

Installation Note

Agilent Technologies Firmware Upgrade Kit 08665-61114 for the 8665A Synthesized Signal Generator



Agilent Technologies

**Part Number 08665-90067
Printed in USA November 2004
Supersedes March 2004**



08665-90067

Notice

The information contained in this document is subject to change without notice.

Agilent Technologies makes no warranty of any kind with regard to this material, including but not limited to, the implied warranties of merchantability and fitness for a particular purpose. Agilent Technologies shall not be liable for errors contained herein or for incidental or consequential damages in connection with the furnishing, performance, or use of this material.

Installation Instructions

Firmware Upgrade Kit 08665-61114 for the 8665A Synthesized Signal Generator

Introduction

The firmware for this product has gone through several revisions to improve performance and fix problems. It is recommended that the firmware be upgraded to the latest revision whenever an instrument is repaired or a performance problem is found. This is especially important if an assembly level repair is performed because exchange assemblies may be a later revision than the one replaced and require a later revision of the firmware to function. The following table shows all the firmware revisions shipped in this instrument and describes any major changes associated with each change. The last change in this table is the current firmware revision for this instrument. A kit is available that contains the latest revision of the firmware. When the firmware changes, the contents of this kit change to reflect the latest revision of the firmware.

Firmware Revision History

Revision Code	Date Code	ROM Part Number 08665-	Reason for Change
2.1.0	2908	87002 87003 87004 87005	Original release of the firmware. Contains diagnostics, but will not support Comm Discriminator (option 004).
2.2.0	2916	87102 87103 87104 87105	Support for the Comm Discriminator (Option 004) added. Minor problem in the operating firmware and diagnostics fixed.
2.3.0	2920	87202 87203 87204 87205	Fixes pulse modulation (Option 008) problems in the operating firmware. Fixes a problem with the diagnostics which erroneously generated result code 1,057,XXX.
2.4.0	2926	87302 87303 87304 87305	Fixes a problem which caused a calibration error in instruments without Option 008. Fixed problems with diagnostics which generated result codes 10,197,XXX and 2,471,XXX.
2.5.0	2928	87402 87403 87404 87405	Fixes problems that caused a calibration result code 5,053,XXX and diagnostic result codes 10,127,XXX 10,133,XXX 10,151,XXX and 10,197,XXX.
2.6.0	2931	87502 87503 87504 87505	Fixes problems that generated cal result code, 1,029,XXX and diagnostic result code, 11,131,XXX.
2.7.0	2941	87602 87603 87604 87605	Fixes more problems which generate cal error 1,029,XXX. Fixes problem with auto repeat on frequency up/down keys.
2.9.0	2947	87702 87703 87704 87705	Corrects problem that generated ALC OOL error message. Corrects problem that caused result codes, 11,143,XXX-11,155, XXX and 10,102,XXX.

Firmware Revision History (continued)

Revision Code	Date Code	ROM Part Number 08665-	Reason for Change
2.11.0	3014	87802 87803 87804 87805	Extends RF frequency range up to 4.5 GHz and down to 10 kHz. Changes internal calibration to improve performance with YIG frequencies > 5 GHz.
2.13.0	3018	87902 87903 87904 87905	Corrects problem when after RF OFF, RF would turn on frequency changed. Corrects problem after result code 5,190,XXX which caused HFOS module to be changed instead of ALC module.
2.15.0	3022A	87052 87053 87054 87055	Fixes a firmware problem which causes the instrument to lock up when sweeping with external DC FM on.
3.4.0	3046	87152 87153 87154 87155	Fixes Special Function 110 Phase Adjust. Corrects Diagnostics 3150, 5053, and 2426. Reinstates Special Function 329. Fixes ALC error in the 8664A. Fixes MSIB Lockup in MMS versions of PSG (70320, 70322, and 70325).
4.0.0	3203	87252 87253 87254 87255	Adds firmware to control the new timebase configuration. Corrects the following special functions: 160, 162, 171, 320, 331. Adds special 328: user enabled transient error interrupts.
4.2.0	3409	87352 87353 87354 87355	Fixes center frequency accuracy in FM mode. Corrects counter diagnostic error 18999.
4.2.1	3428	80111 80112 80113 80114	Correct ALC error that occurred on self calibration or self test. Fixed faulty cal constant that is created when performing "ALC AM CAL ZAP".

Parts Required

Parts Kit 08665-61114 Contents

Part Number	Description
08665-80111	ROM-U31
08665-80112	ROM-U32
08665-80113	ROM-U33
08665-80114	ROM-U34
08665-90067	Installation Note

Tools Required

- 2-pt. pozidriv screwdriver
- T-10 TORX screwdriver
- T-15 TORX screwdriver
- Small flat-blade screwdriver
- 15/64-in. (6-mm) open end wrench

Installation Procedure

1. Remove the top cover of the instrument by following the instructions in the Assembly Level Repair manual for the instrument.
2. Remove the card cage cover on the right side of the instrument by disconnecting all the cables from connectors that extend through the cover, and then remove the screws that secure the cover.

