Agilent Technologies 8960 Series 10 E5515B Wireless Communications Test Set
Agilent Technologies E1962A CDMA 2000 Mobile Test Mode Application

Reference Manual

Test Application Revision A.01

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Printed in U.S.A. October 2000

Agilent Part Number: E1962-90001

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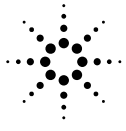

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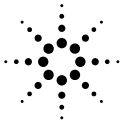

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Edition/Print Date

All Editions and Updates of this manual and their creation dates are listed below.

October 2000 E1962A TA Revision A.01

Safety Summary

The following general safety precautions must be observed during all phases of operation of this instrument. Failure to comply with these precautions or with specific warnings elsewhere in this manual violates safety standards of design, manufacture, and intended use of the instrument. Agilent Technologies Inc. assumes no liability for the customer's failure to comply with these requirements.

GENERAL

This product is a Safety Class 1 instrument (provided with a protective earth terminal). The protective features of this product may be impaired if it is used in a manner not specified in the operation instructions.

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This product has been designed and tested in accordance with *IEC Publication 1010*, "Safety Requirements for Electronic Measuring Apparatus," and has been supplied in a safe condition. This instruction documentation contains information and warnings which must be followed by the user to ensure safe operation and to maintain the product in a safe condition.

ENVIRONMENTAL CONDITIONS

This instrument is intended for indoor use in an installation category II, pollution degree 2 environment. It is designed to operate at a maximum relative humidity of 95% and at altitudes of up to 2000 meters. Refer to the specifications tables for the ac mains voltage requirements and ambient operating temperature range.

Ventilation Requirements: When installing the product in a cabinet, the convection into and out of the product must not be restricted. The ambient temperature (outside the cabinet) must be less than the maximum operating temperature of the product by 4° C for every 100 watts dissipated in the cabinet. If the total power dissipated in the cabinet is greater than 800 watts, then forced convection must be used.

BEFORE APPLYING POWER

Verify that the product is set to match the available line voltage, the correct fuse is installed, and all safety precautions are taken. Note the instrument's external markings described under Safety Symbols.

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Safety Symbols

Caution, refer to accompanying documents

Warning, risk of electric shock

Earth (ground) terminal

Alternating current

Frame or chassis terminal

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Agilent Technologies E1962A CDMA Mobile Test Mode Application

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According to ISO/IEC Guide 22 and CEN/CENELEC EN45014

Manufacturer's Name:	**Agilent Technologies UK Ltd.**	**Agilent Technologies, Inc.**
Manufacturer's Address:	**Electronic Products & Solutions Group - Queensferry South Queensferry West Lothian, EH30 9TG Scotland, United Kingdom**	**24001 E. Mission Avenue Liberty Lake Washington 99019-9599 USA**

Declares that the product

Product Name: 8960 Series 10 Wireless Communications Test Set

Model Number: E5515A,B,T

Product Options: This declaration covers all options of the above product.

EMC:

Conforms with the following product specifications:

Standard:	**Limit:**
CISPR11:1990 / EN55011:1991	Group 1 Class A
IEC 801-2:1991 / EN 50082-1:1992	4kV CD, 8kV AD
IEC 801-3:1984 / EN 50082-1:1992	3V/m, 27-500 MHz
IEC 801-4:1988 / EN 50082-1:1992	0.5kV signal lines, 1kV power lines

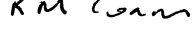
Safety:

The product conforms to the following safety standards:

IEC 61010-1(1990) +A1(1992) +A2(1995) / EN 61010-1:1993
Canada / CSA-C22.2 No. 1010.1-93

The product herewith complies with the requirements of the Low Voltage Directive 73/23/EEC, and the EMC Directive 89/336/EEC, and carries the CE mark accordingly.

South Queensferry, Scotland. 04 May 2000



R.M. Evans / Quality Manager

Spokane, Washington, USA. 04 May 2000

W.V.Roland / Reliability & Regulatory Engineering Manager

For further information, please contact your local Agilent Technologies sales office, agent, or distributor.

Manufacturer's Declaration

This statement is provided to comply with the requirements of the German Sound Emission Directive, from 18 January 1991.

This product has a sound pressure emission (at the operator position) < 70 dB(A).

- Sound Pressure Lp < 70 dB(A).
- At Operator Position.
- Normal Operation.
- According to ISO 7779:1988/EN 27779:1991 (Type Test).

Herstellerbescheinigung

Diese Information steht im Zusammenhang mit den Anforderungen der Maschinenlärminformationsverordnung vom 18 Januar 1991.

- Schalldruckpegel Lp < 70 dB(A).
- Am Arbeitsplatz.
- Normaler Betrieb.
- Nach ISO 7779:1988/EN 27779:1991 (Typprüfung).

1 Measurements

Channel Power Measurement Description

How is a Channel Power measurement made?

Channel power measurements are made by analyzing a digitized version of the input signal's downconverted IF using the test set's DSP. The measurement is cross-calibrated with the detected average power to determine the absolute power level. This measurement is limited to a 1.23 MHz bandwidth, and can be made on either power-gated or non-power-gated input signals.

Channel Power Measurement Calibration

Channel power measurements are calibrated using the "CALibration:CPOWer?" command. Refer to "CALibration Subsystem" for a description of channel power calibration.

Channel Power Measurement Speed

There are two channel power measurement speeds, fast and normal. See "SETup:CPOWer:MSPeed" . Fast channel power measurements sample the input signal for 1.25 milliseconds, and are available when the input signal power is not gated.

Normal channel power measurements sample the input signal for 10 milliseconds, and are always available.

Input Signal Requirements

The channel power measurement meets or exceeds specifications when the following input signal requirements are met:

- The frequency of the signal being measured must be within the range of 800 MHz to 960 MHz or 1.7 GHz to 2.0 GHz, and be within 100 kHz of the expected frequency.
- The average power level of the signal at the RF IN/OUT connector must be between -61 dBm to +37 dBm.

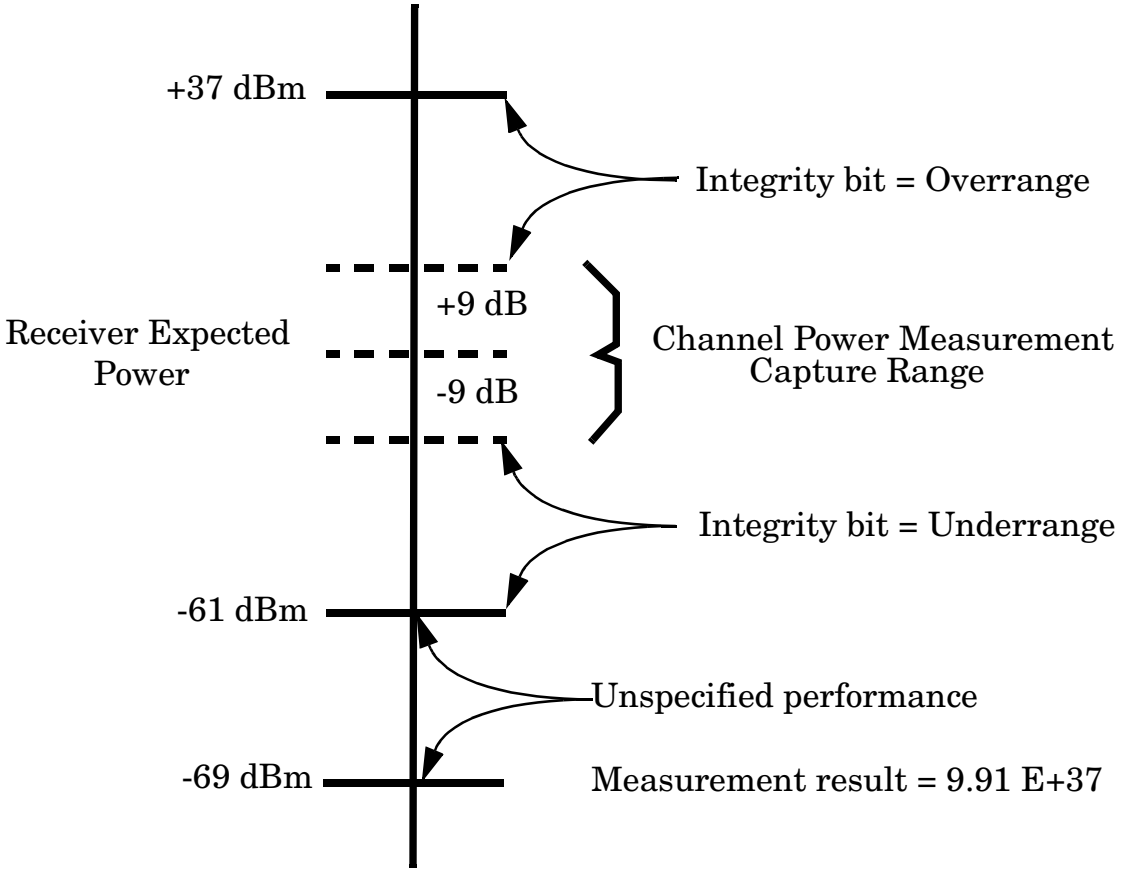
Receiver Autoranging

The test set's measurement receiver automatically ranges to an expected input signal level based on:

- Cell power level
- AWGN level
- Nominal Power (a base station parameter)
- Nominal Power Extended (a base station parameter)
- Path loss settings
- Pilot channel level

These settings, applied along with the open loop power control offset (-73 dB for cellular, -76 dB for PCS), determine the expected input signal level for channel power measurements. See Figure 1., "Channel Power Measurement Level Ranges,"

Figure 1. Channel Power Measurement Level Ranges



Related Topics

****

"READ? Subsystem"

"SETup:CPOWer"

"INITiate"

"FETCh:CPOWer"

"Digital Average Power Measurement Description"

****

Programming a Channel Power Measurement

This section provides BASIC and C programming examples for performing channel power and digital average power measurements.

