
2. Connect the Voltage Calibrator to the DVM Connector.
3. Set the Voltage Calibrator to 200 mV.
4. Set the Voltage Calibrator to the following levels and verify 200 mV (±30 mV) on the 2975 Digital Voltmeter.

   50 Hz
   100 Hz
   1 kHz
   10 kHz
   20 kHz

   - If all readings are correct, go to Step 5.
   - If reading is out of tolerance, this indicates a hardware failure in the 2975. Probable source of failure: Multifunction I/O PCB Assy. Return the 2975 to Aeroflex for repair.

5. Perform one of the following:

   - If this procedure is performed as a stand-alone procedure, perform the following key sequences to reset Factory Default Settings, then remove power from the Unit and disconnect the test equipment.

     Press **MODE** Key, **7** Key, **1** Key to display the Configuration Screen.

     Press **10 MHz REFERENCE** to select Internal reference.

     Press **FACTORY DEFAULT** (F2) to restore the Unit to Factory Defaults.

   - If this procedure is performed as part of a complete Verification, proceed with the next Verification Procedure.

2-4-25 FUNCTION GENERATOR LEVEL ACCURACY

PREREQUISITES: 2-4-1 Initial Setup

EQUIPMENT REQUIRED: Microphone Adapter
Digital Multimeter
10 kΩ Load

STEP PROCEDURE

1. Recall Verification Setup File #24.
2. Connect the Microphone Adapter to the MIC Connector and AUDIO I/O Connector.
3. Connect the Digital Multimeter, through a 10 kΩ Load, to the Microphone Adapter AUDIO OUT 1 Connector.
4. Set the Digital Multimeter to measure AC Volts.
5. Verify the level is 7.070 Vrms (±350 mVrms) on the Digital Multimeter.
   - If reading is correct, go to Step 6.
   - If reading is out of tolerance, this indicates a hardware failure in the 2975. Probable source of failure: Front Panel Audio PCB Assy. Return the 2975 to Aeroflex for repair.
6. Perform one of the following:
   - If this procedure is performed as a stand-alone procedure, perform the following key sequences to reset Factory Default Settings, then remove power from the Unit and disconnect the test equipment.

     Press **MODE** Key, **7** Key, **1** Key to display the Configuration Screen.

     Press **10 MHz REFERENCE** to select Internal reference.

     Press **FACTORY DEFAULT** (F2) to restore the Unit to Factory Defaults.
   - If this procedure is performed as part of a complete Verification, proceed with the next Verification Procedure.

2-4-26 FUNCTION GENERATOR FREQUENCY ACCURACY

PREREQUISITES: 2-4-1 Initial Setup

EQUIPMENT REQUIRED: Microphone Adapter
Universal Counter
10 kΩ Load

STEP PROCEDURE

1. Recall Verification Setup File #25.
2. Connect the Microphone Adapter to the MIC Connector and AUDIO I/O Connector.
3. Connect the Universal Counter, through a 10 kΩ Load, to the Microphone Adapter AUDIO OUT 1 Connector.
4. Verify the frequency is 5000 Hz (±1 Hz) on the Universal Counter.
   - If reading is correct, go to Step 5.
   - If reading is out of tolerance, this indicates a hardware failure in the 2975. Probable source of failure: Front Panel Audio PCB Assy. Return the 2975 to Aeroflex for repair.
5. Perform one of the following:
   - If this procedure is performed as a stand-alone procedure, perform the following key sequences to reset Factory Default Settings, then remove power from the Unit and disconnect the test equipment.

     Press **MODE** Key, **7** Key, **1** Key to display the Configuration Screen.

     Press **10 MHz REFERENCE** to select Internal reference.

     Press **FACTORY DEFAULT** (F2) to restore the Unit to Factory Defaults.
   - If this procedure is performed as part of a complete Verification, proceed with the next Verification Procedure.

2-4-27 FUNCTION GENERATOR TOTAL HARMONIC DISTORTION

PREREQUISITES: 2-4-1 Initial Setup

EQUIPMENT REQUIRED: Microphone Adapter
Audio Analyzer
10 kΩ Load

STEP	PROCEDURE

1. Recall Verification Setup File #26.
2. Connect the Microphone Adapter to the MIC Connector and AUDIO I/O Connector.
3. Connect the Audio Analyzer Audio Input, through a 10 kΩ Load, to the Microphone Adapter AUDIO OUT 1 Connector.
4. Verify the total harmonic output is <0.5%.
   - If reading is correct, go to Step 5.
   - If reading is out of tolerance, this indicates a hardware failure in the 2975. Probable source of failure: Front Panel Audio PCB Assy. Return the 2975 to Aeroflex for repair.
5. Perform one of the following:
   - If this procedure is performed as a stand-alone procedure, perform the following key sequences to reset Factory Default Settings, then remove power from the Unit and disconnect the test equipment.

     Press **MODE** Key, **7** Key, **1** Key to display the Configuration Screen.

     Press **10 MHz REFERENCE** to select Internal reference.

     Press **FACTORY DEFAULT** (F2) to restore the Unit to Factory Defaults.
   - If this procedure is performed as part of a complete Verification, proceed with the next Verification Procedure.

2-4-28 AF COUNTER ACCURACY

PREREQUISITES: 2-4-1 Initial Setup

EQUIPMENT REQUIRED: Microphone Adapter
Arbitrary Waveform Generator

STEP	PROCEDURE

1. Recall Verification Setup File #27.
2. Connect the Microphone Adapter to the MIC Connector and AUDIO I/O Connector.
3. Connect the Arbitrary Waveform Generator to the Microphone Adapter AUDIO IN Connector.
4. Set the Arbitrary Waveform Generator to 5 Vp-p at 5000 Hz.
5. Verify the frequency is 5000 Hz (±1 Hz) on the 2975 AF Counter.
   - If reading is correct, go to Step 6.
   - If reading is out of tolerance, this indicates a hardware failure in the 2975. Probable source of failure: Front Panel Audio PCB Assy. Return the 2975 to Aeroflex for repair.
6. Perform one of the following:
   - If this procedure is performed as a stand-alone procedure, perform the following key sequences to reset Factory Default Settings, then remove power from the Unit and disconnect the test equipment.

     Press **MODE** Key, **7** Key, **1** Key to display the Configuration Screen.

     Press **10 MHz REFERENCE** to select Internal reference.

     Press **FACTORY DEFAULT** (F2) to restore the Unit to Factory Defaults.
   - If this procedure is performed as part of a complete Verification, proceed with the next Verification Procedure.

2-4-29 SINAD/DISTORTION METER ACCURACY

PREREQUISITES: 2-4-1 Initial Setup

EQUIPMENT REQUIRED: Microphone Adapter
Arbitrary Waveform Generator

NOTE: If an Arbitrary Waveform Generator is used other than the model specified In Appendix B, an residual measurement needs to be accomplished prior to verifying the Distortion level in Step 7.