Caution	The controller board which is removed in the next step can be damaged by electrostatic discharge (ESD). Remove the controller board and install and remove the ROM's only in an ESD safe environment.
----------------	---

3. Remove the Controller board from the card cage. The Controller board is in the right-most slot of the card cage and has a blue extractor on one end.
4. The firmware ROM's are in sockets in the upper-left section of the Controller board. Remove the old ROM's and install the new ones. Use a small flat-blade screwdriver to pry the old ROM's out of their sockets. The label on each ROM includes the reference designator (U31, etc.) where it should be installed.
5. Install the Controller board in its socket and replace the card cage cover and any cables that were disconnected. Turn on the instrument. The message, - - -Calibrating.- - -, should be displayed in the front panel FREQUENCY/STATUS display. Removing the Controller board from its socket destroyed the calibration data in its battery backed-up RAM and the instrument must go through its calibration routine to acquire the data. If the calibration is successful, the message, Result code = 0, will be displayed. If any other result code is displayed, there is a problem. Follow the procedures in the Assembly Level Repair Manual to isolate the cause of the problem.

Error Messages

What Happens When You Get an Error Message

The Signal Generator interacts with the user to communicate error messages about its operating condition. The error messages suggest or imply that a problem exists either with the instrument or the way in which the user is operating the instrument. Error messages are presented to the user in two ways.

First, if the user attempts to operate the instrument beyond its capabilities, intentionally or not, an error message is immediately shown in the FREQUENCY/STATUS display. Refer to Table D-1 for a description of the error messages that occur under these circumstances.

Second, if the instrument detects a malfunction at power up, or as a result of performing service diagnostics or calibration, an error message is put into the message queue.

You will know that this has occurred because the **MSSG** annunciator lights up in the FREQUENCY/STATUS display. Refer to Table D-2 for a description of the error messages that occur under these circumstances.

The error messages in the message queue can then be viewed at the users request by simply pressing the Utility (MSSG) key on the front panel; repetitively pressing the (MSSG) key allows you to view all of the error messages.

To view the error messages again, simply press the blue (SHIFT) key, and then the (MSSG) key. If you have corrected the malfunction shown in the error message list, the message for that error will not reappear.

Note

A hardware failure message does not always indicate that a hardware problem exists. Certain operating conditions may also cause a hardware problem.

Also, if you program the Signal Generator to operate outside of its specified operating ranges a hardware failure may occur. For example, if the current output amplitude and AM depth results in an output signal greater than approximately +16 dBm you may get a hardware failure message.

Table D-1. Error Messages Immediately Shown to the User

Error Message	Description
AM depth too large	The entered amount of AM depth is greater than the maximum permitted (100%). Also, AM depth is limited by the current amplitude setting; Special Function 103 (Amptd Limit) sets the maximum amplitude limit. For example, if the current amplitude setting is +19.9 dBm, the maximum AM depth is 0%.
AM depth too small	The AM depth value entered is less than the minimum permitted (0%).
AM incr too large	The AM increment value entered is greater than the maximum permitted (100%).
AM incr too small	The AM increment value entered is less than the minimum permitted (0.1%).
Amptd incr too large	The amplitude increment value entered is greater than the maximum permitted (100 dB or 1V).
Amptd incr too small	The amplitude increment value entered is less than the minimum permitted (0.1 dB or 0.001 μ V).
Amptd limit too high	The Amplitude Limit value entered is greater than the maximum permitted (+19.9 dBm specified by Special Function 103).
Amptd limit too low	The Amplitude Limit value entered is less than the minimum permitted (–137 dBm specified by Special Function 103).
Amptd offset too large	The amplitude offset value entered is greater than the maximum permitted (50 dB).
Amptd offset too small	The amplitude offset value entered is less than the minimum permitted (–50 dB).
Amptd setting too low	The carrier amplitude value entered is less than the minimum permitted (–137 dBm).
Amptd setting too high	The carrier amplitude value entered is greater than the maximum permitted (+19.9 dBm).
Argument out of range	An attempt was made over GPIB to send an invalid numeral in the command parameter. For example, sending “FM:STATE 2” (there is no STATE 2), or “FREQ:SYNT 6” (there is no Mode 6 synthesis) would give you this error.
Attenuation too large	The attenuation value entered is greater than the maximum permitted (145 dB).
Attenuation too small	The attenuation value entered is less than the minimum permitted (0 dB).
Audio2 freq too high	The frequency of the audio source in Channel 2, entered from Special Function 133, is greater than the maximum permitted (400 kHz).
Audio2 freq too low	The frequency of the audio source in Channel 2, entered from Special Function 133, is less than the minimum permitted (0.1 Hz).
Audio2 level too high	The level of the audio source in Channel 2, entered from Special Function 134, is greater than the maximum permitted (2V).
Audio2 level too low	The level of the audio source in Channel 2, entered from Special Function 134, is less than the minimum permitted (0V).
Audio Φ incr too large	The increment value for phase in the audio source is greater than the maximum permitted (359.9°).