The following program example assumes that the mobile's antenna output is connected to the RF IN/OUT connector, and the mobile is being operated in test mode.

Example Program - Basic

```
10    !************************************************************************
20    !  Program: PROG_EX.TXT
30    !  Purpose:  Comprehensive Example of programming measurements on the
40    !            Agilent 8960 using IS-2000 test mode.
50    !            This example is written using BASIC command.
60    !************************************************************************
70    !
80    !  Configure the BASIC environment.
90    !  These actions are unrelated to configuring or performing tests with
100   !     the Agilent 8960.
110   !
120   COM Test_set
130   Test_set=720 !  Test set's GPIB address
140   PRINTER IS CRT
150   CLEAR SCREEN
160   !
170   !  Turn on the GPIB debugger.
180   OUTPUT Test_set;"SYST:COMM:GPIB:DEB:STAT ON"
190   !
200   !************************************************************************
210   ! Step 1: Set Test Set Cell Operating Mode To IS-2000 Test Mode
220   !************************************************************************
230   !
240   OUTPUT Test_set;"CALL:OPER:MODE D2KT"
250   !
260   !************************************************************************
270   ! Step 2: Configure the Base Station Emulator (BSEmul)
280   !************************************************************************
290   OUTPUT Test_set;"SYST:CORR -2.5"! MS has a -2.5 dB fixture loss
300   OUTPUT Test_set;"CALL:POW -55"! Set cell power to -55 dBm and turn
310                                   ! power state ON with complex command
320   OUTPUT Test_set;"CALL:BAND:DIG2000:USPC"! Set active band to PCS
330   OUTPUT Test_set;"CALL:CHAN:USPC 384"! Set traffic channel to 384
340   !
```

```
350   !*************************************************************************
360   ! Step 4: Configure Measurement Execution Parameters
370   !*************************************************************************
480   !  Configure Digital Average Power Measurement:
490   !
500   OUTPUT Test_set;"SET:DAP:CONT ON"
510   OUTPUT Test_set;"SET:DAP:COUN 10"
520   OUTPUT Test_set;"SET:DAP:TIM:STIM 5"
530   !
540   !  Configure Channel Power Measurement
550   !
560   OUTPUT Test_set;"SET:CPOW:CONT OFF"
570   OUTPUT Test_set;"SET:CPOW:COUN 5"
580   OUTPUT Test_set;"SET:CPOW:TIM:STIM 15"
590   !
600   !*************************************************************************
610   !  Step 5:  Set Up The MS Using MS Test Mode Commands
620   !*************************************************************************
630   PRINT "SETUP THE MS FOR TEST MODE (USE A TERMINAL PROGRAM IF NECESSARY)"
640   PRINT "PRESS CONTINUE"
650   PAUSE
660   !*************************************************************************
670   !  Step 6:  Make Measurements
680   !*************************************************************************
690   !
700   !  Step 6a: Start Set of Concurrent Measurements:
710   !
720   OUTPUT Test_set;"INIT:DAP;CPOW"
730   !
740   !  Step 6b:  Determine if A Measurement Is Done:
750   !
760   LOOP
770     OUTPUT Test_set;"INIT:DONE?"
780     ENTER Test_set;Meas_done$
790   !
800   !  Step 6c: Obtain Measurement Results
```

```
810   !
820     SELECT Meas_done$
830     CASE "CPOW"
840        GOSUB "CPOW"
850 CASE "DAP"
860        OUTPUT Test_set;"FETC:DAP?"
870        ENTER Test_set;Dap_integ,Dig_avg_pow
880        IF Dap_integ=0 THEN
890          PRINT "DIG AVG POW= ",Dig_avg_pow
900        ELSE
910          GOSUB Bad_int_ind
920    !
930    !  Step 6d: Are Measurement Results Valid?
940    !
950       END IF
960     END SELECT
970   EXIT IF Meas_done$="NONE"
980   END LOOP  !  If 'WAIT' is returned from the 'INIT:DONE?' query, it will
990             !  pass through the loop
1000  !************************************************************************
1010  !  Step 7:  Make Test Set Changes for New MS Configuration
1020  !************************************************************************
1030  !
1040  !  Proceed to next test if testing in a new BSE configuration.
1050  !
1060  !************************************************************************
1070  !  Step 2: Configure the Base Station Emulator (BSEmul)
1080  !************************************************************************
1090  OUTPUT Test_set;"CALL:BAND:DIG2000:KPCS"! Set active band to Korean PCS
1100  OUTPUT Test_set;"CALL:CHAN:USPC 325"! Set traffic channel to 325
1110  !************************************************************************
1120  !  Step 5(REPEATED):  Set Up The MS Using MS Test Mode Commands
1130  !************************************************************************
1140  PRINT " "
1150  PRINT "SETUP THE MS FOR TEST MODE (USE A TERMINAL PROGRAM IF NECESSARY)"
1160  PRINT "PRESS CONTINUE"
```

```
1170  PAUSE
1180  !
1190  !************************************************************************
1200  !  Step 6(REPEATED):  Make Measurements
1210  !************************************************************************
1220  !
1230  !  Step 6a: Start Set of Concurrent Measurements:
1240  !
1250  OUTPUT Test_set;"INIT:CPOW"
1260  !
1270  !  Step 6b:  Determine if A Measurement Is Done:
1280  !
1290  LOOP
1300    OUTPUT Test_set;"INIT:DONE?"
1310    ENTER Test_set;Cpow_done$
1320  !
1330  !  Step 6c: Obtain Measurement Results
1340  !
1350    SELECT Cpow_done$
1360  !
1370    CASE "CPOW"
1380       OUTPUT Test_set;"FETC:CPOW?"
1390       ENTER Test_set;Cpow_integ,Chan_pow_meas
1400       IF Integrity=0 THEN
1410          PRINT "Channel Power Integrity = ",Cpow_integ
1470       ELSE
1480          GOSUB Bad_int_ind
1490       END IF
1500    END SELECT
1510  EXIT IF Meas_done$="NONE"
1520  END LOOP
1530 Bad_int_ind !
1540  PRINT Meas_done$&" Measurement Error"
1550  PRINT "Measurement Integrity Indicator: ",Integrity
1560  RETURN
1570  END
```

Example Program - C

```
/*-------------------------------------------------------------------------*/
/* Copyright (C) 2000 Agilent Technologies                                 */
/*-------------------------------------------------------------------------*/
/*                                                                         */
/* Title   : Programming Example.cpp                                       */
/* Purpose : C Example for IS-2000 Programming Guide                       */
/*                                                                         */
/*-------------------------------------------------------------------------*/
// IS2000.cpp : Defines the entry point for the console application.
//
#include <stdafx.h>     // include file for standard system include files
#include <visa.h>       // VISA library header file
#include <iostream.h>   // Input/output stream definitions
#include <stdlib.h>     // Declares several commonly used routines such as
                        //  conversion routines and search/sort routines
#include <stdio.h>      // Input and output standard library

/* typedefs */

#define NOT_A_NUMBER      9.91E+37 // IEEE not a number (NAN)
#define NO_RESULT_AVAIL   1        // No result available

/* global variables */

ViStatus   errStatus;                    // error status
ViSession  defaultRM, vi;                // default resource manager, instrument handle
ViRsrc     resourceName;                 // VISA address of instrument
ViInt32    timeout_time;                 // timeout value, in msec, for VISA driver calls
ViInt32    Dap_done,Cpow_done;           // measurement status
ViInt32    Dap_integ,Cpow_integ;         // measurement integrity
ViReal64   Dig_avg_pwr,Chan_pow_meas;
```

```
/* function prototypes */

void close_session();

/* start main program */

int main()
{
      /* initialize variables */
      resourceName = "GPIB0::20::INSTR";
      vi = VI_NULL;
      timeout_time = 5000;
      /*************************************************************/
      /* Open session with the Default Resource Manager.           */
      /*************************************************************/
      if ((errStatus = viOpenDefaultRM(&defaultRM)) < VI_SUCCESS)
      {
      printf("\nviOpenDefaultRM failed with return code %d.\n", errStatus);
      return 1;
      }
      /*************************************************************/
      /* Open session to 8960 and get session identifier.          */
      /*************************************************************/
      if ((errStatus = viOpen(defaultRM, resourceName, VI_NULL, VI_NULL, &vi)) < VI_SUCCESS)
      {
      printf("\nviOpen failed with return code %d.\n", errStatus);
      viClose(defaultRM);
      vi=VI_NULL;
      return 1;
      }
      /*************************************************************/
      /* Set the driver timeout value (in milliseconds).           */
      /*************************************************************/
      if ((errStatus = viSetAttribute(vi, VI_ATTR_TMO_VALUE, timeout_time)) < VI_SUCCESS)
      {
      close_session();
```

```
return 1;
}
/*************************************************************/
/* Reset the instrument setup.                               */
/*************************************************************/
if ((errStatus = viPrintf(vi, "*RST\n")) < VI_SUCCESS)
{
close_session();
return 1;
}
/*************************************************************/
/* Configure the instrument.                                 */
/*************************************************************/
if ((errStatus = viPrintf(vi, "SYST:COMM:GPIB:DEB ON\n")) < VI_SUCCESS)
{
close_session();
return 1;
}
if ((errStatus = viPrintf(vi, "CALL:BAND:DIG2000 USPC\n")) < VI_SUCCESS)
{
close_session();
return 1;
}
if ((errStatus = viPrintf(vi, "CALL:CHANNEL:USPC 384\n")) < VI_SUCCESS)
{
close_session();
return 1;
}
if ((errStatus = viPrintf(vi, "SET:DAP:CONT ON\n")) < VI_SUCCESS)
{
close_session();
return 1;
}
if ((errStatus = viPrintf(vi, "SET:DAP:COUN:NUMB 10\n")) < VI_SUCCESS)
{
close_session();
```

```
return 1;
}
if ((errStatus = viPrintf(vi, "SET:DAP:TIM:STIM 20\n")) < VI_SUCCESS)
{
close_session();
return 1;
}
if ((errStatus = viPrintf(vi, "SET:CPOW:CONT OFF\n")) < VI_SUCCESS)
{
close_session();
return 1;
}
if ((errStatus = viPrintf(vi, "SET:CPOW:COUN:NUMB 1\n")) < VI_SUCCESS)
{
close_session();
return 1;
}
/*********************************************************/
/* Make measurements.                                    */
/*********************************************************/
if ((errStatus = viPrintf(vi,"INIT:DAP;CPOW\n")) < VI_SUCCESS)
{
close_session();
return 1;
}
if ((errStatus = viQueryf(vi,"DAP:DONE?\n","%ld,%lf%*t",&Dap_done)) < VI_SUCCESS)
{
close_session();
return 1;
}
if ((errStatus = viQueryf(vi,"CPOW:DONE?\n","%ld,%lf%*t",&Cpow_done)) < VI_SUCCESS)
{
close_session();
return 1;
}
if ((errStatus = viQueryf(vi,"WQU:DONE?\n","%ld,%lf%*t",&Wqu_done)) < VI_SUCCESS)
```

```
      {
      close_session();
      return 1;
      }
      if ((errStatus = viQueryf(vi,"FETC:DAP?\n","%ld,%lf%*t",&Dap_integ,&Dig_avg_pwr)) <
VI_SUCCESS)
      {
      close_session();
      return 1;
      }
      if ((errStatus = viQueryf(vi,"FETC:CPOW?\n","%ld,%lf%*t",&Cpow_integ,&Chan_pow_meas)) <
VI_SUCCESS)
      {
      close_session();
      return 1;
      }
      cout << "DAP Integrity = " << Dap_integ << endl;
      cout << "Average digital power = " << Dig_avg_pwr << " dBm" << endl << endl;
      cout << "" << endl;
      cout << "CPOW Integrity = " << Cpow_integ << endl;
      cout << "Channel power measurements completed = " << Chan_pow_meas << endl;
      cout << "" << endl;
      /*************************************************************/
      /* Terminate the VISA session.                               */
      /*************************************************************/
      printf("Program completed successfully.\n");
      close_session();
      return 0;
}

/*****************************************************************************/
void close_session()
/*****************************************************************************/
/*  Closes the VISA session on an error condition.                           */
/*****************************************************************************/
{
```

```
if (errStatus < VI_SUCCESS)
{
cout << "Last returned errStatus code = " << errStatus << endl;
}
if ((errStatus = viClose(defaultRM)) < VI_SUCCESS)
{
cout << "Close vi session failed with error: " << errStatus << endl;
}
else
{
cout << "Vi session closed successfully." << endl;
}
vi=VI_NULL;
return;

}/* ----- end of function ----- */
```