STEP	PROCEDURE

1. Recall Verification Setup File #28.
2. Connect the Microphone Adapter to the MIC Connector and AUDIO I/O Connector.
3. Connect the Arbitrary Waveform Generator to the Microphone Adapter AUDIO IN Connector.
4. Set the Arbitrary Waveform Generator for a 1 kHz sinewave carrier at 10.0 Vp-p. Set the AM Modulation on the Arbitrary Waveform Generator to 37% at a 1500.0 Hz rate.
5. Verify the level is 12 dB (±1.1 dB) on the 2975 SINAD Meter.
   - If reading is correct, go to Step 6.
   - If reading is out of tolerance, this indicates a hardware failure in the 2975. Probable source of failure: Front Panel Audio PCB Assy. Return the 2975 to Aeroflex for repair.
6. Switch OFF the AM Modulation on the Arbitrary Waveform Generator and record the Residual Distortion on the 2975 Distortion Meter.
7. Set the AM Modulation on the Arbitrary Waveform Generator to 7% at a 1500.0 Hz rate.
8. Subtract the Residual Distortion reading in Step 6 from the level on the Arbitrary Waveform Generator and verify the level is 5% (±0.09%) on the 2975 Distortion Meter.
   - If reading is correct, go to Step 9.
   - If reading is out of tolerance, this indicates a hardware failure in the 2975. Probable source of failure: Front Panel Audio PCB Assy. Return the 2975 to Aeroflex for repair.
9. If this procedure is performed as a stand-alone procedure or as part of a complete Verification, perform the following key sequence to reset Factory Default Settings, then remove power from the Unit and disconnect the test equipment.

   Press **MODE** Key, **7** Key, **1** Key to display the Configuration Screen.

   Press **10 MHz REFERENCE** to select Internal reference.

   Press **FACTORY DEFAULT** (F2) to restore the Unit to Factory Defaults.

2-5 VERIFICATION DATA SHEET

TECHNICIAN: _____ DATE: _____

2975 S/N: _____

STEP	DATA	RESULT
GENERATOR OUTPUT FREQUENCY (2-4-2)		
4.	1 GHz (±10 Hz)	_____
GENERATOR OUTPUT POWER (2-4-3)		
4.	+10 dBm +10 dBm (±1.5 dB)	_____
	0 dBm 0 dBm (±1.5 dB)	_____
	-10 dBm -10 dBm (±1.5 dB)	_____
	-20 dBm -20 dBm (±1.5 dB)	_____
	-30 dBm -30 dBm (±1.5 dB)	_____
	-40 dBm -40 dBm (±1.5 dB)	_____
	-50 dBm -50 dBm (±1.5 dB)	_____
	-60 dBm -60 dBm (±1.5 dB)	_____
GENERATOR LEVEL FLATNESS (2-4-4)		
3.	170 MHz 0 dBm (±1 dB)	_____
	220 MHz 0 dBm (±1 dB)	_____
	270 MHz 0 dBm (±1 dB)	_____
	320 MHz 0 dBm (±1 dB)	_____
	370 MHz 0 dBm (±1 dB)	_____
	420 MHz 0 dBm (±1 dB)	_____
	470 MHz 0 dBm (±1 dB)	_____
	520 MHz 0 dBm (±1 dB)	_____
	570 MHz 0 dBm (±1 dB)	_____
	620 MHz 0 dBm (±1 dB)	_____
	670 MHz 0 dBm (±1 dB)	_____
	720 MHz 0 dBm (±1 dB)	_____
	770 MHz 0 dBm (±1 dB)	_____
	820 MHz 0 dBm (±1 dB)	_____
	870 MHz 0 dBm (±1 dB)	_____
	920 MHz 0 dBm (±1 dB)	_____
	970 MHz 0 dBm (±1 dB)	_____
	1020 MHz 0 dBm (±1 dB)	_____
	1070 MHz 0 dBm (±1 dB)	_____
	1120 MHz 0 dBm (±1 dB)	_____
	1170 MHz 0 dBm (±1 dB)	_____
	1220 MHz 0 dBm (±1 dB)	_____
	1270 MHz 0 dBm (±1 dB)	_____
	1320 MHz 0 dBm (±1 dB)	_____
	1370 MHz 0 dBm (±1 dB)	_____
	1420 MHz 0 dBm (±1 dB)	_____

STEP	DATA	RESULT

GENERATOR LEVEL FLATNESS (2-4-4) (cont)

3.	1470 MHz	0 dBm (±1 dB)	_____
	1520 MHz	0 dBm (±1 dB)	_____
	1570 MHz	0 dBm (±1 dB)	_____
	1620 MHz	0 dBm (±1 dB)	_____
	1670 MHz	0 dBm (±1 dB)	_____
	1720 MHz	0 dBm (±1 dB)	_____
	1770 MHz	0 dBm (±1 dB)	_____
	1820 MHz	0 dBm (±1 dB)	_____
	1870 MHz	0 dBm (±1 dB)	_____
	1920 MHz	0 dBm (±1 dB)	_____
	1970 MHz	0 dBm (±1 dB)	_____
	2020 MHz	0 dBm (±1 dB)	_____
	2070 MHz	0 dBm (±1 dB)	_____
	2120 MHz	0 dBm (±1 dB)	_____
	2170 MHz	0 dBm (±1 dB)	_____
	2220 MHz	0 dBm (±1 dB)	_____
	2270 MHz	0 dBm (±1 dB)	_____
	2320 MHz	0 dBm (±1 dB)	_____
	2370 MHz	0 dBm (±1 dB)	_____
	2420 MHz	0 dBm (±1 dB)	_____
	2470 MHz	0 dBm (±1 dB)	_____
	2520 MHz	0 dBm (±1 dB)	_____
	2570 MHz	0 dBm (±1 dB)	_____
	2620 MHz	0 dBm (±1 dB)	_____
	2670 MHz	0 dBm (±1 dB)	_____
	2700 MHz	0 dBm (±1 dB)	_____

GENERATOR T/R POWER LEVEL ACCURACY (2-4-5)

3.	-30 dBm	-30 dBm (±1 dB)	_____
	-40 dBm	-40 dBm (±1 dB)	_____
	-50 dBm	-50 dBm (±1 dB)	_____
	-60 dBm	-60 dBm (±1 dB)	_____

GENERATOR T/R POWER LEVEL FLATNESS (2-4-6)