Table D-1. Error Messages Immediately Shown to the User (continued)

Error Message	Description
Audio Φ incr too small	The increment value for phase in the audio source is less than the minimum permitted (0.1°).
Audio Φ M dev too large	The Φ M deviation for the audio source in Channel 1, entered from Special Function 145, is greater than the maximum permitted (179.9°).
Audio Φ M dev too small	The Φ M deviation for the audio source in Channel 1, entered from Special Function 145, is less than the minimum permitted (0°).
Audio Φ M freq too high	The Φ M frequency for the audio source in Channel 1, entered from Special Function 146, is greater than the maximum permitted (400 kHz).
Audio Φ M freq too low	The Φ M frequency for the audio source in Channel 1, entered from Special Function 146, is less than the minimum permitted (0.1 Hz).
Audio Φ M incr too large	The increment value of Φ M deviation for the audio source in Channel 1, entered from Special Function 145, is greater than the maximum permitted (179.9°).
Audio Φ M incr too small	The increment value of Φ M deviation for the audio source in Channel 1, entered from Special Function 145, is less than the minimum permitted (0.1°).
Audio AM depth too large	The AM depth for the audio source in Channel 1, entered from Special Function 137, is greater than the maximum permitted (100%).
Audio AM depth too small	The AM depth for the audio source in Channel 1, entered from Special Function 137, is less than the minimum permitted (0%).
Audio AM freq too high	The AM frequency for the audio source in Channel 1, entered from Special Function 138, is greater than the maximum permitted (400 kHz).
Audio AM freq too low	The AM frequency for the audio source in Channel 1, entered from Special Function 138, is less than the minimum permitted (0.1 Hz).
Audio AM incr too large	The increment value of AM depth for the audio source in Channel 1, entered from Special Function 137, is greater than the maximum permitted (100%).
Audio AM incr too small	The increment value of AM depth for the audio source in Channel 1, entered from Special Function 137, is less than the minimum permitted (0.1%).
Audio FM dev too large	The FM deviation for the audio source in Channel 1, entered from Special Function 141, is greater than the maximum permitted (400 kHz).
Audio FM dev too small	The FM deviation for the audio source in Channel 1, entered from Special Function 141, is less than the minimum permitted (0 kHz).
Audio FM freq too high	The FM frequency for the audio source in Channel 1, entered from Special Function 142, is greater than the maximum permitted (400 kHz).
Audio FM freq too low	The FM frequency for the audio source in Channel 1, entered from Special Function 142, is less than the minimum permitted (0.1 Hz).

Table D-1. Error Messages Immediately Shown to the User (continued)

Error Message	Description
Audio FM incr too large	The increment value of FM deviation for the audio source in Channel 1, entered from Special Function 141, is greater than the maximum permitted (400 kHz).
Audio FM incr too small	The increment value of FM deviation for the audio source in Channel 1, entered from Special Function 141, is less than the minimum permitted (0.1 Hz).
Audio freq incr too low	The audio frequency increment value entered is less than the minimum permitted (0.1 Hz).
Audio freq incr too high	The audio frequency increment value entered is greater than the maximum permitted (400 kHz).
Audio freq too low	The audio frequency value entered is less than the minimum permitted.
Audio freq too high	The audio frequency value entered is greater than the maximum permitted.
Audio level/AM conflict	The sum of the audio levels in Channels 1 and 2 cannot exceed 2 Vpk with the AM source in Channel 1 ON.
Audio level conflict	The sum of the audio levels in Channels 1 and 2 cannot exceed 2 Vpk.
Audio level incr high	The audio level increment value entered is greater than the maximum permitted (2 V).
Audio level incr low	The audio level increment value entered is less than the minimum permitted (1.0 mV).
Audio level too high	The audio level value entered is greater than the maximum permitted (2 V).
Aud lev/source conflict	The sum of the audio levels in Channels 1 and 2 cannot exceed 2 Vpk, and too many audio sources are turned ON.
Aud pulse freq too high	The frequency of the audio pulse entered from Special Function 150 is greater than the maximum permitted (50 kHz).
Aud pulse freq too low	The frequency of the audio pulse entered from Special Function 150 is less than the minimum permitted (0.1 Hz).
Bad char during numeric	While the instrument was reading in a numeric argument, a character other than "0" through "9" occurred at a place where it is not valid to end the number.
Bad/missing exponent	After getting a valid mantissa and an "E" (for exponential), a character was found that was not a digit "0" through "9" or a $\pm$ sign, or the character was not a digit "0" through "9" after an "E+" or an "E-".
Bad register number	The recalled Save Register does not contain a SAVE setting, or the recalled Save Register is less than 0 or greater than 49.
Bad sequence entry	An attempt was made to enter a register value less than 0 or greater than 9 into the Save/Recall Sequence list.
Cannot continue	An attempt has been made to restart diagnostic testing after altering an internal cable or module without being in the repair mode, or you have come to the point where no additional tests are available or the test sequence has ended.

