

Technical Publication for 89450A Options H01 and H02



Agilent Technologies

Manufacturing Part Number: 89450-91005

Printed in USA

April 1999

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In This Book

This book, “Technical Publication for HP 89450A Options H01/H02”, shows you how to install and use option H01 and option H02 with the HP 89450A M-16QAM Radio Test Personality. Option H01 adds iDEN and DJ-SMRS capability to the HP 89450A M-16QAM Radio Test Personality. Option H02 adds iDEN M-4QAM and iDEN M-64QAM capability to the HP 89450A M-16QAM Radio Test Personality.

To Learn About the HP 89450A M-QAM Radio Test Personality

To learn how to use the HP 89450A M-16QAM Radio Test Personality, see the *HP 89450A User's Guide* shipped with the HP 89450A M-16QAM Radio Test Personality. To learn how to use Options H01 and H02 with the HP 89450A M-16QAM Radio Test Personality, see the chapters in this manual.

To Learn More About HP 89400-Series Analyzers

To learn more about the HP 89400-Series analyzers, see the *Getting Started Guide* and *Operator's Guide* shipped with your HP 89400-Series analyzer.

Table of Contents

1 About Options H01 and H02

About Option H01 1-2

Installing Option H01 1-2

About Option H02 1-3

Installing Option H02 1-3

Using Other Tests to Measure iDEN and DJ-SMRS Signals 1-4

Additional Details

2 Using the BER Test

To measure Bit Error Rate (BER) 2-2

To interpret BER results 2-4

To display the BER summary 2-6

To disable pilot tracking 2-7

3 HP-IB Commands

HP-IB Commands 3-2

Questionable Modulation Status Register 3-2

Need Assistance?

About this edition

1

About Options H01 and H02

This chapter introduces you to Options H01 and H02 and tells you how to install each option.

About Option H01

Option H01 adds the following capabilities to the HP 89450A M-16QAM Radio Test Personality:

- Two new demodulation formats (press [**Shift**], [**Instrument Mode**], [demod format]):
 - iDEN M-16QAM (Integrated Digital Enhanced Network Multiple 16 Quadrature Amplitude Modulated). iDEN is a trademark of the Motorola Company.
 - DJ-SMRS.
- BER (Bit Error Rate testing) on iDEN or DJ-SMRS signals (press [**Shift**], [**Instrument Mode**], [select test]).
- An [error symbol table] softkey that lets you see the bit errors obtained from the BER test (press [**Measurement Data**], [more choices]).

Option H01 does not change the operation of the HP 89450A M-16QAM Radio Test Personality. Therefore, use the *HP 89450A User's Guide* to learn how to use the HP 89450A M-16QAM Radio Test Personality; use this manual to learn how to use the one new test added by Option H01—the Bit Error Rate test.

Installing Option H01

You install Option H01 the same way you install the HP 89450A Radio Test Personality.

With Option H01, you receive an HP 89400-Series Firmware Update kit and two 3.5" disks (an install disk and an application disk), just as you did when you received the HP 89450A M-16QAM Radio Test Personality. The install disk gives the analyzer permission to use Option H01. The Option H01 application disk contains the HP 89450A M-16QAM Radio Test Personality with Option H01 enhancements.

To install Option H01, follow the instructions in Chapter 1 in the *HP 89450A User's Guide* using the HP 89400-Series Firmware Update, install disk, and application disk that you received with Option H01, and note the following:

- After completing “*To give your analyzer permission to use the application*”, verify that your analyzer has permission to use Option H01 by looking for YES next to **0 and **1 in the OPTIONS CONFIGURATION table. To display the OPTIONS CONFIGURATION table, press [**System Utility**], [options setup].
- To *run the BER test* on approximately 20 or more frames, you must have the following hardware option:
 - AY9 Extended Time Capture

About Option H02

Option H02 adds iDEN M-4QAM and iDEN M-64QAM to option H01 (press **[Shift]**, **[Instrument Mode]**, [demod format]).

Note that Option H02 extends the capability of option H01, it does not change the operation of option H01.