3.	50 MHz	-30 dBm (±1 dB)	_____
	100 MHz	-30 dBm (±1 dB)	_____
	150 MHz	-30 dBm (±1 dB)	_____
	200 MHz	-30 dBm (±1 dB)	_____
	250 MHz	-30 dBm (±1 dB)	_____
	300 MHz	-30 dBm (±1 dB)	_____
	350 MHz	-30 dBm (±1 dB)	_____
	400 MHz	-30 dBm (±1 dB)	_____
	450 MHz	-30 dBm (±1 dB)	_____
	500 MHz	-30 dBm (±1 dB)	_____
	550 MHz	-30 dBm (±1 dB)	_____
	600 MHz	-30 dBm (±1 dB)	_____
	650 MHz	-30 dBm (±1 dB)	_____
	700 MHz	-30 dBm (±1 dB)	_____
	750 MHz	-30 dBm (±1 dB)	_____
	800 MHz	-30 dBm (±1 dB)	_____

STEP	DATA	RESULT

GENERATOR T/R POWER LEVEL FLATNESS (2-4-6) (cont)

3.	850 MHz	-30 dBm (±1 dB)	_____
	900 MHz	-30 dBm (±1 dB)	_____
	950 MHz	-30 dBm (±1 dB)	_____
	1000 MHz	-30 dBm (±1 dB)	_____
	1050 MHz	-30 dBm (±1 dB)	_____
	1100 MHz	-30 dBm (±1 dB)	_____
	1150 MHz	-30 dBm (±1 dB)	_____
	1200 MHz	-30 dBm (±1 dB)	_____
	1250 MHz	-30 dBm (±1 dB)	_____
	1300 MHz	-30 dBm (±1 dB)	_____
	1350 MHz	-30 dBm (±1 dB)	_____
	1400 MHz	-30 dBm (±1 dB)	_____
	1450 MHz	-30 dBm (±1 dB)	_____
	1500 MHz	-30 dBm (±1 dB)	_____
	1550 MHz	-30 dBm (±1 dB)	_____
	1600 MHz	-30 dBm (±1 dB)	_____
	1650 MHz	-30 dBm (±1 dB)	_____
	1700 MHz	-30 dBm (±1 dB)	_____
	1750 MHz	-30 dBm (±1 dB)	_____
	1800 MHz	-30 dBm (±1 dB)	_____
	1850 MHz	-30 dBm (±1 dB)	_____
	1900 MHz	-30 dBm (±1 dB)	_____
	1950 MHz	-30 dBm (±1 dB)	_____
	2000 MHz	-30 dBm (±1 dB)	_____
	2050 MHz	-30 dBm (±1 dB)	_____
	2100 MHz	-30 dBm (±1 dB)	_____
	2150 MHz	-30 dBm (±1 dB)	_____
	2200 MHz	-30 dBm (±1 dB)	_____
	2250 MHz	-30 dBm (±1 dB)	_____
	2300 MHz	-30 dBm (±1 dB)	_____
	2350 MHz	-30 dBm (±1 dB)	_____
	2400 MHz	-30 dBm (±1 dB)	_____
	2450 MHz	-30 dBm (±1 dB)	_____
	2500 MHz	-30 dBm (±1 dB)	_____
	2550 MHz	-30 dBm (±1 dB)	_____
	2600 MHz	-30 dBm (±1 dB)	_____
	2650 MHz	-30 dBm (±1 dB)	_____
	2700 MHz	-30 dBm (±1 dB)	_____

RF POWER METER ACCURACY (2-4-7)

5.	10.5 dBm (±1.05 dB)		_____

RSSI METER ACCURACY (2-4-8)

4.	-70 dBm	-70.0 dBm (±2.5 dB)	_____
	-60 dBm	-60.0 dBm (±2.5 dB)	_____
	-50 dBm	-50.0 dBm (±2.5 dB)	_____
	-40 dBm	-40.0 dBm (±2.5 dB)	_____
	-30 dBm	-30.0 dBm (±2.5 dB)	_____
	-20 dBm	-20.0 dBm (±2.5 dB)	_____

STEP	DATA	RESULT

ANALYZER LEVEL ACCURACY (2-4-9)

5.	1 MHz	-30.0 dBm (±2 dB)	_____
	50 MHz	-30.0 dBm (±2 dB)	_____
	100 MHz	-30.0 dBm (±2 dB)	_____
	150 MHz	-30.0 dBm (±2 dB)	_____
	200 MHz	-30.0 dBm (±2 dB)	_____
	250 MHz	-30.0 dBm (±2 dB)	_____
	300 MHz	-30.0 dBm (±2 dB)	_____
	350 MHz	-30.0 dBm (±2 dB)	_____
	400 MHz	-30.0 dBm (±2 dB)	_____
	450 MHz	-30.0 dBm (±2 dB)	_____
	500 MHz	-30.0 dBm (±2 dB)	_____
	550 MHz	-30.0 dBm (±2 dB)	_____
	600 MHz	-30.0 dBm (±2 dB)	_____
	650 MHz	-30.0 dBm (±2 dB)	_____
	700 MHz	-30.0 dBm (±2 dB)	_____
	750 MHz	-30.0 dBm (±2 dB)	_____
	800 MHz	-30.0 dBm (±2 dB)	_____
	850 MHz	-30.0 dBm (±2 dB)	_____
	900 MHz	-30.0 dBm (±2 dB)	_____
	950 MHz	-30.0 dBm (±2 dB)	_____
	1000 MHz	-30.0 dBm (±2 dB)	_____
	1050 MHz	-30.0 dBm (±2 dB)	_____
	1100 MHz	-30.0 dBm (±2 dB)	_____
	1150 MHz	-30.0 dBm (±2 dB)	_____
	1200 MHz	-30.0 dBm (±2 dB)	_____
	1250 MHz	-30.0 dBm (±2 dB)	_____
	1300 MHz	-30.0 dBm (±2 dB)	_____
	1350 MHz	-30.0 dBm (±2 dB)	_____
	1400 MHz	-30.0 dBm (±2 dB)	_____
	1450 MHz	-30.0 dBm (±2 dB)	_____
	1500 MHz	-30.0 dBm (±2 dB)	_____
	1550 MHz	-30.0 dBm (±2 dB)	_____
	1600 MHz	-30.0 dBm (±2 dB)	_____
	1650 MHz	-30.0 dBm (±2 dB)	_____
	1700 MHz	-30.0 dBm (±2 dB)	_____
	1750 MHz	-30.0 dBm (±2 dB)	_____
	1800 MHz	-30.0 dBm (±2 dB)	_____
	1850 MHz	-30.0 dBm (±2 dB)	_____
	1900 MHz	-30.0 dBm (±2 dB)	_____
	1950 MHz	-30.0 dBm (±2 dB)	_____
	2000 MHz	-30.0 dBm (±2 dB)	_____
	2050 MHz	-30.0 dBm (±2 dB)	_____
	2100 MHz	-30.0 dBm (±2 dB)	_____
	2150 MHz	-30.0 dBm (±2 dB)	_____
	2200 MHz	-30.0 dBm (±2 dB)	_____
	2250 MHz	-30.0 dBm (±2 dB)	_____
	2300 MHz	-30.0 dBm (±2 dB)	_____
	2350 MHz	-30.0 dBm (±2 dB)	_____
	2400 MHz	-30.0 dBm (±2 dB)	_____
	2450 MHz	-30.0 dBm (±2 dB)	_____

