

Product Information

Product Information

- Options
- Documentations
- Specifications
- Customer Contacts
- Error Messages (Warning Message)
- TDR Error Messages (TDR Warning Message)
- Default Conditions
- Troubleshooting
- Maintenance
- Measurement Accessories
- General Principles of Operation
- Revision History
- Replacing 8753ES with E5071C

Options for E5071C

- Test Port & Frequency Options
- Software Options
- Hardware Options
- Timebase Options
- Accessary Options
- Calibration Option
- System Rack Options

Other topics about Product Information

For more information, see the [Configuration Guide](#).

Test Port & Frequency Options

Frequency Range	Bias Tees	2 Port Test Set	4 Port Test Set	Supported E5071C Firmware
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				Revision
9 kHz to 3 GHz	No	Option 230	Option 430	All
9 kHz to 4.5 GHz		Option 240	Option 440	A.08.00 and above
9 kHz to 6.5 GHz		Option 260	Option 460	A.09.30 and above
9 kHz to 8.5 GHz		Option 280	Option 480	All
100 kHz to 3 GHz	Yes	Option 235	Option 435	All
100 kHz to 4.5 GHz		Option 245	Option 445	A.08.00 and above
100 kHz to 6.5 GHz		Option 265	Option 465	A.09.30 and above
100 kHz to 8.5 GHz		Option 285	Option 485	All
300 kHz to 14 GHz		Option 2D5	Option 4D5	A.09.30 and above
300 kHz to 20 GHz		Option 2K5	Option 4K5	A.09.10 and above

NOTE

Options of (9 kHz to 3 GHz) and (100 kHz to 3 GHz) are discontinued and is being replaced by option of (9 kHz to 4.5 GHz) and (100 kHz to 4.5 GHz). Upgrade kit is available. See http://www.agilent.com/find/ena_upgrades.

NOTE

14/20 GHz options (2D5, 4D5, 2K5 and 4K5) are available to use in -85 dBm to +10 dBm power range. The maximum power level is frequency range dependent.

Mechanical attenuation is used only in 14/20 GHz options. Due to this, attenuation selection points/timing is different from 4.5/6.5/8.5 GHz options. For more information on attenuation, refer to Setting Power Level with Auto Power Range

Software Options

Option Number	Description
008	Frequency Offset Mode
010	Time Domain Analysis

790	Measurement Wizard Assistant Software
TDR	Enhanced Time Domain Analysis

The upgrade (retrofit) kits are available for the software options. See the [Configuration Guide](#) and http://www.agilent.com/find/ena_upgrades for the upgrade kits. For activating the option, refer to Activating Software Option.

Hardware Options

Option Number	Description
019	Standard (non-removable) HDD
017	Removable HDD

Timebase Options

Option Number	Description
UNQ	Standard Stability Timebase
1E5	High Stability Timebase

Accessory Options

Option Number	Description
810	Add Keyboard
820	Add Mouse

Calibration Option

Option Number	Description
A6J	ANSI Z540 Compliant Calibration
1A7	ISO 17025 Compliant Calibration

System Rack Options

Option Number	Description	Equivalent Agilent Part Number
1CM	Rack Mount Kit	5063-9216
1CN	Front Handle Kit	5063-9229
1CP	Rack Mount and Front Handle Kit	5188-4430

Documentations for E5071C

Manuals for E5071C

The following documentations are provided for E5071C.

Name	Description
Help (This file)	Provides the information about the measurement operation, programming, built-in VBA, I/O interface.
Installation Guide	Provides information about start up setup and system recovery information when the Windows cannot be boot up. This is furnished with E5071C as a paper manual.
Service Guide	Provides information about the parts, troubleshooting, performance test, adjustment and service menu.

Both Installation Guide and Service Guide can be downloaded from <http://www.agilent.com/find/e5071c-manual>.

The latest revision of Help and Help in PDF, [WebHelp](#) formats are also available at the site.

Other topics about Product Information

Specifications

The data sheet shows the E5071C specifications. The latest version of data sheet is available at <http://cp.literature.agilent.com/litweb/pdf/5989-5479EN.pdf>

For its history, see the Data Sheet Revision History.

The reader is required to see the PDF format.



Other topics about Product Information

Customer Contacts

For assistance on E5071C, refer to <http://www.agilent.com/find/assist> for your regional customer contacts. Click **Select a Country or Area** on the upper right of the [web page](#) to select your region.

Other topics about Product Information

Error Messages

Error Messages

An error message is displayed against a red background in the instrument message/warning area in the lower left part of the screen. Pushing a front panel key or executing :DISP:CCL command clears the error message. Errors caused by the operation of a front panel key simply appear on the display. They are not stored in the error queue with some exceptions.

An error with a positive error number is one uniquely defined for this instrument. On the other hand, an error with a negative error number is basically one defined for common GPIB devices in IEEE488.2

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

A

No.	Message	Description
20	Additional standard needed	<p>The GPIB command that turns ON the calibration function has been sent before all the data measurements required to calculate the calibration factor have been completed.</p> <p>In 1-port calibration, for example, when the measurements are completed for OPEN and SHORT standards but not for LOAD standard. This error occurs when you try to turn ON the calibration function by calculating 1-port calibration coefficient using SENS:CORR:COLL:SAVE or SENS:CORR:OFFS:COLL:SAVE.</p> <p>Be sure to measure all the necessary calibration data before sending commands. This error is not generated by front key operations.</p>
58	Auto port extension not allowed	An auto port extension element has been received at a position where this instrument does not accept one.

B

No.	Message	Description
-168	Block data not allowed	A block-data element has been received at a position where this instrument does not accept one.

C

No.	Message	Description
240	Calibration	This error occurs when a file containing the system

	data lost	calibration data is not found or in a damaged state at time of the startup of this instrument, indicating a failure of this instrument. Contact an Agilent Technology sales office or the company from which you bought the instrument.
22	Calibration method not selected	This error occurs when the command for validating the calibration data, SENS:CORR:COLL:SAVE or SENS:CORR:OFFS:COLL:SAVE is executed before the command for selecting a calibration type, SENS:CORR:COLL:METH:xxxx or SENS:CORR:OFFS:COLL:METH:xxxx, is executed. This error is not generated by front key operations.
- 148	Character data not allowed	A character data element (not violating the standard) has been received at a position where this instrument does not accept one. Double quotes (") are omitted where it is necessary to place a parameter in double quotes ("), for example.
- 100	Command error	A comprehensive syntax error has occurred showing that this instrument cannot detect a more detailed error. This code simply shows that a command error defined in 11.5.1.1.4, IEEE488.2 has occurred.
60	Continuous switching may damage source attenuator	<p>This error occurs when different power ranges are selected in multiple channel measurement settings to avoid source attenuator damage.</p> <p>NOTE This error occurs in case of options 2D5, 4D5, 2K5 and 4K5.</p>

D

No.	Message	Description
- 222	Data out of range	<p>A data element (not violating the standard) outside the range defined by this instrument has been received. This error occurs when an integer-based command for which the parameter can be rounded exceeds the range of -65536 to +65536 or when a real-number-based command for which the parameter can be rounded exceeds the range of -9.9e37 to +9.9e37, for example.</p> <p>This error occurs also when a numeric value other than a specified one is entered into a command in which the "port number" and "CalKit number" are specified as parameters and hence the parameters are not rounded. Such commands are, for example, CALC:FSIM:BAL:TOP:BBAL:PPOR, SENS:CORR:COLL:ACQ:OPEN, SENS:CORR:COLL:ECAL:SOLT3, SENS:CORR:COLL:CKIT:ORD:LOAD, etc.</p>
- 104	Data type error	The parser has recognized a data element that must not exist. Block data has been sent instead of numeric value data

		or character string data that had been expected, for example.
63	Duplicate trace name	This error occurs when a trace name defined with CALCulate[1-160]:PARAmeter[1-16]:TNAME:DATA command already exist.

E

No.	Message	Description
32	ECal module not in appropriate RF path	This error occurs when an ECal command, SENS:CORR:COLL:ECAL:SOLTn or SENS:CORR:OFFS:COLL:ECAL:xxxx, is executed with the port on the ECal module not connected correctly to the instrument. When the auto-detect function is turned OFF, (SENS:CORR:COLL :ECAL:ORI OFF), however, this error does not occur even when the port on the ECal module is not connected correctly to the instrument.
502	Equation run time error	This error occurs under the following conditions: <ul style="list-style-type: none"> The trace number in data(tr)/mem(tr)/xAxis(tr) is out of range # of trace available depends on the maximum number of channel/traces The port number in Advanced math function is out of range # of port available depends on the model option
- 200	Execution error	An error associated with execution has been generated for which this instrument cannot specify the error message. This code shows that an error associated with execution defined in 11.5.1.1.5, IEEE488.2 has occurred. This error occurs also when a calibration measurement is aborted.
- 123	Exponent too large	The absolute value of the exponent exceeds 32,000 (see 7.7.2.4.1, IEEE488.2).
- 178	Expression data not allowed	An expression-data element has been received at a position where this instrument does not accept one.
- 170	Expression error	When the expression data is put to syntactic analysis, an error not corresponding to one of Error Numbers -171 through -179 occurs.
27	External test set enabled	When the external test set mode is turned ON, the allowable calibration is limited. See Calibration and Measurement Parameters.

F

No.	Message	Description
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31	Failed to configure ECal module	This error occurs when the control of the ECal module fails at time of executing an ECal command, SENS:CORR:COLL:ECAL:SOLTn or SENS:CORR:OFFS:COLL:ECAL :xxxx. The failure results from the failure to connect the ECal module to the USB port, failure of the ECal module, etc.
76	Failed to control signal generator	This error occurs when the external signal source fails to respond during measurement, though it is enabled (SENS:OFFS:LOC:STAT ON and SENS:OFFS:LOC:CONT ON). Ensure the connection of the external signal source.
102	Failed to copy file	This error occurs when copying a file (MMEM:COPY command) fails.
104	Failed to create directory	This error occurs when creating a directory (MMEM:MDIR command) fails.
103	Failed to delete file	This error occurs when deleting a file (MMEM:DEL command) fails.
600	Failed to simulate eye	This error occurs when eye diagram simulation fails.
100	Failed to read file	This error occurs when a 2-port touchstone file (CALC:FSIM:SEND:PMC:PORT:USER:FIL command), the formatted data array (MMEM:LOAD:FDAT command) and limit table (MMEM:STOR:LIM command) for the active trace on the active channel, segment sweep table (MMEM:LOAD:SEGM command) for the active channel, a VBA project file (MMEM:LOAD:PROG command), etc. cannot be read normally.
601	Failed to read bit file	This error occurs when reading bit file fails.
101	Failed to write file	This error occurs when the formatted data array (MMEM:STOR:FDATcommand) and limit table (MMEM:STOR:LIM command) for the active trace on the active channel, segment sweep table (MMEM:STOR:SEGM command) for the active channel, display image (MMEM:STOR:IMAG command) for the LCD screen, a VBA project file (MMEM:STOR:PROG command), etc. cannot be written normally.
- 257	File name error	A file name error. This message appears when an error exists in the file name and hence a command is not executed correctly. This error occurs when you try to copy to an unsuitable file name, for example.
-	File name	The file name specified is not found and hence the command

256	not found	is not executed correctly. This error occurs when you try to read a file that does not exist in a disk or a disk is not correctly inserted into the drive to read or write a file, for example.
107	File transfer failed	This error occurs when writing data into or reading data from a file (MMEM:TRAN command) fails.
56	Fixture Simulator not allowed	This error occurs when the fixture simulator is executed (CALC:FSIM:STAT ON) under the condition of the frequency offset is enabled (SENS:OFFS ON). The fixture simulator is allowed to use when the frequency offset is not enabled.
24	Frequency offset enabled	This error occurs when the normal calibration (SENS:CORR:COLL:OPEN etc.) is performed under the condition of the frequency offset is enabled (SENS:OFFS ON).
59	Frequency offset not allowed	This error occurs when frequency offset function is not allowed in the current setting.
25	Frequency offset not enabled	This error occurs when the scalar-mixer calibration (SENS:CORR:OFFS:COLL:OPEN etc.) is performed under the condition of the frequency offset is not enabled (SENS:OFFS OFF).
62	Frequency out of range	This error occurs when the setting of frequency exceeds output frequency range under the condition of the frequency offset is enabled (SENS:OFFS ON).

G

No.	Message	Description
-105	GET not allowed	A group execution trigger (GET) has been received in the program message (see 7.7, IEEE488.2).
280	Global power limit violated	The power is exceeded over the defined by global power limit.

H

No.	Message	Description
-114	Header suffix out of range	The unit of the header is outside the range. The header is invalid in the unit for numeric parameters following a SCPI command.

I

No.	Message	Description
-224	Illegal parameter	The parameter value is not suitable. This error occurs

	value	when the CALC:PAR:DEF command is used to specify an S-parameter that does not exist in the model (S44 in the case of a 2-port model), for example. It also occurs because the number of specified traces exceed the maximum number of trace set.
-282	Illegal program name	This error occurs when a nonexistent VBA program name is specified by the PROG:SEL:NAME command.
-213	Init ignored	Because another measurement is in progress, the request for initiating a measurement ("INIT" command) is ignored.
35	Insufficient ECal module memory	This error occurs when the embedded memory is insufficient to save the user property in ECal module during the user definition ECal processing.
-161	Invalid block data	Block data has been expected, but the block data that appears is invalid for some reason (see 7.7.6.2, IEEE488.2). The END message is received before the length of block data has been filled, for example.
28	Invalid calibration method	This error occurs when the type of calibration is not specified or not correct when partial overwrite is executed with the GPIB command. This error does not occur for operation with front keys.
-101	Invalid character	An invalid character exists in the program message character string.
-141	Invalid character data	An invalid character is found in the character data element, or the parameter received is not valid.
-121	Invalid character in number	A character that is invalid for the data type subject to syntactic analysis has been received. For example, a letter is found in a decimal numeric value or a numeric character "9" in octal data.
500	Invalid equation expression	The equation expression used in Equation Editor is not valid.
501	Invalid equation label	The equation label used in Equation Editor is not valid.
-171	Invalid expression	The expression-data element is invalid (see 7.7.7.2, IEEE488.2). Parentheses are not paired, or illegal characters are used, for example.
602	Invalid mask data	This error occurs when invalid mask data is loaded.
-103	Invalid separator	The parser (a syntactic analysis program) had been expecting a delimiter, but a character that is not a

		delimiter has been sent.
-151	Invalid string data	Character string data has been expected, but the character string data that appears is invalid for some reason (see 7.7.5.2, IEEE488.2). The END message is received before the ending quotation mark character appears, for example.
-131	Invalid suffix	The suffix does not comply with the syntax defined in 7.7.3.2, IEEE488.2. Or it does not suit E5071C.

L

No.	Message	Description
53	Log sweep requires 2 octave minimum span	<p>The span of sweep range is not satisfied the requirement for logarithmic sweep. The sweep type is automatically changed to linear sweep when this error occurs.</p> <p>For example, this error occurs when, with the start and stop frequency are set 1 MHz and 2 MHz respectively, the sweep type is changed to logarithmic sweep.</p> <p>Set the stop frequency to more than four times as many as the start frequency. And then select logarithmic sweep.</p>

M

No.	Message	Description
-109	Missing parameter	<p>The number of parameters is less than that required for the command, or the parameter has not been entered. For example, the command SENS{1-6}:SWE:POIN requires one more parameter.</p> <p>Therefore, when a message "SENS1:SWE:POIN" is sent to a correct program message "SENS1:SWE:POIN 201" this instrument receives the former message as an invalid one because all parameters have not been entered. Enter command parameters correctly.</p>

N

No.	Message	Description
70	No GPIB system controller	<p>The GPIB system controller is not set properly.</p> <p>This error occurs when USB/GPIB interface is not connected or the interface setting is improper, during the measurement for power calibration data or for that in scalar-mixer calibration.</p> <p>It also occurs when USB/GPIB interface is not connected or the interface setting is improper,</p>

		<p>though the control of the external signal source is enabled.</p> <p>Ensure the connection of USB/GPIB interface and its setting.</p>
52	No valid memory trace	<p>This error occurs when you have executed either DISP:WIND:TRAC:MEM ON command to display memory trace, or any other command to enable data calculation using memory trace (CALC:MATH:FUNC command with other than NORM is specified), though no valid data exists in memory trace. This error is not generated by front key operations.</p>
-120	Numeric data error	<p>An error resulting from the numeric value data (including numeric value data having no decimal point representation) has occurred. A numeric value error other than Errors -121 through -129 has occurred.</p>
-128	Numeric data not allowed	<p>An numeric-value-data element (not violating the standard) has been received at a position where this instrument does not accept one.</p>

O

No.	Message	Description
200	Option not installed	<p>The command received has been ignored because of the mismatch between the contents of an option for this instrument and the command.</p> <p>It also occurs when you try to enable the time domain function in a model not having the time domain option. This holds true for the frequency offset option.</p> <p>This error is not generated by front key operations.</p>
-225	Out of memory	<p>Insufficient memory is available in this instrument to perform the required operation.</p>

P

No.	Message	Description
-220	Parameter error	<p>When a parameter-related error other than Errors -221 through -229 occurs, that error is displayed.</p>
-108	Parameter not allowed	<p>The number of parameters exceeds that required for the command.</p> <p>For instance, when a program message ":SENS1:SWE:TYPE LIN, SEGM" is sent instead of a correct program message with a command</p>

		":SENS1:SWE:TYPE LIN" which requires a parameter, the instrument receives the message as the number of parameters is invalid. See the command reference to confirm the required number of parameters.
41	Peak not found	This error occurs when, after specifying a peak and executing the CALC:MARK:FUNC:EXEC and CALC:FUNC:EXEC commands, the specified peak is not found in the marker search analysis.
220	Phase lock loop unlocked	This error occurs when the PLL circuit of this instrument becomes unlocked while the measurement is in progress. The measurement value is not correct. This error may occur when an external reference out of specification is connected to this instrument. Should an error occur with an external reference not connected, this instrument is faulty. Contact an Agilent Technology sales office or the company from which you bought the instrument.
221	Port 1 receiver overload	<p>The input to Test Port 1 exceeds the maximum input level. The measurement value is not correct. When a DUT is an amplifier or the like, this error may occur, damaging the receiver in the worst case. Should this error occur with a passive part used as the DUT or with nothing connected to the test port, this instrument is faulty. Contact an Agilent Technology sales office or the company from which you bought the instrument.</p> <p>If this error occurs, the stimulus signal output is automatically turned to off.</p> <p>NOTE For more information, see Overload Detection and Power Trip Function.</p>
222	Port 2 receiver overload	<p>The input to Test Port 2 exceeds the maximum input level. The measurement value is not correct. When a DUT is an amplifier or the like, this error may occur, damaging the receiver in the worst case. Should this error occur with a passive part used as the DUT or with nothing connected to the test port, this instrument is faulty. Contact an Agilent Technology sales office or the company from which you bought the instrument.</p> <p>If this error occurs, the stimulus signal output is automatically turned to off.</p> <p>NOTE For more information, see Overload Detection and Power</p>

		Trip Function.
223	Port 3 receiver overload	<p>The input to Test Port 3 exceeds the maximum input level. The measurement value is not correct. When a DUT is an amplifier or the like, this error may occur, damaging the receiver in the worst case. Should this error occur with a passive part used as the DUT or with nothing connected to the test port, this instrument is faulty. Contact an Agilent Technology sales office or the company from which you bought the instrument.</p> <p>If this error occurs, the stimulus signal output is automatically turned to off.</p> <p>NOTE For more information, see Overload Detection and Power Trip Function.</p>
224	Port 4 receiver overload	<p>The input to Test Port 4 exceeds the maximum input level. The measurement value is not correct. When a DUT is an amplifier or the like, this error may occur, damaging the receiver in the worst case. Should this error occur with a passive part used as the DUT or with nothing connected to the test port, this instrument is faulty. Contact an Agilent Technology sales office or the company from which you bought the instrument.</p> <p>If this error occurs, the stimulus signal output is automatically turned to off.</p> <p>NOTE For more information, see Overload Detection and Power Trip Function.</p>
73	Power meter not settled	<p>The measurement value of the power meter is unstable, or it goes outside the tolerance.</p> <p>This error occurs when the power meter's measurement value does not become stable within about 10 seconds during measurement for power calibration data or that for scalar-mixer calibration data.</p> <p>This error also occurs when the power calibration value exceeds the set tolerance.</p> <p>In addition, it occurs when the power meter fails to respond for any reason, such as power-down for example, during measurement under the same conditions.</p> <p>Ensure a firm connection of the power sensor.</p>
241	Power on test failed	<p>This error occurs when the power-on test fails, indicating a failure of this instrument. Contact an Agilent Technology sales office or the company from which you bought the instrument.</p>

61	Power unlevelled	<p>The out power level exceeds available range.</p> <p>For example, if the level after correction exceeds the power level that can be outputted when correcting the power level with the power calibration and power slope feature, this error occurs.</p> <p>Check that the power level is set correctly, the power calibration has been performed correctly and the correction value of the power slope is set correctly.</p>
120	Printer error	This error occurs when the previous printing is still in progress or the printer fails (offline, short of paper, etc.) at time of outputting the display image on the LCD screen to the printer (HCOP:IMM command).
121	Print failed	This error occurs when printing fails for reasons other than Error 120, Printer error.
-284	Program currently running	This error occurs when the PROG:SEL:STAT RUN command is executed with the VBA program in the Run state.
-112	Program mnemonic too long	The length of the header exceeds 12 characters (see 7.6.1.4.1, IEEE488.2).
-286	Program runtime error	An error occurring when VBA is executed.

Q

No.	Message	Description
-430	Query DEADLOCKED	The state that generates a "DEADLOCKED" Query error (see 6.3.1.7, IEEE488.2). This error occurs when both input and output buffers have become full, preventing the instrument from continuing processing, for example.
-400	Query error	A comprehensive query error has occurred showing that this instrument cannot detect a more detailed error. This code simply shows that a query error defined in 11.5.1.1.7 and 6.3, IEEE488.2 has occurred.
-410	Query INTERRUPTED	The state that generates a "INTERRUPTED" Query error (see 6.3.2.3, IEEE488.1). This error occurs when data bytes (DAB) or GET are received before the transmission of the response after a query has not been completed, for example.

-420	Query UNTERMINATED	The state that generates an "UNTERMINATED" Query error (see 6.3.2, IEEE488.2). This error occurs when this instrument is designated as the talker and an incomplete program message is received, for example.
-440	Query UNTERMINATED after indefinite response	After a query asking for an indefinite response has been run, another query is received in the same program message (See 6.5.7.5.7, IEEE488.2).
-350	Queue overflow	The queue contains a specific code in place of the code which caused this error. The code indicates that the error occurred because of no space available in the queue, but the error is not recorded.

R

No.	Message	Description
105	Recall failed	This error occurs when reading an instrument status file (State01.sta, etc.) (MMEM:LOAD:STAT command) fails.

S

No.	Message	Description
106	Save failed	This error occurs when writing an instrument status file (State01.sta, etc.) (MMEM:STOR:STAT command) fails.
290	Segment data overflow	This error occurs when the number of data of segment table exceeds its limitation. Reduce the measurement data size (i.e. NOP, number of channels).
33	Selected parameter not valid for confidence check	This error occurs when the mix mode S parameter has been selected for the S parameter you want to check, while using the confidence check function for calibration coefficient.
57	SnP request not valid for selected measurement	This error occurs when you try to save data to a Touchstone file but no measurement has been executed. This error also occurs when you try to save a Touchstone file with power sweep measurement specified or with the frequency offset function set to ON.
50	Specified channel	This error occurs when an attempt is made to

	hidden	activate a channel not on display using the DISP:WIND:ACT command. This error is not generated by front key operations.
23	Specified error term does not exist	The error occurs when the calibration coefficient type of the parameter specified in the read/write command of the calibration coefficient (SENS:CORR:COEF) is invalid for the calibration type selected by the calibration type selection command (SENS:CORR:COEF:METH:xxxx.) This error is not generated by front key operations.
21	Specified ports overlapped	This error occurs when a port number is duplicated in a command requiring two or more port numbers as parameters. Such commands are, for example, CALC:FSIM:BAL:TOP:SSB:PPOR 1,2,3,3. Specify port setup correctly to avoid duplication of ports. This error is not generated by front key operations.
51	Specified trace dose not exist	This error occurs when CALC:PAR:SEL command is executed to activate more traces than specified by CALC:PAR:COUN command. This error is not generated by front key operations.
26	Standard not selected	This error occurs when you execute the measurement under the condition that the standard is not selected for the subclass (the standard number is set to 0).
-150	String data error	When a character-string-data element is put to syntactic analysis, an error not corresponding to one of Error Numbers -151 through -159 occurs.
-158	String data not allowed	A character-string-data element has been received at a position where this instrument does not accept one.
-138	Suffix not allowed	A suffix is attached to a numeric value element to which a suffix is not allowed to be attached.
-134	Suffix too long	The unit is too long. The unit is expressed in 12 or more characters (see 7.7.3.4, IEEE488.2).
55	Sweep mode changed to stepped	You cannot change the sweep mode to the swept mode. This error occurs when you

	sweep.	change the sweep mode to the swept mode/high speed swept mode under the conditions where the sweep type is set to power sweep, power slope function is enabled (ON, correction coefficient is other than zero), power calibration is ON, frequency offset is enabled, spurious avoidance of frequency offset is enabled, or external signal source control is enabled.
-102	Syntax error	A command or data type that is not recognized exists.
-310	System error	One of the errors designated as "system errors" in this instrument has occurred.