Installing Option H02

Option H02 requires Option H01. If Option H01 is not installed, install Option H01 before installing Option H02.

Like Option H01, Option H02 includes an HP 89400-Series Firmware Update kit, an install disk, and an application disk. The install disk gives your analyzer permission to use Option H02. The application disk contains the HP 89450A M-16QAM Radio Test Personality with Option H01 and H02 enhancements.

To install Option H02, follow the instructions in Chapter 1 in the *HP 89450A User's Guide* using the HP 89400-Series Firmware Update kit, install disk, and application disk that you received with Option H02, and note the following:

- After completing “*To give your analyzer permission to use the application*”, verify that your analyzer has permission to use Option H02 by looking for YES next to **0, **1, and **3 in the OPTIONS CONFIGURATION table. To display the OPTIONS CONFIGURATION table, press **[System Utility]**, [options setup].
- Option H02 requires instrument firmware revision A.06.10 or later. The HP 89400-Series Firmware Update kit that you receive with Option H02 contains the latest instrument firmware.

Using Other Tests to Measure iDEN and DJ-SMRS Signals

With Options H01 and H02, you can run any HP 89450A test on an iDEN or DJ-SMRS signal. Selecting iDEN or DJ-SMRS automatically configures a test to measure iDEN or DJ-SMRS signals. For example, selecting iDEN or DJ-SMRS sets the default adjacent-channel bandwidth (for the Adjacent-Channel Power test) to 10 kHz. The default for D-MCA is 18 kHz.

Here's how you run a test on an iDEN or DJ-SMRS signal:

- 1** Press [**Shift**], [**Instrument Mode**], [demod format] and select one of the iDEN demodulation formats or select DJ-SMRS. The analyzer selects [iDEN M-16QAM] by default.
- 2** Follow the instructions in the *HP 89450A User's Guide* for the desired test . If you are running the BER test, follow the instructions in chapter 2 of this manual.

NOTE

When running the Burst Power test on an iDEN or DJ-SMRS signal, you can still use the Burst Power template but remember—the template is defined by Standard RCR-32 for D-MCA signals.

Additional Details

When using option H01 or H02, note the following:

- When you save the measurement state (using **[Save/Recall]** [save state]), the measurement state does not include 89450A application parameters.

2

Using the BER test

Option H01 adds the BER (Bit Error Rate) test to the HP 89450A application software. This chapter shows you how to run that test.

To measure Bit Error Rate (BER)

Option H01 adds one additional test to the HP 89450A Radio Test Personality: the BER (Bit Error Rate) test. The BER test lets you test for bit errors in your iDEN or DJ-SMRS signal. You must install option H01 to run the BER test. You must install option H02 to run the BER test on iDEN M-4QAM or iDEN M-64QAM signals.

- 1** Prepare to run the BER test as shown in “*Before you run a test*” in chapter 3 of the *HP 89450A User’s Guide*.

Since the BER test uses digital demodulation, make sure you set the analyzer’s center frequency within 100 Hz of your carrier frequency (for details, see “To choose the best configuration” in chapter 3 of the *HP 89450A User’s Guide*).

- 2** If necessary, set the M-QAM format to iDEN M-QAM or DJ-SMRS .
Press **[Shift]**, **[Instrument Mode]**, [demod format], an iDEN M-QAM softkey or [DJ-SMRS].

- 3** Start the Bit Error Rate test.

Press [select test], [BER].

At this point, the analyzer starts the BER test and displays another softkey menu that lets you set parameters specific to the BER test.

- [data source] determines where the BER test acquires data. Select [data source **input**] to acquire and analyze data from the RF input. Select [data source **buffer**] to analyze data previously acquired in the analyzer’s time-capture buffer.
- [test mode] determines how the BER test ends; [test mode **single**] configures the BER test to end after a single test; [test mode **loop**] configures the BER test to make repetitive tests, without stopping.
- [num frames] determines the number of frames used by each test. The default is 16. The BER test requires one additional frame. For example, if [num frames] is 16, the BER test acquires 17 frames of data ($n + 1$), and then searches for the first frame that it can demodulate. The test demodulates that frame, and then continues to demodulate consecutive frames (consecutive 90 ms data-blocks) until all frames specified by [num frames] have been demodulated. The size of time-capture memory determines the maximum number of frames that you can measure (up to a maximum of 128). If you want to examine more frames than currently allowed, install option AY9 (Extended Time-Capture Memory).