Related Topics

****

“Channel Power Measurement Description”

“SETup:CPOWer”

“INITiate”

“FETCh:CPOWer”

****

Channel Power Measurement Troubleshooting

Possible Setup Issues

During remote operation of the waveform quality measurements, you should configure the trigger arm state to single. See "SETup:CPOWer" for remote operation command syntax. If single triggering is used during manual operation, press the START SINGLE key to trigger each measurement.

The input power level during channel power measurements must be between –61 dBm and +37 dBm to ensure specified performance.

Also, the input power level must be within 9 dBm of the test set receiver's expected power level. See "Receiver Autoranging" . If it is not, or if the input power level is outside of the -61 dBm to +37 dBm range, the under range or over range integrity indicator will be returned. See "Integrity Indicator" on page 67.

Refer to "Integrity Indicator" for definitions of abnormal (non-zero) integrity indicators.

Digital Average Power Measurement Description

How is a Digital Average Power measurement made?

Digital average power measurements are broadband power measurements that return the true rms power level of the input signal. Triggering is handled by internal mechanisms and autoranging is used. No external triggering is available.

The input waveform is detected by a peak detector with sufficient AM bandwidth to track the instantaneous power changes of a CDMA signal. Each measurement is made by sampling and digitizing a 20 millisecond period of the detected waveform.

The test set's digital signal processor (DSP) determines the true rms value of the signal. If the input signal is power-gated, only the active power control groups will be included in the measurement.

Digital Average power measurement characteristics

The digital average power measurement has greater than 2 GHZ bandwidth and signal energy outside the expected signal bandwidth can adversely affect measurement accuracy.

This measurement can be made on signals that are power-gated or signals that are not power-gated. It is not necessary to specify whether the input signal is power-gated.

Input Signal Requirements

The digital average measurement meets or exceeds specifications when the following requirements are met:

- The frequency of the signal being measured must be in the range 800 MHz to 960 MHz or 1.7 GHz to 2.0 GHz.
- The signal level of a non power-gated signal into the test set's RF IN/OUT connector must be between +37 dBm and -30 dBm.

Receiver Autoranging

The test set's measuring receiver automatically ranges to the input signal level detected on the RF IN/OUT connector.

Related Topics

****

"READ? Subsystem"

"SETup:DAPower"

"INITiate"

"FETCh:DAPower"

"Channel Power Measurement Description"

****

Programming a Digital Average Power Measurement

This section provides BASIC and C programming examples for performing channel power and digital average power measurements.

The following program example assumes that the mobile's antenna output is connected to the RF IN/OUT connector, and the mobile is being operated in test mode.

Example Program - Basic

```
10    !************************************************************************
20    !  Program: PROG_EX.TXT
30    !  Purpose:  Comprehensive Example of programming measurements on the
40    !            Agilent 8960 using IS-2000 test mode.
50    !            This example is written using BASIC command.
60    !************************************************************************
70    !
80    !  Configure the BASIC environment.
90    !  These actions are unrelated to configuring or performing tests with
100   !     the Agilent 8960.
110   !
120   COM Test_set
130   Test_set=720 !  Test set's GPIB address
140   PRINTER IS CRT
150   CLEAR SCREEN
160   !
170   !  Turn on the GPIB debugger.
180   OUTPUT Test_set;"SYST:COMM:GPIB:DEB:STAT ON"
190   !
200   !************************************************************************
210   ! Step 1: Set Test Set Cell Operating Mode To IS-2000 Test Mode
220   !************************************************************************
230   !
240   OUTPUT Test_set;"CALL:OPER:MODE D2KT"
250   !
260   !************************************************************************
270   ! Step 2: Configure the Base Station Emulator (BSEmul)
280   !************************************************************************
290   OUTPUT Test_set;"SYST:CORR -2.5"! MS has a -2.5 dB fixture loss
300   OUTPUT Test_set;"CALL:POW -55"! Set cell power to -55 dBm and turn
310                                  ! power state ON with complex command
320   OUTPUT Test_set;"CALL:BAND:DIG2000:USPC"! Set active band to PCS
330   OUTPUT Test_set;"CALL:CHAN:USPC 384"! Set traffic channel to 384
340   !
```

```
350   !************************************************************************
360   ! Step 4: Configure Measurement Execution Parameters
370   !************************************************************************
480   !  Configure Digital Average Power Measurement:
490   !
500   OUTPUT Test_set;"SET:DAP:CONT ON"
510   OUTPUT Test_set;"SET:DAP:COUN 10"
520   OUTPUT Test_set;"SET:DAP:TIM:STIM 5"
530   !
540   !  Configure Channel Power Measurement
550   !
560   OUTPUT Test_set;"SET:CPOW:CONT OFF"
570   OUTPUT Test_set;"SET:CPOW:COUN 5"
580   OUTPUT Test_set;"SET:CPOW:TIM:STIM 15"
590   !
600   !************************************************************************
610   !  Step 5:  Set Up The MS Using MS Test Mode Commands
620   !************************************************************************
630   PRINT "SETUP THE MS FOR TEST MODE (USE A TERMINAL PROGRAM IF NECESSARY)"
640   PRINT "PRESS CONTINUE"
650   PAUSE
660   !************************************************************************
670   !  Step 6:  Make Measurements
680   !************************************************************************
690   !
700   !  Step 6a: Start Set of Concurrent Measurements:
710   !
720   OUTPUT Test_set;"INIT:DAP;CPOW"
730   !
740   !  Step 6b:  Determine if A Measurement Is Done:
750   !
760   LOOP
770     OUTPUT Test_set;"INIT:DONE?"
780     ENTER Test_set;Meas_done$
790   !
800   !  Step 6c: Obtain Measurement Results
```

```
810   !
820     SELECT Meas_done$
830     CASE "CPOW"
840        GOSUB "CPOW"
850 CASE "DAP"
860        OUTPUT Test_set;"FETC:DAP?"
870        ENTER Test_set;Dap_integ,Dig_avg_pow
880        IF Dap_integ=0 THEN
890          PRINT "DIG AVG POW= ",Dig_avg_pow
900        ELSE
910          GOSUB Bad_int_ind
920    !
930    !  Step 6d: Are Measurement Results Valid?
940    !
950       END IF
960     END SELECT
970   EXIT IF Meas_done$="NONE"
980   END LOOP  !  If 'WAIT' is returned from the 'INIT:DONE?' query, it will
990             !  pass through the loop
1000  !************************************************************************
1010  !  Step 7:  Make Test Set Changes for New MS Configuration
1020  !************************************************************************
1030  !
1040  !  Proceed to next test if testing in a new BSE configuration.
1050  !
1060  !************************************************************************
1070  !  Step 2: Configure the Base Station Emulator (BSEmul)
1080  !************************************************************************
1090  OUTPUT Test_set;"CALL:BAND:DIG2000:KPCS"! Set active band to Korean PCS
1100  OUTPUT Test_set;"CALL:CHAN:USPC 325"! Set traffic channel to 325
1110  !************************************************************************
1120  !  Step 5(REPEATED):  Set Up The MS Using MS Test Mode Commands
1130  !************************************************************************
1140  PRINT " "
1150  PRINT "SETUP THE MS FOR TEST MODE (USE A TERMINAL PROGRAM IF NECESSARY)"
1160  PRINT "PRESS CONTINUE"
```

```
1170  PAUSE
1180  !
1190  !************************************************************************
1200  !  Step 6(REPEATED):  Make Measurements
1210  !************************************************************************
1220  !
1230  !  Step 6a: Start Set of Concurrent Measurements:
1240  !
1250  OUTPUT Test_set;"INIT:CPOW"
1260  !
1270  !  Step 6b:  Determine if A Measurement Is Done:
1280  !
1290  LOOP
1300    OUTPUT Test_set;"INIT:DONE?"
1310    ENTER Test_set;Cpow_done$
1320  !
1330  !  Step 6c: Obtain Measurement Results
1340  !
1350    SELECT Cpow_done$
1360  !
1370    CASE "CPOW"
1380       OUTPUT Test_set;"FETC:CPOW?"
1390       ENTER Test_set;Cpow_integ,Chan_pow_meas
1400       IF Integrity=0 THEN
1410          PRINT "Channel Power Integrity = ",Cpow_integ
1470       ELSE
1480          GOSUB Bad_int_ind
1490       END IF
1500    END SELECT
1510  EXIT IF Meas_done$="NONE"
1520  END LOOP
1530 Bad_int_ind !
1540  PRINT Meas_done$&" Measurement Error"
1550  PRINT "Measurement Integrity Indicator: ",Integrity
1560  RETURN
1570  END
```