T

No.	Message	Description
40	Target value not found	This error occurs when the target is not found during the marker search analysis after specifying the target and executing the CALC:MARK:FUNC:EXEC and CALC:FUNC:EXEC commands. This error occurs also when the bandwidth is not found after executing the bandwidth marker command, CALC:MARK:BWID:DATA?
242	TDR option requires advanced system calibration	TDR requires the system information PCC2.00 and above. This instrument should be sent to service centre for adjustment (with the firmware Rev 9.50 and above) to suit E5071C-TDR option.
-124	Too many digits	The number of digits of the argument of the decimal numeric-value-data element exceeds 255 with the preceding 0 removed (see 7.7.2.4.1, IEEE488.2).
-223	Too much data	The block-, expression-, or character-string-type program data that has been received conforms with the standard. But it exceeds the amount that can be processed under the condition of the memory or conditions specific to memory-related devices. In this instrument, this error occurs when the number of characters exceeds 254 in a character-string parameter.
54	Transform, Gate not allowed	This message appears when you turn on the gating/conversion function of the time domain feature, while frequency offset is

		<p>enabled, measurement points are set to two, or sweep type is set to other than linear sweep</p> <p>Turn off the frequency offset (SENS:OFFS OFF command), set the measurement points to three or more and the sweep type to linear sweep, and then turn on the gating/conversion function.</p>
-211	Trigger ignored	<p>This instrument receives and detects a trigger command ("TRIG") or an external trigger signal. But it is ignored due to the timing condition (This instrument is not in the wait-for- trigger state, for example). Change the setup so that a trigger command or an external trigger signal can be sent after the instrument has entered the wait-for- trigger state.</p>

U

No.	Message	Description
300	Unable to estimate adapter length	<p>Adapter length can not be estimated at zero span. Change the frequency span other than 0.</p>
-113	Undefined header	<p>A command not defined in this instrument, though not illegal in the syntactic structure, has been received. For example, when a message ":DISP:WIND1:TABL:MEM ON" is sent to a correct program message ":DISP:WIND1:TRAC1:MEM ON," the message sent is received as an undefined command by this instrument. See the command reference and use correct commands.</p> <p>This error occurs also when a port not existing on this model is specified in a command specifying a port number as an index. Such commands are CALC:FSIM:SEND:DEEM:PORTn:xxxx, CALC:FSIM:SEND:PMC:PORTn:xxxx, CALC:FSIM:SEND:ZCON:PORTn:Z0:R, and SENS:CORR:EXT:PORTn:TIME; they include PORTn as a part.</p>
34	User characterization not found in module	<p>This error occurs when the selected user profile is not detected in the ECal memory, while reading it from the ECal module, written by the user definition ECal.</p>

V

No.	Message	Description
30	Valid Ecal module not found	This error occurs when the number of ports of the ECal module connected is less than the necessary number of ports. This error occurs, for example, when a 4-port Cal executing command, SENS:CORR:COLL:ECAL:SOLT4, is executed with a 2-port ECal module connected. This error is not generated by front key operations.
71	Valid power meter not found.	Valid power meter is not connected . This error occurs when the E5071C and the power meter is not connected with USB/GPIB interface, the GPIB addresses do not match between the power meter and the E5071C's power meter, or the power meter is turned off, during the measurement for power calibration data or for that in scalar-mixer calibration. It also occurs when inoperable power meter is connected or an unspecified power sensor is set using :SYST:COMM:PSEN command. Ensure the connection of the power meter, GPIB addresses and power supply.
72	Valid power sensor not found. No valid sensor is connected to the power meter.	This error occurs when no power sensor is connected to the specified channel of the power meter, during the measurement for power calibration data or for that in scalar-mixer calibration. Ensure the connection of the power sensor.
75	Valid signal generator not found. No valid external signal source is connected.	This error occurs when the specified type of external signal source is not connected to the specified GPIB address, though the control of the external signal source is enabled (SENS:OFFS:LOC:STAT ON and SENS:OFFS:LOC:CONT ON). It also occurs when USB/GPIB interface is set but not connected. Ensure the external signal source and the connection of USB/GPIB interface.

Warning Message

A warning message is displayed in the instrument message/Warning area in the lower left part of the display against a gray background. Pushing a front panel key or executing :DISP:CCL command clears the message.

This message simply appears on the display, being not known to a remote environment such as a GPIB. This message is not displayed when another error (against a red background) has already been displayed in the instrument message/Warning area.

Messages	Description
Arbitrary Segment is not compatible with Swept Seep Mode	Sweep type should be Stepped when you turn the arbitrary segment on.
Auto port extension not allowed	This message appears when you try to execute the auto port extension when the sweep type is power sweep or the frequency offset function is ON. If this message is displayed, the auto port extension is not available.
Calibration extrapolated	The frequency range that can be calibrated with the ECal module is exceeded. In this case, the calibration data for the minimum frequency or maximum frequency are used instead of the data exceeding the allowable frequency range for calibration.
Failed to set zero type of power meter	This error occurs when zero type (External or Internal) of power meter cannot be performed.
Failed to zero and calibrate power meter	This error occurs when zeroing or calibration of power meter cannot be performed.
Fixture simulator not allowed	This message appears when enabling the frequency offset, while the fixture simulator function is turned on. If this message is displayed, the fixture simulator function is automatically turned off.
Log sweep requires 2 octave minimum span	If you change the sweep range that does not satisfy the necessary condition of the frequency span (the stop frequency is about 4 times or more of the start frequency) when the sweep type is set to the log sweep, this message is displayed. If this message is displayed, the sweep type is automatically set to the linear sweep. For example, if you attempt to change the log type to the

	<p>log sweep when the start frequency is set to 1 MHz and the stop frequency to 2 MHz, this error occurs.</p> <p>Set the stop frequency to a value of about 4 times or more the start frequency and then set the low seep.</p>
Peak not found	<p>This warning message is displayed when, with the tracking turned on, the peak specified by the marker search has not been found by the time the sweep is finished (with the tracking executed).</p>
Segment table changed	<p>This warning message is displayed when the setting specified segment by segment in the segment table is automatically changed by a change in the other setting.</p> <p>For example, this warning message is displayed when, with the power specified segment by segment in the segment table, the power setting for a segment is adjusted by a change in the power range setting.</p>
Sweep mode changed to stepped sweep	<p>This message appears when you set the sweep type to power sweep, power slope function to enabled (ON, correction coefficient is other than zero), power calibration to ON, frequency offset to enabled, spurious avoidance of frequency offset to enabled, or external signal source control to enabled, while the sweep mode is set to swept mode. When this message is displayed, the sweep mode is automatically set to step mode (during swept mode).</p>
Target value not found	<p>This warning message is displayed when, with the tracking turned on, the target specified by the marker search has not been found by the time the sweep is finished (with the tracking executed).</p> <p>This warning message is displayed also when, with the bandwidth marker displayed, the setting for the bandwidth marker is changed at the end of the sweep, or when, with the <i>active marker</i> changed or moved, the bandwidth is not found.</p>
Transform, Gate not allowed	<p>This message appears when you have set the measurement points to two, sweep type to other than linear sweep, or frequency offset to enabled, while the gating/conversion function of the time domain feature is turned on.</p> <p>If this message is displayed, the gating/conversion function is automatically turned off.</p>
User Preset File not found	<p>This warning message is displayed if no user preset file (D:\UserPreset.sta) exists when executing the SYST:UPR command.</p> <p>If this message is displayed, a normal preset (SYST:PRES) will be performed.</p>

TDR Error Message

TDR Error Messages

An error message is displayed on a dialog box. In E5071C-TDR application on PC (remote control), the error message is displayed at the Error Message area of the application.

An error with a positive error number is one uniquely defined for this instrument. On the other hand, an error with a negative error number is basically one defined for common GPIB devices in IEEE488.2

A [B](#) [C](#) [D](#) [E](#) [F](#) [G](#) [H](#) [I](#) [J](#) [K](#) [L](#) [M](#) [N](#) [O](#) [P](#) [Q](#) [R](#) [S](#) [T](#) [U](#) [V](#) [W](#) [X](#) [Y](#) [Z](#)

B

No.	Message	Description
- 168	Block data not allowed	An block-data element has been received at a position where this instrument does not accept one.

C

No.	Message	Description
- 148	Character data not allowed	A character data element (not violating the standard) has been received at a position where this instrument does not accept one. Double quotes (") are omitted where it is necessary to place a parameter in double quotes ("), for example.
- 100	Command error	A comprehensive syntax error has occurred showing that this instrument cannot detect a more detailed error. This code simply shows that a command error defined in 11.5.1.1.4, IEEE488.2 has occurred.

D

No.	Message	Description
- 222	Data out of range	A data element (not violating the standard) outside the range defined by this instrument has been received. This error occurs when an integer-based command for which the parameter can be rounded exceeds the range of -65536 to +65536 or when a real-number-based command for which the parameter can be rounded exceeds the range of -9.9e37 to +9.9e37, for example.
- 104	Data type error	The parser has recognized a data element that must not exist. Block data has been sent instead of numeric value data

		or character string data that had been expected, for example.
--	--	---

E

No.	Message	Description
- 200	Execution error	An error associated with execution has been generated for which this instrument cannot specify the error message. This code shows that an error associated with execution defined in 11.5.1.1.5, IEEE488.2 has occurred. This error occurs also when a calibration measurement is aborted.
- 123	Exponent too large	The absolute value of the exponent exceeds 32,000 (see 7.7.2.4.1, IEEE488.2).
- 178	Expression data not allowed	An expression-data element has been received at a position where this instrument does not accept one.
- 170	Expression error	When the expression data is put to syntactic analysis, an error not corresponding to one of Error Numbers -171 through -179 occurs.

F

No.	Message	Description
100	Failed to read file	This error occurs when load eye-mask file (:MMEM:LOAD:EYE:MASK) and load user defined bit pattern file (:MMEM:LOAD:EYE:BPAT) cannot be read correctly.
101	Failed to write file	This error also occurs when formatted data (:MMEMy:STOR:FDAT), displayed image (:MMEM:STOR:IMAG) and measurement data (:MMEM:STOR:SNP) cannot be stored correctly.
- 257	File name error	A file name error. This message appears when an error exists in the file name and hence a command is not executed correctly. This error occurs when you try to copy to an unsuitable file name, for example.
- 256	File name not found	The file name specified is not found and hence the command is not executed correctly. This error occurs when you try to read a file that does not exist in a disk or a disk is not correctly inserted into the drive to read or write a file, for example.

H

No.	Message	Description
-114	Header suffix out of range	The unit of the header is outside the range. The header is invalid in the unit for numeric parameters

		following a SCPI command.
--	--	---------------------------

I

No.	Message	Description
-224	Illegal parameter value	The parameter value is not suitable. This error occurs when the CALC:TRAC:PAR command is used to specify an S-parameter that does not exist in the model (S44 in the case of a 2-port model), for example.
601	Invalid bit pattern	An invalid bit pattern is entered or loaded.
-161	Invalid block data	Block data has been expected, but the block data that appears is invalid for some reason (see 7.7.6.2, IEEE488.2). The END message is received before the length of block data has been filled, for example.
28	Invalid calibration method	This error occurs when execution of load measurement (:SENS:CORR:COLL:DLC:LOAD), open measurement (:SENS:CORR:COLL:DLC:OPEN), thru measurement as part of DLC sequence (:SENS:CORR:COLL:DLC:THRU) or registration of DLC results (:SENS:CORR:COLL:DLC:SAVE) is not performed correctly.
-101	Invalid character	An invalid character exists in the program message character string.
-141	Invalid character data	An invalid character is found in the character data element, or the parameter received is not valid.
-121	Invalid character in number	A character that is invalid for the data type subject to syntactic analysis has been received. For example, a letter is found in a decimal numeric value or a numeric character "9" in octal data.
-171	Invalid expression	The expression-data element is invalid (see 7.7.7.2, IEEE488.2). Parentheses are not paired, or illegal characters are used, for example.
602	Invalid mask data	An invalid mask data is loaded.
-103	Invalid separator	The parser (a syntactic analysis program) had been expecting a delimiter, but a character that is not a delimiter has been sent.
-151	Invalid string data	Character string data has been expected, but the character string data that appears is invalid for some reason (see 7.7.5.2, IEEE488.2). The END message is

		received before the ending quotation mark character appears, for example.
-131	Invalid suffix	The suffix does not comply with the syntax defined in 7.7.3.2, IEEE488.2. Or it does not suit E5071C.

M

No.	Message	Description
-109	Missing parameter	<p>The number of parameters is less than that required for the command, or the parameter has not been entered. For example, the command "SENS:AVER:COUN" requires one more parameter.</p> <p>Therefore, when a message "SENS:AVER:COUN" is sent to a correct program message "SENS:AVER:COUN 16" this instrument receives the former message as an invalid one because all parameters have not been entered. Enter command parameters correctly.</p>

N

No.	Message	Description
-120	Numeric data error	An error resulting from the numeric value data (including numeric value data having no decimal point representation) has occurred. A numeric value error other than Errors -121 through -129 has occurred.
-128	Numeric data not allowed	An numeric-value-data element (not violating the standard) has been received at a position where this instrument does not accept one.

O

No.	Message	Description
-225	Out of memory	Insufficient memory is available in this instrument to perform the required operation.

P

No.	Message	Description
-220	Parameter error	When a parameter-related error other than Errors -221 through -229 occurs, that error is displayed.
-108	Parameter not allowed	<p>The number of parameters exceeds that required for the command.</p> <p>For instance, when a program message ":CALC:DEV SEND1, SEND2" is sent instead of a correct program message with a command</p>

		":CALC:DEV SEND1" which requires a parameter, the instrument receives the message as the number of parameters is invalid. See the command reference to confirm the required number of parameters.
-112	Program mnemonic too long	The length of the header exceeds 12 characters (see 7.6.1.4.1, IEEE488.2).

Q

No.	Message	Description
-430	Query DEADLOCKED	The state that generates a "DEADLOCKED" Query error (see 6.3.1.7, IEEE488.2). This error occurs when both input and output buffers have become full, preventing the instrument from continuing processing, for example.
-400	Query error	A comprehensive query error has occurred showing that this instrument cannot detect a more detailed error. This code simply shows that a query error defined in 11.5.1.1.7 and 6.3, IEEE488.2 has occurred.
-410	Query INTERRUPTED	The state that generates a "INTERRUPTED" Query error (see 6.3.2.3, IEEE488.1). This error occurs when data bytes (DAB) or GET are received before the transmission of the response after a query has not been completed, for example.
-420	Query UNTERMINATED	The state that generates an "UNTERMINATED" Query error (see 6.3.2, IEEE488.2). This error occurs when this instrument is designated as the talker and an incomplete program message is received, for example.
-440	Query UNTERMINATED after indefinite response	After a query asking for an indefinite response has been run, another query is received in the same program message (See 6.5.7.5.7, IEEE488.2).
-350	Queue overflow	The queue contains a specific code in place of the code which caused this error. The code indicates that the error occurred because of no space available in the queue, but the error is not recorded.

S

No.	Message	Description
-150	String data error	When a character-string-data element is put

		to syntactic analysis, an error not corresponding to one of Error Numbers -151 through -159 occurs.
-158	String data not allowed	A character-string-data element has been received at a position where this instrument does not accept one.
-138	Suffix not allowed	A suffix is attached to a numeric value element to which a suffix is not allowed to be attached.
-134	Suffix too long	The unit is too long. The unit is expressed in 12 or more characters (see 7.7.3.4, IEEE488.2).
-102	Syntax error	A command or data type that is not recognized exists.
-310	System error	One of the errors designated as "system errors" in this instrument has occurred.

T

No.	Message	Description
-124	Too many digits	The number of digits of the argument of the decimal numeric-value-data element exceeds 255 with the preceding 0 removed (see 7.7.2.4.1, IEEE488.2).
-223	Too much data	The block-, expression-, or character-string-type program data that has been received conforms with the standard. But it exceeds the amount that can be processed under the condition of the memory or conditions specific to memory-related devices. In this instrument, this error occurs when the number of characters exceeds 254 in a character-string parameter.
242	TDR option requires advanced system calibration	Advanced system calibration has to be performed on the E5071C so that the TDR option functions accurately.

U

No.	Message	Description
-113	Undefined header	A command not defined in this instrument, though not illegal in the syntactic structure, has been received. Check the command syntax.

E5071C

TDR Warning Message

An error message is displayed on a dialog box.

This message simply appears on the display, being not known to a remote environment such as a GPIB. This message is not displayed when another error (against a red background) has already been displayed in the instrument message/Warning area.

Messages	Description
TDR option is not found	This message appears when the E5071C-TDR option is not installed completely or correctly. Reinstall the E5071C-TDR option. Restart the option.
E5071C is not in TDR mode	This message appears when E5071C-TDR option is not turned ON. Turn ON the E5071C-TDR option: Analysis > TDR - ON . If its already at ON state, then click Start TDR .
Failed to connect <address>	This message appears when there's start-up error in the E5071C-TDR option remote mode. <address> shows the specified VISA address.
E5071C ENA option TDR already exist	This message appears if E5071C-TDR option is turned ON when there's another E5071C-TDR option already turned ON and is running.
E5071C is in SVC mode	This message appears if E5071C-TDR option is turned ON when the E5071C is in SVC mode.
Invalid state file	This message appears when an invalid state file is recalled. Recall a valid state file, in *.tdr format.
Latest E5071C firmware not found	This message appears when E5071C-TDR option is run on older version of E5071C firmware.
Unsupported revision	This message appears when you recall the state file which is stored by newer revisions. The state file stored by newer revisions cannot be recalled. Update your TDR software with latest revision.
Advanced/cal mode mismatch	This message appears in E5071C-TDR option when you recall a setting which was saved in Advanced Mode, in Basic Mode. Note that, when you save the setting in the Advanced Mode, you cannot recall the file in the Basic mode. Recall the setting in the Advanced Mode.

Default Conditions

Analysis

Key Operation			Default Value	Prese t	*RS T	Save/Rec all
Fixture Simulator	Fixture Simulator		OFF	←	←	√
	Topology	Device	SE-BAL	←	←	√
		Port1 (se)	1 (When SE-Bal is selected as the device) (When SE-SE-Bal is selected as the device)	←	←	√
		Port1 (bal)	1-2 (When Bal-Bal is selected as the device)	←	←	√
		Port2 (bal)	2-3 (SE-Bal is selected as the device) 3-4 (Bal-Bal is selected as the device)	←	←	√
		Port2 (se)	2 (When SE-	←	←	√

			SE-Bal is selected as the device)			
		Port3 (bal)	3-4 (When SE-SE-Bal is selected as the device)	←	←	√
		Property	OFF	←	←	√
	BalUn		OFF	←	←	√
	Port Matching	Port Matching	OFF	←	←	√
		Select Port	1	←	←	√
		Select Circuit	None	←	←	√
		C (C1)	0.000e-12F	←	←	√
		G (G1)	0.000S	←	←	√
		L (L1)	0.000e-9H	←	←	√
		R (R1)	0.0000 ohm	←	←	√
		C2	0.000e-12F	←	←	√
		G2	0.000S	←	←	√
		L2	0.000e-9H	←	←	√
		R2	0.0000 ohm	←	←	√
	Port Z Conversion	Port Z Conversion	OFF	←	←	√
		Port1 Z0 Real	50.000 ohm	←	←	√

		Port1 Z0 Imag	0.000 ohm	←	←	√
		Port2 Z0 Real	50.000 ohm	←	←	√
		Port2 Z0 Imag	0.000 ohm	←	←	√
		Port3 Z0 Real	50.000 ohm	←	←	√
		Port3 Z0 Imag	0.000 ohm	←	←	√
		Port4 Z0 Real	50.000 ohm	←	←	√
		Port4 Z0 Imag	0.000 ohm	←	←	√
	De- Embedding	De- Embedding	OFF	←	←	√
		Select Port	1	←	←	√
		Select Type	None	←	←	√
	Diff Matching	Diff Matching	OFF	←	←	√
		Select Bal Port	2	←	←	√
		Select Circuit	None	←	←	√
		C	0.0000 F	←	←	√
		G	0.0000 S	←	←	√
		L	0.0000 H	←	←	√
		R	0.0000 ohm	←	←	√
	Diff Z Conversion	Diff Z Conversion	OFF	←	←	√

		Port1 (bal) Real	100.00 ohm	←	←	√
		Port1 (bal) Imag	0.00 ohm	←	←	√
		Port2 (bal) Real	100.00 ohm	←	←	√
		Port2 (bal) Imag	0.00 ohm	←	←	√
		Port3 (bal) Real	100.00 ohm	←	←	√
		Port3 (bal) Imag	0.00 ohm	←	←	√
	Cmn ZConversion	Cmn Z Conversion	OFF	←	←	√
		Port1 (bal) Real	25.000 ohm	←	←	√
		Port1 (bal) Imag	0.000 ohm	←	←	√
		Port2 (bal) Real	25.000 ohm	←	←	√
		Port2 (bal) Imag	0.000 ohm	←	←	√
		Port3 (bal) Real	25.000 ohm	←	←	√
		Port3 (bal) Imag	0.000 ohm	←	←	√
	De-Embedding S4P	De-Embedding S4P	OFF			
		Topology	A			
Gating	Gating		OFF	←	←	√

	Start		-10.000 ns	←	←	√
	Stop		10.000 ns	←	←	√
	Center		0.0000 s	←	←	√
	Span		20.000 ns	←	←	√
	Type		Bandpass	←	←	√
	Shape		Normal	←	←	√
Transform	Transform		OFF	←	←	√
	Start		-10.000 ns	←	←	√
	Stop		10.000 ns	←	←	√
	Center		0.0000 s	←	←	√
	Span		20.000 ns	←	←	√
	Type		Bandpass	←	←	√
	Window		Normal	←	←	√
		Impulse Width	230.69 ps	←	←	√
		Kaiser Bata	6.0000	←	←	√
Conversion	Conversion		OFF	←	←	√
	Function		Z:Reflection	←	←	√
Limit Test	Limit Test		OFF	←	←	√
	Limit Line		OFF	←	←	√
	Limit Line Offsets	Stimulus Offset	0.0000 Hz	←	←	√
		Amplitude Offset	0.0000 Hz	←	←	√
	Fail Sign		ON	←	←	√

Ripple Limit	Ripple Limit Test		OFF	←	←	√
	Ripple Limit		OFF	←	←	√
	Ripple value		OFF	←	←	√
	Ripple Band		1	←	←	√
	Fail Sign		ON	←	←	√
Bandwidth Limit	BW Test		OFF	←	←	√
	BW Display		OFF	←	←	√
	BW Marker		OFF	←	←	√
	N dB Points		3.0000 dB	←	←	√
	Min Bandwidth		10.000 kHz	←	←	√
	Max Bandwidth		300.00 kHz	←	←	√
	Fail Sign		ON	←	←	√
Point Limit	Point Limit Test		OFF	←	←	√
	Point Limit		OFF	←	←	√
	Edit Point Limit	Delete				
		Add				
		Clear Point Limit Table				
		Export to CSV File...				
		Import				

E5071C

		From CSV File...				
	Fail Sign		ON	←	←	√

Avg

Key Operation	Default Value	Preset	*RST	Save/Recall
Avg Factor	16	←	←	✓
Averaging	OFF	←	←	✓
Avg Trigger	OFF	←	←	✓
SMO Aperture	1.5000%	←	←	✓
Smoothing	OFF	←	←	✓
IF Bandwidth	70 kHz	←	←	✓

Cal

Key Operation			Default Value	Prese t	*R ST	Save/Re call
Correction			OFF	←	←	✓
Calibrate	Respo nse (Open)	Select Port	1	←	←	
	Respo nse (Short)	Select Port	1	←	←	
	Respo nse (Thru)	Select Ports	2-1 (S21)	←	←	
	Enhan ced Respo nse	Select Ports	2-1 (S21 S11)	←	←	
	1-Port Cal	Select Port	1	←	←	
	2-Port Cal	Select Ports	1-2	←	←	
	3-Port Cal	Select Ports	1-2-3	←	←	
	2-Port TRL Cal	Select Ports	1-2	←	←	
	3-Port TRL Cal	Select Ports	1-2-3	←	←	
	Adapt er Remov al	Select Ports	1	←	←	

	Adapt er Remov al	Cal Kit	85033 E			
ECal	Enhanced Response		2-1 (S21 S11)	←	←	√
	Isolation		OFF	←	←	√
	Characterization		Factor y	←	←	√
	Orientation		Auto	←	←	√
	ECal					
Property			OFF	←	←	√
Cal Kit			85033 E	←	←	√
Modify Cal Kit	Define STDs		Define STDs	←	←	√
	Specif y CLSs	Sub Class	Sub Class 1	←	←	√
	TRL Reflect		Short			
	TRL Option	Impedance	Syste m			
	TRL Option	Reference Plane	Thru			
	Label Kit		85033 E			
Port Extensions	Extensions		OFF	←	←	√
	Auto Port Extens ion	Select Ports	1,2,3, 4	←	←	√

		Method	Current Span	←	←	√
	Method	User Span Start	Minimum value in frequency range	←	←	√
	Method	User Span Stop	Maximum value in frequency range	←	←	√
		Adjust Mismatch	OFF	←	←	√
		Include Loss	OFF	←	←	√
Extension Port1			0.000 0 s	←	←	√
Extension Port2			0.000 0 s	←	←	√
Extension Port3			0.000 0 s	←	←	√
Extension Port4			0.000 0 s	←	←	√
Loss	Select Port		1	←	←	√
	Loss1		OFF	←	←	√
	Loss1		0.000 0 dBm	←	←	√
	Freq1		1.000 0 GHz	←	←	√
	Loss2		OFF	←	←	√