The BER test is a time-capture measurement. In other words, it uses the analyzer's time-capture buffer. If you select [data source **input**], the BER test takes data from the RF input, puts it in the time-capture buffer, and then performs analysis on that data to find bit errors. If you select [data source **buffer**], the BER test assumes data is already in the time-capture buffer. To see the time-capture data, select [**Measurement Data**], [more choices], [cptr buffer **ch1**]. By default, the measurement data for Trace D is capture-buffer data.

The [num frames] softkey determines the number of 90 milli-second frames that the BER test demodulates. Since each frame has multiple slots, the BER test uses the 1st slot that contains data. If the data in that slot matches one of the 16 *Transmission Unit Data Words* defined by iDEN or DJ-SMRS, the BER test displays the number of the WORD found.

Hint

Trace information, such as that shown in the composite and error symbol tables, only shows results from the current frame. If your analyzer has option AYB (Waterfall and Spectrogram Displays), you can turn on the waterfall display to see results from previous frames. For details, see online help for the [waterfall on/off] softkey.

BER WORD shows the current word. The results here were obtained by comparing data in the current frame with WORD 15. The test displays WORD NOT FOUND if the current frame doesn't match one of the 16 WORDs defined by iDEN.

By default, trace A is the composite symbol table, which contains information interleaved from all four sub-channels, including SYNC (S) and PILOT (P) symbols.

TRACE A: Ch1 MQAM Composite

	SSSSSSSS	SSSS6371	E278P1FP	F371ECFE	F118FPPB	3679F385
0	SSSSSSSS	SSSS6371	E278P1FP	F371ECFE	F118FPPB	3679F385
192	0B6FPF5P	D020ABA5	42114PP6	2D52A547	8F8FPEFP	17E3E2D9
384	D148BPP4	883B76C9	93C0P10P	8B8D12C9	1F878PP4	09F3E746
576	8CDDPAEP	B46ADB7D	DE07EPP0	019E3C0D	1ADCP8CP	B87C9D5E
768	F71BBPP7	2F0F1F57	AEE5PBDP	C399BA25	2E7F5PPB	F6AD5B43

BER WORD: 15

By default, trace B is the error symbol table, which shows bit errors. S shows SYNC symbols, P shows Pilot symbols, and a dash indicates no bit error. By default, bit errors are in hexadecimal format. For additional details, run the BER test, then see online help for the [Measurement Data] [more choices] [err sym tbl] softkey.

TRACE B: Ch1 MQAM Error Syms

B Marker 0.0000 sym 0. dBm

	SSSSSSSS	SSSS----	----P--P	-----	-----PP-	BER WORD: 15
0	SSSSSSSS	SSSS----	----P--P	-----	-----PP-	BER WORD: 15
192	----P--P	-----	----PP-	-----	-----PP-	-----
384	----PP-	-----	----P--P	-----	-----PP-	-----
576	----P--P	-----	----PP-	-----	-----PP-	-----
768	----PP-	-----	----P--P	-----	-----PP-	-----

	Total	Peak	Current
BIT ERROR RATE:	0.006 %	0.125 %	0.000 %
Bits Failed:	3	1	0
Bits Tested:	51200	800	800
Found:	64/64 frames	Word 11	Word 15

To interpret BER results

By default, the BER test displays two traces (see the previous procedure). The BER test also displays the following results at the bottom of the display:

- BIT ERROR RATE, shown as a percentage.
- Bits failed, which is the number of bits that failed.
- Bits tested, which is the number of bits tested.

The BER test computes the Bit-Error Rate as follows:

$$BER (\%) = \frac{\text{Number of bits failed}}{\text{Number of bits tested}} \times 100 \%$$

Results are shown in three columns:

- *Total* shows the results from all frames that were tested. It also shows the number of frames successfully demodulated and the number of frames tested.
- *Peak* shows the results from the frame that had the highest (peak) BER. It also shows the WORD in that frame.
- *Current* shows the results for current frame being tested. It also shows the WORD in that frame.