Example Program - C

```
/*-------------------------------------------------------------------------*/
/* Copyright (C) 2000 Agilent Technologies                                 */
/*-------------------------------------------------------------------------*/
/*                                                                         */
/* Title   : Programming Example.cpp                                       */
/* Purpose : C Example for IS-2000 Programming Guide                       */
/*                                                                         */
/*-------------------------------------------------------------------------*/
// IS2000.cpp : Defines the entry point for the console application.
//
#include <stdafx.h>     // include file for standard system include files
#include <visa.h>       // VISA library header file
#include <iostream.h>   // Input/output stream definitions
#include <stdlib.h>     // Declares several commonly used routines such as
                        //  conversion routines and search/sort routines
#include <stdio.h>      // Input and output standard library

/* typedefs */

#define NOT_A_NUMBER      9.91E+37 // IEEE not a number (NAN)
#define NO_RESULT_AVAIL   1        // No result available

/* global variables */

ViStatus   errStatus;                    // error status
ViSession  defaultRM, vi;                // default resource manager, instrument handle
ViRsrc     resourceName;                 // VISA address of instrument
ViInt32    timeout_time;                 // timeout value, in msec, for VISA driver calls
ViInt32    Dap_done,Cpow_done;           // measurement status
ViInt32    Dap_integ,Cpow_integ;         // measurement integrity
ViReal64   Dig_avg_pwr,Chan_pow_meas;
```

```
/* function prototypes */

void close_session();

/* start main program */

int main()
{
      /* initialize variables */
      resourceName = "GPIB0::20::INSTR";
      vi = VI_NULL;
      timeout_time = 5000;
      /*************************************************************/
      /* Open session with the Default Resource Manager.           */
      /*************************************************************/
      if ((errStatus = viOpenDefaultRM(&defaultRM)) < VI_SUCCESS)
      {
      printf("\nviOpenDefaultRM failed with return code %d.\n", errStatus);
      return 1;
      }
      /*************************************************************/
      /* Open session to 8960 and get session identifier.          */
      /*************************************************************/
      if ((errStatus = viOpen(defaultRM, resourceName, VI_NULL, VI_NULL, &vi)) < VI_SUCCESS)
      {
      printf("\nviOpen failed with return code %d.\n", errStatus);
      viClose(defaultRM);
      vi=VI_NULL;
      return 1;
      }
      /*************************************************************/
      /* Set the driver timeout value (in milliseconds).           */
      /*************************************************************/
      if ((errStatus = viSetAttribute(vi, VI_ATTR_TMO_VALUE, timeout_time)) < VI_SUCCESS)
      {
      close_session();
```

```
return 1;
}
/*************************************************************/
/* Reset the instrument setup.                               */
/*************************************************************/
if ((errStatus = viPrintf(vi, "*RST\n")) < VI_SUCCESS)
{
close_session();
return 1;
}
/*************************************************************/
/* Configure the instrument.                                 */
/*************************************************************/
if ((errStatus = viPrintf(vi, "SYST:COMM:GPIB:DEB ON\n")) < VI_SUCCESS)
{
close_session();
return 1;
}
if ((errStatus = viPrintf(vi, "CALL:BAND:DIG2000 USPC\n")) < VI_SUCCESS)
{
close_session();
return 1;
}
if ((errStatus = viPrintf(vi, "CALL:CHANNEL:USPC 384\n")) < VI_SUCCESS)
{
close_session();
return 1;
}
if ((errStatus = viPrintf(vi, "SET:DAP:CONT ON\n")) < VI_SUCCESS)
{
close_session();
return 1;
}
if ((errStatus = viPrintf(vi, "SET:DAP:COUN:NUMB 10\n")) < VI_SUCCESS)
{
close_session();
```

```
return 1;
}
if ((errStatus = viPrintf(vi, "SET:DAP:TIM:STIM 20\n")) < VI_SUCCESS)
{
close_session();
return 1;
}
if ((errStatus = viPrintf(vi, "SET:CPOW:CONT OFF\n")) < VI_SUCCESS)
{
close_session();
return 1;
}
if ((errStatus = viPrintf(vi, "SET:CPOW:COUN:NUMB 1\n")) < VI_SUCCESS)
{
close_session();
return 1;
}
/*********************************************************/
/* Make measurements.                                    */
/*********************************************************/
if ((errStatus = viPrintf(vi,"INIT:DAP;CPOW\n")) < VI_SUCCESS)
{
close_session();
return 1;
}
if ((errStatus = viQueryf(vi,"DAP:DONE?\n","%ld,%lf%*t",&Dap_done)) < VI_SUCCESS)
{
close_session();
return 1;
}
if ((errStatus = viQueryf(vi,"CPOW:DONE?\n","%ld,%lf%*t",&Cpow_done)) < VI_SUCCESS)
{
close_session();
return 1;
}
if ((errStatus = viQueryf(vi,"WQU:DONE?\n","%ld,%lf%*t",&Wqu_done)) < VI_SUCCESS)
```

```
      {
      close_session();
      return 1;
      }
      if ((errStatus = viQueryf(vi,"FETC:DAP?\n","%ld,%lf%*t",&Dap_integ,&Dig_avg_pwr)) <
VI_SUCCESS)
      {
      close_session();
      return 1;
      }
      if ((errStatus = viQueryf(vi,"FETC:CPOW?\n","%ld,%lf%*t",&Cpow_integ,&Chan_pow_meas)) <
VI_SUCCESS)
      {
      close_session();
      return 1;
      }
      cout << "DAP Integrity = " << Dap_integ << endl;
      cout << "Average digital power = " << Dig_avg_pwr << " dBm" << endl << endl;
      cout << "" << endl;
      cout << "CPOW Integrity = " << Cpow_integ << endl;
      cout << "Channel power measurements completed = " << Chan_pow_meas << endl;
      cout << "" << endl;
      /*************************************************************/
      /* Terminate the VISA session.                               */
      /*************************************************************/
      printf("Program completed successfully.\n");
      close_session();
      return 0;
}

/*****************************************************************************/
void close_session()
/*****************************************************************************/
/*  Closes the VISA session on an error condition.                           */
/*****************************************************************************/
{
```

```
if (errStatus < VI_SUCCESS)
{
cout << "Last returned errStatus code = " << errStatus << endl;
}
if ((errStatus = viClose(defaultRM)) < VI_SUCCESS)
{
cout << "Close vi session failed with error: " << errStatus << endl;
}
else
{
cout << "Vi session closed successfully." << endl;
}
vi=VI_NULL;
return;

}/* ----- end of function ----- */
```

Related Topics

****

"Digital Average Power Measurement Description"
"SETup:DAPower"
"INITiate"
"FETCh:DAPower"

****

Digital Average Power Measurement Troubleshooting

Possible Setup Issues

During remote operation of the digital average power measurements, you should configure the trigger arm state to single. See "SETup:DAPower" for remote operation command syntax. If single triggering is used during manual operation, press the START SINGLE key to trigger each measurement.

When the input signal is not bursted, the power level during digital average power measurements must be between -30 dBm and +37 dBm to ensure specified performance.

The digital average power measurement should not be used to characterize CW (continuous wave) signals.

Refer to "Integrity Indicator" for definitions of abnormal (non-zero) integrity indicators.

Waveform Quality/Code Domain Power Measurement Description

How is a Waveform Quality measurement made?

Waveform quality measurements are made by digitally sampling the down-converted input signal then decoding and de-spreading the signal to determine the original data transmitted. The test set then creates a reference signal that represents the "ideal" signal given the coding and data in use at the time of transmission. This distortion-free waveform is then compared with the waveform being measured to determine the percentage of the signal energy that conforms with the ideal signal.

Waveform Quality measurements return numeric values for Rho, Frequency Error, Timing Error, Carrier Feedthrough, Phase Error, Magnitude Error, and Error Vector Magnitude (EVM). Waveform quality measurements made on mobile stations operating in radio configuration 1 and 2 are industry standard rho measurements. However, waveform quality measurements made on mobile stations operating in radio configurations 3, 4, and 5 (multi-code rho) are unique to the test set and do not conform to industry standard tests.

How is a Code Domain Power measurement made?