		Loss2	0.000 0 dBm	←	←	√
		Freq2	1.000 0 GHz	←	←	√
		Loss at DC	0.000 0 dBm	←	←	√
Velocity Factor			1.000 0	←	←	√
Set Z0			50.00 0 ohm	←	←	√
Power Calibration	Select Port		1	←	←	√
	Correction		OFF	←	←	√
	User Sensor		A	←	←	√
	Num of Readings		1	←	←	√
	Tolerance		5 dB	←	←	√
	Max Itertion		0	←	←	√
	Loss Comp en	Compensatio n	OFF	←	←	√
	Sensor A Settin gs	Ref Cal Factor	100.0 0%	Non-chang ing	←	√
		Zero Type	Extern al			
	Sensor B Settin gs	Ref Cal Factor	100.0 0%	Non-chang ing	←	√
		Zero Type	Extern al			
Receiver Calibration	Select Port		1	←	←	

	Correction			OFF	←	←	√
	Source Port			1	←	←	
	Power Offset			0	←	←	√
	Calibrate Both						
	Calibrate R						
	Calibrate T						
Mixer/Converter Calibration	Scalar Cal (Manual)	Select Ports		2-1 (fwd)	←	←	
	Scalar Cal (Manual)	Power Meter	User Sensor	A	←	←	
	Scalar Cal (ECal)	Select Ports		2-1 (fwd)	←	←	
	Scalar Cal (ECal)	Power Meter	User Sensor	A	←	←	
Cal Trig Source				Internal	←	←	√

Center

Key Operation	Default Value	Preset	*RST	Save/Recall
	(Maximum Frequency - 10E5)/2	←	←	✓

Display

Key Operation	Default Value	Preset	*RST	Save/Recall
Allocate Channels		←	←	✓
Number of Traces	1	←	←	✓
Allocate Traces		←	←	✓
Display	Data	←	←	✓
Data Math	OFF	←	←	✓
Data Hold	OFF	←	←	✓
Title Label	OFF	←	←	✓
Graticule Label	ON	←	←	✓
Invert Color	OFF	←	←	✓
Frequency	ON	←	←	✓
Update	ON	←	←	✓
Equation	OFF	←	←	✓

Format

Key Operation	Default value	Preset	*RST	Save/Recall
	Log Mag	←	←	√

Macro Setup

Key Operation	Default Value	Preset	*RST	Save/Recall
Echo Window	OFF	←	←	√

Marker Fctn

Key Operation		Default Value	Preset	*RST	Save/Recall
Discrete		OFF	←	←	✓
Couple		ON	←	←	✓
Marker Table		OFF	←	←	✓
Statistics		OFF	←	←	✓
Annotation Options	Marker Info X Pos	1 %	←	←	✓
	Marker Info Y Pos	1 %	←	←	✓
	Align	ON	←	←	✓
	Active Only	ON	←	←	✓

Marker Search

Key Operation			Default Value	Preset	*RST	Save/Recall
Peak			Search Peak			
	Peak Excursion		3.0000 dB	←	←	√
	Peak Polarity		Positive	←	←	√
Target			Search Target	←	←	√
	Target Value		0.0000 dB (When Target is selected)	←	←	√
	Target Transition		Both (When Target is selected)	←	←	√
Multi Peak			Search Multi Peak	←	←	√
	Peak Excursion		3.0000 dB (When Multi Peak is selected)	←	←	√
	Peak Polarity		Positive (When Multi Peak is selected)	←	←	√
Multi Target			Search Multi Target	←	←	√
	Target Value		0.0000 dB (When Multi	←	←	√

			Target is selected)			
	Target Transition		Both (When Multi Target is selected)	←	←	√
Tracking			OFF	←	←	√
Search Range	Search Range		OFF	←	←	√
	Start		0.0000 Hz	←	←	√
	Stop		0.0000 Hz	←	←	√
	Couple		ON	←	←	√
	Multiple Range	Multiple Range	OFF	←	←	√
		Target Range	1	←	←	√
		Start	0.0000 Hz	←	←	√
		Stop	0.0000 Hz	←	←	√
Bandwidth			OFF	←	←	√
Bandwidth Value			-3.0000 dB (When one of the marker is on)	←	←	√
Notch			OFF	←	←	√
Notch Value			-3.0000 dB (When one of the marker is on)	←	←	√

Marker

Key Operation	Default Value	Preset	*RST	Save/Recall
Marker1	Marker 1 is turned on immediately after the marker softkey menu is displayed	←	←	√
Ref Marker Mode	OFF	←	←	√

Meas

Key Operation		Default value	Preset	*RST	Save/Recall
		S11	←	←	✓
		Sss11 (When Fixture Simulator is set on, set Topology at SE-Bal, and, BalUn on in Analysis mode)	←	←	✓
		Sdd11 (When Fixture Simulator is set on, set Topology at Bal-Bal, and BalUn on in Analysis mode)	←	←	✓
		Sss11 (When Fixture Simulator is set on, set Topology at SE-SE-Bal, and BalUn on in Analysis mode)	←	←	✓
Absolute		A(1)	←	←	✓
Aux Input 1	Range	10 V	←	←	✓
	Sweep Port	1	←	←	✓
Aux Input 2	Range	10 V	←	←	✓
	Sweep Port	1	←	←	✓

Save/Recall

Key Operation		Default Value	Preset	*RST	Save/Recall
Save Type		State & Cal	←	←	✓
Channel/Trace		Disp Only	←	←	✓
Auto Trig Source		ON	←	←	✓
Save SnP	SnP Format	Auto	←	←	✓

Scale

Key Operation	Default value	Preset	*RST	Save/Recall
Divisions	10	←	←	✓
Scale/Div	10.000 dB/div	←	←	✓
Reference Position	5 Div	←	←	✓
Reference Value	0.0000 dB	←	←	✓
Electrical Delay	0.0000 s	←	←	✓
Phase Offset	0.0000 °	←	←	✓

Span

Key Operation	Default Value	Preset	*RST	Save/Recall
	Maximum Frequency - 10E5	←	←	✓

Start

Key Operation	Default Value	Preset	*RST	Save/Recall
	100.00 kHz	←	←	√

Stop

Key Operation	Default Value	Preset	*RST	Save/Recall
	Maximum value in frequency range	←	←	√

Sweep Setup

Key Operation			Default Value	Preset	*RST	Save/Recall
Power	Power		0 dBm	←	←	√
	Port Couple		ON	←	←	√
	Port Power	Port 1 Power	0 dBm	←	←	√
		Port 2 Power	0 dBm	←	←	√
		Port 3 Power	0 dBm	←	←	√
		Port 4 Power	0 dBm	←	←	√
	Slope [xx dB/GHz]		0 dB/GHz	←	←	√
	Slope [ON/OFF]		OFF	←	←	√
	CW Freq		100.00 kHz	←	←	√
	RF Out		ON	←	←	√
Sweep Time			AUTO	←	←	√
Sweep Delay			0.0000 s	←	←	√
Sweep Mode			Stepped	←	←	√
Points			201	←	←	√
Sweep Type			Lin Freq	←	←	√
Edit Segment Table	Freq Mode		Start/Stop	←	←	√
	List IFBW		OFF	←	←	√
	List Power		OFF	←	←	√
	List Port Power		OFF	←	←	√
	List Delay		OFF	←	←	√
	List Sweep Mode		OFF	←	←	√
	List Time		OFF	←	←	√

	List State		OFF	←	←	✓
	List Shift LO		OFF	←	←	✓
	List Port IFBW		OFF	←	←	✓
	Arbitrary Segments		OFF	←	←	✓
Segment Display			Order Base	←	←	✓
Frequency Offset	Frequency Offset		OFF	←	←	✓
	Port 1	Multiplier	1.0000	←	←	✓
		Divisor	1.0000	←	←	✓
		Offset	0.0000 Hz	←	←	✓
		Start	9.00 KHz	←	←	✓
		Stop	8.5000 GHz	←	←	✓
	Port 2	Multiplier	1.0000	←	←	✓
		Divisor	1.0000	←	←	✓
		Offset	0.0000 Hz	←	←	✓
		Start	9.00 kHz	←	←	✓
		Stop	8.5000 GHz	←	←	✓
	Port 3	Offset	0.0000 Hz	←	←	✓
		Start	9300 kHz	←	←	✓
		Stop	8.5000 GHz	←	←	✓
	Port 4	Offset	0.0000 Hz	←	←	✓
		Start	9.00 kHz	←	←	✓
		Stop	8.5000 GHz	←	←	✓
	External Source	LO Frequency	OFF	←	←	✓
		Multiplier	0.0000	←	←	✓

		Divisor	1.0000	←	←	✓
		Offset	0.0000 Hz	←	←	✓
		Start	0.0000 Hz	←	←	✓
		Stop	0.0000 Hz	←	←	✓
		Control	OFF	←	←	✓
		Power	-10 dBm	←	←	✓
		Slope [xxdB/GHz]	0 dB/GHz	←	←	✓
		Slope [ON/OFF]	OFF	←	←	✓
	X-Axis		Normal (When Frequency Offset is set off.)	←	←	✓
			Response (When Frequency Offset is set on.)	←	←	✓
Shift LO Mode	Shift LO Mode		OFF	←	←	✓
		Maximum Frequency	14 GHz	←	←	✓

System

Key Operation				Default Value	Preset	*RST	Save/Recall
Invert Image				ON	←	←	√
Multi port Test Set Setup	Test Set 1	Select Test Set		E5091_9	←	←	√
		Control		OFF	←	←	√
		Property		OFF	←	←	√
		Port1		A	←	←	√
		Port2		T1	←	←	√
		Port3		R1+	←	←	√
		Port4		R1-	←	←	√
		Port5		X1	←	←	√
		Port6		Y1	←	←	√
		Port7		Z1	←	←	√
		Control Lines	Line 1	LOW	←	←	√
		Control Lines	...	LOW	←	←	√
		Control Lines	Line 8	LOW	←	←	√
	Test Set 2	Select Test Set		E5091_9	←	←	√
		Control		OFF	←	←	√
		Property		OFF	←	←	√
		Port1		A	←	←	√
		Port2		T1	←	←	√
		Port3		R1+	←	←	√
		Port4		R1-	←	←	√

		Port5		X1	←	←	√	
		Port6		Y1	←	←	√	
		Port7		Z1	←	←	√	
		Control Lines	Line 1	LOW	←	←	√	
		Control Lines	...	LOW	←	←	√	
		Control Lines	Line 8	LOW	←	←	√	
Misc Setup	Beeper	Beep Complete		ON	←	←	√	
		Beep Warning		ON	←	←	√	
		Talker/Listener Address		17	Non-changing	←		
		Power Meter Address		13	Non-changing	←		
	Signal Generator Address		Address		19	←	←	√
			Switching Time		100.00 ms	←	←	√
		Custom Commands	Prese t	""	←	←	√	
			Turn RF Out ON	"R3"	←	←	√	
			Set Frequency	"FR %f% HZ"	←	←	√	
			Set Power Level	"AP %p % DM"	←	←	√	
	Power Meter Setup	Select Type			GPIB	Non-changing	←	

		GPIB Address		13	Non-changing	←	
		USB					
	Power Limit Setup	Port 1	Enable	OFF	←	←	√
			Max Power	200 dBm	←	←	√
		Port 2	Enable	OFF	←	←	√
			Max Power	200 dBm	←	←	√
		Port 3	Enable	OFF	←	←	√
			Max Power	200 dBm	←	←	√
		Port 4	Enable	OFF	←	←	√
			Max Power	200 dBm	←	←	√
	Network Setup	Telnet Server		OFF	Non-changing	←	
		SICL-LAN Server		OFF	Non-changing	←	
		SICN-LAN Address		17	Non-changing	←	
		Web Server		OFF	Non-changing	←	
		MAC Address		-	Non-changing	←	
	Clock Setup	Show Clock		ON	←	←	√
	Key Lock	Front Panel & Keyboard Lock		OFF	←	←	
		Touch Screen & Mouse Lock		OFF	←	←	

Product Information

	Display Setup	Color Setup	Normal	Data Trace 1	Red: 5 Green: 5 Blue: 0	←	←	√
				Data Trace 2	Red: 0 Green: 5 Blue: 5	←	←	√
				Data Trace 3	Red: 5 Green: 0 Blue: 5	←	←	√
				Data Trace 4	Red: 0 Green: 5 Blue: 0	←	←	√
				Data Trace 5	Red: 5 Green: 4 Blue: 0	←	←	√
				Data Trace 6	Red: 5 Green: 3 Blue: 3	←	←	√
				Data Trace 7	Red: 3 Green: 4 Blue: 5	←	←	√
				Data Trace 8	Red: 5 Green: 4	←	←	√

					Blue: 4			
				Data Trace 9	Red: 3 Green: 4 Blue: 3	←	←	√
				Mem Trace 1	Red: 3 Green: 3 Blue: 0	←	←	√
				Mem Trace 2	Red: 0 Green: 3 Blue: 3	←	←	√
				Mem Trace 3	Red: 3 Green: 0 Blue: 3	←	←	√
				Mem Trace 4	Red: 0 Green: 3 Blue: 0	←	←	√
				Mem Trace 5	Red: 3 Green: 2 Blue: 0	←	←	√
				Mem Trace 6	Red: 3 Green: 1 Blue: 1	←	←	√

				Mem Trace 7	Red: 1 Green: 2 Blue: 3	←	←	√
				Mem Trace 8	Red: 3 Green: 2 Blue: 2	←	←	√
				Mem Trace 9	Red: 1 Green: 2 Blue: 1	←	←	√
				Graticule Main	Red: 3 Green: 3 Blue: 3	←	←	√
				Graticule Sub	Red: 1 Green: 1 Blue: 1	←	←	√
				Limit Fail	Red: 5 Green: 0 Blue: 0	←	←	√
				Limit Line	Red: 3 Green: 0 Blue: 0	←	←	√
				Background	Red: 0 Green: 0	←	←	√

					Blue: 0			
		Magnification			Normal			
	Channel/Trace Setup				9 Channels 9 Traces	Non-changing	←	
	Preset Setup	State			Factory	Non-changing	←	
		Confirm			ON	Non-changing	←	
Backlight					ON	←	←	
Service Menu	System Correction				ON	←	←	✓
	External Test Set				OFF	←	←	✓
	Init Src Ctrl				ON	←	←	✓
	Init Src Port				1	←	←	✓
	Security Level				None	←	←	✓
	Rf Range Fixed				OFF	←	←	✓

Trigger

Key Operation	Default	Preset	*RST	Save/Recall
Continuous	Continuous (Ch1) Hold (Other Ch)	←	Hold (all channels)	✓
Trigger Source	Internal	←	←	✓
Trigger Event	On Sweep	←	←	✓
Ext Trig Input	Negative Edge	←	←	✓
Ext Trig Delay	0.0000 s	←	←	✓
Low Latency	OFF	←	←	✓
Ext Trig Output	OFF	←	←	✓
Polarity	Positive Pulse	←	←	✓
Position	After Point	←	←	✓
Trigger Scope	All Channel	←	←	✓

Troubleshooting

Troubleshooting

This section describes the steps you should take when you believe the Agilent E5071C is operating improperly. The results of these simple investigative procedures may help you avoid the down-time and inconvenience of repair service. The troubleshooting instructions are divided into three categories.

When taking all solution but it does not work. Contact Agilent Technology's Customer Contact.

- Troubleshooting during Startup
- Troubleshooting during Operation
- Troubleshooting for External Devices

Troubleshooting during Startup

Symptom	Solution
Turning on (I) the standby switch does not start up the system.	<ul style="list-style-type: none"> • Confirm that the power cable is properly plugged in. • Confirm that the line switch on the rear panel is turned on. • Confirm that the USB memory is NOT connected on the USB connector.
The system starts up, but it automatically shuts down immediately.	Execute the system recovery.
The system starts up, but it enters the service mode (The instrument status bar in the lower right part of the screen displays SVC in red).	Execute the system recovery.
The measurement screen appears after startup, but the date and time displayed on the instrument status bar in the lower right part of the screen differ greatly from the previous settings.	Execute the system recovery.
The measurement screen appears after startup, but the power-on test is failed, with Error Message 241 appearing against a red background in the instrument message/warning area in the lower left part of the screen.	Execute the system recovery.

It is not possible to lock the removable hard disk after replacing it with another one.

Confirm that the connector at the rear end of the HDD is the same as the original HDD.

There are two types of connectors as shown in the following figure. If they are different, contact your Agilent service office.



e5071c449

Troubleshooting during Operation

Symptom	Solution
<p>The Error Message "Port N receiver overload" (N denotes a port number) is Displayed.</p> <p>During the measurement of an amplifier, Error Messages 221 through 224 "Port N receiver overload" (N denotes a port number) are displayed.</p> <p>This error occurs when the input to a test port exceeds the maximum input level in the measurement of an amplifier. The measurement value obtained in such a case is not correct. In the worst case, a failure (damage to the receiver) may occur.</p>	<ul style="list-style-type: none"> • Disconnect any cables and adapter on test ports. • Change the measurement condition so that the input to the test port does not exceed the maximum input level. • When you measure the 3rd harmonics over 8.5 GHz with options 2D5, 4D5, 2K5 and 4K5, it is recommended to suppress the carrier signal using filter etc before executing the measurement for accurate results.
<p>A Clearly Abnormal Measurement Value</p> <p>The measurement value is not reproducible, or clearly abnormal.</p>	<ul style="list-style-type: none"> • Confirm that the DUT, connection cables, and other parts are connected correctly. • Confirm that the connectors and cables used to connect the DUT are free from damage and poor contact. • Confirm that the calibration has been executed correctly. If you have not acquired a correct error correction factor, you cannot obtain a correct measurement value.

	<ul style="list-style-type: none"> • Confirm that the calibration kit was selected correctly. • Confirm that the calibration kit is defined correctly. • Confirm that if the stimulus signal output is turned on.
<p>The System Cannot be Operated Manually (Front Panel Keys, Keyboard, Touch Screen and Mouse)</p> <p>The keyboard or mouse becomes inoperable.</p>	<ul style="list-style-type: none"> • Confirm that the keyboard or mouse is connected correctly. When it is connected correctly, turn off the power once, and restart the system.
<p>The front panel key or keyboard becomes inoperable.</p>	<ul style="list-style-type: none"> • Using the mouse, turn System > Key Lock > Front Panel & Keyboard Lock OFF.
<p>The touch screen becomes inoperable.</p>	<ul style="list-style-type: none"> • Using the front panel keys, press System > Key Lock > Touch Screen & Mouse Lock OFF to turn OFF the lock. • Execute the calibration of the touch screen. • After the System Recovery, touch screen may be inoperable. See the Reconfiguring Touch Panel Setting in the installation guide.
<p>The mouse becomes inoperable.</p>	<ul style="list-style-type: none"> • Using the front panel keys, press System > Key Lock > Touch Screen & Mouse Lock to turn OFF the lock.
<p>All of the front panel keys, keyboard, and mouse become inoperable.</p>	<ul style="list-style-type: none"> • Confirm that the keyboard or mouse is connected correctly. When it is connected correctly, turn off the power once, and restart the system.
<p>The keyboard and mouse have been connected after power-on.</p>	<ul style="list-style-type: none"> • Turn off the power once, and restart the system. When taking all these measures does not recover operability, there is a possibility of a failure.
<p>The Screen Freezes and All Operations Become Impossible.</p> <p>The measurement in progress or screen update is stalled and all of the front panel keys, keyboard, mouse, and touch screen are inoperable.</p>	<ul style="list-style-type: none"> • Press the standby switch to turn off the power once, and restart the system.

The System Freezes while in Operation.	<ul style="list-style-type: none"> Press the standby switch to turn off the power once, and restart the system.
The Rear Cooling Fan Does Not Operate.	<ul style="list-style-type: none"> There is a possibility of a failure.
The Sweep Action Stops during Measurement or Is Not Executed. An Error or Warning Message Appears.	<ul style="list-style-type: none"> There is a possibility of a failure.
An error or warning message is displayed on the instrument message/warning area in the lower part of the screen	<ul style="list-style-type: none"> Refer to Error Messages and Warning Messages.
All front panel keys except Trace Prev , Trace Next , Trace Max and ENTRY block are inoperable.	<ul style="list-style-type: none"> Check if TDR is turned ON. If ON, turn OFF.

Troubleshooting for External Devices

Symptom	Solution
<p>Cannot Output to a Printer</p> <p>Cannot output a measurement screen or data to a printer.</p> <p>Attempting to output to a printer causes Error Messages 120 and 121 to appear.</p>	<ul style="list-style-type: none"> Confirm that the power to the printer is on and that the line cable is connected correctly. Confirm that the connector cable of the printer is connected correctly. Confirm that the printer is online. Confirm that the printer has not run out of paper. Confirm that the printer has not run out of ink.
<p>Does Not Respond to an External Controller/Fails to Function Normally</p> <p>A GPIB device does not respond to the external controller, or fails to function normally.</p>	<ul style="list-style-type: none"> Confirm that the GPIB address is defined correctly. Confirm that the GPIB cable is connected. Confirm that another instrument connected by the GPIB cable has the same GPIB address. Confirm that the GPIB cable connection forms a loop.
An ECal module can not be detected.	When you install the firmware A.09.31 and below in the HDD revision CN960 and above, this symptom may occur. Follow the following steps.

	<ol style="list-style-type: none">1. Disconnect all ECal module from E5071C.2. Execute the system recovery.3. Delete two files, AgtEcal.inf and AgtEcal.PNF in C:\WINDOWS\PNPDRVRS\AGILENT.4. Get the usbecal.inf file from http://www.agilent.com/find/ena_firmware5. Put this file into C:\WINDOWS\PNPDRVRS\AGILENT.6. Reinstall the firmware.7. Install the Ecal Driver.
The E5071C hung up when two (or more) ECals are connected/disconnected at the same time.	<p>When you install the firmware A.09.60 and above in the HDD revision CN954 and below, this symptom may occur. Follow the following steps.</p> <ol style="list-style-type: none">1. Disconnect all ECal module from E5071C.2. Execute the system recovery.3. Delete two files, USBECAL.inf and USBECAL.PNF in C:\WINDOWS\PNPDRVRS\AGILENT.4. Get the AgtEcal.inf and ausbtmc.sys files from http://www.agilent.com/find/ena_firmware.5. Put these two files into C:\WINDOWS\PNPDRVRS\AGILENT.6. Reinstall the firmware.7. Install the Ecal Driver.

Maintenance

Maintenance

- Backing Up the Data
- Cautions Applicable to Requesting Repair, Replacement, Regular Calibration, etc.
- Cleaning this Instrument
- Removing Log Data
- Removing/Mounting Removable Hard Disk
- Replacement of Parts with Limited Service Life
- System Recovery
- Service Menu
- Updating Firmware
- System Verification
- Solid State Drive (SSD) Optimization

Backing Up the Data

Be sure to back up regularly your important data (including program) files in this instrument to a CD-R or other backup medium. Agilent Technologies shall not be liable for any data damages caused by troubles of this instrument.

Making Backup Files

You can make backup files on the hard disk of an external PC using following methods.

You can access to drive D: of the E5071C from an external PC via LAN, and copy your important data files on the drive D: to the external PC. See Accessing Hard Disk of E5071C from External PC for details.

You can transfer your important data files on the drive D: of the E5071C to the external PC using :MMEM:TRAN command via GPIB.

CAUTION

Do not modify any files and folders in drives other than drive D:. Doing so will cause malfunctions.

Other topics about Maintenance

Cautions Applicable to Requesting Repair, Replacement, Regular Calibration, etc.

- Backing Up Data in the Hard Disk
- Devices to be Sent Back for Repair or Regular Calibration

Other topics about Maintenance

Backing Up Data in the Hard Disk

The user is requested to back up the stored programs and data into external media by using the instrument's storing function before requesting the Company's Service Center to repair the instrument or replace hard disks.

See Making Backup Files for how to make backup files.

Please take note that the Company will not be held liable to any extent for potential erasure or change of stored programs or data due to the repair or replacement of hard disks performed by the Company. When a hard disk itself fails, the programs and data stored in it cannot be recovered.

Devices to be Sent Back for Repair or Regular Calibration

If it is necessary to send the unit to the Service Center of Agilent Technologies for repair or regular calibration, please follow the instructions below.

Equipment to be Sent

When requesting repair or regular calibration of the unit by our Service Center, send only the E5071C main unit without any installed option you may have ordered. Unless specifically instructed, it is not necessary to send accessories and calibration kits.

Packing

Use the original package and shock absorbers, or equivalent anti-static packing materials, when sending the unit.

Shipping Address

For the location of the nearest Agilent Technologies Service Center, contact the Customer Contact.

Recommended Calibration Period

The recommended calibration period for this instrument is one year. The user is recommended to request the Company's Service Center to perform regular calibration every year.

Product Warranty Period

The actual warranty of the instrument depends on the date it was ordered and whether any warranty options were purchased or not at that time. To determine the exact warranty period on your instrument, contact Agilent Technologies with the model and serial number of the instrument.

E5071C

For online information about Agilent's service and support, visit: http://www.agilent.com/find/tm_services.

Cleaning this Instrument

- Cleaning an LCD
- Maintenance of Test Ports and Other Connectors/Ports
- Cleaning a Display Other than an LCD

Other topics about Maintenance

This section describes how to clean the instrument.