The BER test may display any of the following messages:

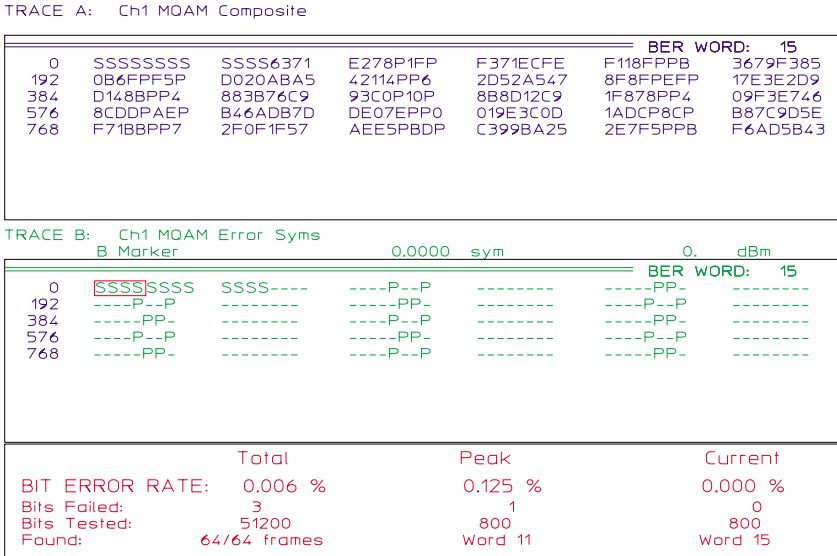
- *SYNC NOT FOUND*— the test did not find a valid SYNC pattern in the current frame. The analyzer also displays SYNC NOT FOUND if your carrier frequency drifts more than 100 Hz between measurements. For example, if the BER test is processing a long time capture and the carrier frequency drifts more than 100 Hz before the next time capture, the analyzer loses sync and displays SYNC NOT FOUND. For additional details, see “Tracking Carrier-Frequency Drift” in chapter 2 of the *HP 89450A User’s Guide*.
- *WORD NOT FOUND*—the test did not find a valid iDEN or DJ-SMRS Transmission Unit Data Word in the current frame.
- *PULSE NOT FOUND*—you are measuring an inbound signal and the test did not detect a pulse in the current frame.

The BER test changes the results as follows if it cannot demodulate a frame:

- **Under Total:** *Bits Failed* is increased by half the number of bits in the frame. Statistically, a pure noise signal should have a BER of 50%. *Bits Tested* is increased by the number of bits in the frame. *Found* shows two numbers: the first number shows the number of frames successfully demodulated; the second number shows the number of frames tested. For example, *Found: 4/15 frames* means 15 frames were tested—of these, only 4 frames were successfully demodulated; the other 11 frames resulted in SYNC NOT FOUND, WORD NOT FOUND, or PULSE NOT FOUND.
- **Under Current:** *Bits Failed* shows half the number of bits in the frame. *Bits Tested* shows all bits in the frame. *Word* is incremented or set to zero if it is the first word in the test.

HINT

For additional details about SYNC NOT FOUND or PULSE NOT FOUND, see online help for the [pulse search on/off] softkey (under [Time] when digital demodulation is selected).



Results displayed by the BER test. This information is updated with each measurement.

Total shows results for all frames .
 Peak only shows results for the frame that had the peak bit-error rate.
 Current only shows results for the current frame being tested.

To display the BER summary

The BER test also lets you display a table showing the symbols that contained the most bit errors. This procedure shows you how to display this information

1 Run the BER test as shown at the beginning of this chapter.

2 Display the BER summary.

Press [summary **on**].

With [summary **on**], the BER test displays a summary that includes the results described in the previous procedure and a table with up to 20 lines of additional information. These additional lines show the symbols that had the most bit errors. The symbol with the most bit errors is shown first. Frames that cannot be found (frames with SYNC NOT FOUND, WORD NOT FOUND, or PULSE NOT FOUND) do not affect this table.