Table D-1. Error Messages Immediately Shown to the User (continued)

Error Message	Description
Center freq too high	The center frequency value entered for the sweep is greater than the maximum permitted.
Center freq too low	The center frequency value entered for the sweep is less than the minimum permitted.
Empty sequence list	An attempt was made to sequence through an empty Save/Recall sequence list.
EOC during numeric	While the instrument was reading in a numeric argument, an end-of-command (EOC) condition occurred at a place where it is not valid to end the number (for example, after a $\pm$ sign, after a decimal with no leading digits, or after an "E" for exponential).
EOM during numeric	While the instrument was reading in a numeric argument, an end-of-message (EOM) condition occurred at a place where it is not valid to end the number (for example, after a $\pm$ sign, after a decimal with no leading digits, or after an "E" for exponential).
EOM in #B/Q/H W/O data	An end-of-message (EOM) was encountered without getting any data in, or without getting the "B" (for binary), "Q" (for octal), or "H" (for hexadecimal) while the instrument was reading in a non-decimal numeric argument.
EOM in arbitrary block	An end-of-message (EOM) was encountered before the end of data while the instrument was reading in an "arbitrary block program data".
Error-EOC after colon	An end-of-command (EOC) was encountered after a colon in the command header. A colon in the command header must always be followed by a keyword mnemonic.
Error-EOC after comma	An end-of-command (EOC) was found after a comma. A comma in the data string must be followed with an additional data item(s).
Error-EOM after colon	An end-of-message (EOM) condition was encountered after a colon in the command header. A colon in the command header must always be followed by a keyword mnemonic.
Error-EOM after comma	An end-of-message (EOM) was found after a comma. A comma in the data string must be followed with an additional data item(s).
Error-Space after colon	A space character was encountered after a colon in the command header. A colon in the command header must always be followed by a keyword mnemonic.
Exponent too big	The numeric exponent was either less than -127 or greater than 127 .
FM deviation too large	The FM deviation value entered is greater than the maximum permitted. Refer to the specifications in the technical data sheet or to Chapter 2 for FM deviation limits.
FM deviation too small	The FM deviation value entered is less than the minimum permitted. Refer to the specifications in the technical data sheet or to Chapter 2 for FM deviation limits.
FM incr too large	The FM increment value entered is greater than the maximum permitted (100 MHz).

Table D-1. Error Messages Immediately Shown to the User (continued)

Error Message	Description
FM incr too small	The FM increment value entered is less than the minimum permitted (0.01 Hz).
FM out of range for mode	An attempt was made to change from a Synthesis Mode setting with a higher deviation range, to a Synthesis Mode setting with less deviation range for the set RF output. Push the Synthesis Mode AUTO key to let the Signal Generator determine the best mode for the deviation and RF output you have selected.
Freq divider too large	The frequency divider value entered is greater than the maximum permitted (–10 from the front panel, 0.1 over GPIB).
Freq incr too large	The frequency increment value entered is greater than the maximum permitted (10 GHz).
Freq incr too small	The frequency increment value entered is less than the minimum permitted (0.01 Hz).
Freq mult too large	The frequency multiplier value entered is greater than the maximum permitted (10).
Freq offset too large	The frequency offset value entered is greater than the maximum permitted (50 GHz).
Freq offset too small	The frequency offset value entered is less than the minimum permitted (–50 GHz).
Freq setting too high	The frequency value entered is greater than the maximum permitted.
Freq setting too low	The frequency value entered is less than the minimum permitted.
Frequency span too large	The frequency span value entered for the sweep is greater than the maximum permitted.
Frequency span too small	The frequency span value entered for the sweep is less than the minimum permitted.
Hardware not installed	An attempt was made to activate a Synthesis Mode setting presently not installed in the instrument.
GPIB Command error	This is a generic GPIB command error. Something is wrong with the command, but the firmware does not recognize the specific problem.
GPIB No response data	The instrument was given the GPIB interface command to “talk”, but has not been told to “say” anything.
GPIB Query interrupted	The instrument was given a command to return some data, then given another command before the entire response was read back from the instrument.
GPIB Query unterminated	The instrument was given the GPIB interface command to talk, and has received part of a message including a command to return some data, but the message was not terminated (not completely sent, or no end-of- message sent).
Insufficient capability	An attempt has been made to activate a function or feature presently not configured or accessible.
Int modulation enabled	An attempt has been made over GPIB to turn off the audio source with the internal modulation source turned on.