STEP	DATA	RESULT
ANALYZER LEVEL ACCURACY (2-4-9) (cont)		
5.	2500 MHz -30.0 dBm (±2 dB)	_____
	2550 MHz -30.0 dBm (±2 dB)	_____
	2600 MHz -30.0 dBm (±2 dB)	_____
	2650 MHz -30.0 dBm (±2 dB)	_____
	2700 MHz -30.0 dBm (±2 dB)	_____
GENERATOR FM RESIDUAL (2-4-10)		
4.	<15 Hz rms	_____
GENERATOR AM RESIDUAL (2-4-11)		
4.	<0.1%	_____
GENERATOR FM DEVIATION ACCURACY (2-4-12)		
4.	Record FM deviation	_____
5.	Subtract reading in para 2-4-10 from reading in Step 4	_____
	FM deviation is 10 kHz (±0.31 kHz)	_____
GENERATOR FM MODULATION RATE (2-4-13)		
4.	50.0 Hz 6 kHz (±0.18 kHz)	_____
	300.0 Hz 6 kHz (±0.18 kHz)	_____
	10000.0 Hz 6 kHz (±0.18 kHz)	_____
GENERATOR FM MODULATION DISTORTION (2-4-14)		
5.	Modulation Distortion is <1%	_____
GENERATOR AM MODULATION ACCURACY (2-4-15)		
4.	Record AM Modulation	_____
5.	Subtract reading in para 2-4-11 from reading in Step 4	_____
	AM Modulation is 30% (±5%)	_____
RF ERROR METER ACCURACY (2-4-16)		
3.	1000.01 MHz +10000 Hz (±1 Hz)	_____
	999.99 MHz -10000 Hz (±1 Hz)	_____
AF METER ACCURACY (2-4-17)		
5.	1000 Hz (±1 Hz)	_____
FM DEVIATION METER ACCURACY (2-4-18)		
4.	Record deviation level	_____
6.	Record deviation level	_____
7.	Subtract Step 4 from Step 6	_____
	Deviation level is 10 kHz (±0.52 kHz)	_____

STEP	DATA	RESULT

AM MODULATION METER ACCURACY (2-4-19)

4. Record modulation level _____

6. Record modulation level _____

7. Subtract Step 4 from Step 6 _____

Modulation level is 50% (±5%) _____

ANALYZER FREQUENCY AND SPAN ACCURACY (2-4-20)

4. Measure 20 dB bandwidth of displayed signal _____

Calculate center frequency _____

Record peak frequency of displayed signal _____

5. Subtract 1.5 GHz from peak frequency in Step 4 _____

Peak frequency is 0 kHz (±2.5 kHz) _____

7. -30 dBm point is within 1/2 minor division of 9th major division from left _____

ANALYZER BANDWIDTH SWITCHING ERROR (2-4-21)

6.

SPAN	RBW	VBW	TOLERANCE	
5 kHz	300 Hz	100 Hz	≤2 dB	_____
50 kHz	3 kHz	100 Hz	≤2 dB	_____
500 kHz	30 kHz	3 kHz	≤2 dB	_____
1 MHz	60 kHz	3 kHz	≤2 dB	_____
5 MHz	300 kHz	3 kHz	≤2 dB	_____
20 MHz	6 MHz	3 kHz	≤2 dB	_____

OSCILLOSCOPE AMPLITUDE ACCURACY (2-4-22)

4.

GEN LEVEL	2975 OSC	TOLERANCE	
160 mVp-p	0.02 V/Div	7 to 9 major divisions	_____
400 mVp-p	0.05 V/Div	7 to 9 major divisions	_____
800 mVp-p	0.1 V/Div	7 to 9 major divisions	_____
1.6 Vp-p	0.2 V/Div	7 to 9 major divisions	_____
4 Vp-p	0.5 V/Div	7 to 9 major divisions	_____
8 Vp-p	1.0 V/Div	7 to 9 major divisions	_____
16 Vp-p	2.0 V/Div	7 to 9 major divisions	_____

7.

GEN LEVEL	2975 OSC	TOLERANCE	
160 mVp-p	0.02 V/Div	7 to 9 major divisions	_____
400 mVp-p	0.05 V/Div	7 to 9 major divisions	_____
800 mVp-p	0.1 V/Div	7 to 9 major divisions	_____
1.6 Vp-p	0.2 V/Div	7 to 9 major divisions	_____
4 Vp-p	0.5 V/Div	7 to 9 major divisions	_____
8 Vp-p	1.0 V/Div	7 to 9 major divisions	_____
16 Vp-p	2.0 V/Div	7 to 9 major divisions	_____

DIGITAL VOLTMETER DC ACCURACY (2-4-23)

4. 200 mV (±10 mV) _____

STEP	DATA	RESULT
DIGITAL VOLTMETER AC ACCURACY (2-4-24)		
4. 50 Hz	200 mV (±30 mV)	_____
100 Hz	200 mV (±30 mV)	_____
1 kHz	200 mV (±30 mV)	_____
10 kHz	200 mV (±30 mV)	_____
20 kHz	200 mV (±30 mV)	_____
FUNCTION GENERATOR LEVEL ACCURACY (2-4-25)		
5. 7.070 Vrms (±350 mVrms)		_____
FUNCTION GENERATOR FREQUENCY ACCURACY (2-4-26)		
4. 5000 Hz (±1 Hz)		_____
FUNCTION GENERATOR TOTAL HARMONIC DISTORTION (2-4-27)		
4. Total harmonic output is <0.5%		_____
AF COUNTER ACCURACY (2-4-28)		
5. 5000 Hz (±1 Hz)		_____
SINAD/DISTORTION METER ACCURACY (2-4-29)		
5. 12 dB (±1.1 dB)		_____
6. Record Residual Distortion		_____
8. 5% (±0.09%)		_____

2-6 CALIBRATION PROCEDURES

2-6-1 POWER SUPPLY VOLTAGES

PREREQUISITES: None

EQUIPMENT REQUIRED: Digital Multimeter

STEP PROCEDURE

1. Remove Case Assy (para 3-3-1).

VERIFY RESISTANCE

2. Using the Digital Multimeter, verify resistance between the locations shown and chassis ground.

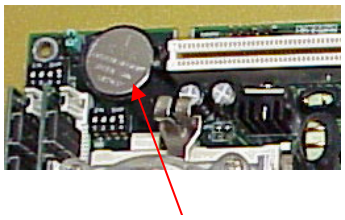
RESISTANCE	LOCATION
>100 Ω	42A1A1A1J19, Pin B2
>12 Ω	42A1A1A1J19, Pin B25
>12 Ω	42A1A1A1J19, Pin B28
>400 Ω	42A1A1A1J19, Pin B31
>2 kΩ	42A1A1A1J19, Pin C14

- If readings are correct, go to Step 3.
- If any of the resistance measurements are out of tolerance, return the 2975 to the factory for fault diagnosis and repair.