- *WORD* is the iDEN or DJ-SMRS Transmission Data Unit Word that contains the symbol with the bit errors.
- *Symbol* is the composite symbol that contained the bit errors.
- *Total* is the total number of bit errors in the composite symbol.
- *Sub_n* is the number of bit errors in each sub-channel for the composite symbol. These add up to the *Total* number of bit errors.

BIT ERROR RATE RESULTS SUMMARY						
	Total	Peak	Current			
BIT ERROR RATE:	0.766 %	1.625 %	0.750 %			
Bits Failed:	98	13	6			
Bits Tested:	12800	800	800			
Found:	16/16 frames	Word 2	Word 8			
SYMBOLS WITH MOST BIT ERRORS (20 max)						
Word	Symbol	Total	Sub_1	Sub_2	Sub_3	Sub_4
11	59	3	1	1	0	1
10	56	2	0	0	1	1
10	59	2	0	1	0	1
11	46	2	0	0	1	1
1	59	2	1	1	0	0
2	58	2	1	0	1	0
3	57	2	1	0	0	1
7	48	2	1	0	1	0
10	23	1	1	0	0	0
11	5	1	0	0	1	0
11	14	1	0	0	0	1
11	15	1	0	0	0	1
11	16	1	0	1	0	0
11	18	1	0	0	1	0
11	33	1	1	0	0	0
11	57	1	1	0	0	0
12	35	1	0	1	0	0
12	38	1	0	1	0	0
13	10	1	0	0	0	1
13	12	1	0	0	0	1

*Pressing [summary **on**] displays these results. The BER test updates the results with each frame tested. A new measurement clears the results. If [test mode **loop**] is selected, the start of the next loop (next measurement) clears the results.*

To disable pilot tracking

By default, the BER test uses pilot tracking to closely simulate the reception characteristics of an actual M-QAM receiver. This procedure shows you how to disable pilot tracking so you can observe BER results with pilot tracking removed.

1 Run the BER test as shown at the beginning of this chapter.

2 Disable pilot tracking.

Press [pilot track **off**].

Pilot tracking removes magnitude and phase deviations within a slot by using the sync and pilot symbols as magnitude and phase reference-points.

By default, pilot tracking is on. This way, the BER test closely simulates the reception characteristics of an actual M-QAM receiver.

You may want to turn pilot tracking off to:

- Observe the BER in the system with pilot tracking removed.
- Examine the drift/pull characteristics of an LO (Local Oscillator) across a slot.

3

HP-IB Commands

This chapter describes the HP-IB commands added to the HP 89450A Application by Options H01 and H02.

HP-IB Commands

This chapter describes the HP-IB commands added to the HP 89450A Application by Options H01 and H02. HP-IB commands let you control the application from an external controller.

Note

The *HP 89450A User's Guide* describes all HP 89450A HP-IB commands except those added by Options H01 and H02.

This chapter contains the following information:

- *Questionable Modulation Status Register* describes how Option H01 affects this status register.
- *HP-IB Cross Reference* lists the softkeys added to the HP 89450A application by Options H01 and H02 and shows the equivalent HP-IB commands.
- *HP-IB commands* describes each HP-IB command for Options H01 and H02.

Questionable Modulation Status Register

The *HP-IB Command Reference* that you received with your analyzer describes the analyzer's HP-IB status registers. Option H01 adds the following bit to the Questionable Modulation Status Register:

- **Word Not Found** (bit 2) is set to 1 when the BER test cannot locate a known test word in the current frame. In other words, this bit is set if the current frame does not contain one of the 16 words defined by the iDEN or DJ-SMRS BER test sequence.

For further details about the Questionable Modulation Status Register, see chapter 1 in your analyzer's *HP-IB Command Reference*.