Table D-1. Error Messages Immediately Shown to the User (continued)

Error Message	Description
Invalid char after "."	While the instrument was reading in a numeric argument, a character other than "0" through "9", or an "E" (for exponential) with no digits before the decimal occurred.
Invalid char after sign	While the instrument was reading in a numeric argument, a character other than "0" through "9", or a decimal point occurred after the $\pm$ sign.
Invalid data mnemonic	A mnemonic was not recognized as the instrument was reading in a non-numeric parameter.
Invalid header mnemonic	A keyword mnemonic in the command header is not recognized as a keyword. Incorrect protocol or a spelling mistake might be the cause.
Invalid suffix	While the instrument was reading in a numeric argument, an invalid suffix occurred after a comma, semicolon, or end-of-command.
Log sweep not allowed	An attempt has been made to do phase continuous log sweep.
Marker freq too high	The marker frequency value entered is greater than the maximum permitted.
Marker freq too low	The marker frequency value entered is less than the minimum permitted (251,464.85 Hz).
Missing space after "?"	A non-blank character other than a semicolon followed a question mark. The question mark must either be followed by an end-of- message, an end or command, or a space before a parameter.
Mod and sweep conflict	An attempt was made to phase continuous sweep with internal modulation on, or with internal or external FM, Φ M, or the audio source turned on.
Needs space after header	The characters following the command header must have a space or an end-of-command message.
No manual Φ cont. sweep	An attempt was made to do Manual phase continuous sweep.
No such special	An invalid Special Function number was entered. Refer to Chapter 4 for a list of available Special Functions.
Not allowed-Security on	An attempt has been made to turn on a "Blanked" display area when the security Special Function 173 is active.
Notice >> FM turned off	An attempt was made to turn on Φ M with FM on, or an attempt was made to go from CW to sweep or from sweep to CW with FM set to a value out of range for the frequency that was entered.
Notice >> Φ M turned off	An attempt was made to turn on FM with Φ M already on.
Notice Aud state changed	A conflict has occurred which causes a subcarrier modulation source to be turned off in order to allow modulation on the RF carrier.
Not in service mode	An attempt has been made over GPIB to access a service Special Function that is not accessible because the service mode switch has been turned off.
Numeric overflow	The number was out of range for the parameter being set.
Pulse delay incr high	The pulse delay increment value entered is greater than the maximum permitted (1 second).
Pulse delay incr low	The pulse delay increment value entered is less than the minimum permitted (1 second).

Table D-1. Error Messages Immediately Shown to the User (continued)

Error Message	Description
Pulse delay too long	The pulse delay value entered is more than the maximum permitted (1 second).
Pulse delay too short	The pulse delay value entered is less than the minimum permitted (50 nseconds).
Pulse width incr high	The pulse width increment value entered is greater than the maximum permitted (1 second).
Pulse width incr low	The pulse width increment value entered is less than the minimum permitted (1 nsecond).
Pulse width too long	The pulse width value entered is more than the maximum permitted (1 second).
Pulse width too short	The pulse width value entered is less than the minimum permitted (50 nseconds).
Reference cal too high	The reference calibration value entered is greater than the maximum permitted (255).
Reference cal too low	The reference calibration value entered is less than the minimum permitted (0).
Reverse power detected	A reverse power condition was detected at either the RF Output. (Disconnect the affected output from any external equipment and re-enter the key sequence that originally resulted in the error. If the error is still detected by the instrument, a reverse power problem still exists.)
Sequence overflow	An attempt was made to enter more than 10 entries into the Save/Recall Sequence list.
Settings conflict	Certain operating conditions are in conflict. For example, an attempt was made over GPIB to set the Amplitude Limit to a value less than the current amplitude setting.
Start frequency too high	The start frequency value entered for the sweep is greater than the maximum permitted.
Start frequency too low	The start frequency value entered for the sweep is less than the minimum permitted.
Stop frequency too high	The stop frequency value entered for the sweep is greater than the maximum permitted.
Stop frequency too low	The stop frequency value entered for the sweep is less than the minimum permitted.
Sweep settings conflict	An attempt was made over GPIB to send a command message with conflicting sweep statements.
Sweep time too large	The sweep time value entered is greater than the maximum permitted. Refer to the specifications in the technical data sheet or to Chapter 2 for sweep time limits.
Sweep time too small	The sweep time value entered is less than the minimum permitted. Refer to the specifications in the technical data sheet or to Chapter 2 for sweep time limits.
Too many audio sources	There cannot be more than three other audio sources turned ON with the audio source in Channel 1 turned ON.
Too many commands	Too many commands were sent in a single message. The message must be broken up into several messages with less commands in each one.