Using the same data collected in the latest waveform quality measurement, the test set also displays graphical views of waveform quality in the code domain. Mobile station channelization consists of walsh coded data transmitted on the I (in-phase) and Q (quadrature-phase) channels. Code domain power measurements reveal how signal energy is distributed throughout the walsh code set. Code domain power measurements are displayed on the following two screens, each displaying an I and a Q graph:

1. **Code Domain Power**

   This pair of I and Q graphs display the total power in each code channel of a CDMA channel. Active channels show up as red bars and inactive channels are displayed as yellow bars. Pass/fail limits can be set for power in inactive channels. Inactive channels should be at least 26 dB below the total output power.

2. **Code Domain Power + Noise**

   This pair of I and Q graphs display the signal power in each code channel along with the noise component. Noise is displayed as the yellow portion of the bar and power is displayed in red.

On the horizontal axis of each graph is a set of labels identifying the walsh code number for each bar. The order of the walsh codes is not sequential because of the spreading factor of certain code channels. The order of the walsh codes in each graph allows grouping of shorter walsh codes with their longer related codes. This results in contiguous blocks of bars.

Each bar on each I and Q graph is referred to as a "bin" in the GPIB command syntax. For example, "FETCh:WQUality:CDPower:ICHannel:BIN? <bin num>" returns values such as walsh number and power level for the bin number specified.

The number of bins that contain valid measurement results can be as high as 16 and is determined by the spreading factors of the active channels. One active channel can occupy up to eight of the available Walsh 16 codes.

Input Signal Requirements

The Waveform Quality measurement meets or exceeds specifications when the following requirements are met:

- The frequency of the signal being measured must be in the range of 800 MHz to 960 MHz or 1.7 GHz to 2.0 GHz, and within 100 kHz of the expected frequency.
- The signal level into the test set's RF IN/OUT connector must be in the range of -25 dBm to +37 dBm, and within 9 dBm of the expected input power to meet specifications.

Related Topics

****

"READ? Subsystem"

"SETup:WQUality"

"INITiate"

"FETCh:WQUality"

"Statistical Measurement Results" on page 77

"Triggering of Measurements" on page 99

"Timeouts" on page 69

****

Waveform Quality/Code Domain Power Troubleshooting

Possible Setup Issues

During remote operation of the waveform quality measurements, you should configure the trigger arm state to single. See "SETup:WQUality:CONTinuous" on page 301. If single triggering is used during manual operation, press the START SINGLE key to trigger each measurement.

The input power level during waveform quality/code domain power measurements must be between –25 dBm and +37 dBm.

Also, the input power level must be within 9 dBm of the expected power level. If it is not, the under range or over range integrity indicator will be returned. See "Integrity Indicator" on page 67

Refer to "Integrity Indicator" for definitions of abnormal (non-zero) integrity indicators.

2 General Programming

Concurrent Measurements

Description

A number of measurements can be initiated (with the INITiate command) while other measurements are being made, and the test set will perform as many operations simultaneously as its architecture allows. This technique is referred to as concurrency. Performing measurements concurrently can greatly improve test throughput.

Operating Considerations

The test set's block diagram includes three parallel signal paths. One path, the demodulation downconverter, is primarily used for base station emulation. This frees the measurement downconverter and power detector from performing functions necessary to maintain an active RF link. Since measurements are DSP (digital signal processor) based, and there are four A/D converters available to digitize or "sample" the input signal for analysis by the DSP, the test set will always have the capability to perform link maintenance, one transmitter, and one receiver measurement concurrently. The test set's ability to perform multiple transmitter, or multiple receiver tests concurrently will depend on the availability of resources within the test set and availability of the signal to be tested.

Related Topics

****

"Block Diagram"

****

Compound Commands

Description

In accordance with IEEE 488.2-1992 Section 8.4.1 the test set uses the semicolon (;) as the response message unit separator (RMUS). The RMUS separates sequential response message unit elements from one another when multiple response message unit elements are sent in a response message. This condition would occur when combining multiple queries into a single GPIB transaction.

Query Response Data Types Used By Test Set

The test set can return the following data types in response to queries:

- character data (char): ASCII characters A-Z (65-90 decimal), underscore (95 decimal), digits (48-57 decimal).
- string data: ASCII characters enclosed in quotes (for example, “5551212” or “PGSM”)
- numeric response data (nr1): numeric data in the form +/- ddddddd
- numeric response data (nr3): numeric data in the form +/- ddd.ddd E +/- dddd

Semicolon Separated Response Data Lists Containing Mixed Data Types

Problems can occur when trying to enter semicolon separated response data lists containing mixed data types.

For example: If the following command string is sent to the test set, the test set will respond by constructing a response message which contains multiple response message unit elements (that is, one response message unit element for each query item contained in the command string). Some response message unit elements are string data type, some are character data type and some are nr3 data type.

```
OUTPUT 714;"CALL:MS:REP:IMSI?;PCL?;REV?;SBAN?;ONUM?;MCC?;MNC?;LAC?"
```

An example response message generated by the test set in response to the above OUTPUT statement would be:

“001012345678901”;+4.00000000E+000;PHAS1;”PGSM”;”5551212”;9.91E37;9.91E37;9.91E37

Since the programmer knows that the control program should expect multiple responses to the above command string he or she might construct the following data entry statement:

```
ENTER 714;Imsi$,Pcl,Rev$,Sban$,Onum$,Mcc,Mnc,Lac
```

In the Basic programming environment the above ENTER statement will fail with an 'Insufficient data for ENTER' error. Some programming languages, Basic for example, cannot use the semicolon character as a data item terminator for string variables. In this example Basic will attempt to enter data into Imsi$ until it sees a LF (line feed) data item terminator. The test set does not send the LF until all the data has been sent. Consequently when Basic sees the LF it terminates entry of data into Imsi$ and starts to look for data to enter into Pcl. Since the test set is no longer sending any data the error message 'Insufficient data for ENTER' is generated.

One possible workaround is to enter all the data into a single string variable, replace all semicolons with line feeds and then enter the data from the string into the individual data items. For example:

```
DIM Response$[500]
!
!
OUTPUT 714;"CALL:MS:REP:IMSI?;PCL?;REV?;SBAN?;ONUM?;MCC?;MNC?;LAC?"
ENTER 714;Response$
Semicolon=POS(Response$,";")
WHILE Semicolon
Response$[Semicolon,Semicolon]=CHR$(10)
Semicolon=POS(Response$,";")
END WHILE
ENTER Response$;Imsi$,Pcl,Rev$,Sban$,Onum$,Mcc,Mnc,La
```

Semicolon Separated Response Data Lists Containing Only Numeric Data Types

Semicolon separated response data lists containing only numeric data types do not present the types of problem associated with semicolon separated response data lists containing mixed data types. The number building routines in most languages will use any non-numeric character (that is, anything other than +/- 0123456789 E .) as the data item terminator. Consequently when the number building routines encounter the semicolon the data item is terminated. The following example illustrates this:

```
OUTPUT 714;"FETCH:TXP:INT?;POW:MIN?;MAX?"
ENTER 714;Integrity,Min_power,Max_power
```

Integrity Indicator

Description

The test set can evaluate its own performance and make a determination as to the validity of a measurement result. The test set evaluates the conditions surrounding a measurement and reports to the user its evaluation of these conditions in a parameter called the measurement integrity indicator. A measurement integrity indicator value is returned for every completed measurement. It is recommended that the user take advantage of this feature in every measurement.

The returned value defines whether or not a problem was encountered by the measurement process. It is not, however, guaranteed to be the only or root cause of the measurement problem. This is because some of the conditions surrounding a measurement may interact and the test set may have insufficient information to determine the root cause of the measurement problem. However, in most cases, the value returned is the most likely cause of the problem.

The values returned by the measurement integrity indicator range from 0 to 16. Not all of the values are available for each measurement or test application, if a value doesn't apply it will not be available.

Example: Questionable Result for PGSM (15) and Questionable Result Due To Channel Mode (16) are GSM only integrity indicator values.

NOTE Measurement synchronization must be set to midamble in order for GSM measurements to return integrity indicator (8, 9, 11).

Table 1.

Integrity Indicator Number	Integrity Indicator Message
0	Normal: Indicates the measurement completed successfully without error and the result is accurate.
1	No Result Available: Indicates that there is no measurement result and returns NAN (not a number).
2	Measurement Timeout: Indicates that a measurement has timed out. The measurement timeout state must be set to ON.
3	Hardware Not Installed: Indicates that a piece of hardware is not installed in the test set, or the hardware has failed in a way which leads the instrument controller to believe it isn't installed.
4	Hardware Error: Indicates that a hardware failure has occurred. These include failures such as a phase lock loop out-of-lock, defective DSP samplers, or power detectors that can not be calibrated.
5	Over Range: Indicates that the input signal is over range. The amplitude of the device-under test's (DUT's) signal is causing the voltage at a DSP sampler to be above its maximum input level or the frequency is too high or the voltage measured is beyond the maximum voltmeter range, either positive or negative.

Table 1.

Integrity Indicator Number	Integrity Indicator Message
6	Under Range: Indicates that the input signal is under range. The amplitude of the DUT's signal is not high enough for the DSP sampler to produce accurate results with the measurement algorithm.
7	Burst Short: Indicates that the burst duration is too short, or part of the burst was not sampled due to improper triggering.
8	Trigger Early or Fall Early: Indicates that the DUT's burst amplitude fell prematurely or, due to an early trigger (early relative to a transmitted burst) the measurement sampling operation terminated before the falling edge of the burst.
9	Trigger Late or Rise Late: Indicates that either the rising edge of the DUT's burst was late or, due to a late trigger (late relative to a transmitted burst) the measurement sampling operation didn't start until after the rising edge of the transmitted burst.
10	Signal Too Noisy: Indicates that the measurement algorithm has found the signal measured to be too noisy to provide accurate results.
11	Sync Not Found: Indicates that the midamble was not found therefore the measurement was not synchronized.
12	Oven Out of Range: Indicates that a temperature controlled oven (other than the internal timebase oven) is outside of its operating range. The power meter's oven is checked and its condition reported with this value. (The internal timebase generates a temporary error message (out of lock) that is sent to the system error queue and the display. This is not an integrity indicator value, it is an error message.)
13	Unidentified Error: Indicates errors which are not covered by the other integrity values. Examples include: parameter errors, algorithm memory errors (too many measurements), measurements unavailable (unable to control), autorange unable to converge, default calibration data used.
14	PCM Full Scale Warning: Indicates that the PCM signal has reached plus or minus full scale. The measurement made will be accurate on the PCM signal but would typically indicate an overdriven or oscillating element in the DUT.
15	Questionable Result for PGSM: Indicates that the user attempted to make an FBER measurement in a phase 1 system. FBER is only possible in a phase 2 GSM system. This indicator is available only when the selected broadcast band is PGSM.
16	Questionable Result Due To Channel Mode: Indicates that the channel mode was set to Enhanced Full Rate Speech while a Decoded Audio measurement was active. Decoded Audio is not supported for EFR Speech.