3. Remove CPU Adapter Assy (para 3-3-9).
4. Using the Digital Multimeter, verify the battery voltage on the back side of the CPU Adapter Assy is ≥2.8 Vdc.

- If reading is correct, reinstall CPU Adapter Assy (para 3-3-9) and go to Step 5.
- If reading is out of tolerance, replace the CPU Battery and go to Step 5.

(BACK SIDE)
(7005-4243-500)

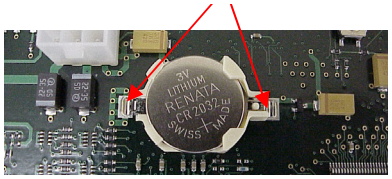


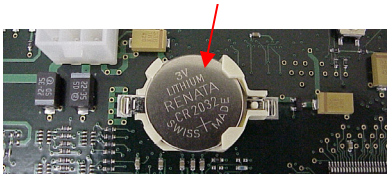
(TOP SIDE)
(7005-4243-500)

Measure Battery Voltage Here

CPU Battery

(TOP SIDE)
(7010-4238-800)





VERIFY VOLTAGES

5. Apply power to the 2975 from an appropriate power source.
6. Using the Digital Multimeter, verify the following voltages between the locations shown and chassis ground.

VOLTAGE	LOCATION
14.8 to 15.2 Vdc	42A1A1A1J19, Pin B2
4.9 to 5.3 Vdc	42A1A1A1J19, Pin B25
4.9 to 5.3 Vdc	42A1A1A1J19, Pin B28
14.8 to 15.2 Vdc	42A1A1A1J19, Pin B31
4.9 to 5.3 Vdc	42A1A1A1J19, Pin C14

- If readings are correct, go to Step 7.
- If any of the supply voltages are out of tolerance, return the 2975 to the factory for fault diagnosis and repair.

7. Allow a 15-minute warm-up period before proceeding with the Calibration Procedures.

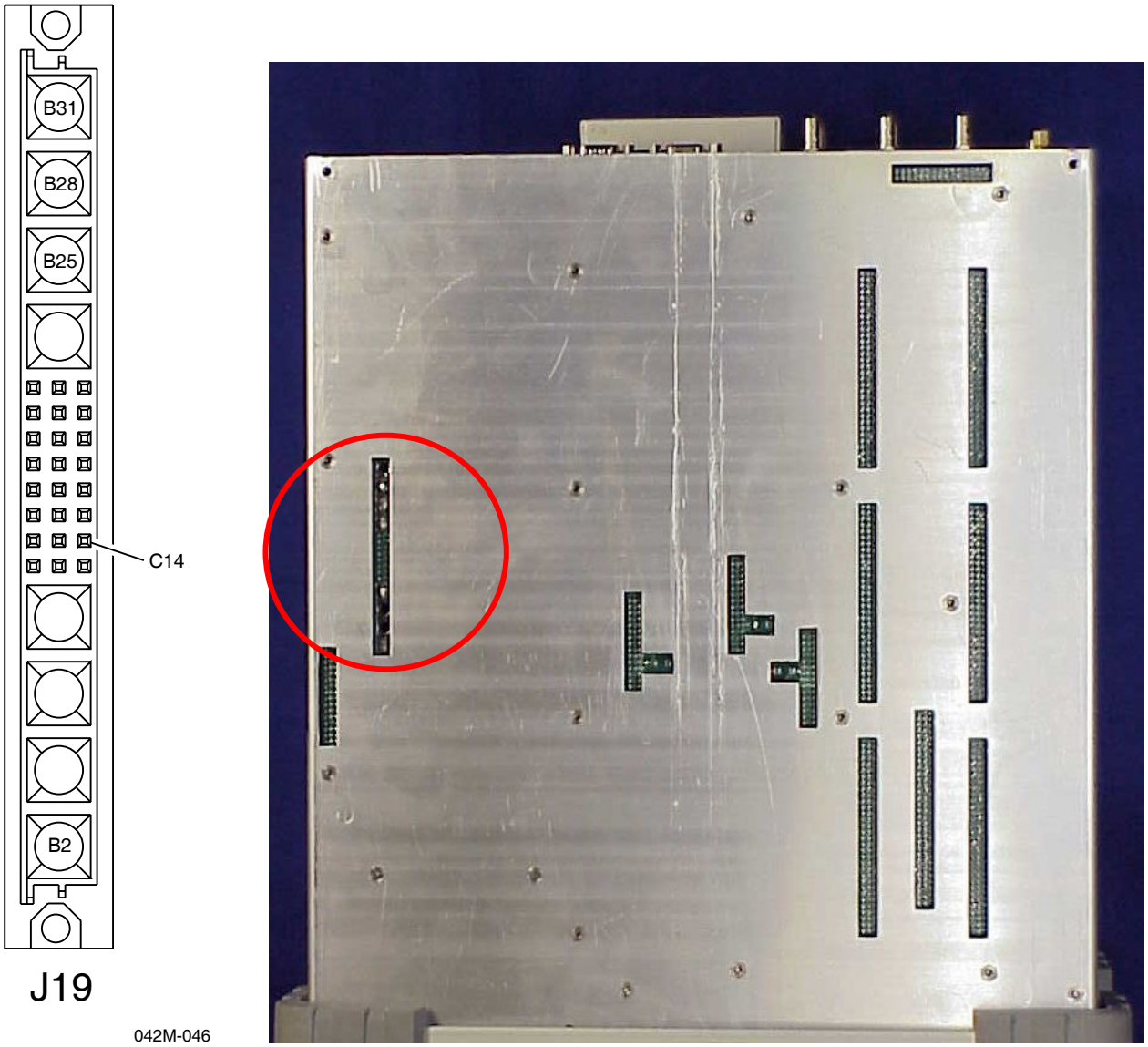


Figure 2-1 Power Supply Voltages

2-6-2 GENERATOR / ANALYZER / TCXO

PREREQUISITES: 2-6-1 Power Supply Voltages

EQUIPMENT REQUIRED:
PC w/ Ethernet Card and GPIB Card
Power Meter
Power Meter Sensor Head “A”
Power Meter Sensor Head “B”
Signal Generator
Universal Counter
Ethernet Crossover Cable
GPIB Cables

NOTE: The Case Assy should be reassembled prior to performing the Generator / Analyzer Calibration Procedure.