To protect yourself from electrical shock, be sure to unplug the power cable from the outlet before cleaning the instrument.

Never clean the internal components of the instrument.

Cleaning an LCD

Use one of the following methods to clean the display surface regularly.

- For normal cleaning, rub the surface gently with a dry, soft cloth.
- When stains are difficult to remove, gently wipe the surface with cloth dampened with a small amount of ethanol or isopropyl alcohol. You can clean the standard type LCD (no touch screen function) with a cloth dipped in water and then wrung tightly.
 - Do not use chemicals other than ethanol and isopropyl alcohol to wet the cleaning cloth. To clean the touch screen LCD, do not wet the cloth with water.

Maintenance of Test Ports and Other Connectors/Ports

Test ports on the front panel of the E5071C are fitted with N Type connectors (f). Stains or other damage to these connectors would significantly affect the accuracy in measurements in the RF range. Always pay attention to the following precautions.

- Always keep the connectors free from stains and dust.
- Do not touch the contact surface on the connectors.
- Do not plug damaged or scratched connectors into the test ports.
- Use compressed air for cleaning connectors. Do not use abrasives under any circumstance.

The above precautions must also be observed in maintaining connectors and ports other than these test ports.

Cleaning Parts Other than the LCD, Test Ports, and Other Connectors/Ports

To remove stains on parts other than the LCD, test ports, and other connectors/ports of the instrument, wipe them gently with a soft cloth that is dry or wetted with a small amount of water and wrung tightly.

Removing Log Data

The E5071C creates automatic log of data for troubleshooting purpose. For security reasons, if this data needs to be deleted, then SCPI.SERVICE.LOGGING.CLEAR command can be used to clear the log recorded by the E5071C.

The log file stores data related to:

- Total power ON time
- Number of times of power ON
- Result of power ON test
- Number of switching time of step attenuator
- Number of time of overload
- Number of aborted time
- Windows event log
- Hardware configuration (Board ID, Revision , Serial number)
- Hardware driver installation/error Log
- Connected USB device Log
- User calibration log
- Firmware error Log
- Temperature of analog boards
- Internal test result

Other topics about Maintenance

Removing/Mounting Removable Hard Disk (Option 017 User Only)

- Overview
- Backing_Up_Retributing_Option_Data
- Removing Removable Hard Disk (Type I)
- Mounting Removable Hard Disk (Type I)
- Removing Removable Hard Disk (Type II)
- Mounting Removable Hard Disk (Type II)
- Writing System Correction Data from Backup Memory to Removable Hard Disk

Other topics about Maintenance

Overview

This section provides information on how to mount and remove a removable hard disk as well as write the system correction data.

For calibration or repair of the E5071C, send it with the removable hard disk mounted.

If you replace the removable hard disk, make sure to retrieve the system correction data and option data after mounting the hard disk

Backing Up/Retributing Option Data

1. Back up the license key file for software option before removing hard disk.
2. Place the license key file after mounting the hard disk.

Removing Removable Hard Disk (Type I)

Follow the steps below to remove a removable hard disk.

1. Turn off the power.
2. Insert the key (furnished, Agilent Part Number 0960-2562) in the lock and turn clockwise.
3. Press the button under the lock and remove the hard disk. It may be too rigid to remove by fingers. In that case, use some tool such as a

flat-blade screw driver to remove it.



e5071c190

4. Do not attempt to unlock the key and remove the hard disk when the power is on. Doing so will turn off the power automatically.

WARNING

Be careful not to be hurt your hands while removing the hard disk.

Mounting Removable Hard Disk (Type I)

Follow the steps below to mount a removable hard disk.

1. Insert the hard disk into the slot.
2. Turn the key to the left until it is locked.
3. Remove the key.
4. Turn on the E5071C.
5. The "U" is displayed at the 8 segment LED on next to the removal hard disk when E5071C is turned on without key lock.

CAUTION

The key is available to remove even in Unlocked state. Before power on, confirm if Removable hard disk is locked completely.

Removing Removable Hard Disk (Type II)

Follow the steps below to remove a removable hard disk.

1. Turn off the power.
2. Insert the key (furnished, Agilent Part Number 5188-4426) in the lock and turn anti-clockwise.



ssa0153

3. Open the screw in clockwise direction.



ssa0154

E5071C

4. Press the button under the screw.



ssa0155

5. Remove the hard disk.



ssa0156

6. Do not attempt to unlock the key and remove the hard disk when the power is on. Doing so will turn off the power automatically.

Mounting Removable Hard Disk (Type II)

Follow the steps below to mount a removable hard disk.

1. Insert the hard disk into the slot.
2. Turn the screw in anti-clockwise direction until it is locked.
3. Turn the key to the right until it is locked.
4. Remove the key.
5. Turn on the E5071C.
 6. The key is available to remove even in Unlocked state. Before power on, confirm if Removable hard disk is locked completely.

Writing System Correction Data from Backup Memory to Removable Hard Disk

The following procedure shows how to write the system correction data stored in the backup memory to the newly mounted removable hard disk.

E5071C

1. Turn on the E5071C.
2. Press **Macro Setup** key.
3. Click **Load Project...** in the softkey menu.
4. Select **RestoreSysCorFile.vba** from the **D:\Agilent\Service** folder and then press the **Open** button.
5. Press **Macro Run** key
6. The RestoreSysCorFile dialog box appears.
7. Click **OK**.
 8. Once the program has terminated, restart the E5071C to enable the system correction data.

Replacement of Parts with Limited Service Life

This instrument incorporates parts with limited service life as shown in the following table. Using the recommended replacement time as a guide, request the Agilent Service Center to replace these parts. However, a part may need to be replaced at an earlier time than that listed in the table, depending on such conditions as location, frequency of use, and where it is stored.

NOTE

Each service life and recommended replacement time listed below is for reference only and does not imply a guarantee of the part's service life.

Part Name	Service Life (Parts supplier reference value)	Recommended replacement time
Hard Disk Drive (HDD)	5 years or 20,000 operating hours, whichever comes earlier. Exchanging hard disk drives causes the contents written after shipment from the factory (LAN setup, etc.) to be initialized to the state at the time of shipment. The programs and data stored in Drive D (user directory) are erased.	3 years
Main fan	50,000 operating hours. The service life may be significantly shorter when used in a dusty and dirty environment.	5 years
CPU fan		
Battery on Mother board	50,000 operating hours. The service life may be shorter if E5071C power has not been turned on for long time.	5 years
Power supply	50,000 operating hours (Depends on the service life of the power supply cooling fan) The service life may be significantly shorter when used in a dusty and dirty environment.	5 years
LCD screen backlight	50,000 operating hours. When the unit is used for automatic measurements in a production line and the on-screen information is not required, the life of the LCD backlight can be saved by turning it off. As for the method of turning the backlight off, refer to Turning off the LCD Screen Backlight.	5 years
Touch screen (function)	One million times (dotting life)	5 years

E5071C

USB receptacle	1,500 cycles insertion/extraction. The service life may be shorter when used in a dusty and dirty environment. In case that the insertion/extraction is in heavy usage such as Ecal in the production line, using USB extension cable may save the USB receptacle life.	N/A
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Other topics about Maintenance

System Recovery

By executing system recovery, you can return the Windows operating system of the E5071C to the factory state or the user state at the setting the user performed save user state.

NOTE User state recovery function is available at HDD revision CN924 and below.

The procedure of system recovery is described in both Installation Guide and Service Guide.

Other topics about Maintenance

Updating Firmware

- Overview
- Procedure

Other topics about Maintenance

Overview

Users can update E5071C firmware by themselves. The latest firmware can be downloaded from the http://www.agilent.com/find/ena_firmware.

Updating firmware does not include the following software update:

- Windows Operating System
- VBA (Visual Basic for Application)
- Driver for Windows
- Calibration Constant Data

When E5071C firmware is updated from version A.08.12 to A.09.10, the update process may interrupt, and all of update actions may stop without generating any warning message. When such case happens, reboot the Windows. After rebooting, firmware update process will start again.

Procedure

NOTE

If you have E5071C-TDR option installed, turn OFF this option before updating the firmware: **Analysis > TDR (OFF)**.

1. Download the latest firmware from the http://www.agilent.com/find/ena_firmware.
2. Download the execution file (**E5071C_xx.xx.exe**).
3. Run the **E5071C_xx.xx.exe** to extract the **E5071C.msi**.
4. If you use your local PC to download, save the file to a USB mass storage device in order to move it to E5071C. Connect the USB mass storage device into the front USB port of the E5071C.
5. Copy or move the **E5071C.msi** file to D drive.
6. Press **System > Service Menu > Update Firmware**. Then, the password dialog box appears.
7. Type **e507xa** as the password, then click **OK**.
8. In **Open** dialog box, select **E5071C.msi**, then press **Open**. Then the windows installer appears.
9. Follow the instruction of windows installer.
10. After the installation is finished, the firmware restarts.

11. Press **System** > **Firmware Revision** to confirm the firmware revision you have just installed.

Installing E5071C-TDR Option

1. Download the latest TDR software from the http://www.agilent.com/find/ena-tdr_firmware.
2. Download the execution file (**E5071C_opt_TDR_xx.xx.exe**).
3. Ensure that you have updated the E5071C firmware.
4. Press **System** > **Service Menu** > **EXIT** to exit the E5071C measurement application.
5. Run the **E5071C_opt_TDR_xx.xx.exe** to extract the **E5071C_opt_TDR.msi**.
6. If you use your local PC to download, save the file to a USB mass storage device in order to move it to E5071C. Connect the USB mass storage device into the front USB port of the E5071C.
7. Copy or move the **E5071C_opt_TDR.msi** file to D drive.
8. Double-click **E5071C_opt_TDR.msi**.
9. If you are installing for the first time, select **Install Option TDR on E5071C Instrument (default)**.
10. Follow the instruction of window installer.
11. After the installation is finished, double-click the Network Analyzer icon on the desk top to restart the E5071C firmware.
12. Click **About E5071C-TDR** button in E5071C-TDR option tool bar to confirm the option revision you have just installed.

Service Functions

This menu (**System** > **Service Menu** > **Test** and **Service Functions**) provides information related to various test related to the E5071C.

For more information about any test related to the E5071C, like System Test, please refer to the E5071C Service manual available at <http://www.agilent.com/find/e5071c-manual>.

Under service menu, the following topics are described in this help.

Other topics about Maintenance

System Verification

The performance of the network analyzer is specified in two ways: system specifications, and instrument specifications. It is the end users' responsibility to determine which set of specifications is applicable to their use of the E5071C.

A network analyzer measurement "system" includes the analyzer, calibration kit, test cables, and any necessary adapters. The system verification software in the E5071C is used to verify the system's conformance to the "system" specifications. A "pass" result demonstrates that the analyzer, test cables, and adapters, perform correctly as a system. It DOES NOT demonstrate that any one component performs according to its individual specifications. A change to any part of this measurement system requires a re-verification of the system.

Instrument specifications specify the network analyzer's uncorrected measurement port characteristics and its output and input behavior. The E5071C performance tests are used to verify the analyzer's conformance to "instrument" specifications.

The System Verification utility verifies the E5071C's system specifications by automatically measuring the magnitude and phase for all four S-parameters for each verification device, and comparing the values against the following:

- Factory measured data from files on the verification disk
- Limit lines based on the measurement uncertainty

System Verification requires the use of a Calibration Kit and Verification Kit which has been certified within the past 12 months by Agilent. System Verification can NOT be used to perform this kit certification.

- [Equipment Used in the System Verification](#)
- [Precautions for Handling Airlines](#)
- [Flow Diagram of Procedure](#)
- [System Verification Program](#)
- [Procedure for System Verification](#)
- [If the System Fails the Verification Test](#)
- [System Verification Results](#)

Other topics about Maintenance

NOTE

Although the performance for all S-parameters is measured, the S-parameter phase uncertainties for reflection

measurements are less important for verifying system performance. Therefore, the limit lines will not appear on the printouts.

Equipment Used in the System Verification

Supported Verification Kit:

- 85053B, 3.5 mm, 300 kHz - 26.5 GHz
- 85055A, Type-N, 300 kHz - 18.0 GHz
- 85051B, 7 mm, 300 kHz - 18 GHz

The combination of Calibration Kit and Verification Kit

The combination of Calibration Kit and Verification Kit that can be used is as follows:

Cal kit	Connector	Kit Type	Verification Kit	Minimum Frequency	Maximum Frequency
85033D	3.5 mm	Mechanical	85053B	-	6 GHz
85033E	3.5 mm	Mechanical	85053B	-	9 GHz
85052D	3.5 mm	Mechanical	85053B	-	26.5 GHz
85052C	3.5 mm	Mechanical	85053B	-	26.5 GHz
85093B	3.5 mm	ECal**	85053B	300 kHz	9 GHz
85093C	3.5 mm	ECal**	85053B	300 kHz	9 GHz
N4433A	3.5 mm	ECal**	85053B	300 kHz	20 GHz
N4691A	3.5 mm	ECal**	85053B	10 MHz	26.5 GHz
N4691B	3.5 mm	ECal**	85053B	300 kHz	26.6 GHz
85032B/E	Type-N	Mechanical	85055A	-	6 GHz
85032F	Type-N	Mechanical	85055A	-	9 GHz
85054D	Type-N	Mechanical	85055A	-	18 GHz

		al			
85092B	Type-N	ECal**	85055A	300 kHz	9 GHz
85092C	Type-N	ECal**	85055A	300 kHz	9 GHz
N4432A	Type-N	ECal**	85055A	300 kHz	18 GHz
N4690A	Type-N	ECal**	85055A	10 MHz	18 GHz
N4690B	Type-N	ECal**	85055A	300 kHz	18 GHz
85031B	APC-7mm	Mechanical	85051B	-	6 GHz
85050C	APC-7mm	Mechanical	85051B	-	18 GHz
85050D	APC-7mm	Mechanical	85051B	-	18 GHz
85091B	APC-7mm	ECal**	85051B	300 kHz	9 GHz
85091C	APC-7mm	ECal**	85051B	300 kHz	9 GHz
N4696A	APC-7mm	ECal**	85051B	10 MHz	18 GHz
N4696B	APC-7mm	ECal**	85051B	300 kHz	18 GHz
N4431A*	3.5 mm	ECal**	85053B	300 kHz	9 GHz
N4431B*	3.5 mm	ECal**	85053B	9 kHz	13.5 GHz
N4431A*	Type-N	ECal**	85055A	300 kHz	9 GHz
N4431B*	Type-N	ECal**	85055A	9 kHz	13.5 GHz

NOTE

The results from the verification kit other than following combination are not warranted specification:

E5071C 3GHz, 4.5GHz, 6.5GHz, 8.5GHz (Option 230/235/240/245/260/265/280/285/430/435/440/445/460/465/480/485)

Calibration Kit: 85032F, 85033E Electronic calibration (ECal) module: 85092C, 85093C

E5071C 14GHz, 20GHz (Option 2D5/2K5/4D5/4K5)

Calibration Kit: 85052D

NOTE * The connection of the N4431x is for the thru path A-B, C-D, A-D, and B-C.

NOTE ** The supported connector type is "male-female".

Cable Substitution

The test port cables specified for the E5071C have been characterized for connector repeatability, magnitude and phase stability with flexing, return loss, insertion loss, and aging rate. Since test port cable performance is a significant contributor to the system performance, cables of lower performance will increase the uncertainty of your measurement. It is highly recommended that the test port cables be regularly tested.

If the system verification is performed with a non-Agilent cable, ensure that the cable meets or exceeds the operation of the specified cable.

Cable Flex Factor

Flex Factor determines how much of the cable phase uncertainty to include in determining the limit lines.

Set to 0% (zero) if the cables are held down in a fixture and are not allowed to move during the calibration and verification.

Set to 100% if the cables are allowed to move a lot.

Calibration Kit Substitution

Non-Agilent calibration kits are not recommended nor supported.

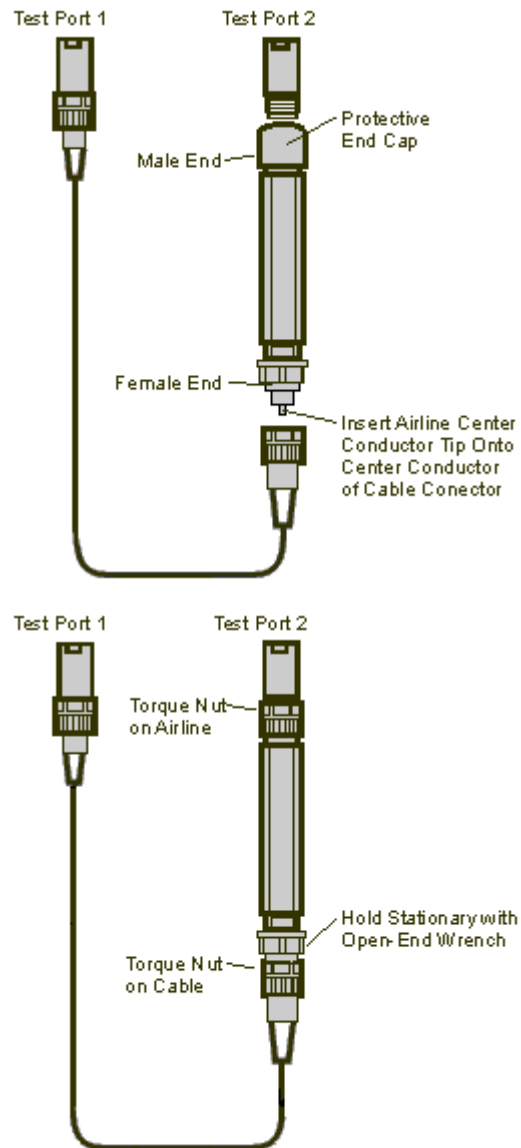
Precautions for Handling Airlines

When you are using the airlines in the Verification Kit, observe the following practices to ensure good measurement techniques.

Be very careful not to drop the airline's center or outer conductor. Damage will result if these devices are dropped.

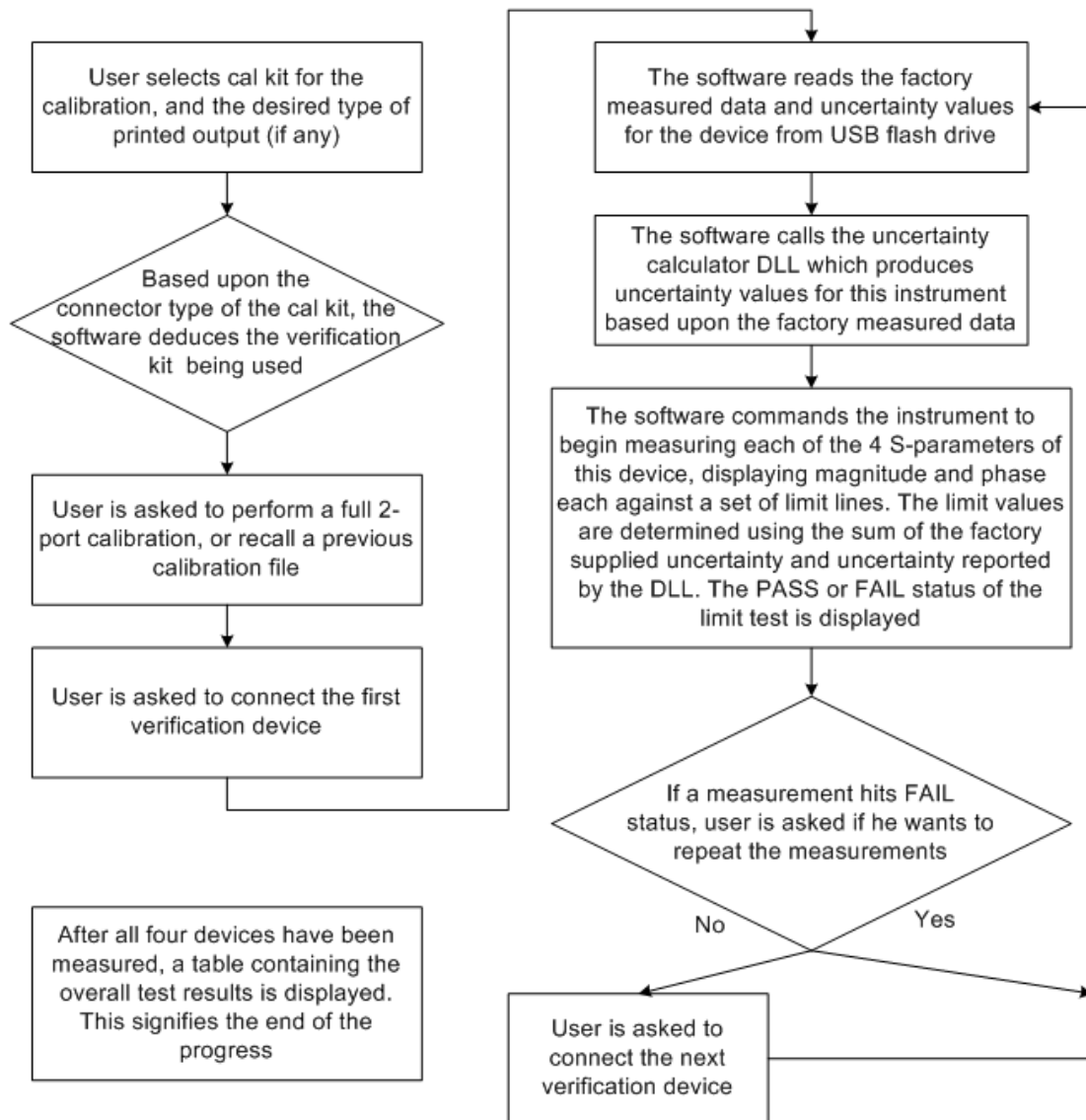
Use proper Electro-Static Discharge (ESD) procedures.

Clean your hands or wear gloves as skin oils will cause a change in electrical performance.



Flow Diagram of Procedure

The operational flow of the software is depicted by the flowchart shown below.

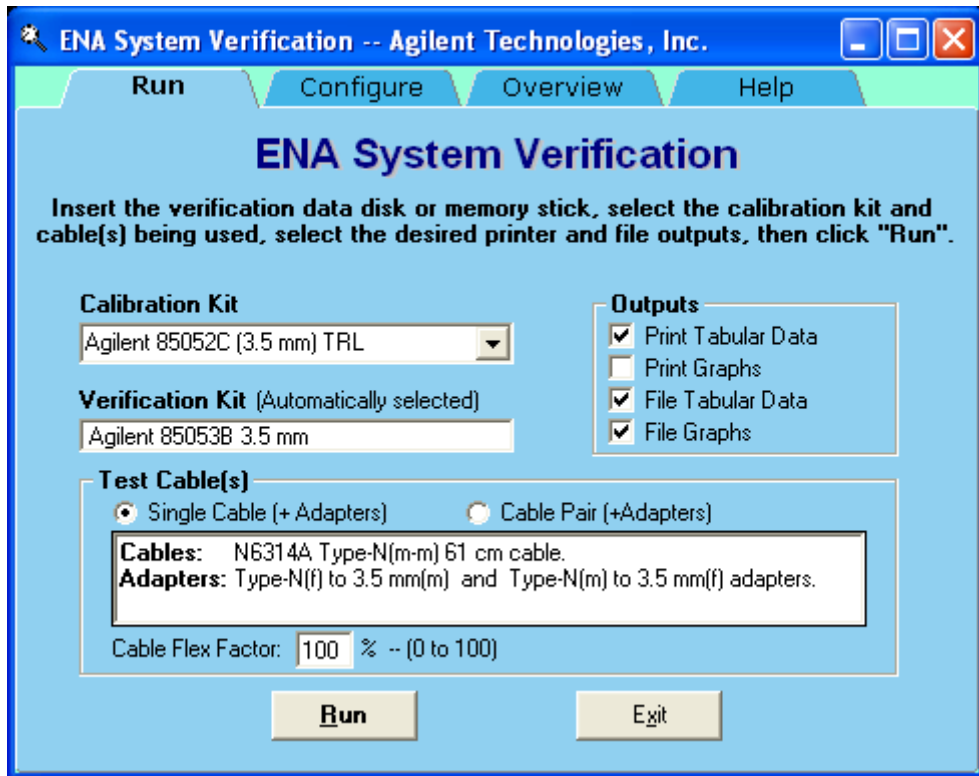


System Verification Program

There are four tabs in the E5071C System Verification program:

- Run
- Configure
- Overview
- Help

Run



1. **Calibration Kit:** Select the calibration kit or ECal module that is being used.
2. **Verification Kit:** The corresponding Verification Kit to use appears in the **Verification Kit** box. Refer to [the combination of Calibration Kit and Verification Kit](#) table.
3. **Test Cable(s):** Select the method of connecting ports and Calibration/Verification Kit of E5071C. It is necessary to connect Calibration Kit and Verification Kit to E5071C with the same cable connection.