Related Topics

****

"Reading Error Messages"

****

Timeouts

Description

The primary use of measurement timeouts is to regain control of the test set's GPIB in cases where the bus could potentially "hang."

The time normally required for a measurement to complete may vary greatly depending on the individual measurement, its settings, it's multiple measurement count value, and so forth. Because of this, you may need to set the timeout longer than the default for measurements where a large number of multiple measurements are requested or where measurement triggers may be infrequent.

Be careful when setting a timeout that is shorter than the default. It is possible to specify a timeout that is so short the measurement does not even have a chance to begin. Measurement timeouts should always be at least several seconds long.

Timeout units default to S (seconds). The seconds suffix is an optional part of the command. If you want MS (milliseconds), US (microseconds) or NS (nanoseconds), you must specify these units in the suffix.

Related Topics

****

"Integrity Indicator"

"SETup Subsystem"

****

Invalid Measurement Results

Description

Invalid measurement results are returned by the test set when conditions such as signal level are not within the present measurement range. Three different invalid measurement results are provided in order to help the user understand the condition that caused the invalid result.

- 9.9E+37 = INFinity (Infinity)
- -9.9E+37 = NINF (Negative Infinity)
- 9.91E+37 = NAN (Not A Number)

9.9E+37 (INFinity)

9.9E+37 is returned by the test set when, the measurement is out of range, results are far above the present measurement range.

-9.9E+37 (NINFinity)

-9.91E+37 is returned by the test set when, the measurement is out of range, results are far below the present measurement range.

9.91E+37 (NAN)

9.91E+37 is returned by the test set when, the measurement is out of range but it can not be determined if measurement results are far above, or far below the measurement range.

If a measurement exceeds its measurement timeout value before a valid result is determined, 9.91E+37 is returned.

FETCH? and READ? Invalid Results

When a FETCH? or READ? query is performed on a measurement with invalid results, the integrity indicator will return a value of 1, indicating No Result Available.

Manual Users Invalid Results

Manual users will generally see four dashes , "----" on the test set display. When the measurement timeout value has been exceeded, "Measurement Timeout" is displayed as well as the four dashes .

Measurement Progress Report

Description

The measurement progress report is a query of how far along a multi-measurement cycle has progressed. When the multi-measurement count is greater than one, the measurement progress report will indicate the number of measurements that have completed. The returned value will be the last update and not the actual number, because the value is updated periodically and not for each multi-measurement cycle. Every measurement has the measurement progress report available.

Example

```
OUTPUT 714;"FETCH:DAPOWER:ICOUNT?" !Returns the approximate number of
                                   !multi-measurement cycles completed during a
                                   !multi-measurement count cycle
```

Related Topics

****

"Statistical Measurement Results"

****

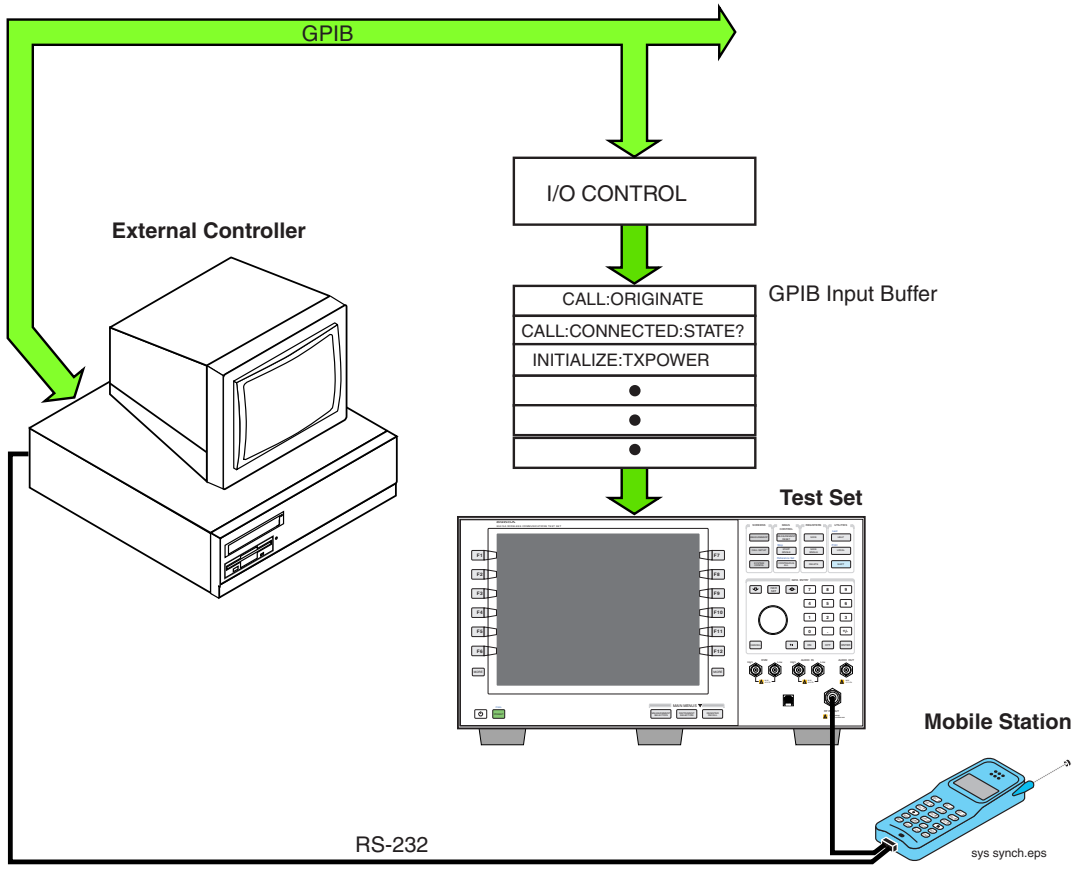
Test System Synchronization Overview

Description

Typical test systems include an external controller with a GPIB connection to the test set, an RF (and possible AF) connection between the test set and a mobile station under test, and a serial connection between the mobile station and the external controller.

Synchronizing an external controller with the test set and a mobile station under test ensures that no device does something before it is supposed to, which can cause errors, or does something well after it could have, which wastes time.

Figure 2. Test System



Sequential versus overlapped commands

The test set uses both sequential and overlapped commands:

- Sequential commands must finish executing before the next command starts to execute.
- Overlapped commands do not finish executing before the next command starts to execute.

Overlapped commands are more difficult to synchronize because an overlapped operation that started several commands earlier may still be executing as subsequent commands are being parsed out from the input buffer and executed. This can present a problem unless the external controller is properly synchronized to the test set's execution of commands. Overlapped commands allow the test set to use its internal resources as efficiently as possible.

Methods for synchronization

The test set's GPIB command set supports the following methods to achieve synchronization for overlapped commands. In some cases, combinations of these methods will provide the best results:

Methods one and two do not require the external controller to query the test set, nor to perform any branching or decision-making associated with information acquired from the test set.

Methods three through six rely on responses from the test set to an external controller, indicating that some event has occurred. The external controller can then make decisions based on these responses to control the flow of commands to the test set and other devices in the test system.

1. Force the test set to execute overlapped commands sequentially.
2. Force the test set to wait until an overlapped command is done executing before executing any more commands.
3. Query the test set to determine when a command has finished executing.
4. Query the test set to determine when all commands sent to it have at least begun executing.
5. Query the test set to determine the current call or data connection processing state.
6. Program the test set to generate a service request when an operation has completed or the test set is in a certain state.

Statistical Measurement Results

Description

Most measurements have a setup window that provides for the entry of a multi-measurement count value. This specifies how many measurements the test set will perform to obtain a set of values from which to calculate the following statistical measurement results:

- Average (arithmetic mean) of measurement set
- Minimum value from measurement set
- Maximum value from measurement set
- Standard Deviation of measurement set

Operating Considerations

The advantages of using the multi-measurement feature to obtain statistical measurement data include: reduced time associated with GPIB bus traffic, and reduced time configuring hardware. This is because the number of measurements specified in the multi-measurement count value are performed during one measurement cycle.