Table D-1. Error Messages Immediately Shown to the User (continued)

Error Message	Description
Unexpected "?"	A question mark was found in the data string. A question mark should only occur immediately after the command header.
Unexpected colon	A colon was found in the command header in an invalid location (for example, after another colon, after a question mark, or found with a command parameter).
Unexpected comma	A comma was found in the command header, before the first argument, or after another comma. Commas are only allowed between certain arguments in the command header or message.
Unexpected EOC	An unexpected end-of-command (EOC) condition was found by the instrument before a valid command was complete. This includes not having a required parameter in a command.
Unexpected EOM	An unexpected end-of-message (EOM) condition was found by the instrument before a valid command was complete. This includes not having a required parameter in a command.
Unrecognized "#" format	In a non-decimal numeric argument you must use a binary, octal, hexadecimal, or "arbitrary block program data" format.
Wrong char after suffix	An unexpected character was encountered by the instrument after reading in a numeric suffix. This may indicate a missing comma, semicolon, or an end-of-message.
Wrong position for "?"	A question mark was found at the start of the message, after a colon or a space, or after an argument or a suffix. Question marks must follow directly after command header mnemonics.

Table D-2. Error Messages Put In the Message Queue for the User

Error Message	Description
Hardware Failure 1	A communications discriminator failure has been detected at power up, or detected as a result of a self-calibration or self-test. Refer to Figure 1 for corrective action.
Hardware Failure 2	A VCO failure has been detected at power up, or detected as a result of a self-calibration or self-test. Refer to Figure 1 for corrective action.
Hardware Failure 3	A Fractional-N failure has been detected at power up, or detected as a result of a self-calibration or self-test. Refer to Figure 1 for corrective action.
Hardware Failure 4	A modulation distribution failure has been detected at power up, or detected as a result of a self-calibration or self-test. Refer to Figure 1 for corrective action.
Hardware Failure 5	An ALC failure has been detected at power up, or detected as a result of a self-calibration or self-test. Refer to Figure 1 for corrective action.
Hardware Failure 6	An attenuator failure has been detected at power up, or detected as a result of a self-calibration or self-test. Refer to Figure 1 for corrective action.
Hardware Failure 7	An audio source failure has been detected at power up, or detected as a result of a self-calibration or self-test. Refer to Figure 1 for corrective action.
Hardware Failure 8	A reference failure has been detected at power up, or detected as a result of a self-calibration or self-test. Refer to Figure 1 for corrective action.
Hardware Failure 9	A doubler failure has been detected at power up, or detected as a result of a self-calibration or self-test. Refer to Figure 1 for corrective action.
Hardware Failure 10	A High Frequency Output Section failure has been detected at power up, or detected as a result of self-calibration or self-test. Refer to Figure 1 for corrective action.
Hardware Failure 11	A Low Frequency Output Section failure has been detected at power up, or detected as a result of self-calibration or self-test. Refer to Figure 1 for corrective action.
Hardware Failure 12	A Microwave Extender Automatic-Level-Control (ALC) out-of-lock (OOL) condition occurred. Refer to Figure 1 for corrective action.
Hardware Failure 13	A front panel failure has been detected at power up, or detected as a result of a self-calibration or self-test. Refer to Figure 1 for corrective action.
Hardware Failure 14	A power supply failure has been detected at power up, or detected as a result of a self-calibration or self-test. Refer to Figure 1 for corrective action.
Hardware Failure 15	An I/O board failure has been detected at power up, or detected as a result of a self-calibration or self-test. Refer to Figure 1 for corrective action.

**Table D-2. Error Messages Put In the Message Queue for the User
(continued)**

Error Message	Description
Hardware Failure 16	A controller failure has been detected at power up, or detected as a result of a self-calibration or self-test. Refer to Figure 1 for corrective action.
Hardware Failure 17	A Pulse Modulator failure has been detected at power up, or detected as a result of a self-calibration or self-test. Refer to Figure 1 for corrective action.
Hardware Failure 18	A frequency counter failure has been detected at power up, or detected as a result of a self-calibration or self-test. Refer to Figure 1 for corrective action.
Hardware Failure 21	A communications discriminator out-of-lock (OOL) condition exists. Refer to Figure 1 for corrective action.
Hardware Failure 22	A VCO out-of-lock (OOL) condition exists. Refer to Figure 1 for corrective action.
Hardware Failure 23	A Fractional-N (NF) phase-locked-loop (PLL) out-of-lock (OOL) condition exists. Refer to Figure 1 for corrective action.
Hardware Failure 24	A VCO frequency-locked-loop (FLL) out-of-lock (OOL) condition exists. Refer to Figure 1 for corrective action.
Hardware Failure 25	A VCO phase-locked-loop (PLL) out-of-lock (OOL) condition exists. Refer to Figure 1 for corrective action.
Hardware Failure 26	A fast controller failure has been detected at power up, or detected as a result of a self-calibration or self-test. Refer to Figure 1 for corrective action.
Hardware Failure 27	An audio source out-of-lock (OOL) condition exists. Refer to Figure 1 for corrective action.
Hardware Failure 28	A reference out-of-lock (OOL) condition exists. Refer to Figure 1 for corrective action.
Hardware Failure 30	A High Frequency Output Section Automatic-Level-Control (ALC) out-of-lock (OOL) condition occurred. Refer to Figure 1 for corrective action
Hardware Failure 31	A ROM failure has been detected at power up, or detected as a result of a self-calibration or self-test. Refer to Figure 1 for corrective action.
Hardware Failure 32	A ROM failure has been detected at power up, or detected as a result of a self-calibration or self-test. Refer to Figure 1 for corrective action.
Hardware Failure 33	A ROM failure has been detected at power up, or detected as a result of a self-calibration or self-test. Refer to Figure 1 for corrective action.