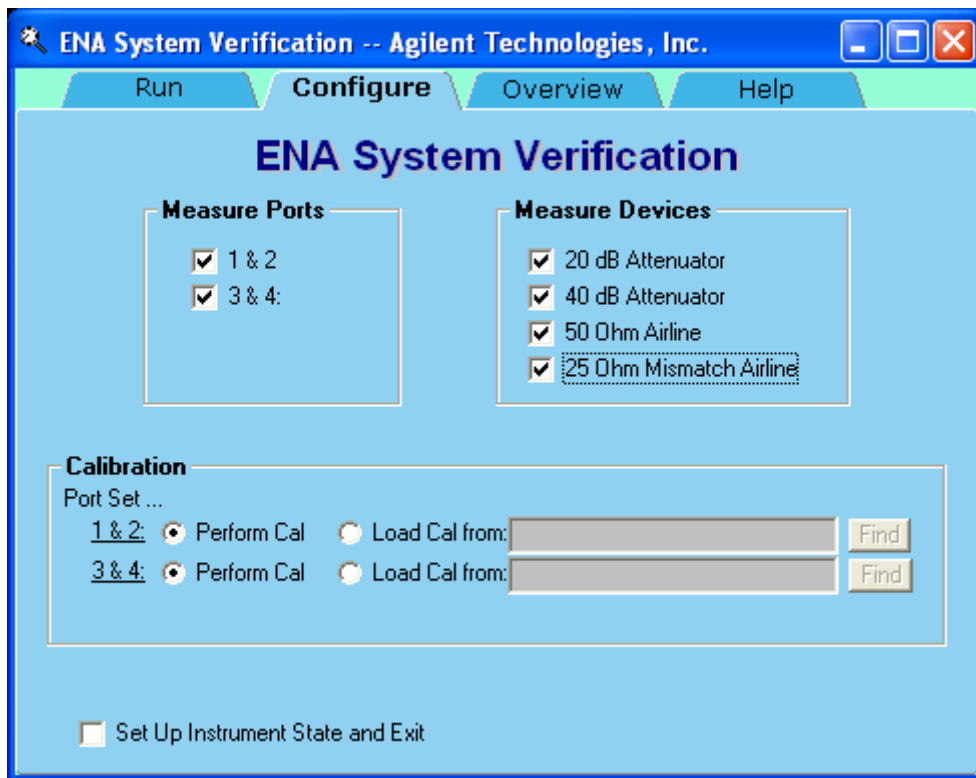
When calibration or verification is measured (2 port measurement), E5071C ports are connected to ports of kit by the following options:

- **Single Cable:** One side of the port is connected to the port of E5071C and kit directly. The other port is connected through Cable.
- **Cable Pair:** Both ports are connected to both ports of E5071C and kit through Cable.
- **Cable Flex Factor:** Flex Factor determines how much of the cable phase uncertainty should be included in determining the limit lines.

- Set to 0% (zero) if the cables are held down in a fixture and are not allowed to move during the calibration and verification.
 - Set to 100% if the cables are allowed to move extensively.
4. **Outputs:** Select the Verification result output format from one of the following options.
- **Print Tabular Data:** Prints the Verification data in tabular form which includes measured data and uncertainty limits.
 - **Print Graphs:** Prints the Verification data in graphical form. It is the screen image of the Verification result of a measurement is printed as output. The graphic form includes the measured data trace, factory supplied data trace and uncertainty limits.
- NOTE** When you select Print Graphs, proceed to the next step once the printing is completed. Otherwise, printer error will occur.
- **File Tabular Data:** Writes the Verification data in tabular form to a text file. The file is stored as SysVer(Date)(Time)(Ports).txt and saved under the directory of "D:\SysVer", where Date=yyyymmdd (ex. 20101016), Time=hhmm (ex. 1520), Ports=Pnm (ex. P12). An example of a filename is SysVer201010161520P12.txt.
 - **File Graphs:** Saves a screen image in .PNG format. The file is stored as SysVer(Date)(Time)(Ports)(DevNo)(Param).png and saved under the directory of "D:\SysVer", where DevNo=Device Number (ex. Dev1), Param=M or P (M is for LogMag or LinMag, P is for Phase). An example of a filename is SysVer201010161520P12Dev1M.png.
5. Click **Run** button to start the Verification procedure. Follow the instructions on the E5071C for performing the System Verification, inserting the Verification devices as prompted.
6. Click **Exit** button to exit the Verification program.

NOTE For the System Verification to be truly adequate, the software must measure all devices in the kit with a recent calibration applied. Removing and reattaching any test port cables or adapters invalidates all previous calibrations.

Configure



1. **Measure Ports:** The port pair that executes verification measurement is selected.
 - **1 & 2 :** Port 1 and Port 2
 - **3 & 4 :** Port 3 and Port 4 (This option is not displayed on 2 port E5071C model)

In 4 ports E5071C model, both options are selected as default. At least one option should be selected.

In 2 ports E5071C model, option *1 & 2* is selected and it cannot be changed.

2. **Measure Devices:** Select the device in the verification kit to execute the measurement from the following options. By default, all options are selected and at least one option must be selected. In general, all items should be measured. When you disable all items, *20 dB Attenuator* is automatically selected:
 - **20 dB Attenuator**
 - **40 dB Attenuator**
 - **50 Ohm Airline**
 - **25 Ohm Mismatch Airline**
3. **Calibration:** Select the method of acquiring the calibration data in the Verification procedure from the following options.

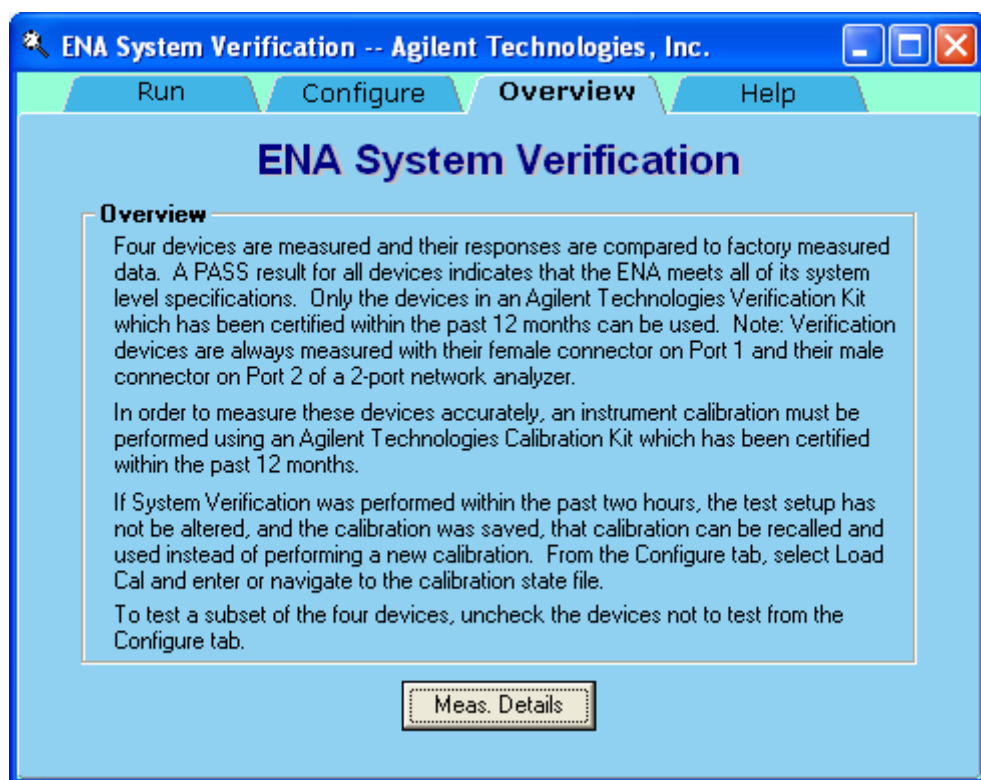
- **Perform Cal:** Calibration data is acquired from the actual Calibration measurement.
- **Load Cal from:** Calibration data is recalled from the State file. The State file should include the full 2 port calibration for the corresponding ports.

The radio button for unselected options are disabled.

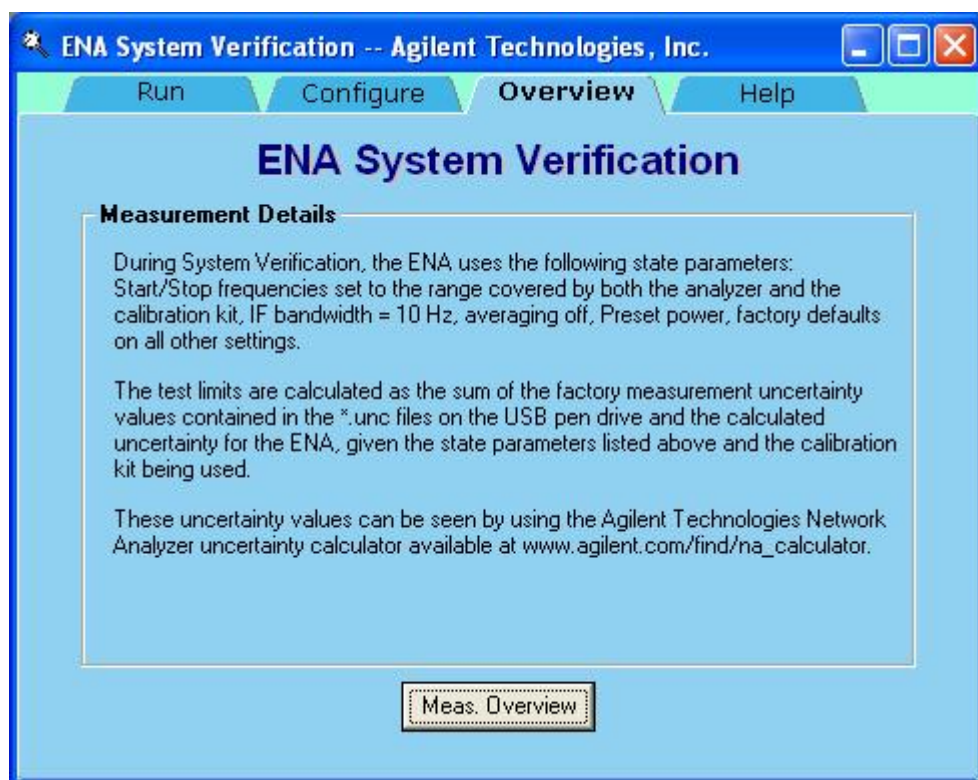
In 2 ports E5071C model, the option and entry for Port 3 & 4 is not displayed.

4. **Set Up Instrument State and Exit:** If this check box is checked, only set up is performed and the program is terminated thereafter without executing the verification process. If this check box is un-checked, the verification process is executed once the set up is performed.

Overview



1. This tab displays the overview of the ENA System Verification. Click **Meas. Details** to view the Verification measurement details. Click Meas. Overview to toggle back to ENA System Verification overview.



Help



1. This tab displays the information of the ENA System Verification and links to online help topics.

Procedure for System Verification

1. If you want printed test outputs, connect a printer to the E5071C.
 2. Let the E5071C warm up for at least 90 minutes.
 3. Insert the Verification Kit USB flash drive into the E5071C's USB port.
 4. On the **System** menu, point to **Service Menu > Test Menu > System Verification**. The System Verification window is displayed.
 5. Select calibration kit or ECal module in the **Calibration Kit** box.
 6. Setup the configuration in **Run** tab and **Configure** tab as required.
- If you click **Cancel**, **Abort**, **Abort All Measurements** button in one of the following steps, the program returns to the main menu.
7. Click the **Run** button.
 8. Type the serial number for both Calibration kit and Verification kit, then click the **Continue** button.
 9. The user-entered serial number is printed on the Verification result report. If not necessary, blank is acceptable.

Kit Serial Numbers

If you would like kit serial numbers printed in the test report, provide them below. When done, click Continue.

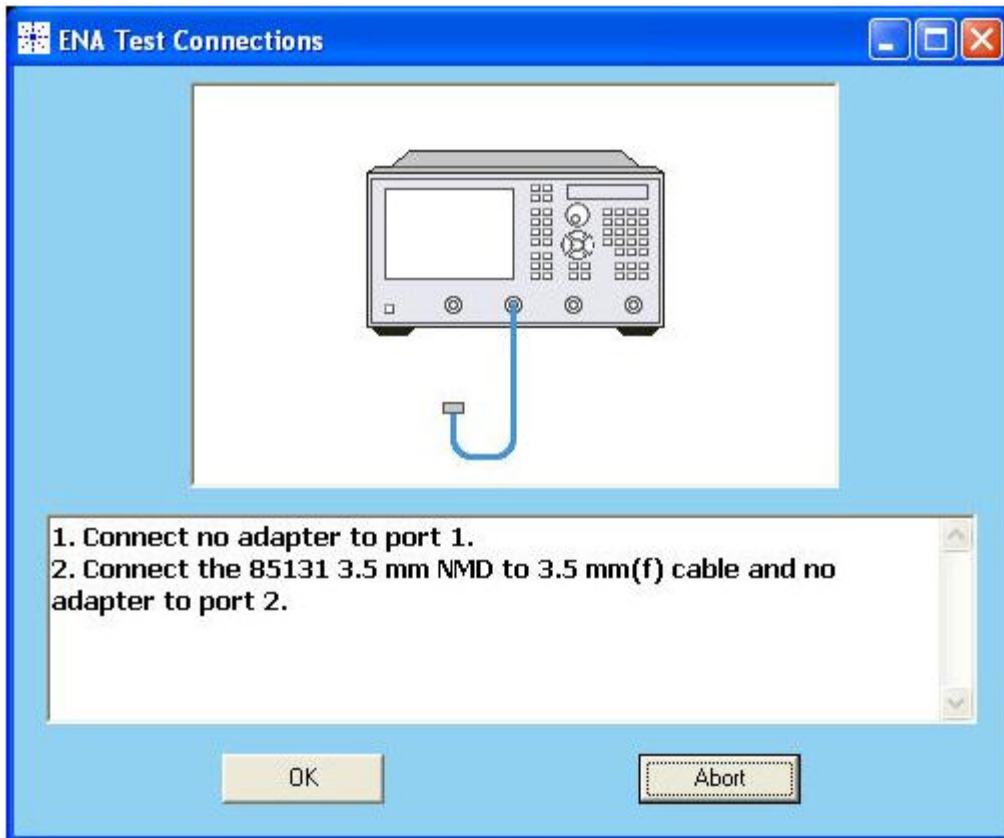
Calibration Kit

Verification Kit

Continue

10. Connect the cable with E5071C ports, and Calibration Kit (or ECal) with adapter, then click **OK**.
11. The connection is depends on the selected Calibration Kit, test cables configuration (Single Cable or Cable Pair) and E5071C model used. The following figure shows an example case of E5071C 20GHz with Calibration Kit 85033D and Single Cable.

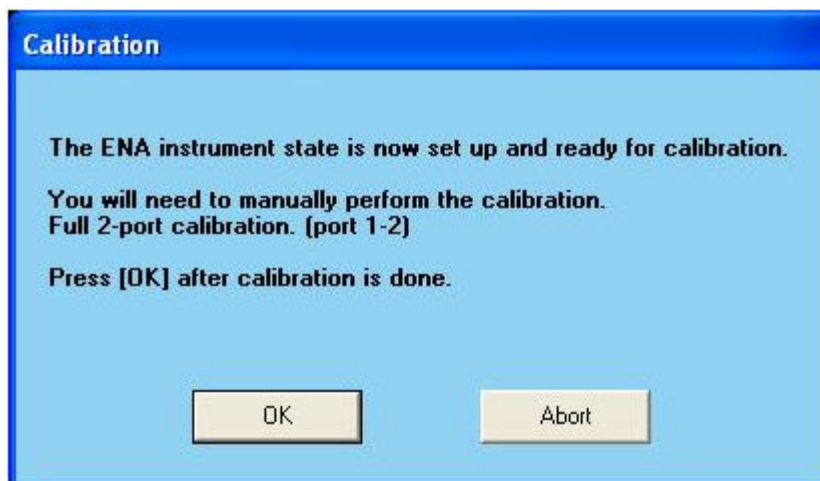
NOTE At single cable connection for the E5071C option x3x/x4x/x6x and x8x, a precision m-m adapter at port 1 and m-f cable at port 2 can be used instead for easy airline connection. The test result is regarded as typical.



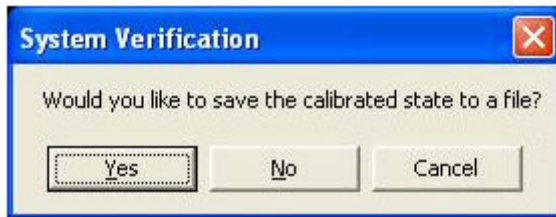
12. Calibration Execution:
- Press **Cal** key on the E5071C front panel and execute full 2 ports calibration.

NOTE

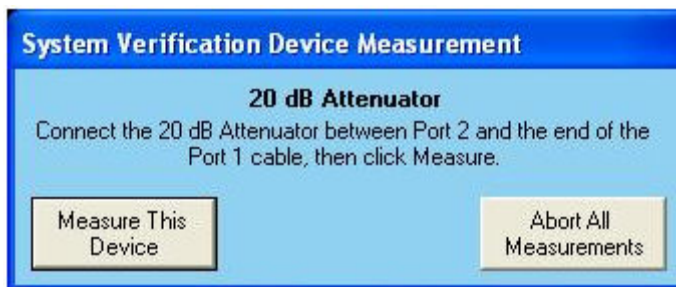
Once you have completed calibration, click **OK** in the following dialog box to proceed with the next step.



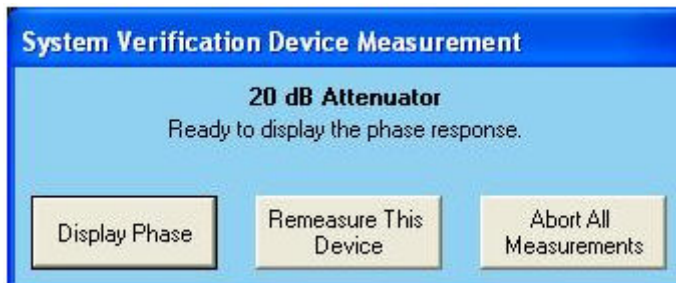
- b. When the calibration is performed correctly, the following dialog box is displayed. If you want to save the calibration result into the State file, click **Yes**. Otherwise, click **No**.



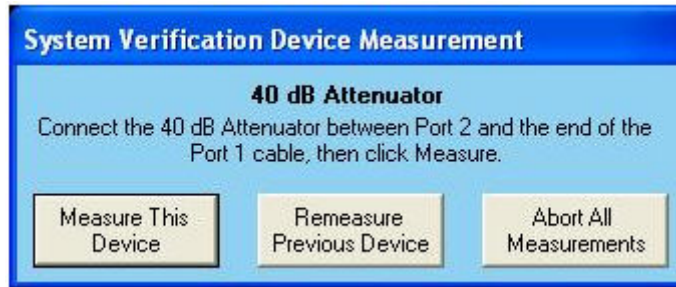
- c. If the *Load Cal from* is selected from the **Calibration** option of the **Configure** tab, then this step is skipped. Instead of executing calibration, the selected State file is recalled. Then, the calibration data is set up.
13. Verification Execution:
- a. Execute the Verification measurements for the devices selected under **Measure Devices** options of the **Configure** tab.
- b. Follow the instruction displayed in the dialog.
- c. Connect the Verification Kit device, then click **Measure This Device** to measure. The result is displayed in the graph display area on the E5071C screen.



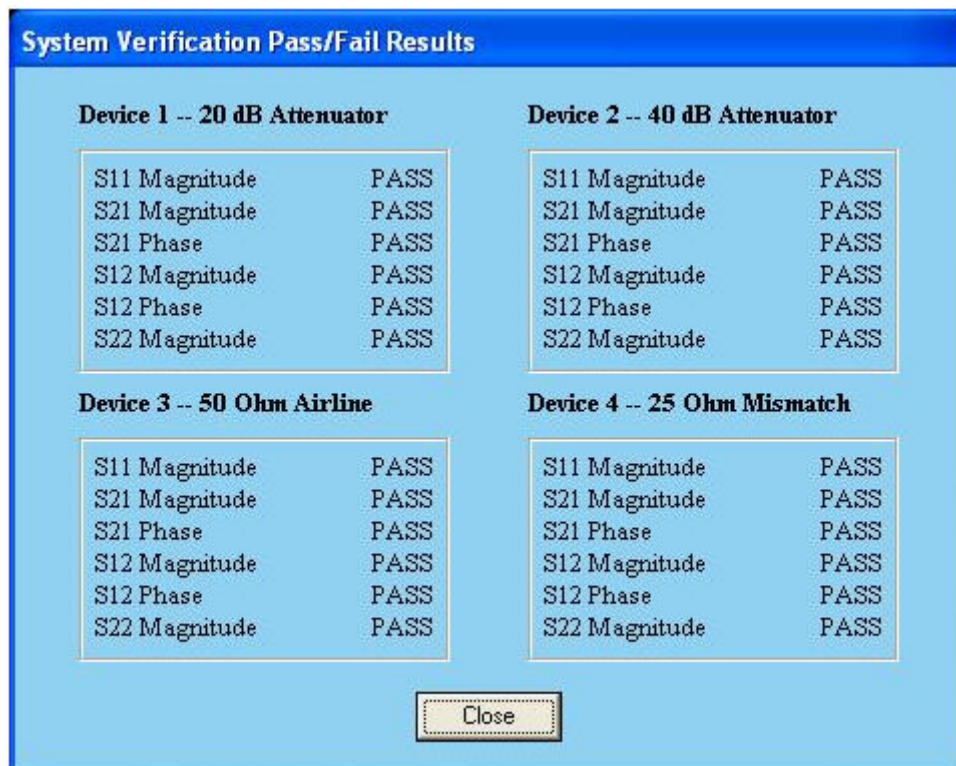
- d. Once the measurement is completed, the following dialog is displayed:



- e. Click **Display Phase** to change the display format of the graph into Phase. Instruction on the next step for the next device measurement (40 dB Attenuator) is displayed in the following dialog box:

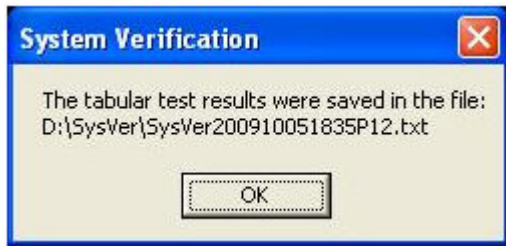


- f. Click **Remeasure This Device** to return to the previous dialog so that you can re-measure the same device (20 dB Attenuator).
 - g. Similarly, repeat step c to e in order to measure all the devices.
 - h. Click **Remeasure Previous Device** to return to the previous measurement (in this example, 20 dB Attenuator).
14. Displaying the result of Verification Measurement
- a. Once all the verification measurements for the selected devices are completed, the following result is displayed. It shows the PASS and FAIL status for each measurement.



- b. Click **Close** to close the dialog box.
15. Saving the Verification result into a file

- a. If the *File Tabular Data* is selected as the **Outputs** option in the **Run** tab, the following dialog is displayed. If it is not selected, this step is skipped.



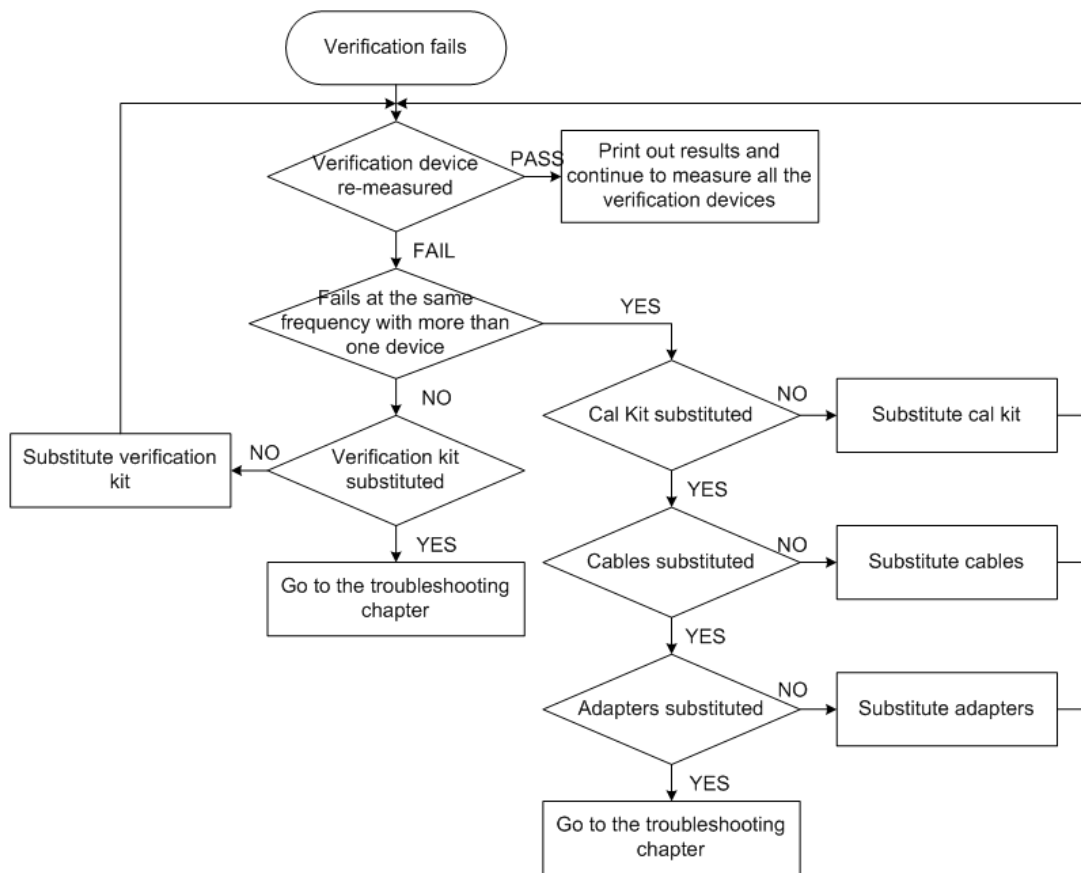
- b. Click **OK** to save the result into the file as shown in the dialog box.
16. If both pairs (1&2 and 3&4) are selected under Measure Ports option of Configure tab for 4 port E5071C, follow the procedure from the step [10](#) onwards for one pair, then repeat them for another pair.
17. If only one pair is selected, follow the procedure from step [5](#) onwards.