Programming Example

```
OUTPUT 714;"SETUP:DAPOWER:COUNt 10" !Enters a Digital Average Power count
                                      !of 10, and turns the Digital Average Power
                                      !multi-measurement state on.
```

Related Topics

****

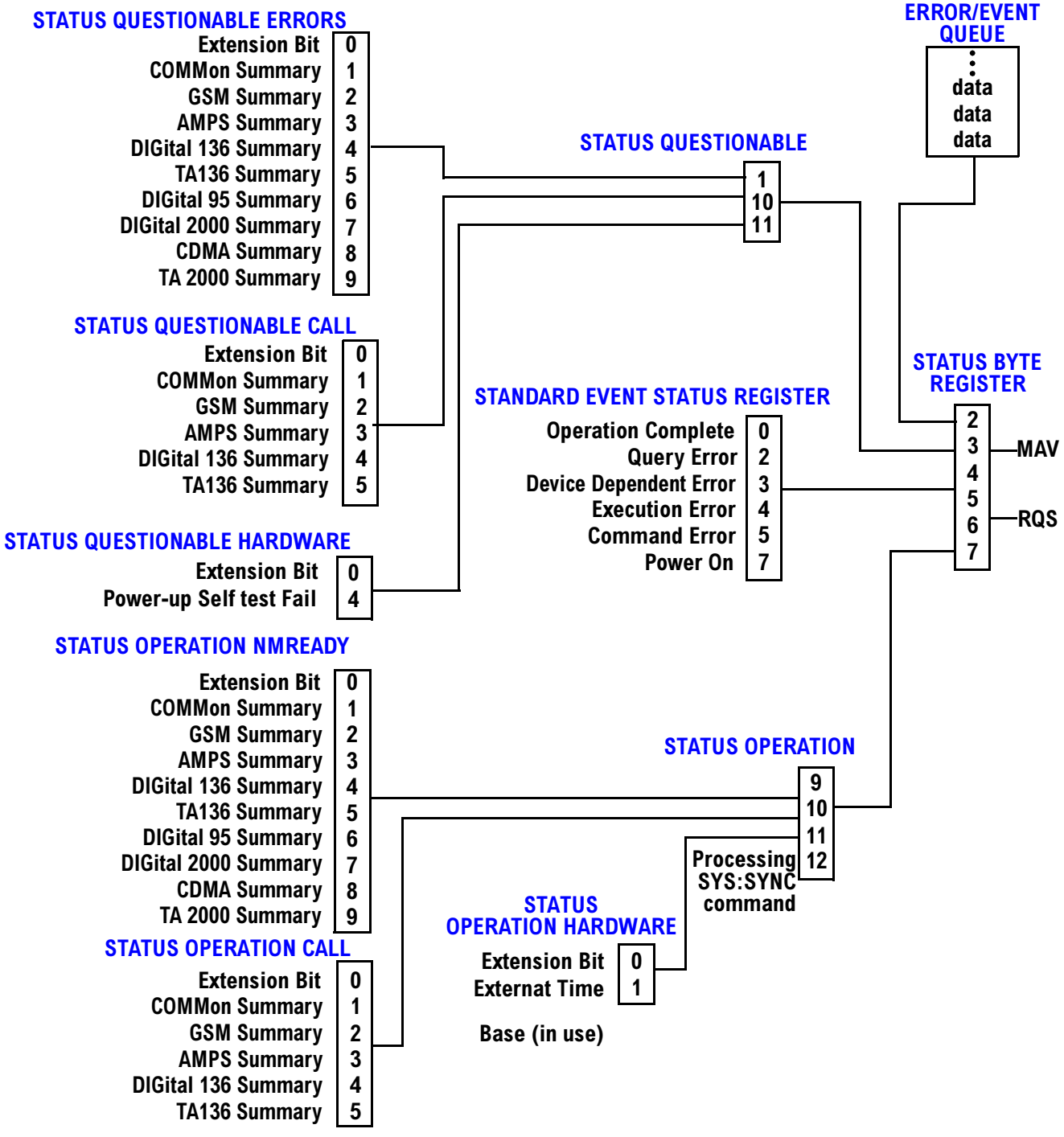
"Measurement Progress Report"

****

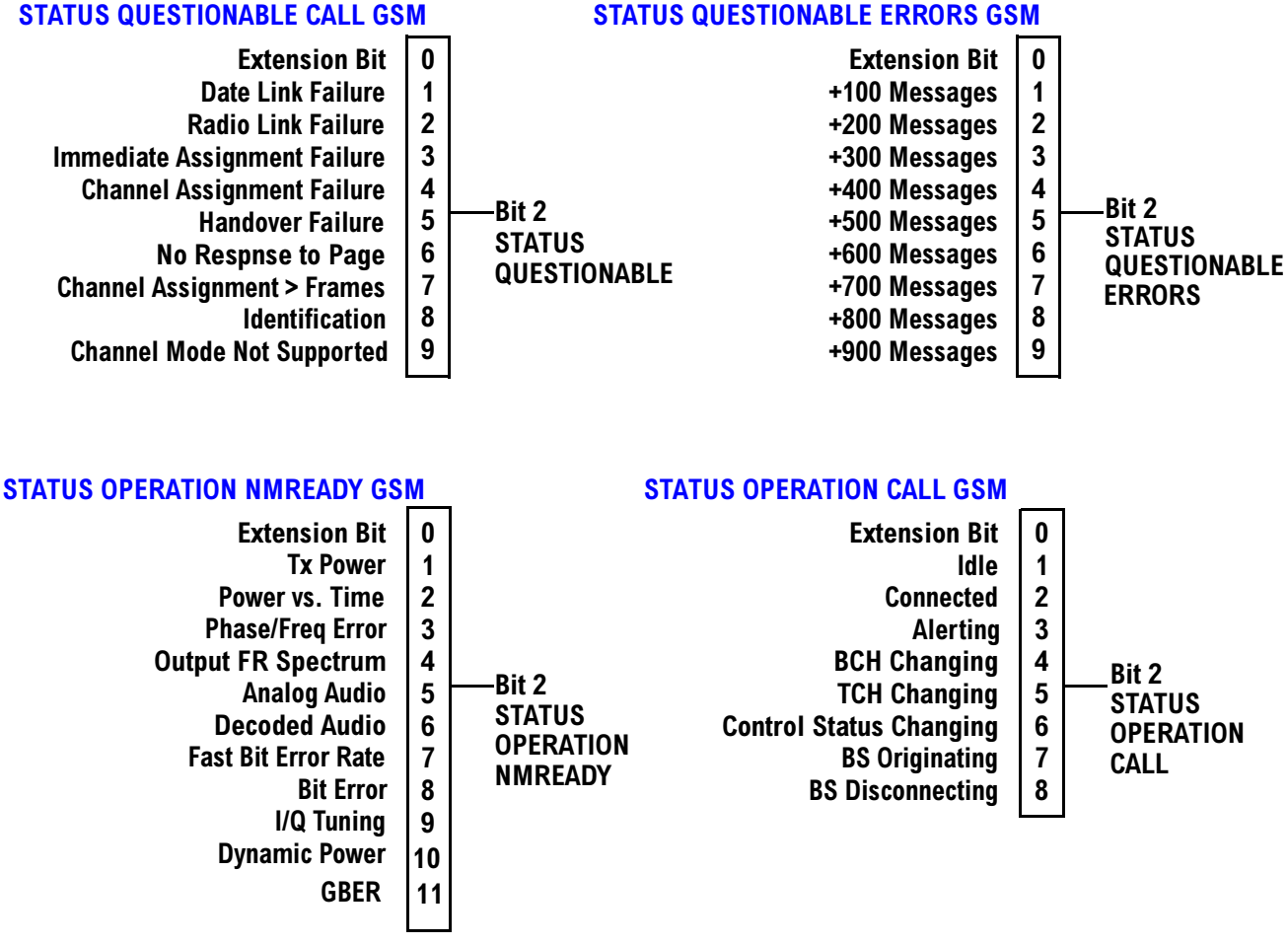
Status Subsystem Overview

Description

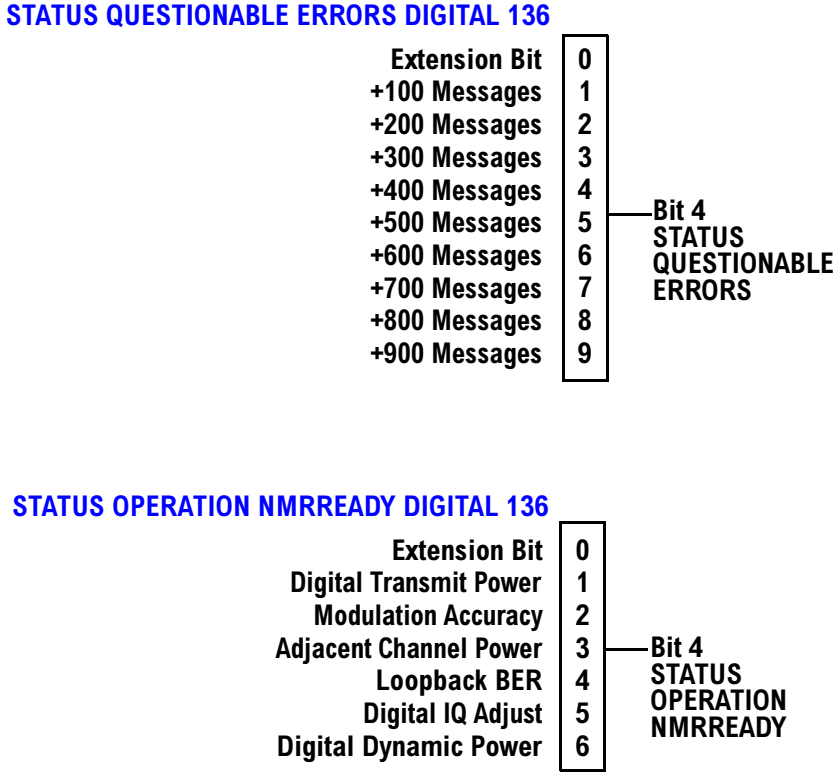
Overview of STATus Reporting Structure



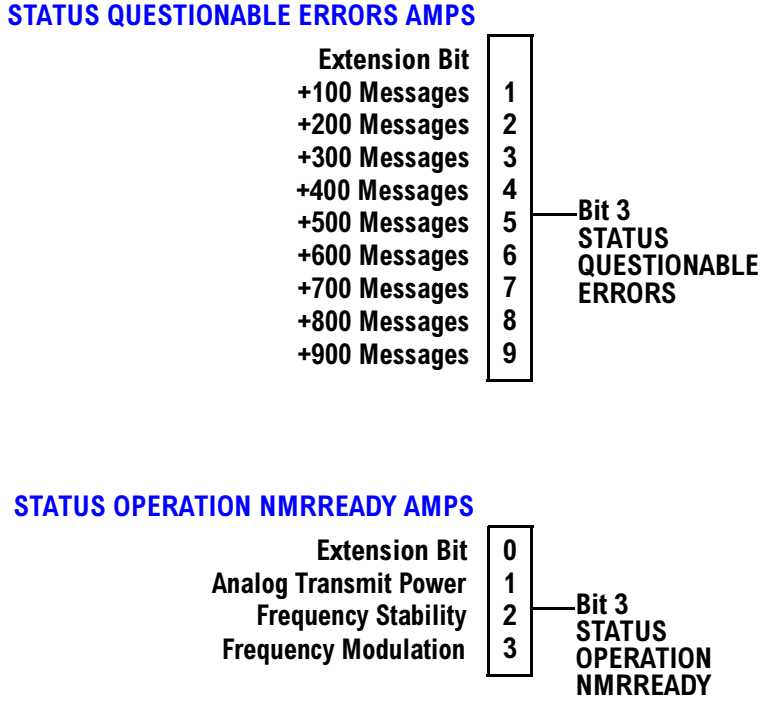
Status Reporting Structure For The GSM Test Application