NOTE: Refer to Figures 2 through 5 for the Calibration Test Equipment Configuration Setups, including cable hookups and GPIB addresses.

STEP	PROCEDURE

ETHERNET CARD SETUP

1. With the PC operating in Windows 95, 98, 2000 or NT, right click on the Network icon and select **Properties**.
2. Select **TCP/IP** and **Specify An IP Address**.
3. Enter PC IP Address: **10, 200, 126, 77**
4. Enter PC Subnet Mask: **255, 255, 0, 0**
5. After the PC reboots, connect the Ethernet Crossover Cable to the 2975 and the PC Ethernet Card.
6. Power up the 2975.
7. Enter 2975 IP Address: **10, 200, 126, 76**
8. Enter 2975 Subnet Mask: **255, 255, 0, 0**

CALIBRATION SOFTWARE SETUP

9. Insert Calibration Software CD-ROM into PC.
10. Run “Setup” to install the Calibration Software onto the PC.

    NOTE: The drive designation can be changed to the desired drive letter by the user. DO NOT use “X” as the drive letter.

11. Follow the on-screen prompts through the installation process.

RUNNING THE CALIBRATION SOFTWARE

12. Select the **2975 Auto Calibration** icon.
13. Enter the following when prompted: Badge - **1112** Password - **1112**
14. With the Calibration Main Screen displayed, select **Test Menu**, **IFR-2975 (FITS)** and **Complete Calibration**.
15. Select **Run All Tests**.

16. Follow the on-screen prompts through the Calibration process.

    NOTE: When the “Connect To UUT” pop-up window is displayed, the IP Address entered must match the IP Address of the 2975.

    NOTE: The Calibration process can be halted at anytime by selecting **Pause/Abort** on the Calibration Main Screen.

17. When the Calibration is completed, the Calibration Results for the Generator and Analyzer Calibration process are stored in an electronic file on the PC, accessed by selecting **Report**.

2-7 CALIBRATION DATA SHEET

TECHNICIAN: _____ DATE: _____

2975 S/N: _____

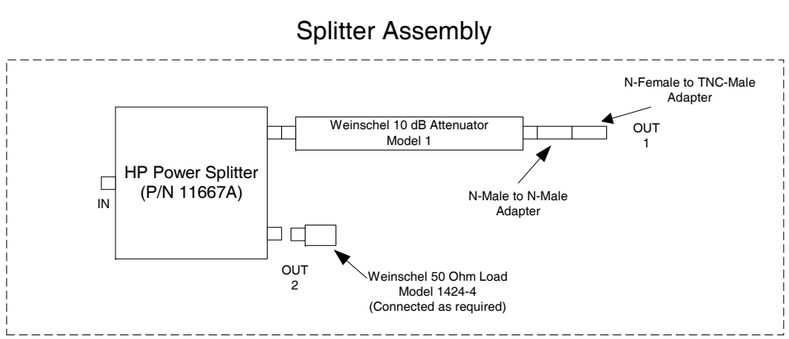
STEP	DATA	RESULT
POWER SUPPLY VOLTAGES (2-6-1)		
2.	>100 Ω at 42A1A1A1J19, Pin B2	_____(√)
	>12 Ω at 42A1A1A1J19, Pin B25	_____(√)
	>12 Ω at 42A1A1A1J19, Pin B28	_____(√)
	>400 Ω at 42A1A1A1J19, Pin B31	_____(√)
	>2 kΩ at 42A1A1A1J19, Pin C14	_____(√)
4.	Battery Voltage is ≥2.8 Vdc	_____
6.	14.8 to 15.2 Vdc at 42A1A1A1J19, Pin B2	_____(√)
	4.9 to 5.3 Vdc at 42A1A1A1J19, Pin B25	_____(√)
	4.9 to 5.3 Vdc at 42A1A1A1J19, Pin B28	_____(√)
	14.8 to 15.2 Vdc at 42A1A1A1J19, Pin B31	_____(√)
	4.9 to 5.3 Vdc at 42A1A1A1J19, Pin C14	_____(√)

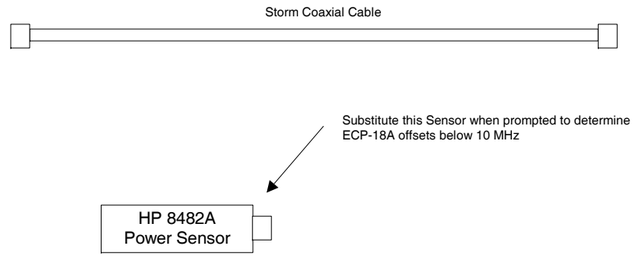
GENERATOR / ANALYZER / TCXO (2-6-2)

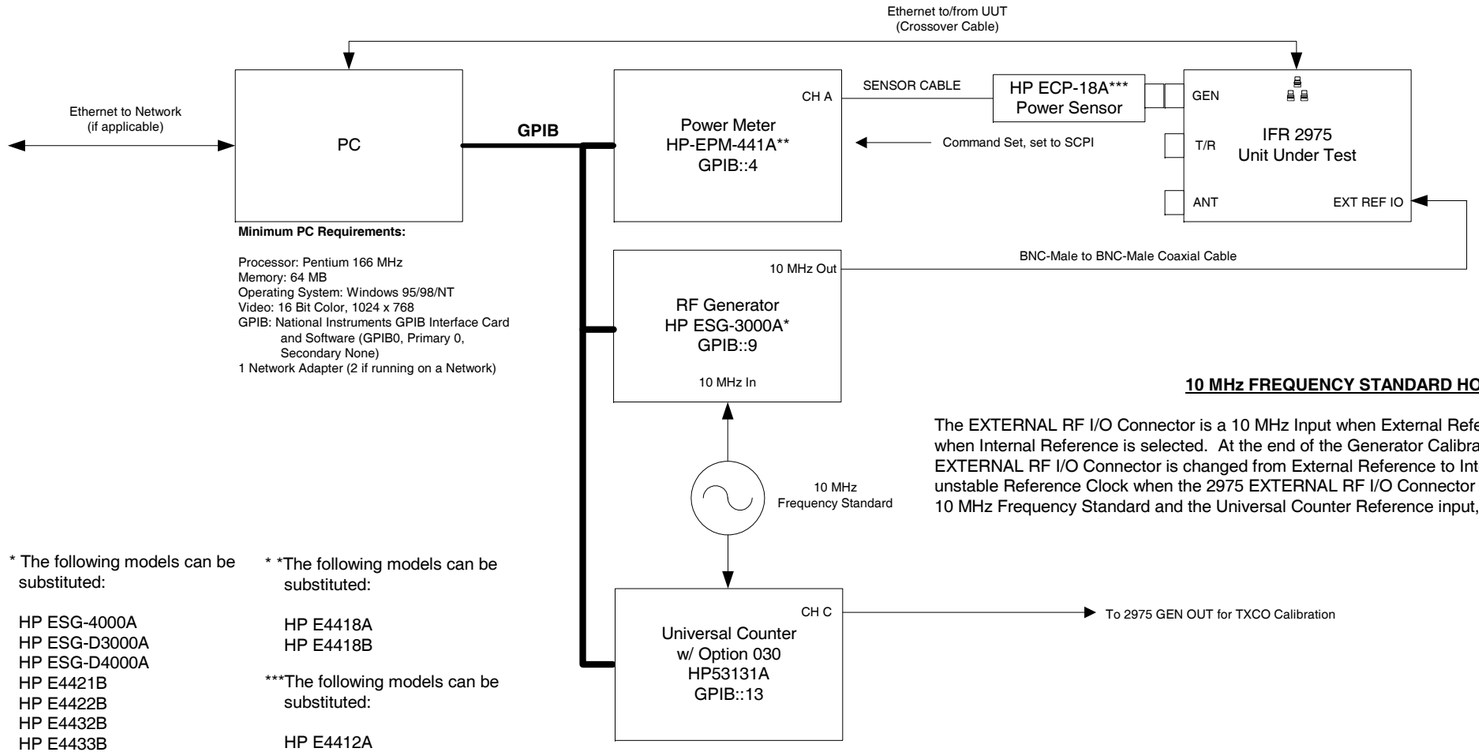
Calibration Results for the Generator / Analyzer / TCXO Calibration process are stored in an electronic file on the PC when the Calibration is completed.