If the System Fails the Verification Test

NOTE

Inspect all connections. Do not remove the cable from the E5071C test port. This will invalidate the calibration that you have done earlier.

1. Repeat this verification test. Make good connections with correct torque specifications for each verification device.
2. Disconnect, clean and reconnect the device that failed the verification test. Then measure the device again.
3. If the analyzer still fails the test, check the measurement calibration.
4. Refer to the graphic below, for additional troubleshooting steps.



System Verification Result

The type of output for the Verification result can be selected under Outputs in the **Run** tab. Use these printouts to determine whether your measured data falls within the total uncertainty limits at all frequencies.

The result includes the following items:

Tabular Data

1. Header information

- E5071C: model number, serial number, verification test time and day
- Calibration Kit: model number, (serial number)
- Verification Kit: model number, (serial number)
- Measured device, Parameter

2. Data for each test point

- Frequency

- Lower limit (defined by the total system uncertainty specification)
- Measurement result
- Upper limit (defined by the total system uncertainty specification)
- Test status (PASS or FAIL). Asterisks (**) is displayed at fail points.

Graphs

1. Upper limit line (defined by the total system uncertainty specification)
2. Lower limit line (defined by the total system uncertainty specification)
3. Measured value at factory (Memory trace)
4. Measured value (Data trace)
5. Parameter name (S11, S12 etc.), format (Lin, Log or Phase)
6. Device name and serial number

Measurement Accessories

Measurement Accessories

- Calibration Kits
- Test Port Cables/Adapters
- System Accessories

Calibration Kits

- Overview
- Mechanical Calibration Kit
- ECal

Other topics about Measurement Accessories

Overview

Calibration kits are used to improve the accuracy of the analyzer in various measurements.

The electronic calibration kit reduces the time required for calibration, misconnections, and wear on connectors since it requires fewer changes of connection than the mechanical type.

Specifications for calibration kits and the availability of particular calibration kits are subject to change without prior notice.

Refer to http://www.agilent.com/find/na_accessories/ for more information.

Mechanical Calibration Kit

Model Name	Description	Connector Type	Frequency Range
85031B	Calibration Kit	APC-7	DC to 6 GHz
85032B/E	Calibration Kit	Type-N, 50 ohm	DC to 6 GHz
85032F	Mechanical Calibration Kit	Type-N, 50 ohm	DC to 9 GHz
85033D	Calibration Kit	3.5 mm	DC to 6 GHz
85033E	Mechanical Calibration Kit	3.5 mm	DC to 9 GHz
85036B	Calibration Kit	Type-N, 75 ohm	DC to 3 GHz
85036E	Economy Calibration Kit	Type-N, 75 ohm	DC to 3 GHz
85038A/F/M	Calibration Kit	7-16	DC to 7.5 GHz
85039B	Calibration Kit	Type F , 75	DC to 3 GHz

		ohm	
85050C	Precision Mechanical Calibration Kit	APC-7	DC to 18 GHz
85050D	Economy Mechanical Calibration Kit	APC-7	DC to 18 GHz
85052D	Economy Mechanical Calibration Kit	3.5 mm	DC to 26.5 GHz
85052C	Precision Mechanical Calibration Kit	3.5 mm	DC to 26.5 GHz
85054D	Economy Calibration Kit	Type-N, 50 ohm	DC to 18 GHz
85056D	Economy Calibration Kit	2.4 mm	DC to 50 GHz
85056K	Mechanical Calibration Kit	2.4 mm and 2.92 mm	DC to 50 GHz
K11644A	Mechanical Calibration Kit (waveguide)	WR-42	18 GHz to 26.5 GHz
P11644A	Mechanical Calibration Kit (waveguide)	WR-62	12.4 GHz to 18 GHz
X11644A	Mechanical Calibration Kit (waveguide)	WR-90	8.2 GHz to 12.4 GHz

NOTE 85054D, 85056D, 85056K, X1164A, P1164A and K1164A Calibration kits are added from Firmware A.09.10. Delay value in Open Standard is updated for 85052C, 85052D, 85033D and 85033E calibration kits.

For more information on definition of calibration kit, refer to <http://na.tm.agilent.com/pna/caldefs/stddefs.html>

NOTE From firmware A.09.10, the number of calibration kit definition is increased from 20 to 30 and number of sub class is increased from 8 to 30.

ECal (electronic calibration) kit

The ECal supported by E5071C are defined below:

Model Name	Connector Type	Frequency Range
85091B	7 mm	300 kHz to 9 GHz

E5071C

85091C	7 mm	300 kHz to 9 GHz
85092B	Type N	300 kHz to 9 GHz
85092C	Type N	300 kHz to 9 GHz
85093B	3.5 mm	300 kHz to 9 GHz
85093C	3.5 mm	300 kHz to 9 GHz
85096B	Type N, 75 ohm	300 kHz to 3 GHz
85096C	Type N, 75 ohm	300 kHz to 3 GHz
85098B	7-16	300 kHz to 7.5 GHz
85098C	7-16	300 kHz to 7.5 GHz
85099B	Type F	300 kHz to 3 GHz
85099C	Type F	300 kHz to 3 GHz
N4431A	3.5 mm, Type N	300 kHz to 9 GHz
N4431B	3.5 mm, Type N	9 kHz to 13.5 GHz (see note)
N4432A	Type N	300 kHz to 18 GHz
N4433A	3.5 mm	300 kHz to 20 GHz
N4690A	Type N	10 MHz to 18 GHz
N4690B	Type N	300 kHz to 18 GHz
N4691A	3.5 mm	10 MHz to 26.5 GHz
N4691B	3.5 mm	300 kHz to 26.5 GHz
N4692A	2.92 mm	10 MHz to 40 GHz
N4696A	7 mm	10 MHz to 18 GHz
N4696B	7 mm	300 kHz to 18 GHz

NOTE

Firmware A.09.10 or above, enable users to calibrate down to 9 kHz using N4431A (4-port).

NOTE

The 9 kHz to 300 kHz performance is valid only for the E5071C with Firmware revision A.09.10 or above using N4431B.

NOTE

When ECal is used with options 2D5, 4D5, 2K5 and 4K5 and in the following condition, the waiting time is added automatically.

- Firmware A.09.10: The maximum frequency of your ECal is over 13 GHz.
- Firmware A.09.20 and above: The maximum frequency of your ECal is over 13 GHz and the stop frequency on your ENA set over 8.5 GHz. (The waiting time is NOT added when stop frequency is set below 8.5GHz.)

NOTE

For scalar mixer calibration, the stop frequency of calibration port is used to determine the waiting time instead of the sweep stop frequency.

The total waiting time of each calibration type (approximately) is as follows:

Calibration Type	Total waiting time for E5071C (sec)
1-port	9.1
2-port	18.1
3-port	27.1
4-port	36.1

NOTE

ENA does not support the following ECal:

Model Name	Connector Type	Frequency Range
N4693A	2.4 mm	10 MHz to 50 GHz
N4694A	1.85 mm	10 MHz to 67 GHz

Test Port Cables/Adapters

- Overview
- Test Port Cables
- Adapters

Other topics about Measurement Accessories

Overview

Agilent Technologies provides various cables and adapters. The following are one of them. Refer to http://www.agilent.com/find/na_accessories/ for more information.

Test Port Cables

N6314A 50 ohm N Type RF Cable (300 kHz to 9 GHz)

An RF cable 610 mm in length with male N type connectors on both ends.

N6315A 50 ohm N Type RF Cable (300 kHz to 9 GHz)

An RF cable 610 mm in length with a male and a female N type connector on each end.

Adapters

11853A 50 ohm N Type Accessory Kit

The 11853A kit includes the following items.

Agilent Cat. No.	Description
1250-1472	N type (f)-(f) adaptor kit (two adaptors)
1250-1475	N type (m)-(m) adaptor kit (two adaptors)
11511A	N type (f), short
11512A	N type (m), short

11878A N type to 3.5 mm Adaptor Kit

The 11878A kit includes the following items.

Agilent Cat. No.	Description
1250-1744	3.5 mm (f) to N type 50 ohm (m) adaptor
1250-1743	3.5 mm (m) to N type 50 ohm (m) adaptor
1250-1745	3.5 mm (f) to N type 50 ohm (f) adaptor
1250-1750	3.5 mm (m) to N type 50 ohm (f) adaptor

11854A 50 ohm BNC Accessory Kit

The 11854A kit includes the following items.

Agilent Cat. No.	Description
1250-0929	BNC (m), short
1250-1473	BNC (m) to N type (m) adaptor kit (two adaptors)
1250-1474	BNC (f) to N type (f) adaptor kit (two adaptors)
1250-1476	BNC (f) to N type (m) adaptor kit (two adaptors)
1250-1477	BNC (m) to N type (f) adaptor kit (two adaptors)

11852B Minimum-loss pad

Option	Description
Option 004	N type connectors, 50 ohm (m) to 75 ohm, (f)

System Accessories

- USB/GPIB Interface
- GPIB Cables
- Agilent IO Libraries

Other topics about Measurement Accessories

82357A/B USB/GPIB Interface

The 82357A/B can be used to control external GPIB devices by the E5071C. It can also be used to control E5071C by PC with USB. See "82357B USB/GPIB Interface High-Speed USB 2.0" in <http://www.agilent.com/find/gpib> for more information.



GPIB Cables

The following GPIB cables can be used to connect the analyzer with an external device such as a computer.

Product Number	Length
10833A	1.0 m (3.3 ft)
10833B	2.0 m (6.6 ft)
10833C	3.0 m (9.9 ft)
10833D	0.5 m (1.6 ft)

Agilent IO Libraries

Agilent IO Libraries is a collection of libraries that give you the ability to use your instruments from a test and measurement program, and utilities that help you quickly and easily connect your instruments to your PC.

See the IO libraries manual for more information. The latest revision of IO Libraries can be downloaded from <http://www.agilent.com/find/iolib>.

CAUTION

Do not update Agilent IO Library on E5071C besides Agilent recommends to do so. Refer to http://www.agilent.com/find/ena_support for the information.

General Principles of Operation

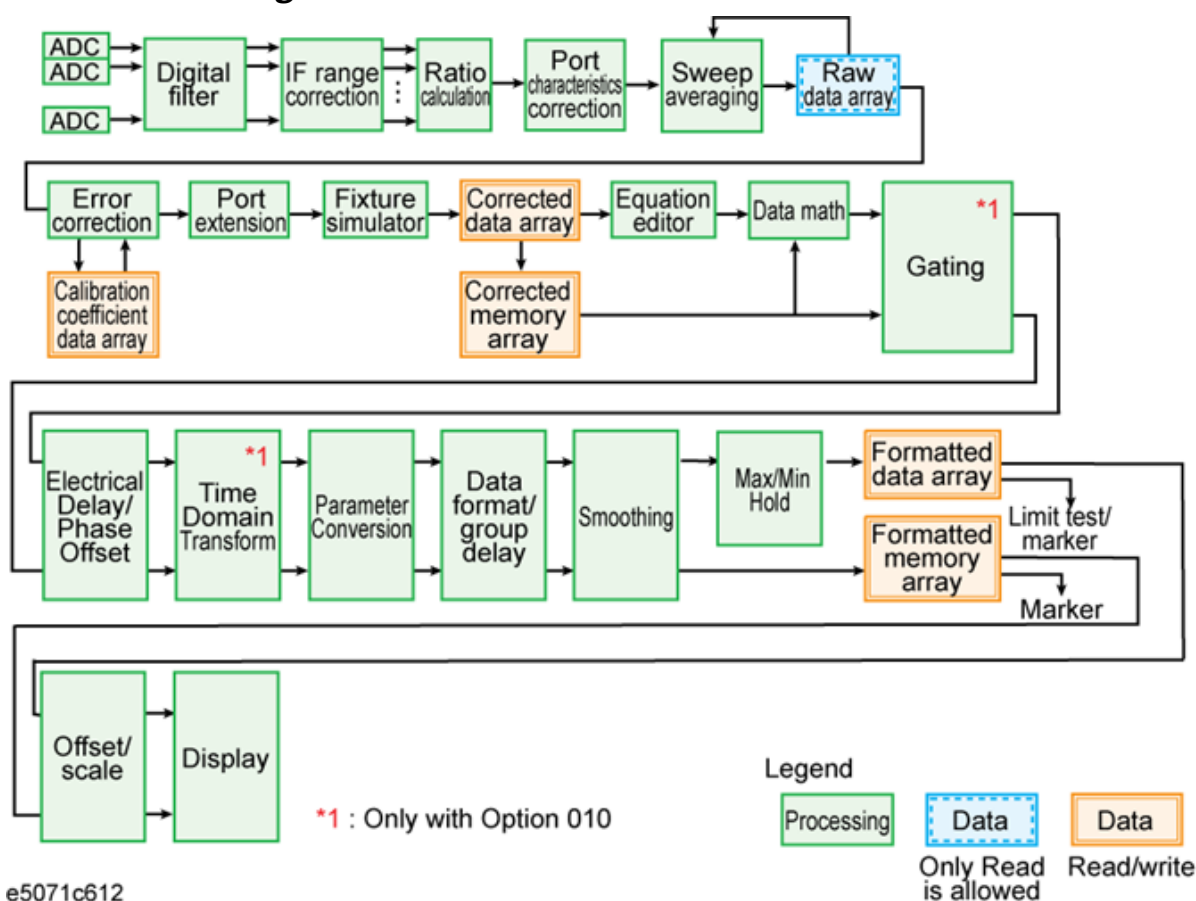
General Principles of Operation

- Data Processing
- System Description

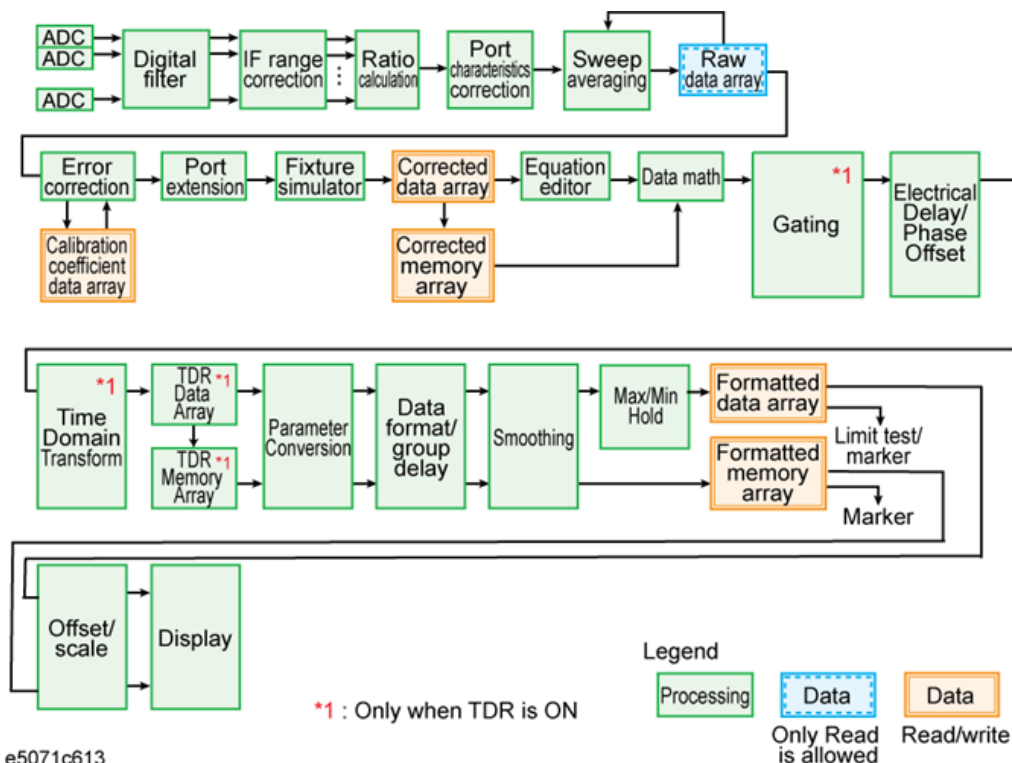
Data Processing

The internal data processing flowchart for the E5071C is shown in the following figure.

Data Processing Flowchart



Data Processing Flowchart (Option TDR)



ADC

The ADCs (analog-to-digital converters) convert analog signals fed to the receiver and converted into IF signals (R_1, R_2, \dots, R_n and T_1, T_2, \dots, T_n) into digital signals. One ADC is available for each signal and the conversion takes place simultaneously.

Digital Filter

The digital filter performs a discrete Fourier transformation (DFT) and picks up IF signals. Each IF signal is then converted into a complex number that has a real part and an imaginary part. The IF bandwidth of the analyzer is equivalent to the bandwidth of the DFT filter. The IF bandwidth can be set in the range of 10 Hz ~ 100 kHz.

IF Range Correction

Input signals that went through ranging at the receiver are reverted (corrected) to previous values before the ranging.

Ratio Calculation

The ratio between two signals is determined by performing divisions on complex numbers. In the case of absolute measurements (Option 008), the ratio of complex number can not be calculated.

Port Characteristics Correction

The equivalent source match error, the directivity error, and the tracking error of each test port bridge are corrected. In the case of absolute measurements (Option 008), the gain of each test port is corrected.

Sweep Averaging

The average of complex indices is determined based on data obtained from multiple sweep measurements. Sweep averaging is effective in reducing random noise in measurements.

Raw Data Array

The results from all data processing done up to this point are stored in this array as raw data. All prior data processing is performed as each sweep takes place. When the full N-port error correction (N=2 to 4) is enabled, all $N \times N$ S parameters are stored in the raw data array and used in error correction. Users are allowed to access (read only) this raw data array.

Error Correction/Calibration Coefficient Data Array

When error correction is enabled, the process eliminates the system errors that are reproducible and stored in the calibration coefficient data array. It accommodates everything from the simple vector normalization to the full 12-term error correction. The user is allowed to access (read/write) this calibration coefficient data array. Gain correction is performed in absolute measurement.

Port Extension

This process carries out a simulation of adding or eliminating a variable length no-loss transmission path on each test port so that the reference plane of calibration is moved. The port extension is defined by an electrical delay (sec).

Fixture Simulator

A data conversion by the fixture simulator function is executed. The fixture simulator function is a collective term for six different functions: balanced-unbalanced conversion, addition of matching circuits, port reference impedance conversion, network elimination, addition of differential matching circuits, and differential reference impedance conversion.

Corrected Data Array

Unlike the raw data array, this array stores the results obtained after error corrections, port extensions, or the fixture simulator functions are applied. The user is allowed to read/write data from/to the corrected data array.

Corrected Memory Array

By pressing **Display > Data -> Mem**, the contents of the corrected data array will be copied to this array. The user is allowed to read/write data from/to the corrected memory array.

Equation Editor

Equation Editor is a function available in Firmware revision A.08.0x or later that allows users to use a custom equation to display data in the E5071C. Equation Editor can be accessed through **Display** > **Equation Editor**.

Data Math

Data processing is carried out using the corrected data array and the corrected memory array. Four types of data processing addition, subtraction, multiplication, and division are available.

Electrical Delay/Phase Offset

An electrical delay and a phase offset are applied to each trace. By setting an electrical delay, a linear phase that is proportional to the frequency will be added or subtracted. On the other hand, setting a phase offset adds or subtracts a phase that is constant throughout the frequency range. Incidentally, data processing performed from this point on in the flowchart is applied to both the data array and the memory array.

TDR Data Array

The results from all data processing done up to this point are stored in this array. The user is not allowed to access (read/write) this data array.

TDR Memory Array

By pressing Display > Data -> Mem, the contents of the TDR data array will be copied to this array. The user is not allowed to access (read/write) this memory array.

Data Format/Group Delay

Complex data consisting of the real parts and the imaginary parts are converted into scalar data according to the data format of user's choice. Group delays are also calculated here.

Smoothing

By enabling the smoothing function, each point in a sweep measurement will be replaced by a moving average of several measurement points nearby. The number of points used in calculating a moving average is determined by the smoothing aperture set by the user. The smoothing aperture is defined by a percentage against the sweep span.

Formatted Data Array/Formatted Memory Array

All results from data processing are stored in the formatted data array and the formatted memory array. The marker functions are applied to these arrays. The limit test is applied to the formatted data array. The user is allowed to read/write data from/to these arrays.

Offset/Scale

Each set of data is processed so that traces can be drawn on the screen. Particular scaling depending on the data format is applied using the position of the reference line, the value of the reference line, and the scale/graticule settings.

Display

The results obtained after data processing are displayed on the screen as traces.

Other topics about General Principles of Operation

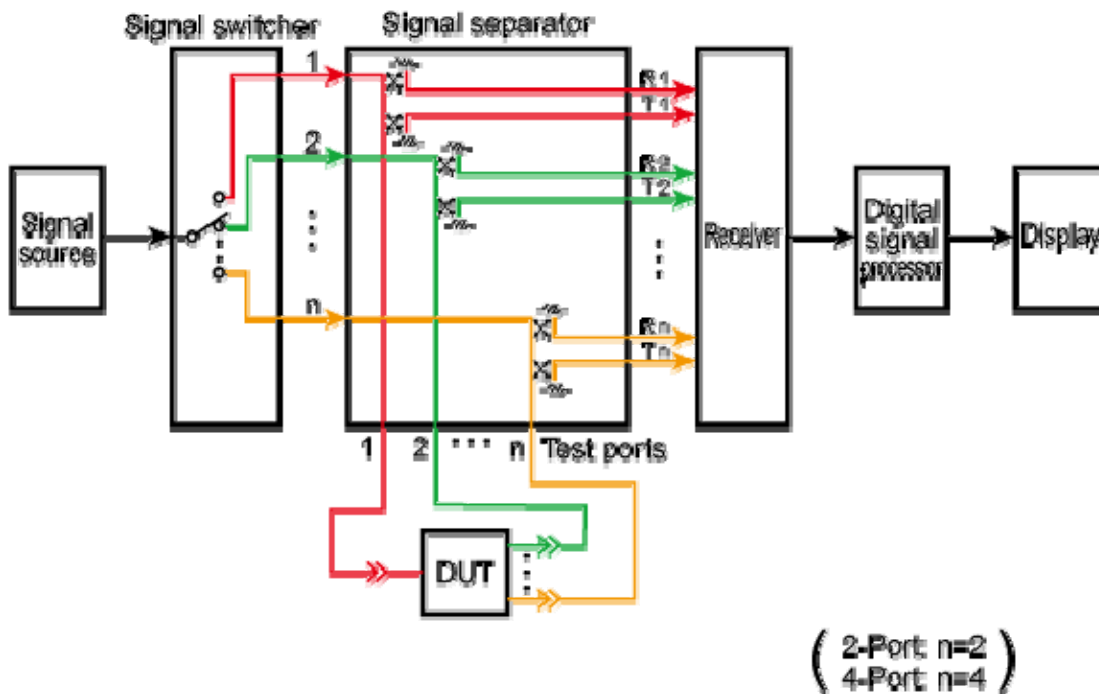
System Description

- Synthesized Source
- Source Switcher
- Signal Separator
- Receiver

Other topics about General Principles of Operation

A network analyzer supplies a sweep signal to a DUT, measures its transmission and reflection, and displays the results as ratios against the input signal from the signal source. The E5071C network analyzer consists of the circuit modules shown in the following figure.

System Diagram for the E5071C Network Analyzer



e5071c241

Synthesized Source

The synthesized source generates an RF sweep signal in the specified frequency range.

The signal source is phase-locked to a highly reliable quartz crystal oscillator to maintain a high level of accuracy in its frequency as well as to achieve precise phase measurements. The level of RF output power is controlled within the range of -15 to +10 dBm by the internal ALC (automatic leveling control) circuit.

Source Switcher

The source switcher is used to switch test ports to which the RF signal is supplied from the source.

Signal Separator

The signal separator consists of directivity couplers that detect input and output signals at the test ports. On a test port to which a signal is output, the output signal and the reflection from the DUT are detected as the reference signal (R) and the test signal (T), respectively. On the other ports, the signal that is transmitted through the DUT is detected as the test signal (T). All signals are then sent to the receiver.

Receiver

Each signal that is sent to the receiver is first converted into an IF signal by a mixer and then converted into a digital signal by an ADC (analog to digital converter). These processes are applied to each signal independently. The digital data is then analyzed by a micro processor and measurement results will be displayed on the screen.

Revision History

Revision History

- Firmware Revision History
- HDD Revision History
- Data Sheet Revision History

Other topics about Product Information

Firmware Revision History

This page is internal use only

- Firmware Revision History
- TDR software Revision History

Other topics about Revision History

Firmware Revision History

- A.11.2x
- A11.0x
- A.10.0x
- A.09.61
- A.09.60
- A.09.5x
- [A.09.4x](#)
- A.09.31
- A.09.30
- A.09.2x
- A.09.1x
- A.08.1x
- A.08.0x
- A.07.0x

A.11.2x

- Minor enhancements

A.11.0x

- Supports iCore 7 CPU and Solid-State Drive (SSD).
- Minor enhancements

A.10.0x

- Changes in splash screen at the boot up.
- Supports TDR revision A.01.51
- The windows icon for minimize, maximize and close are replaced with resize due to windows license change.