HP-IB Cross Reference	
Softkey	Equivalent HP-IB Command
<i>[BER]</i>	<i>[SENSe:]DDEMod:MQAM:TEST BER</i>
<i>[data source input/buffer]</i>	<i>[SENSe:]DDEMod:MQAM:BERate:DSOurce INPut BUFFer</i>
<i>[D-MCA]</i>	<i>DDEM:MQAM:FORM DMCA</i>
<i>[DJ-SMRS]</i>	<i>DDEM:MQAM:FORM JSMR</i>
<i>[error symbol table]</i>	<i>CALCulate:FEED 'XTIM:DDEM:SYMB:ERR'</i>
<i>[iDEN M-4QAM] (H02 only)</i>	<i>DDEM:MQAM:FORM IDEN4</i>
<i>[iDEN M-16QAM]</i>	<i>DDEM:MQAM:FORM IDEN16</i>
<i>[iDEN M-64QAM] (H02 only)</i>	<i>DDEM:MQAM:FORM IDEN64</i>
<i>[num frames]</i>	<i>[SENSe:]DDEMod:MQAM:BERate:FRAMes</i>
<i>[pilot track on/off]</i>	<i>[SENSe:]DDEMod:MQAM:PTRack[:STATe]</i>
<i>[summary on/off]</i>	<i>SCReen:CONTents:MQAM:SUMMary[:STATe]</i>
<i>[test mode loop/single]</i>	<i>[SENSe:]DDEMod:MQAM:BERate:TMODe:SINGle[:STATe]</i>

CALCulate[1 | 2 | 3 | 4]:DATA?**command/query**

This HP-IB command operates as described in the HP 89400-Series HP-IB Command Reference, with the following exception:

- When the composite or error symbol table is displayed in hexadecimal format and the demodulation format is M-4QAM or M-64QAM, the data returned by this command contains interleaved zeros. For example, each composite symbol in M-4QAM represents four subcarriers, and each subcarrier has two bits-per-symbol. If the composite symbol is 01 10 11 00, the analyzer returns 0001 0010 0011 0000, or 1230 Hex.

CALCulate[1 | 2 | 3 | 4]:FEED**command/query**

Selects the measurement data to be displayed.

Command Syntax: CALCulate[1|2|3|4]:FEED <string>

<string> ::= (see below)

Example Statements: OUTPUT 719;"calc2:feed 'XTIM:DDEM:SYMB:ERR' "

Query Syntax: CALCulate[1|2|3|4]:FEED?

Return Format: STRING

Attribute Summary: Synchronization Required: no
Preset State: dependent on options installed
SCPI Compliance: confirmed

Description:

Option H01 adds one additional measurement result, which is:

- error symbol table (send CALC:FEED 'XTIM:DDEM:SYMB:ERR')

This command is the same command as documented in the *HP 89450A User's Guide* and the *HP-IB Command Reference* shipped with your analyzer. See those manuals for additional details about this command.

CALCulate[1 | 2 | 3 | 4]:MARKer:Y?**command/query**

This HP-IB command operates as described in the HP 89400-Series HP-IB Command Reference, with the following exception:

- When the composite or error symbol table is displayed in hexadecimal format and the demodulation format is M-4QAM or M-64QAM, the data returned by this command contains interleaved zeros. For example, each composite symbol in M-4QAM represents four subcarriers, and each subcarrier has two bits-per-symbol. If the composite symbol is 01 10 11 00, the analyzer returns 0001 0010 0011 0000, or 1230 Hex.

CALCulate[1 | 2 | 3 | 4]:MQAM:TEST:RESult?**query**

Queries all results for the current test.

Query Syntax: CALCulate[1|2|3|4]:MQAM:TEST:RESult?

Example Statements: OUTPUT 719;"Calc3:Mqam:Test:Res?"
OUTPUT 719;"CALCULATE:MQAM:TEST:RESULT?"

Return Format: (see, text)

Attribute Summary: Option: AYA (vector modulation analysis)
Synchronization Required: no
Preset State: not affected by Preset
SCPI Compliance: instrument-specific

Description:

This command is documented in the *HP 89450A User's Guide*. The following table shows information specific to Option H01. For details, see the *HP 89450A User's Guide*.