EXAMPLE: C:\2975CALIBRATIONV1.8\TESTREPORT\442215.RPT

2975 Calibration Test Equipment Configuration







10 MHz FREQUENCY STANDARD HOOKUP

The EXTERNAL RF I/O Connector is a 10 MHz Input when External Reference is selected and a 10 MHz Output when Internal Reference is selected. At the end of the Generator Calibration, during the TXCO Calibration, the EXTERNAL RF I/O Connector is changed from External Reference to Internal Reference. This can cause an unstable Reference Clock when the 2975 EXTERNAL RF I/O Connector is connected with a T-Connector to the 10 MHz Frequency Standard and the Universal Counter Reference input, causing the TXCO Calibration to fail.

042M-047

* The following models can be substituted:

HP ESG-4000A
HP ESG-D3000A
HP ESG-D4000A
HP E4421B
HP E4422B
HP E4432B
HP E4433B

* *The following models can be substituted:

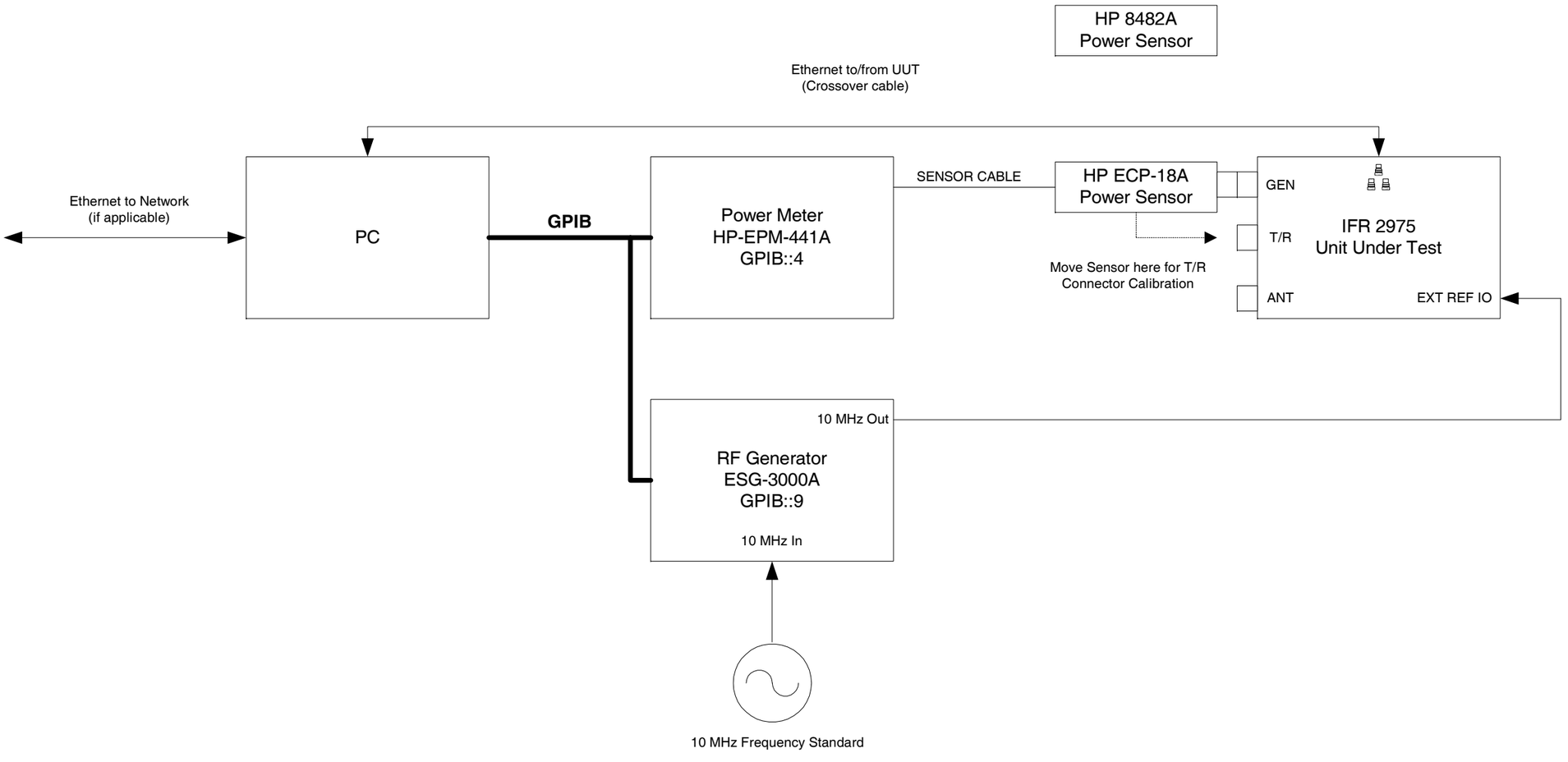
HP E4418A
HP E4418B

***The following models can be substituted:

HP E4412A