A.09.61

- Minor enhancements

A.09.60

- Minor enhancements

A.09.5x

- Enhanced Time Domain Analysis Option (Option TDR) is added.
- Minor enhancements

A.09.4x

- Minor enhancements

A.09.31

- Minor enhancements

A.09.30

- 6.5 GHz/14 GHz frequency model are supported.

(The information of option 260, 265, 460, 465, 2D5, 4D5 is added.)

A.09.2x

New Feature

- Support for USB Power Sensor
 - Selecting the power meter
 - Setting USB power meter
 - Performing Zeroing/Calibration
- Performing 8 term Calibration using External PC
- Receiver Calibration
 - Power Offset
 - R, T Channel independent Calibration
- Removing Log Data
- SCPI Command:
 - SCPI.CALCulate(Ch).SElected.DATA.XAXis
 - SCPI.SENSE(Ch).CORRection.RECeiver(Pt).COLlect.RCHannel.ACQuire
 - SCPI.SENSE(Ch).CORRection.RECeiver(Pt).COLlect.TCHannel.ACQuire
 - SCPI.SENSE(Ch).CORRection.RECeiver(Pt).OFFset.AMPLitude
 - SCPI.SENSE(Ch).CORRection.COLlect.ECAL.INFOrmation
 - SCPI.SERVICE.ADjust.VIRTual.BRIDge.STATe
 - SCPI.SERVICE.ADjust.SENSE(Ch).SWEep.RF.RANGE.PORT(Pt).AUTOTO

- SCPI.SYSTem.COMMunicate.USB.PMETer.CATalog
- SCPI.SYSTem.COMMunicate.PSEnSor
- SCPI.SERVice.LOGGing.CLEar

Modifications

- Channel/Traces Setup (Support for 2ch/8Tr 10001 points)
- Reduce waiting time for ECal calibration
- Overload/Detection and Power Trip function

A.09.1x

New Feature

- Supported Frequency and Power Range
- Auto Power Range Function
- E5092A
- Support for Power Sensors
- Channel/Traces Setup
 - Channel Display Setup
 - Channel/Traces Number
- Activating Software Option
- Waveguide
 - SCPI.SENSE(Ch).CORRection.COLLect.ADAPter(Pt).WAVEguide.CUToff
 - SCPI.SENSE(Ch).CORRection.COLLect.ADAPter(Pt).WAVEguide.LENGth
 - SCPI.SENSE(Ch).CORRection.COLLect.ADAPter(Pt).ROTate
 - SCPI.SENSE(Ch).CORRection.EXTension.PORT(Pt).WAVEguide.CUToff
 - SCPI.SENSE(Ch).CORRection.EXTension.PORT(Pt).WAVEguide.TIME
- Overload Detection/Power Trip Function

Modifications

- Equation Editor
- MWA
- Context Sensitive

- Save/Recall
 - Compatibility of Files (Saving/Recalling)
 - Recall Procedure
- Calibration Kit
- Error Message
- Protecting ENA System
- Default Condition
 - Default Condition Finder
 - Preset, *RST , Save/Recall
- SCPI.SENSE(Ch).CORRection.COLlect.ECAL.ISOLation.STATe

A.08.1x

New Feature

- Extended channels (up to 96 Channels)
- Added Channel display (8x9, 6x12 and 8x12)
- Notch Search
 - Determining the Bandwidth of the Trace (Notch Search)
 - SCPI.CALCulate(Ch).SElected.MARKer.NOTCh
 - SCPI.CALCulate(Ch).SElected.MARKer(Mk).NOTCh.DATA
 - SCPI.CALCulate(Ch).SElected.MARKer(Mk).NOTCh.THReshold

Modifications

- Parallel Printer Port is not supported (only USB port is supported)
- Removable Hard Disk Type II
- Enhanced Command Finder

A.08.0x

- Context Sensitive Help
- Option up to 4.5 GHz
- Equation Editor
 - Equation Editor
 - SCPI.CALCulate(Ch).SElected.EQUation.STATE
 - SCPI.CALCulate(Ch).SElected.EQUation.TEXT
 - SCPI.CALCulate(Ch).SElected.EQUation.VALId
- LXI

- Trigger Scope
 - Trigger Scope (Active Only Trigger)
 - SCPI.TRIGger:SCOpe
- Faster Recall
- User Variable
 - SCPI.PROGram.VARiable.ARRay(Vnum).DATA
 - SCPI.PROGram.VARiable.ARRay(Vnum).SIZE
 - SCPI.PROGram.VARiable.DOUBle(Vnum).DATA
 - SCPI.PROGram.VARiable.LONG(Vnum).DATA
 - SCPI.PROGram.VARiable.STRing(Vnum).DATA
- Revised Firmware Revision Information
- Updated Data Processing Flowchart
- Calkit Definition for 85038A/F/M
- Support for N1911A and N1912A Power Meter

A.07.0x

This is the first revision of E5071C.

New Features

- Improved Measurement Performance (Dynamic Accuracy, Trace Noise, Measurement Speed)
- DC Measurement (AUX Ports)
- External Trigger Output
- Probe Power
- 65dB Full Range Power Sweep (@ 9 kHz to 5 GHz)
- Extended IF Bandwidth up to 500 kHz
- Extended channels up to 36 Channels
- Unknown Thru Calibration (Unknown Thru Calibration with ECal)
- Adapter Removal-Insertion function
- Absolute Measurement is available even if option 008 is not installed.
- External Test Set Mode
- Windows (Open environment)
- XGA 10.4 inch LCD
- More USB ports (Front 2, Rear 4)
- Online Help

E5071C

- Internal DC Bias Tee (Option 235, 435, 285, and 485)
- Extended the lowest frequency to 9 KHz (Option 230, 430, 280, and 480)/100 kHz (Option 235, 435, 285, and 485)
- Touch Panel LCD is equipped as a standard.

Deleted Functions from E5070B/E5071B

- Floppy Disk Drive
- Fast Stepped/Fast Swept mode
- Power Range
- Avoid Spurious
- Warm Up Ready
- Adapter Characterization VBA

TDR software Revision History

- A.01.51
- [A.01.50](#)
- A.01.02

A.01.51

- Added Windows 7 Support in ENA Option TDR remote control
- Fixed bug in rise/fall time calculation when PRBS, K 28.5, or User is selected as the virtual bit pattern.

A.01.50

- Minor Enhancement

A.01.02

- Height (dB) is deleted from the result.
- TDR Mask Test: It is required to define the values of the Logic 1 Lv and Logic 0 Lv in the scale tab for Mask.

HDD Revision History

HDD revision is based upon a number of factors such as windows OS, driver upgrade patch which are installed at the factory shipment. Firmware revision denotes E5071C measurement software. To know E5071C HDD revision, refer to Checking the product information.

- CH110x
- CF100x
- CN96x
- CN95x
- [CN94x](#)
- CN93x
- CN925
- CN922
- CN80x

Other topics about Revision History

CH110x

- Supports iCore 7 CPU and Solid-State Drive (SSD).

CF100x

- Initial registration procedure is changed
- System recovery procedure is changed
- Administrator account at the factory shipment is defined.
- Windows License has been changed to Windows XP Pro for embedded systems

CN96x

- Ecal driver update

CN95x

- No functionally update

CN94x

- No functionally update

CN93x

- No functionally update

CN925

E5071C

- Initial registration procedure is changed
- Factory recovery procedure is changed
- User recovery capability is deleted

CN922

- cXL support: cXL software is pre-installed
- Windows SP3

CN80x

- LXI is supported (dotnet framework is installed)

Data Sheet Revision History

The data sheet revision history is shown below. The print date is used to define the revision. See the last page of the data sheet for its print date.

- May, [2012](#)
- September 26, 2011
- July 5, 2011
- July 5, 2010
- June, 2009
- February 3, 2009

Other topics about Revision History

May, 2012

- Add 700 kHz, 1 MHz and 1.5 MHz IF BW.
- Measurement Throughput Summary is updated for new CPU
- Add SPD data for RF Ranging Fixed Mode ON.

September 26, 2011

- Rear Panel is changed.
- Measurement Throughput Summary is updated.

July 5, 2011

- The following information has been updated:
 - Test Port Noise Floor
 - Compression Level
 - Dynamic Accuracy
 - Bias Tee Input Connector
- Power consumption data is added.

July 5, 2010

- The information for the E5091A is deleted.
- Test Port Output: Source stability and CW Accuracy is changed from ± 5 ppm to ± 7 ppm.

June, 2009

- 6.5 GHz/14 GHz frequency model are added
Option 260, 265, 460, 465, 2D5, 4D5 and its related information are added.

E5071C

- Corrected system performance with 3.5 mm device connectors, 85052D calibration kit, Figures of "Transmission uncertainty" has been corrected.
- Corrected system performance with 3.5 mm device connectors, N4691B electronic calibration (ECal) module, Figures of "Transmission uncertainty" has been corrected.

February 3, 2009

The following specification has been changed.

Corrected System Performance with Calibration Kit

Option 230/235/240/245/280/285/430/435/440/445/480/485

- The data for 85092C and 85093C are changed.

Option 2k5/4K5

- The data for 85052D and N4691B are changed.

Uncorrected System Performances

Option 2k5/4K5

- At 300 kHz to 1MHz, Directivity and Source Match are changed from 25 dB to 20 dB.

Replacing 8753ES with E5071C

Replacing 8753ES with E5071C

The information necessary to replace Agilent 8753ES with the Agilent E5071C is described below. Agilent provides some tools such as a Code Conversion Assistant Editor for the command translation for programming. Refer to <http://www.agilent.com/find/ena/> for more information.

- Important Functional Differences
- Code Migration Tools
- Comparing Functions

Important Functional Differences

This section describes the key differences between the Agilent 8753ES and Agilent E5071C.

- Channel and Trace Concepts
- Measurement Parameters
- Test Port Output Ranges
- Sweep Function
- Calibration
- Trigger System
- Data Flow
- Reading/Writing Data
- Screen Display and Marker Functions
- Math Operation Functions on Traces
- Device Test Functions
- Analytical Functions
- Save/Recall
- Test Sequence Program
- Outputting to a Printer/Plotter
- GPIB Interface
- LAN Interface
- Other Functions

Other topics about Replacing 8753ES with E5071C

Channel and Trace Concepts

In the 8753ES, channels 1 and 2 are independent from each other and have auxiliary channels, channels 3 and 4, respectively. Channels 3 and 4 can be displayed as additions to channels 1 and 2, respectively. This allows up to four channels to be displayed for up to four traces on the screen simultaneously. Channels 1 and 3 and channels 2 and 4 are always coupled, while channels 1 and 2 are independent from each other. This enables you to specify different sweep conditions on each of channels 1 and 2. The E5071C has 4, 9, 12, 16 and 36 independent channels, each of which allows sweep conditions to be defined different from those on other channels. On the screen you can open up to maximum 36 windows for

channels. The channel allows up to maximum 16 traces to be defined depending on the number of channel.

Measurement Parameters

With the E5071C, you can perform measurements of S parameter and absolute value of the power input into ports. In addition to these, the 8753ES supports measurement parameters such as A, B, R, A/R, B/R, A/B, etc.

Test Port Output Ranges

The 8753ES comes standard with test sets for two ports, while the E5071C comes optionally with test sets for two ports and four ports. Furthermore, the 8753ES comes optionally with a 75 ohm test set (Option 075), while the E5071C does not.

For more about the measurement frequency ranges of the 8753ES and E5071C, see the following table.

Measurement Frequency Ranges

Function	8753ES	E5071C
Measurement frequency range	<ul style="list-style-type: none"> 30 kHz to 3 GHz (std.) 30 kHz to 6 GHz (Option 006) 	See Test Port and Frequency Options

For more about the output power levels and output power ranges of the 8753ES and E5071C, see the following table.

Test Port Output Power Levels

Function	8753ES	E5071C
Output power levels	<ul style="list-style-type: none"> - 85 dBm to 10 dBm (std.) - 85 dBm to 8 dBm (Options 014 and 075) 	<ul style="list-style-type: none"> - 55 dBm to 10 dBm (3 GHz, 4.5 GHz, 6.5 GHz, 8.5 GHz options) -85 dBm to +10 dBm (14 GHz and 20 GHz options)
Output power ranges	<ul style="list-style-type: none"> - 15 dBm to 10 dBm (std.) or - 15 dBm to 8 dBm (Options 014 and 075) - 25 dBm to 0 dBm - 35 dBm to - 10 	None

	dBm <ul style="list-style-type: none"> • - 45 dBm to - 20 dBm • - 55 dBm to - 30 dBm • - 65 dBm to - 40 dBm • - 75 dBm to - 50 dBm • - 85 dBm to - 60 dBm 	
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Sweep Function

The list (segment) sweep function enables you to perform measurements corresponding to two or more sweep conditions in one sweep operation and is supported both on the 8753ES and E5071C. While the 8753ES allows only up to 30 segments per table to be defined, the E5071C allows up to 201 segments to be defined. Furthermore, while two or more commands are needed to create a table using GPIB (SCPI) commands on the 8753ES, only one command does the same function on the E5071C.

The 8753ES supports an IF bandwidth up to 6 kHz, but the E5071C supports an IF bandwidth up to 500 kHz, enabling faster sweep operations than with the 8753ES.

While the 8753ES supports automatically selecting the output power range, the E5071C supports only manual selection.

The 8753ES allows you to measure frequency conversion device such as a mixer; since it supports the frequency offset sweep. The E5071C also supports this function when the option 008 is used.

Calibration

The types of calibration kits supported by the 8753ES and E5071C are shown in the following table.

Supported Calibration Kits

Type of calibration kit	8753ES	E5071C
7 mm	<ul style="list-style-type: none"> • 85031B 	<ul style="list-style-type: none"> • 85031B • 85050C/D
3.5 mm	<ul style="list-style-type: none"> • 85033C/D/E 	<ul style="list-style-type: none"> • 85033D/E • 85052D
N type	<ul style="list-style-type: none"> • 50 ohm : 85032B/E/F 	<ul style="list-style-type: none"> • 50 ohm : 85032B/F

	<ul style="list-style-type: none"> • 75 ohm : 85036B/E 	<ul style="list-style-type: none"> • 75 ohm : 85036B/E
2.4 mm	<ul style="list-style-type: none"> • 85056A/D 	N/A
TRL 3.5 mm	<ul style="list-style-type: none"> • 85052C 	<ul style="list-style-type: none"> • 85052C
Others	User-defined calibration kit	User-defined calibration kit

The 8753ES allows only one type of user-defined calibration kit to be saved in the internal memory. Up to 15 classes can be set up when defining calibration kits, including 12 classes (isolation included) to be used for full 2-port calibration and three calibration classes (THRU, reflect, and line/match for TRL*/LRM* calibration. A maximum of seven standards can be defined for each calibration class.

In contrast, the E5071C allows 20 types of user-defined calibration kits to be saved in the internal memory, which include the nine calibration kits registered beforehand. When setting up calibration classes, OPEN, SHORT, and LOAD can be set up on each port and THRU between ports. Eight standards are allowed for each calibration class.

ECal

Both the 8753ES and E5071C support ECal measurement. However, each supports slightly different functions. The 8753ES supports enhanced response calibration, 1-port calibration for S11 and S22, and full 2-port calibration. The E5071C provides multi-port calibrations including enhanced response calibration, 1-port calibration for S11 and S22, full 2-port calibration, full 3-port calibration (with 4 ports model) and full 4-port calibration (with option 4 ports model).

The 8753ES allows a frequency array or module information to be read, but these functions are not supported on the E5071C.

Trigger System

The trigger system detects the signal for starting a measurement (trigger) and controls decisions on whether to measure or not measure.

On the 8753ES, the trigger state is available for the pair of a main channel and an auxiliary channel (two pairs: channels 1 and 3 and channels 2 and 4). For each pair, three states are available: Hold, Waiting for Trigger, and Measurement. When a trigger event occurs, one pair of channels in the Waiting for Trigger state are put into a sweep operation. If the other pair is also Waiting for Trigger, then the next trigger event puts it into sweep operation as well. When the sweep condition coupling channels is turned on, the Hold, Waiting for Trigger, and Measurement states are common to

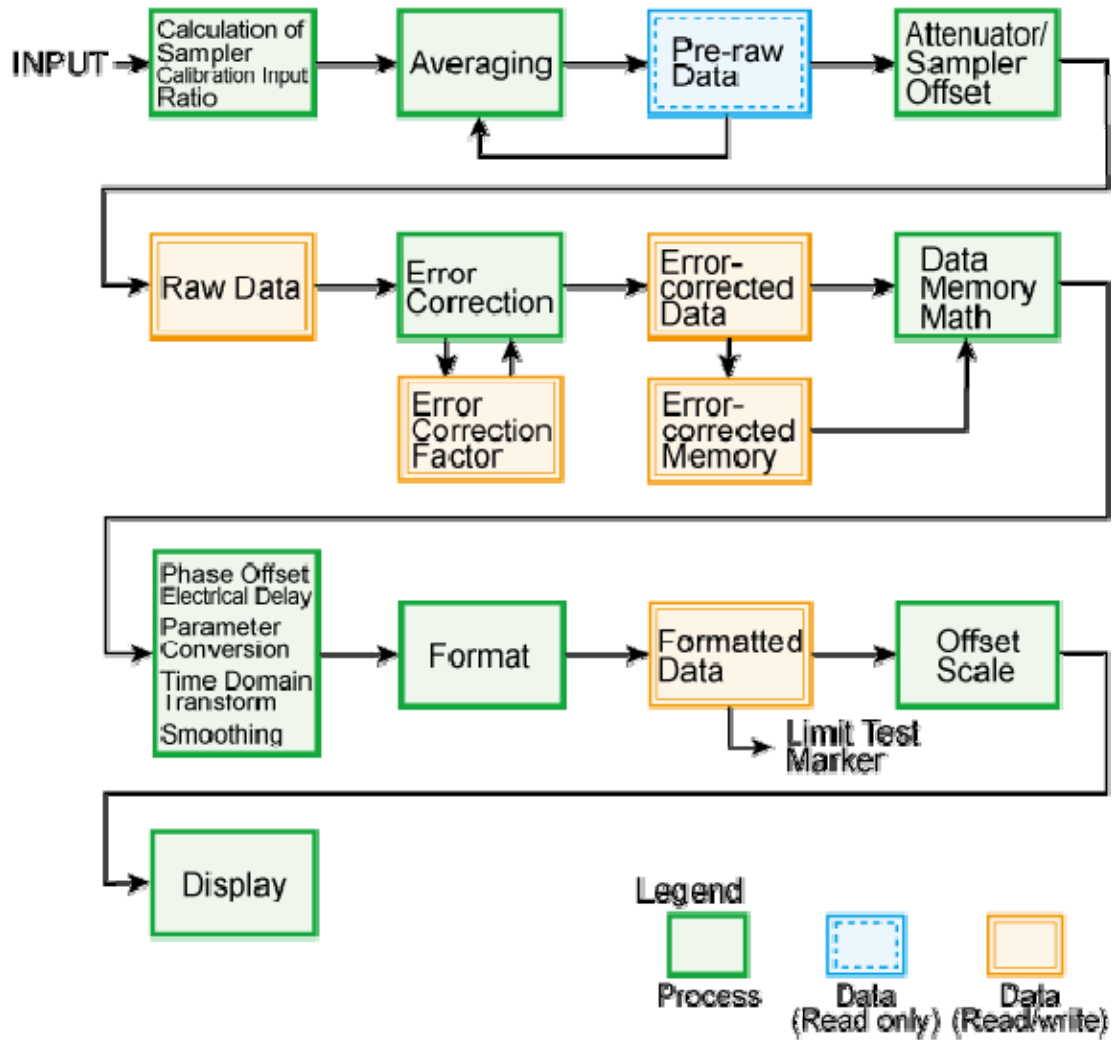
all channels. In this case, when a trigger event occurs in the Waiting for Trigger state, all channels are put into sweep operation. For example, when you set channel 1 and 2 to uncouple and sweep each channel, you need to set each channel to Hold state and make trigger events to each channel.

On the E5071C, the trigger system involves states of the entire system and those of each of the channels. Since a trigger event is common to all channels, three system-wide states exist: Hold, Waiting for Trigger, and Measurement. On the other hand, two states exist for each channel: Idle and Startup. For a channel in an Idle state, measurement is not performed at all, while for a channel in Startup state, measurements are started in sequence after an event occurs. When all channels are in an Idle state, the E5071C is in Hold state when viewed as an entire system. If even one Startup state channel exists, the E5071C enters the Waiting for Trigger or Measurement state. Upon a transition from the Waiting for Trigger to the Measurement state, measurement is performed on channels put into Startup state starting with the channel with the smallest channel number.

Data Flow

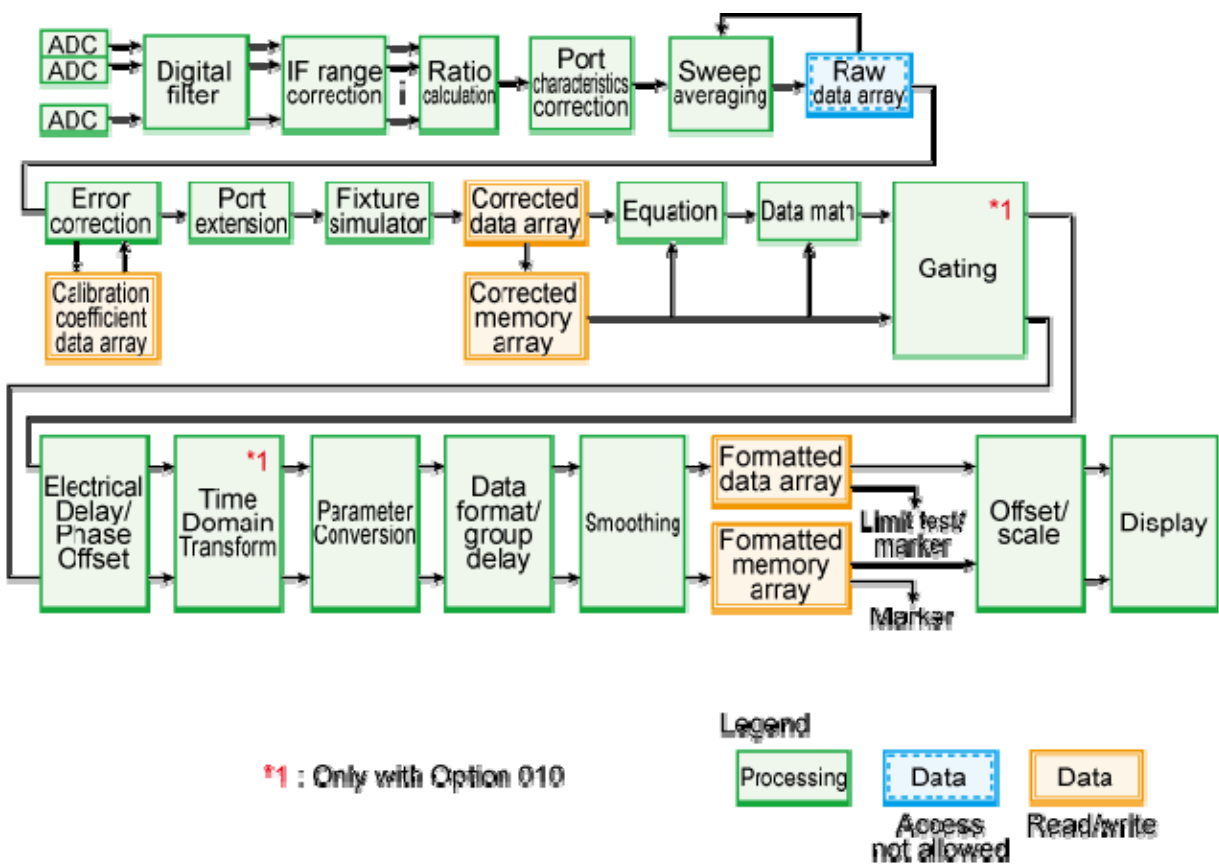
The data flow in the 8753ES is shown in 8753ES Data Flow while the flow in the E5071C is shown in E5071C Data Flow. As described in Reading Writing Data, the types of data you can read/write using the 8753ES differ from those you can read/write using the E5071C.

8753ES Data Flow



e5071c353

E5071C Data Flow



e5071c465

Reading/Writing Data

Types of data that can be handled by the 8753ES and E5071C are listed below.

Reading/Writing Data

Function	8753ES	E5071C
Data transfer format	<ul style="list-style-type: none">Intra-device binaryIEEE 32-bit floating pointIEEE 64-bit floating pointASCIIPC-DOS 32-bit floating point	<ul style="list-style-type: none">IEEE 32-bit floating pointIEEE 64-bit floating pointASCII
Reading/Writing data	<ul style="list-style-type: none">Raw data arrayCalibration coefficient array (before interpolation)	<ul style="list-style-type: none">Formatted data arrayFormatted memory array

	<ul style="list-style-type: none"> • Corrected data array • Formatted memory array • Memory trace • Calibration kit array data • Power meter calibration coefficient array (before interpolation) 	<ul style="list-style-type: none"> • Corrected data array • Corrected memory array • Power meter calibration coefficient array (after interpolation) • Calibration coefficient data array (after interpolation)
Reading data	<ul style="list-style-type: none"> • Pre-raw data (in Take4 mode) • Calibration coefficient array (after interpolation) • Power meter calibration coefficient array (after interpolation) • Entry area display • All lists in list format 	

Screen Display and Marker Functions

The 8753ES allows up to four channels to be displayed on the screen. Up to five markers can be displayed on each channel. Also, one of the displayed markers can be designated as the reference marker. Each channel also supports a fixed marker that can be established at a fixed position.