Test Results for BER Test

<i>Selection you can use with:</i>	<i>Array returned when using:</i>	<i>Description</i>
<i>CALC[1 2 3 4]:MQAM:RESult?</i>	<i>CALC[1 2 3 4]:MQAM:TEST:RESult?</i>	
<i>ERTotal</i>	<i>result[0]</i>	<i>Total Bit Error Rate.</i>
<i>ERTFbits</i>	<i>result[1]</i>	<i>Total number of bits that failed.</i>
<i>ERTTbits</i>	<i>result[2]</i>	<i>Total number of bits tested.</i>
<i>ERFrames</i>	<i>result[3]</i>	<i>Total number of frames tested.</i>
<i>ERPeak</i>	<i>result[4]</i>	<i>BER in worst frame.</i>
<i>ERPfbits</i>	<i>result[5]</i>	<i>Number of bits that failed in worst frame.</i>
<i>ERPtbits</i>	<i>result[6]</i>	<i>Number of bits tested in worst frame.</i>
<i>ERPWord</i>	<i>result[7]</i>	<i>WORD found in worst frame.</i>

[SENSe:]DDEMod:MQAM:BERate:DSource**command/query**

Determines the source of data for the BER test.

Command Syntax: [SENSe:]DDEMod:MQAM:BERate:DSource INPUT|BUFFer

Example Statements: OUTPUT 719;"SENSE:DDEM:MQAM:BERATE:DSO BUFFER"
OUTPUT 719;"ddemod:mqam:ber:dsource INPUT"

Query Syntax: [SENSe:]DDEMod:MQAM:BERate:DSource?

Return Format: CHAR

Attribute Summary: Synchronization Required: no
Preset State: input
SCPI Compliance: instrument-specific

Description:

This command determines where the BER test obtains data. Input obtains data from the RF input. Buffer obtains data from the time-capture buffer.

[SENSe:]DDEMod:MQAM:BERate:FRAMes**command/query**

Sets the number of frames tested by the BER test.

Command Syntax: [SENSe:]DDEMod:MQAM:BERate"FRAMes <number>|<step>|<bound>

<number> ::= a real number (NRf data)

<step> ::= UP|DOWN

<bound> ::= MAX|MIN

Example Statements: OUTPUT 719;"SENSe:DDEMod:MQAM:BERate:FRAM 16"
OUTPUT 719;"ddemod:mqam:ber:fram 10"

Query Syntax: [SENSe:]DDEMod:MQAM:BERate:FRAMes?

Return Format: Real

Attribute Summary: Synchronization Required: no
Preset State: 16
SCPI Compliance: instrument-specific

Description:

The size of time-capture RAM determines the maximum number of frames that you can specify. You can increase the size of time-capture RAM by installing Option AY9 (Extended Time-Capture Memory). With Option AY9, you can specify up to 128 frames.

[SENSe:]DDEMod:MQAM:BERate:TMODe:SINGle[:STATe]**command/query**

Determines how the BER test ends.

Command Syntax: [SENSe:]DDEMod:MQAM:BERate:TMODe:SINGle[:STATe] OFF|0|ON|1

Example Statements: OUTPUT 719;"sens:ddemod:mqam:berate:tmod:sing:state ON"
OUTPUT 719;"Ddem:Mqam:Ber:Tmod:Single ON"

Query Syntax: [SENSe:]DDEMod:MQAM:BERate:TMODe:SINGle[:STATe]?

Return Format: Integer

Attribute Summary: Synchronization Required: no
Preset State: +0 (OFF)
SCPI Compliance: instrument-specific

Description:

This command determines how the BER test ends. ON (1) configures the BER test to complete one, single measurement, and then stop. OFF (0) configures the BER test to perform consecutive measurements without stopping.

[SENSe:]DDEMod:MQAM:FORMat**command/query**

Selects the format used for MQAM measurements.

Command Syntax: [SENSe:]DDEMod:MQAM:FORMat DMCA|JSMR|IDEN4|IDEN16|IDEN64|MIRS

Example Statements: OUTPUT 719;"Sense:Ddem:Mqam:Form IDEN16"
OUTPUT 719;"DDEM:MQAM:FORM DMCA"

Query Syntax: [SENSe:]DDEMod:MQAM:FORMat?