Figure 2-2 2975 Calibration Test Equipment Configuration

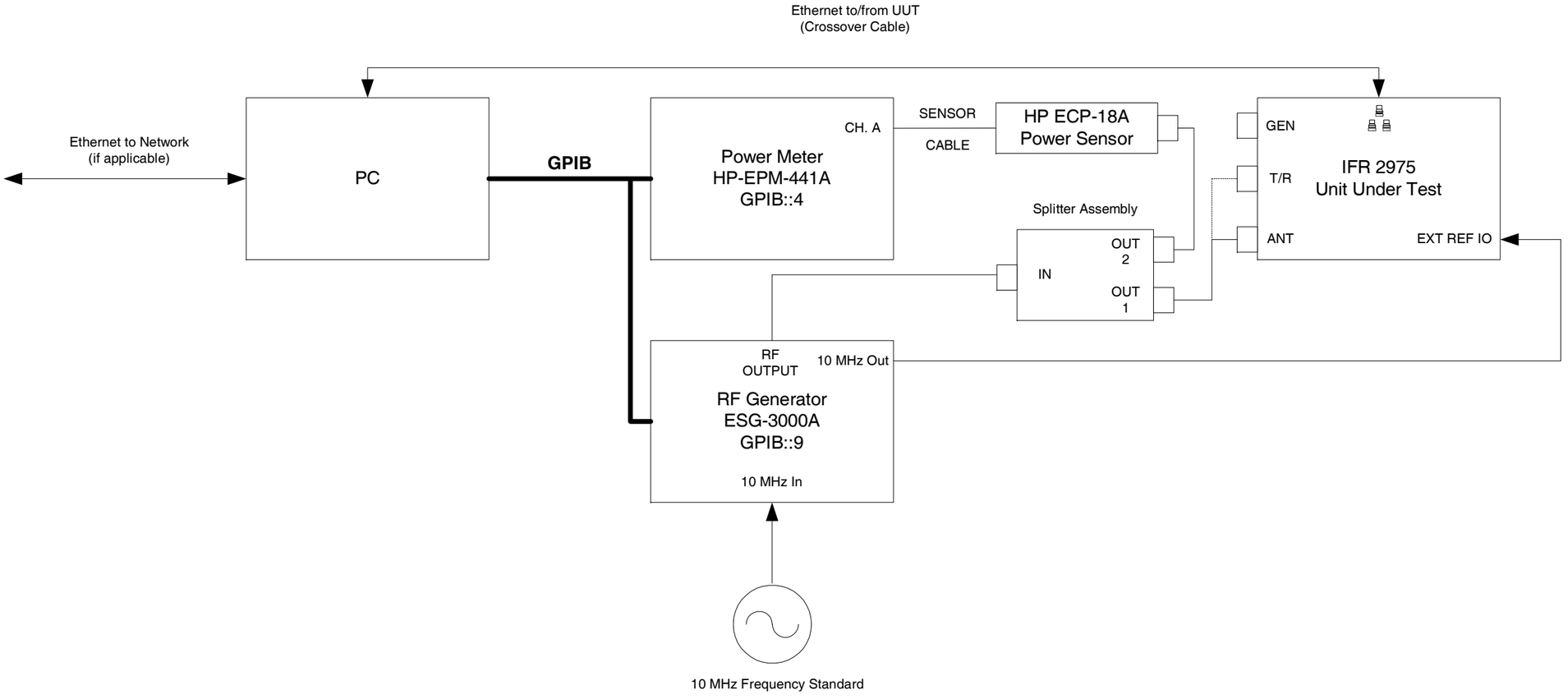
Generator Calibration Setup



042M-048

Figure 2-3 Generator Calibration Setup

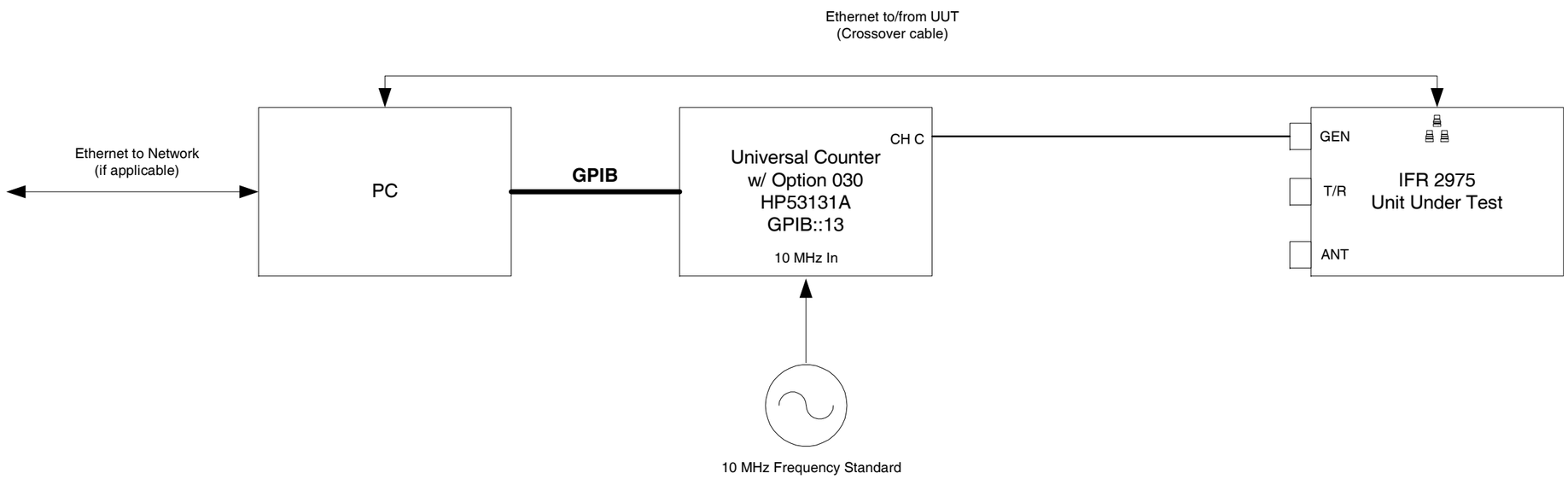
Analyzer Calibration Setup



042M-049

Figure 2-4 Analyzer Calibration Setup

TCXO Calibration Setup



10 MHz FREQUENCY STANDARD HOOKUP

The EXTERNAL RF I/O Connector is a 10 MHz Input when External Reference is selected and a 10 MHz Output when Internal Reference is selected. At the end of the Generator Calibration, during the TXCO Calibration, the EXTERNAL RF I/O Connector is changed from External Reference to Internal Reference. This can cause an unstable Reference Clock when the 2975 EXTERNAL RF I/O Connector is connected with a T-Connector to the 10 MHz Frequency Standard and the Universal Counter Reference input, causing the TXCO Calibration to fail.

042M-050

Figure 2-5 TCXO Calibration Setup