**Table D-2. Error Messages Put In the Message Queue for the User
(continued)**

Error Message	Description
Hardware Failure 34	A ROM failure has been detected at power up, or detected as a result of a self-calibration or self-test. Refer to Figure 1 for corrective action.
Hardware Failure 35	A voltmeter failure has been detected at power up, or detected as a result of a self-calibration or self-test. Refer to Figure 1 for corrective action.
Hardware Failure 36	A RAM failure has been detected at power up, or detected as a result of a self-calibration or self-test. Refer to Figure 1 for corrective action.
Calibration Error 1	A condition occurred where invalid level calibration data resides in either the Output or the Attenuator modules. Follow the external calibration procedures outlined in Figure 1.
Calibration Error 2	At sometime during the calibration or self-test, a condition occurred where some hardware was unable to be calibrated. Fix the hardware and re-calibrate. Refer to Figure 1 for corrective action. This error message will always be accompanied by other error messages.
Calibration Error 3	A sensor indicates that inside temperature has varied $\pm 10^{\circ}$ Centigrade ($\pm 18^{\circ}$ Fahrenheit) from where the temperature was when the instrument was last calibrated. A re-calibration by activating Special Function 171 may be necessary for the instrument to maintain its specifications.
Amplitude Error 1	An Automatic-Level-Control (ALC) out-of-lock (OOL) condition exists. An operating condition may have caused the OOL error, or a hardware problem may exist; check out both possibilities.
Amplitude Error 2	A doubler amplitude out-of-lock (OOL) condition exists. An operating condition may have caused the OOL error, or a hardware problem may exist; check out both possibilities.
Amplitude Error 3	An Automatic-Level-Control (ALC) out-of-lock (OOL) condition occurred. Refer to Figure 1 for corrective action.
Amplitude Error 4	A pulse amplitude error has occurred as a result of the pulse repetition rate being greater than the pulse width. Refer to Figure 1 for corrective action.
User Memory Cleared	A memory failure has been detected, all battery backup memory is lost. Refer to Figure 1 for corrective action.
Reverse power detected	A reverse power condition was detected at the RF Output. (Disconnect the affected output from any external equipment and re-enter the key sequence that originally resulted in the error. If an error is still detected by the instrument, a reverse power problem still exists.)

Note The “Transient Errors” listed in the following section of Table D-2 will only appear if Special Function 328 is activated. Refer to the Service Documentation for corrective action if you see one of these messages.

**Table D-2. Error Messages Put In the Message Queue for the User
(continued)**

Error Message	Description
Transient Error 1	A transient communications discriminator out-of-lock (OOL) condition occurred. Refer to the service documentation for corrective action.
Transient Error 3	A transient Fractional-N (NF) phase-locked-loop (PLL) out-of-lock (OOL) condition occurred. Refer to the service documentation for corrective action.
Transient Error 4	A transient pulse timing error has occurred as a result of the pulse repetition rate being greater than the pulse width. Refer to the service documentation for corrective action.
Transient Error 5	A transient Automatic-Level-Control (ALC) out-of-lock (OOL) condition occurred. Refer to the service documentation for corrective action.
Transient Error 7	A transient audio source out-of-lock (OOL) condition occurred. Refer to the service documentation for corrective action.
Transient Error 8	A transient reference out-of-lock (OOL) condition occurred. Refer to Figure 1 for corrective action.
Transient Error 9	A transient doubler out-of-lock (OOL) condition occurred. Refer to Figure 1 for corrective action.
Transient Error 12	A transient Microwave Extender out-of-lock (OOL) condition occurred. Refer to the service documentation for corrective action.
Transient Error 22	A transient VCO out-of-lock (OOL) condition occurred. Refer to the service documentation for corrective action.
Transient Error 24	A transient VCO frequency-locked-loop (FLL) out-of-lock (OOL) condition occurred. Refer to the service documentation for corrective action.
Transient Error 25	A transient VCO phase-locked-loop (PLL) out-of-lock (OOL) condition occurred. Refer to the service documentation for corrective action.
Transient Error 30	A transient High Frequency Output Section Automatic-Level-Control (ALC) out-of-lock (OOL) condition occurred. Refer to the service documentation for corrective action.