In contrast, the E5071C enables you to have all 36 channels displayed by opening up 36 separate windows on the screen. Sixteen traces can be displayed for each channel, and up to nine markers can be displayed for each trace. In addition to the markers displayed, you can also designate one marker as the reference marker. The E5071C, however, does not support fixed markers.

The 8753ES supports the Maximum, Minimum, Target value, and Bandwidth marker functions. The E5071C supports all these in addition to

a Peak Search function. Using this function, you can determine whether or not to search for a positive or negative peak. In addition, the 8753ES has an additional function to search for the maximum or minimum bandwidth. While the 8753ES allows a target value or search tracking to be established only on the active marker, the E5071C allows a target value or search tracking to be established on all markers.

Math Operation Functions on Traces

On the 8753ES, each channel is provided with a memory trace. For this reason, math operations between the data trace and memory trace are supported: **Data / Memory** and **Data - Memory**. On the E5071C, however, **Data * Memory** and **Data + Memory** are supported along with the division and subtraction operations described above.

The trace displays supported on the 8753ES are: "Data trace only", "Memory trace only", "Both memory trace and data trace" and "Data math only". The E5071C supports these functions in addition to "Both data math and memory trace"

Device Test Functions

The 8753ES supports limit test, ripple test and bandwidth test. The E5071C also supports these tests.

For the limit test on the 8753ES, a limit test table is provided for each channel with up to 18 segments are allowed in each table. In contrast, the E5071C allows a limit test table to be defined for each trace and up to 100 segments to be defined per table.

The 8753ES supports the pass/fail result for each channel, segment or measurement point along with the minimum/maximum measurement value for each segment as retrieved items in test results. On the other hand, the E5071C supports pass/fail results, measurement value, and upper/lower limit values for each measurement point as well as pass/fail results of the active trace for each channel.

Analytical Functions

Although the 8753ES does not support the fixture simulator function, the E5071C does. The fixture simulator supported by the E5071C include the balanced-unbalanced transformation function for analyzing balanced devices, and the matching circuit function.

Save/Recall

For storing data, the 8753ES is provided with an internal register, internal disk drive (floppy disk), and external disk drive (connected through the GPIB). In contrast, the E5071C provides an internal hard disk drive and allows external storage devices such as USB memory. While the 8753ES can save or recall the device setup, screen color settings, and test sequences, the E5071C is able to save or recall the instrument setup,

segment sweep table, and limit line table as well as VBA projects. The 8753ES saves display data in JPEG format while the E5071C supports the Windows Bitmap (BMP) and Portable Network Graphics (PNG) format.

Test Sequence Program

Although the 8753ES supports the test sequence program, the E5071C provides an environment for developing VBA programs for automatic measurement.

Outputting to a Printer/Plotter

The 8753ES enables you to establish the print area covering an entire sheet or just a 1/4 sheet, and to define traces, the reference line, and colors of warning messages. In contrast, the E5071C supports only full-sheet output, and an on/off setting for highlighting the entire screen in connection with color setup.

The 8753ES supports parallel ports, serial ports, and GPIB as printer ports, although the E5071C supports only USB-connected printers.

GPIB Interface

While the 8753ES uses pass control to pass the controller information to an external PC or instrument, the E5071C does not support this function.

LAN Interface

Although the 8753ES does not support a LAN interface, support for LANs is standard on the E5071C.

Other Functions

The 8753ES is provided with Take4 mode, mixer measurement function, and harmonics measurement function (Option 002). The E5071C provides the mixer measurement function, and harmonics measurement function with option 008.

Code Migration Tools

This section provides useful information to migrate the automation system from 8753 to ENA.

- Code Conversion Assistant Editor
- ENA 8753 Code Translator (ENA8753cXL) Application

Other topics about Replacing 8753ES with E5071C

Code Conversion Assistant Editor

The code conversion assistant editor helps to convert 8753 GPIB commands to ENA commands. This software consists of a text editor (EmEditor) and a plug-in software, which works on a PC and helps to edit programs in text format. The editor is also useful for 872X analyzers as most of the 872X commands are the same as 8753's. The software can be downloaded from www.agilent.com/find/ena_support.

ENA 8753 Code Translator (ENA8753cXL) Application

The ENA8753cXL is a code emulation application that allows you to use the ENA with the test program that was written in language for 8753 series network analyzer. This application works on background of the ENA, translating incoming 8753 commands via GPIB in real time.

NOTE

The ENA8753cXL is designed to work with certain legacy Agilent Network Analyzer products. Not all products may be supported nor can all legacy commands be supported. ALWAYS REFER TO THE INFORMATION PROVIDED IN THE HELP FILE FOR ADDITIONAL INFORMATION REGARDING THE LIST OF SUPPORTED COMMANDS AND PRODUCTS.

On the HDD revision CN920 or above, the installer is pre-loaded on the ENA HDD image (**D:\Agilent\ENACXL\Agilent_ENA8753CXL.msi**). To install the ENA8753cXL application, follow the instruction below.

NOTE

If the HDD revision is less than CN920, contact your nearest Agilent Technologies sales representative.

1. Terminate the ENA application: Press **System** key, click **Service** > **Exit**
2. Double-click the Agilent_ENA8753CXL.msi to launch the installer
3. Follow the wizard to install the ENA8753cXL

After the installation is complete, the following files will be available from the Windows start menu. Refer to the "Help Manual" for more details on launching and using the ENA8753cXL.



E5071C

Comparing Functions

Anaysis	8753ES	E5071C
Fixture simulator	Not available	Available

Calibration	8753ES	E5071C
Calibration kit	<div>Available calibration kits:<ul style="list-style-type: none">• 7 mm: 85031B• 3.5 mm: 85033C/D/E• N type (50 ohm): 85032B/E/F• N type (75 ohm): 85036B/E• 2.4 mm: 85056A/D• TRL 3.5 mm: 85052CUser defined calibration kit</div>	<div><ul style="list-style-type: none">• 7 mm: 85031B, 85050C/D• 3.5 mm: 85033D/E, 85052D• N type (50 ohm): 85032B/F• N type (75 ohm): 85036B/E• TRL 3.5 mm: 85052CUp to 11 user defined calibration kits can be registered.</div>

Calibration type	Not more than two ports	<ul style="list-style-type: none">• Response calibration• Response and isolation calibration• Enhanced response calibration• S11 1-port calibration• S22 1-port calibration• Full 2-port calibration• TRL/LRM Calibration• Receiver calibration• Power meter calibration	<ul style="list-style-type: none">• Response calibration (OPEN,SHORT, THRU)• Response and isolation calibration <p>The response calibration includes isolation measurement as an option.</p> <ul style="list-style-type: none">• Enhanced response calibration• Full 1-port calibration• Full 2-port calibration• TRL/LRM Calibration• Power calibration• Receiver calibration• Vector-Mixer calibration• Scalar-Mixer calibration• Partial overwrite calibration• Unknown thru calibration• Adapter Removal/Insertion calibration
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four ports	Not available	<ul style="list-style-type: none"> • Full 3-port calibration (Opts. 430/435/480/485) • Full 4-port calibration (Opts. 430/435/480/485) • TRL/LRM Calibration • Power calibration • Receiver calibration • Vector-Mixer calibration • Scalar-Mixer calibration • Partial overwrite calibration • Simplified calibration • Simplified TRL calibration • Unknown thru calibration • Adapter Removal/Insertion calibration
Omission of the isolation measurement	Possible (Can be omitted by designating it using the softkeys on the front panel or sending a GPIB command)	Possible (Isolation measurement is performed as an option accompanying a response calibration and 2-, and 4-port calibration.)
Power meter calibration	Available	Available
Receiver calibration	Available	Available

Adapter removal	Available	Not available
Velocity factor	Definable	Definable
Characteristic impedance of the measurement system	Definable	Definable with fixture simulator
Port extension	Definable for ports 1 and 2 and inputs A and B	Definable for each port per channel
Selection between chop sweep and alternate sweep	Can be changed over.	Chop sweep for traces in a channel and alternate sweep between channels
Error correction	On/Off setting is definable.	Same
Interpolating the calibration coefficient	On/Off setting is definable.	Always On.

Defining the calibration kit	Calibration class	<ul style="list-style-type: none"> • S11A (OPEN) • S11B (SHORT) • S11C (LOAD) • S22A (OPEN) • S22B (SHORT) • S22C (LOAD) • Forward Transmission • Forward Match • Reverse Transmission • Reverse Match • Response • Response & Isolation • TRL Thru • TRL Reflect • TRL Line/Match 		<ul style="list-style-type: none"> • OPEN • SHORT • LOAD • THRU (OPEN, SHORT, and LOAD are set for each port; THRU is set between ports)
	Class indication label	Editable	<ul style="list-style-type: none"> • TRL Thru • TRL Reflect • TRL Line/Match 	
	Number of standards that can be registered in calibration classes	Up to seven types	Up to eight types	
	Type of standard	OPEN, SHORT, LOAD, and THRU Arbitrary Impedance	OPEN, SHORT, LOAD, and THRU Arbitrary Impedance, None	
	Standard parameters	Common to standards	<ul style="list-style-type: none"> • Offset delay • Offset loss • Offset characteristic impedance • Frequency 	Same

		range	
		<ul style="list-style-type: none">Offset type (coaxial, waveguide)	
ECal		Unique to OPEN	<ul style="list-style-type: none">C0, C1, C2, C3 Same
		Unique to SHORT	<ul style="list-style-type: none">Not available L0, L1, L2, L3
		Unique to LOAD	Type of standard (fixed, sliding, offset) Not available (the type of standard is treated as fixed load.)
		Unique to THRU	Not available Unknown Thru
		Arbitrary Impedance	<ul style="list-style-type: none">Type of standard (fixed, sliding)Arbitrary Impedance <ul style="list-style-type: none">Arbitrary Impedance
	Standard label	Editable	Same
ECal	Type of calibration	<ul style="list-style-type: none">Enhanced response calibrationS11 1-port calibrationS22 1-port calibrationFull 2-port calibration	<ul style="list-style-type: none">Enhanced response calibrationResponse (thru) calibrationFull 1-port calibrationFull 2-port calibrationFull 3-port calibration (Opts. 430/435/480/485)Full 4-port calibration (Opts. 430/435/480/485)

Omission of isolation	Allowed	Allowed
Manual THRU measurement	Allowed	Allowed
Reading the frequency array	Allowed	Not allowed
Reading the module information	Allowed	Not allowed

Device Test		8753ES	E5071C
Limit test	Limit test table	<ul style="list-style-type: none"> • One per channel • Number of segments: Up to 18 per table 	<ul style="list-style-type: none"> • One per trace • Number of segments: Up to 100 per table
	Offset	Definable	Definable
	Creating a table by using the GPIB command	Create a table by using two or more commands	Create a table by using one command
	Reading the results	<ul style="list-style-type: none"> • Per channel, Per segment • Pass/fail at each point, • Number of points per segment that failed the maximum/minimum, • Stimulus value at a failed point 	<ul style="list-style-type: none"> • Pass/Fail of the active trace on each channel • Number of failed points • Stimulus value at a failed point
Ripple test		Available	Available
Bandwidth test		Available	Available

Display		8753ES	E5071C
Memory trace	Number	<ul style="list-style-type: none"> One per channel 	<ul style="list-style-type: none"> One per trace
	Data math	<ul style="list-style-type: none"> Data / Memory Data - Memory 	<ul style="list-style-type: none"> Data / Memory Data * Memory Data - Memory Data + Memory
	Display	<ul style="list-style-type: none"> Data trace only. Memory trace only. Simultaneous display of memory traces and data traces. Data math only. 	<ul style="list-style-type: none"> Data trace only. Memory trace only. Simultaneous display of memory traces and data traces. Data math only. Simultaneous display of data math and memory traces.
Frequency display		On/Off setting is definable for all channels.	On/off setting is definable channel by channel.
Graph layout		<ul style="list-style-type: none"> Up to four graphs can be displayed. 	<ul style="list-style-type: none"> Windows are assigned to each channel; up to 36 windows can be displayed. Up to 16 graphs can be displayed in each window.
Math between data traces		The results for channel 1/channel 2 can be displayed on the trace for channel 2.	Not available
Scale	Auto scale	Available	Available
	Reference line	Both value and position can be specified.	Both value and position can be specified.
	Scales per division	Definable	Definable
	Number of divisions	Fixed at 10	Can be set in increments of 2 from 4 to 30.
Turning the softkey area On/Off		Available	Available

E5071C

List display	Available	Not available
List display of Instrument State	Available	Not available
Color settings	Available	Available
Screen brightness setting	Available	Not available
Turning the LCD On/Off	Available	Available
Turning the update On/Off	Always updates.	Available

Macro	8753ES	E5071C
Creating macros	Uses a test sequence.	Uses VBA.
Automatic execution	Will execute if "AUTO" is given as the name of the sequence 6.	Only auto loading is possible.

Marker		8753ES	E5071C
Number of markers		Up to five markers per channel	Nine markers per trace (exclude reference marker)
Active marker		One marker per channel	One marker per trace
Delta marker (Reference marker)		Designates the marker displayed as the reference marker.	You can designate the reference marker independently from the markers displayed.
Marker coupling		Setting of Couple/Uncouple definable	Setting of Couple/Uncouple definable (coupling available only between markers on the same channel)
Marker move mode		Continuous/discrete (definable channel by channel)	Continuous/discrete (definable trace by trace)
Fixed marker		One marker definable per channel	Not available
Marker value display		On/Off setting for the marker value display definable per channel	All marker values for active traces are displayed on each channel. Display/No Display setting for the marker table displaying all marker values definable.
Marker search	Search function	<ul style="list-style-type: none"> • Maximum • Minimum • Target value • Bandwidth 	<ul style="list-style-type: none"> • Maximum • Minimum • Target value • Peak
	Object of search	<ul style="list-style-type: none"> • Active marker 	<ul style="list-style-type: none"> • Arbitrary marker (during remote control) • Active marker (when manipulating the front panel).
	Parameters for bandwidth search	<ul style="list-style-type: none"> • Bandwidth • Bandwidth center frequency • Q factor • Loss 	<ul style="list-style-type: none"> • Bandwidth • Bandwidth center frequency • Upper and lower frequency of the bandwidth • Q factor

		<ul style="list-style-type: none">• Loss
Target value	Definable for an active marker	Definable for each marker
Target transition type	Not definable	Setting of Positive/Negative transition definable (per marker)
Search tracking	On/Off setting definable for the active marker (Markers other than the active marker are always turned off.)	On/Off setting definable for each marker
Marker reading set at a parameter	Values of the start, stop, center, span, CW frequency, and reference line in the sweep range	Values of the start, stop, center, span, and reference line in the sweep range
Reading the marker value (for remote control)	Possible for the active marker	Possible for any marker

Measurement		8753ES	E5071C
Reset		Can be executed by using the front panel and the GPIB command.	Can be executed by using the front panel, the GPIB command, and telnet.
Channel	Number of channels	4 channels	Up to 36 independent measurement channels.
	Coupling between channels	Channels 3 and 4 are auxiliary channels for channels 1 and 2 and subject to the same sweep conditions, etc. applicable to channels 1 and 2. Couple/Uncouple between channels 1 and 2 can be set up.	Channels are independent of each other.
Trace		A trace for each channel	Up to 16 traces.
Measurement parameter		<ul style="list-style-type: none"> • S-parameters • A • B • R • A/R • B/R • A/B • analog bus 	<ul style="list-style-type: none"> • S-parameters (Mixed-mode S-parameters) • Absolute value measurement parameter • DC Measurement
S-parameter conversion		<ul style="list-style-type: none"> • Impedance (reflection and transmission) • admittance (reflection and 	Same

		transmission)	
Display format (Data format)		<ul style="list-style-type: none"> • 1/S • log magnitude • linear magnitude • phase • group delay • Smith chart • polar format • SWR • real • imaginary 	<ul style="list-style-type: none"> • log magnitude • linear magnitude • phase • expanded phase • positive phase • group delay • Smith chart • polar format • SWR • real • imaginary
Test port output	Number of ports	<ul style="list-style-type: none"> • 2 ports 	<ul style="list-style-type: none"> • 2 and 4 port options are available
	Frequency	<ul style="list-style-type: none"> • 30 kHz to 3 GHz (Std.) • 30 kHz to 6 GHz (Opt. 006) 	<p>The following frequency range is available depending on the option.</p> <ul style="list-style-type: none"> • 9 kHz to 4.5/6.5/8.5 GHz • 100 kHz to 4.5/6.5/8.5 GHz • 300 kHz to 14/20 GHz
	Power level	<ul style="list-style-type: none"> • -85 to +10 dBm (Std.) • -85 to +8 dBm (Opts. 014/075) 	<ul style="list-style-type: none"> • -55 to 10 dBm
	Characteristic Impedance	<ul style="list-style-type: none"> • 50 ohm (Std.) • 75 ohm (Opt. 075) 	<ul style="list-style-type: none"> • 50 ohm

Sweep conditions	Coupled/Uncoupled power levels		You can define Couple/Uncouple between channels and between ports.	Traces are coupled on the same channel, not between channels.
	Power slope function		Available	Available
	Turning the output On/Off		Allowed	Available
	Power range	Items to be set up	Per port and per channel.	No Power Range (one range for entire power level.)
		Automatic setting	On/Off setting capability.	
		Setting range	Range setting with 10 dBm resolution is definable from between -15 and +10 dBm down to between -85 and -60 dBm.	
	Number of points (except for the list frequency sweep operation)		3, 11, 21, 26, 51, 101, 201, 401, 801, 1601	Arbitrary value from 2 to 1601. (Can be set only when the Channel/trace is set to 1 ch/ 4 Tr 20001 points.)
	Sweep type		<ul style="list-style-type: none"> • linear sweep • log sweep • list sweep • power sweep • CW time sweep 	<ul style="list-style-type: none"> • linear sweep • log sweep • segment sweep • power sweep
	List frequency sweep	Number of list tables	One for channels 1 and 3 and one for channels 2 and 4, two in total	One for each channel (16 in total)
		Number of segments per table	Up to 30	Up to 201
		Creation of a table	Creating a table using more than	Creating a table using a single

		using GPIB(SCPI) command	one command	command
		Number of points	1 to 1601 points per segment. Up to 1601 points in total.	2 to 200001 points per segment. Up to 20001 points in total.
		Stepped/sw ept mode	stepped mode and swept mode. Selectable only when list frequency sweep is performed	stepped mode and swept mode. Selectable also when list frequency sweep is not performed.
		Sweep of designated segments.	Allowed	Not allowed (Always sweeps all segments.)
	Sweep time		Automatic, Manual (definable from the shortest time to 24 hours)	Automatic, Manual (range of definable sweep depends on sweep condition)
	IF bandwidth		10 Hz, 30 Hz, 100 Hz, 300 Hz, 1 KHz, 3 kHz, 3.7 kHz, 6 kHz	10 Hz, 15 Hz, 20 Hz, 30 Hz, 40 Hz, 50 Hz, 70 Hz, 100 Hz, 150 Hz, 200 Hz, 300 Hz, 400 Hz, 500 Hz, 700 Hz, 1 kHz, 1.5 kHz, 2 kHz, 3 kHz, 4 kHz, 5 kHz, 7 kHz, 10 kHz, 15 kHz, 20 kHz, 30 kHz, 40 kHz, 50 kHz, 70 kHz, 100 kHz, 150 kHz, 200 kHz, 300 kHz, 400 kHz, 500 kHz
	Averaging		Can be set from 1 to 999.	Can be set from 1 to 999.
	Smoothing		The smoothing aperture can be set from 0.05% to 20%.	Same
Electrical	Transmission		Compatible with	Same

delay	line	coaxial cables and waveguides	
	Value	Any value from 0 to 10 seconds	Any value from -10 to +10 seconds
Phase offset		Any value from -360 degree to +360 degree.	Same
Setting sweep conditions for Couple/Uncouple		Channels 1 and 3 and channels 2 and 4 are always coupled. Channels 1 and 2 can be set either at Couple or Uncouple.	Traces in the same channel are coupled; traces in different channels are not coupled.
Trigger mode		<ul style="list-style-type: none"> • Continuous • Single • Hold • Specified number of sweeps 	<ul style="list-style-type: none"> • Continuous • Single • Hold
Trigger source		<ul style="list-style-type: none"> • Internal • External (per sweep, per point) • Manual (per point) 	<ul style="list-style-type: none"> • Internal • External (per sweep) • bus • manual (per sweep)
External trigger line		Can be set to High or Low	Same

Other		8753ES	E5071C
Time domain transformation		Available	Available
Take4 mode		Available	Not available
Mixer measurement function		Available	Available (Option 008)
Harmonics measurement		Available (Opt. 002)	Available (Option 008)
Key manipulation-related GPIB command		GPIB commands that perform the same processing as do the front panel key and softkey manipulation.	Not available
LAN	interface	Not available	<ul style="list-style-type: none"> • 10 Base-T • 100 Base-TX
	protocol	Not available	<ul style="list-style-type: none"> • TCP/IP
	function	Not available	<ul style="list-style-type: none"> • Telnet • SICL-LAN
GPIB	Debug mode	Can be turned On/Off	Not available
	pass control	Available	Not available
	GPIB address setup	The addresses of the main body, controller, external disk, LO control, power meter, printer, and plotter can be specified by using the GPIB command and from the front panel.	The address of the main body can be specified from the front panel. The addresses of the power meter can be specified by using the GPIB command and from the front panel.
	Parallel port	Can be used as a printer or GPIO connector.	Not available.

Printer	8753ES	E5071C
Print range	Entire sheet, 1/4 of a sheet	Entire sheet
Color settings	Settings definable for the colors of a trace, reference line, text, and warning messages	Highlighting/No highlighting of all elements
Line settings	Possible	Always a solid line.
Printer port	<ul style="list-style-type: none"> • Parallel port • Serial port • GPIB 	<ul style="list-style-type: none"> • USB

Read/Write	8753ES	E5071C
Transfer format	<ul style="list-style-type: none"> • Intra-device binary • IEEE 32-bit floating point • IEEE 64-bit floating point • ASCII • PC-DOS 32-bit floating point 	<ul style="list-style-type: none"> • IEEE 32-bit floating point • IEEE 64-bit floating point • ASCII • PC-DOS 32-bit floating point
Object to be read/written	<ul style="list-style-type: none"> • Raw data array • Calibration coefficient data array (before interpolating) • Corrected data array • Formatted memory array • Memory trace • Calibration kit array data • Power meter calibration coefficient array (before interpolating) 	<ul style="list-style-type: none"> • Calibration coefficient data array (after interpolating) • Corrected data array • Corrected memory array • Formatted data array • Formatted memory array • Power meter calibration coefficient array (after interpolating)
Object to be read only	<ul style="list-style-type: none"> • Pre-raw data (in Take4 mode). • Calibration coefficient array (after interpolating). • Power meter calibration coefficient array (after interpolating). 	
Reading data for a designated point or scope	Allowed only for data traces	Not allowed

Save/Recall	8753ES	E5071C
Storage	<ul style="list-style-type: none"> • Internal registers • Internal disk (floppy disk) • External disk (connected through GPIB) 	<ul style="list-style-type: none"> • Internal hard disk • External storage/memory device through USB.
Storage initialization	Possible	Available with mouse
Save only	LCD screen image	<ul style="list-style-type: none"> • Formatted data array • LCD screen image
Object to be saved/recalled	<ul style="list-style-type: none"> • Instrument State (You can simultaneously save formatted data array for the active trace, raw data array, corrected data array, and LCD images.) • Color settings • Test sequence 	<ul style="list-style-type: none"> • Instrument State (You can simultaneously save formatted data array for the active trace and calibration data.) • Segment sweep table • Limit line table • VBA project
File formats	<ul style="list-style-type: none"> • Binary form • ASCII form 	<ul style="list-style-type: none"> • Binary form
Format for saving the screen display	<ul style="list-style-type: none"> • JPEG format 	<ul style="list-style-type: none"> • Windows Bitmap format • PNG format
File manipulation	<ul style="list-style-type: none"> • Reading file information • Deleting a file 	<ul style="list-style-type: none"> • Reading file information • Deleting a file or folder • Creating a folder • Copying a file

Status Report	8753ES	E5071C
Register types	<ul style="list-style-type: none"> • Status byte register. • Service request enable register. • Standard event status register. • Standard event status register B and enable register. 	<ul style="list-style-type: none"> • Status byte register. • Service request validation register. • Standard event status register. • Operation status register and validation register. • Questionable status register and validation register.
For limit test	Included in the standard event status register B and validation register	<ul style="list-style-type: none"> • Questionable limit status register. • Questionable limit channel status register. • Questionable limit extra channel status register. • Questionable limit channel extra status register. • Questionable ripple limit status register. • Questionable ripple limit channel status register. • Questionable ripple limit extra channel status register. • Questionable ripple limit channel extra status register. • Questionable bandwidth limit status register. • Questionable bandwidth limit channel status register. • Questionable bandwidth limit extra channel status register. • Questionable bandwidth limit channel extra status register.

System	8753ES	E5071C
Self-test	Can be executed by using the front panel and SCPI commands.	Can be executed by using the front panel.
Internal clock	Available	Available
Beep sound	On/Off setting definable for completion of actions, warnings, and limit test failures	On/Off setting definable for completion of actions and warnings
Measuring instrument mode	Can be selected from a <ul style="list-style-type: none"> • standard network analyzer • external signal source (automatic) • external signal source (manual) • tuned receiver. 	Always a network analyzer