Return Format: CHAR

Attribute Summary: Synchronization Required: no
Preset State: (see text)
SCPI Compliance: instrument-specific

Description:

This command determines the format used for MQAM measurements.

Selecting D-MCA configures the HP 89450A application to measure signals that conform to Standard RCR-32.

Selecting IDEN4, IDEN16, or IDEN64 configures the HP 89450A application to measure iDEN M-4QAM, M-16QAM, or M-64QAM signals, respectively. Note that IDEN4 and IDEN64 are available only if option H02 is installed.

Selecting JSMR configures the HP 89450A application to measure DJ-SMRS signals.

Selecting MIRS is the same as selecting IDEN16 (MIRS is provided for backward compatibility).

With options H01 or H02, the default M-QAM format is iDEN16. Otherwise, the default format is DMCA.

This command is supported only if option H01 or H02 is installed.

[SENSe:]DDEMod:MQAM:TEST**command/query**

Selects one of the HP 89450A application's tests.

Command Syntax: [SENSe:]DDEMod:MQAM:TEST <selection>

<selection> ::= MACCuracy|ACPower|OCBandwidth|BURST|BERate|NONE

Example Statements: OUTPUT 719;"sens:ddem:mqam:test NONE"
OUTPUT 719;"Ddemod:Mqam:Test BURST"

Query Syntax: [SENSe:]DDEMod:MQAM:TEST?

Return Format: CHAR

Attribute Summary: Synchronization Required: yes
Preset State: NONE
SCPI Compliance: instrument-specific

Description:

This command selects a test. You can select the:

- Modulation Accuracy test (MACC)
- Adjacent-Channel Power test (ACP)
- Occupied Bandwidth test (OBAN)
- Burst Power test (BURST)
- Bit Error Rate test (BER)

Sending this command configures the analyzer for the selected test. To learn how each test configures the analyzer, see the *HP 89450A User's Guide*.

"NONE" deselects a test. If no test is selected, "NONE" does nothing. If a test is selected, "NONE" aborts the current test.

Synchronization is required with this command. Therefore, use *WAI when using this command. For example, to select the Burst Power test, send DDEM:MQAM:TEST BURS;*WAI.

[SENSe:]DDEMod:MQAM:TEST:PRESet**command**

Presets the analyzer settings for the currently selected test, if any.

Command Syntax: [SENSe:]DDEMod:MQAM:TEST:PRESet

Example Statements: OUTPUT 719;"Sens:Ddemod:Mqam:Test:Pres"
OUTPUT 719;"DDEM:MQAM:TEST:PRESET"

Attribute Summary: Synchronization Required: no
Preset State: not applicable
SCPI Compliance: instrument-specific

Description:

This command preserves the transmission format, center frequency, M-QAM format, and input range. It then presets the analyzer, restores the parameters saved before the preset, and then reruns the currently selected test, if any.

If no test is currently selected, then this command only presets the analyzer.

Need Assistance?

If you need assistance, contact your nearest Hewlett-Packard Sales and Service Office listed in the HP Catalog, or contact your nearest regional office listed at the back of this guide. If you are contacting Hewlett-Packard about a problem with your analyzer, please provide the following information:

- Model number:
- Serial number:
- Options:
- Date the problem was first encountered:
- Circumstances in which the problem was encountered:
- Can you reproduce the problem?
- What effect does this problem have on you?

You may find the serial number and options from the front panel of your analyzer by executing the following:

Press **[System Utility]**, [more], [serial number].

Press **[System Utility]**, [options setup].

About this edition

November 1994: First Edition. This edition documents the use of Option H01 for the HP 89450A M-16QAM Radio Test Personality used in HP 89400-Series analyzers that have software revision A.02.06 or later.

March 1999: Second Edition: This edition incorporates these new M-16QAM formats: iDEN and DJ-SMRS.

April 1999: Third Edition: This edition incorporates the use of Option H02 for the HP 89450A M-16QAM Radio Test Personality used in HP 89400-Series analyzers that have software revision A.06.10 or later. Option H02 is included on HP 89450A Application Disks that have software revision A.02.00 or later.