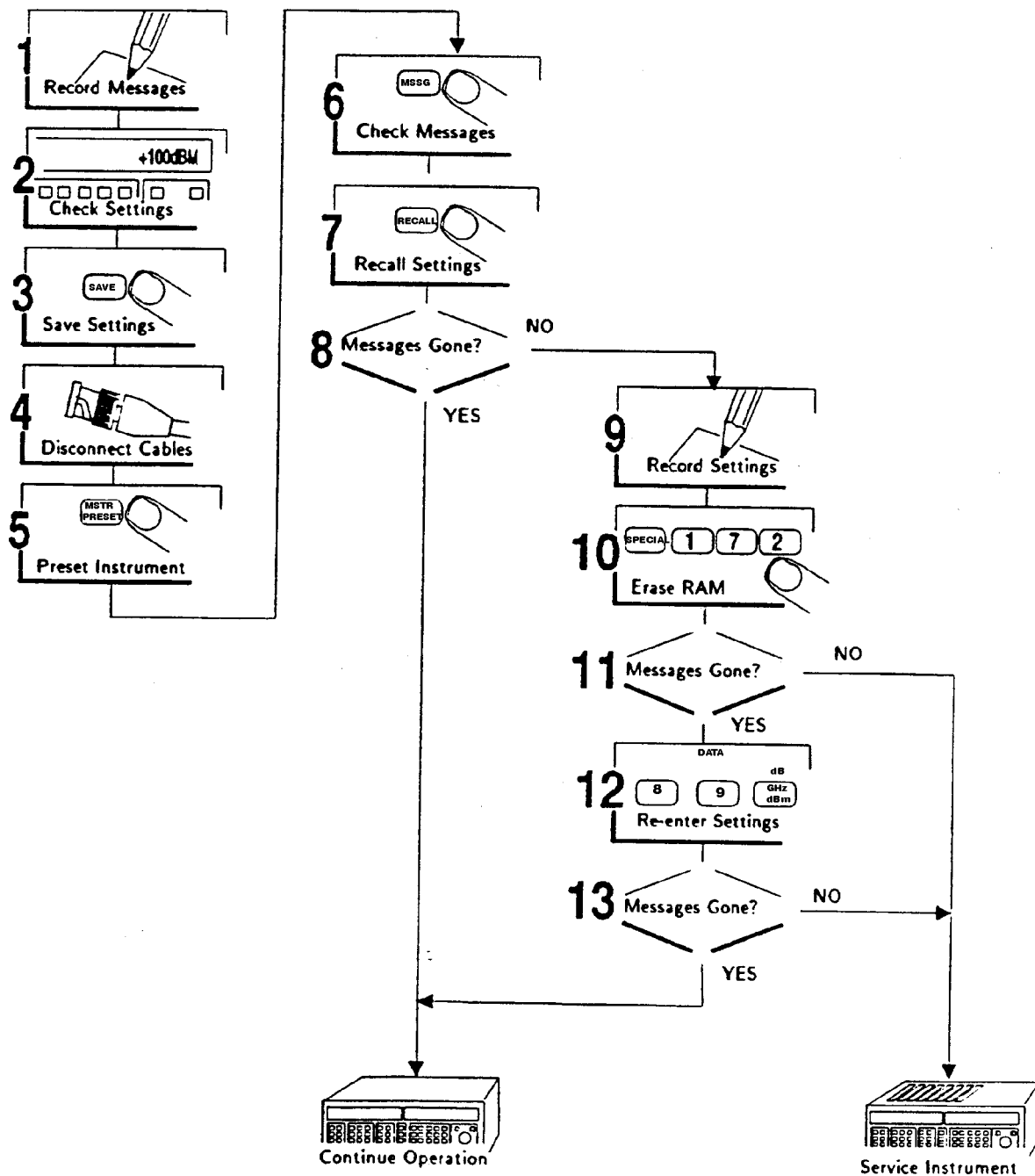


Figure 1. Corrective Action for Error Messages

Packing List for 08665-61114

The following items are packed as part of this kit. Please insure that all items have been packed or received.

Product Line	Shipping	Customer		
[]	[]	[]	Item 1	08665-80111 ROM-U31 (Qty= 1)
[]	[]	[]	Item 2	08665-80112 ROM-U32 (Qty= 1)
[]	[]	[]	Item 3	08665-80113 ROM-U33 (Qty= 1)
[]	[]	[]	Item 4	08665-80114 ROM-U34 (Qty= 1)
[]	[]	[]	Item 5	08665-90067 Installation Note (Qty= 1)
Checked By	Checked By			
[]	[]			
(initial)	(initial)			

8665A Firmware Upgrade Kit
Part Number 08665-61114

TO BE OPENED
BY END USER

Item 1
08665-80111
ROM-U31
Qty 1

Item 2
08665-80112
ROM-U32
Qty 1

Item 3
08665-80113
ROM-U33
Qty 1

Item 4
08665-80114
ROM-U34
Qty 1

Item 5
08665-90067
Installation Note
Qty 1