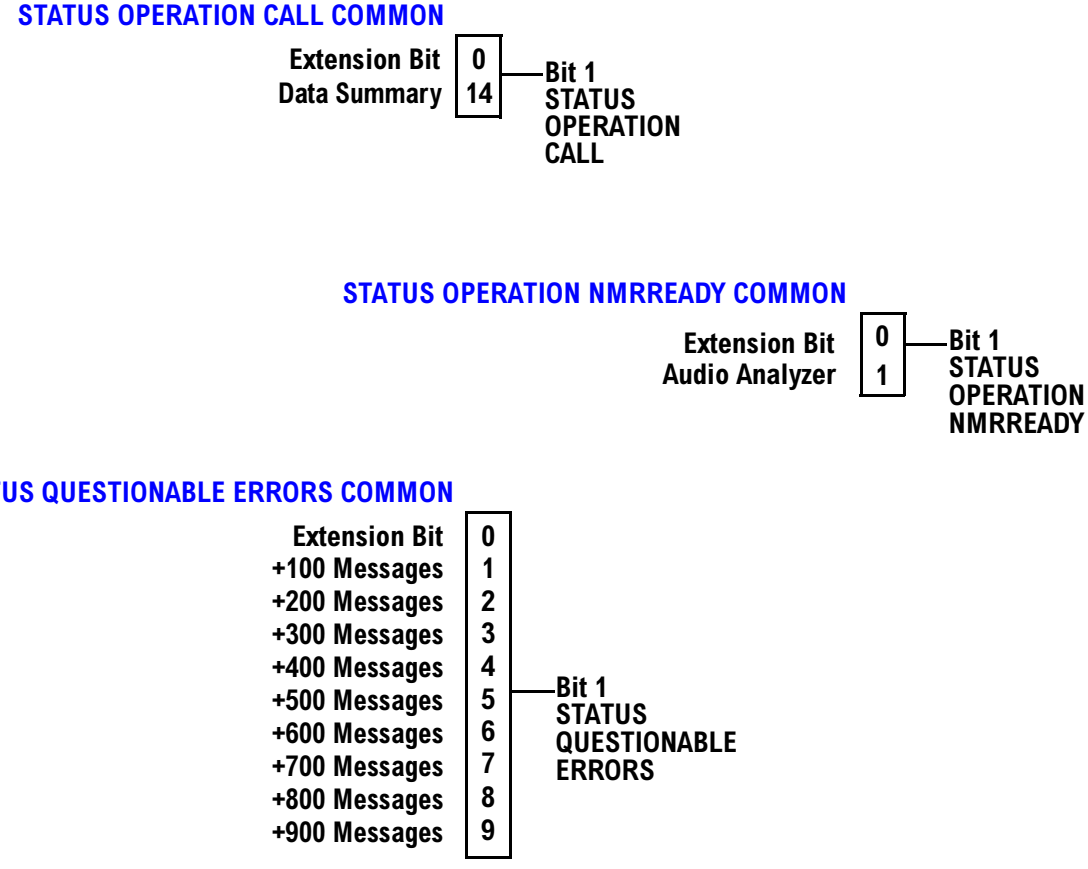
Status Reporting Structure For The DIGital136 Registers



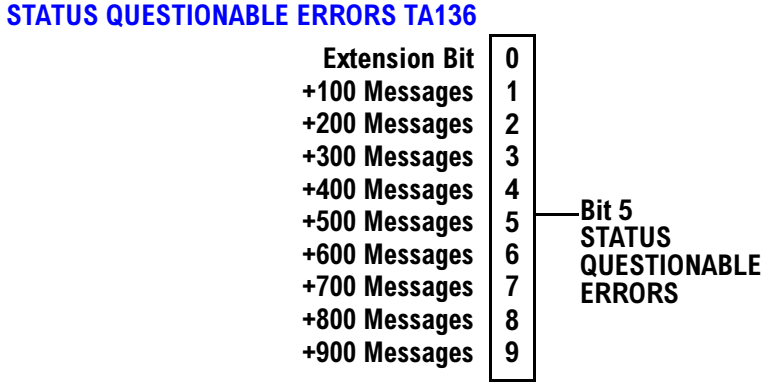
Status Reporting Structure For The AMPS Registers



Status Reporting Structures For The COMMon Registers

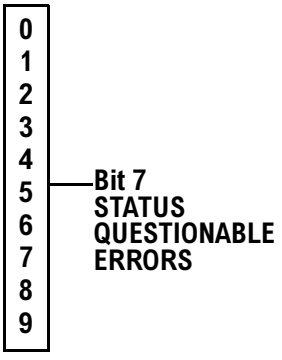


Status Reporting Structures For The TA136 Registers

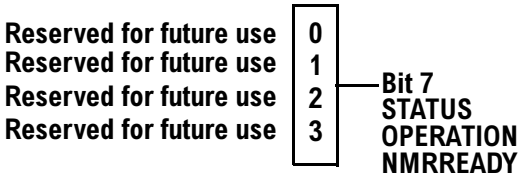


Status Reporting Structure For The DIGital 2000 Registers

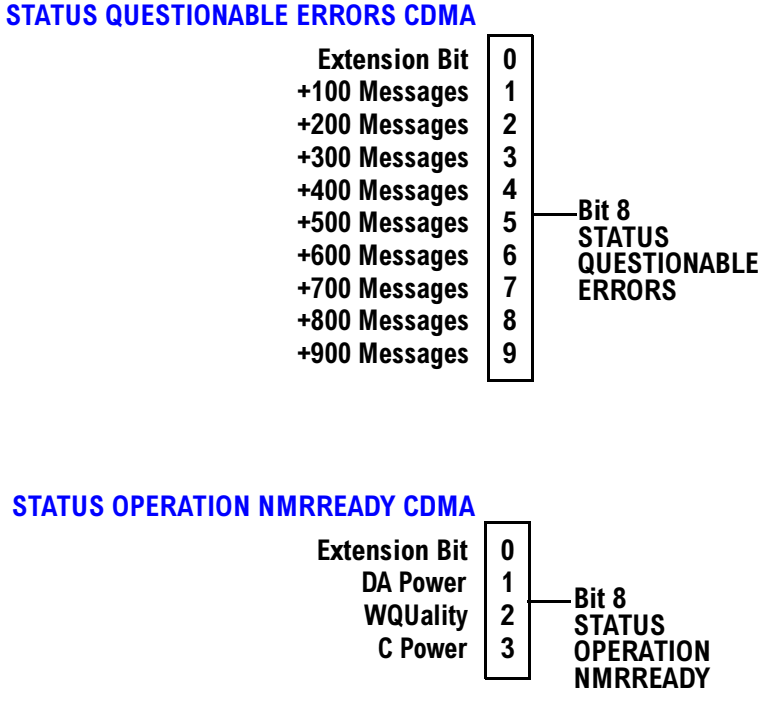
STATUS QUESTIONABLE ERRORS DIGITAL 2000



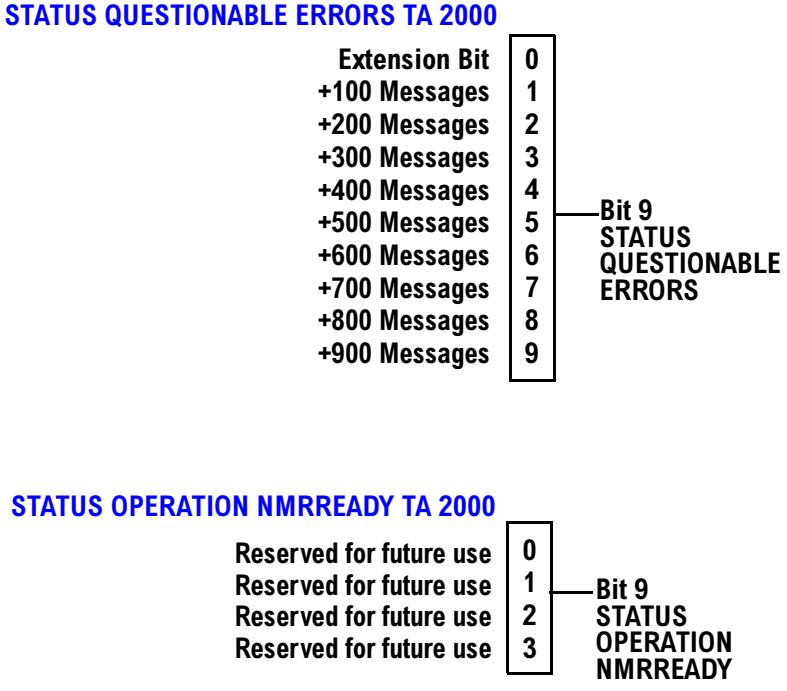
STATUS OPERATION NMRREADY DIGITAL 2000



Status Reporting Structure For The CDMA Registers



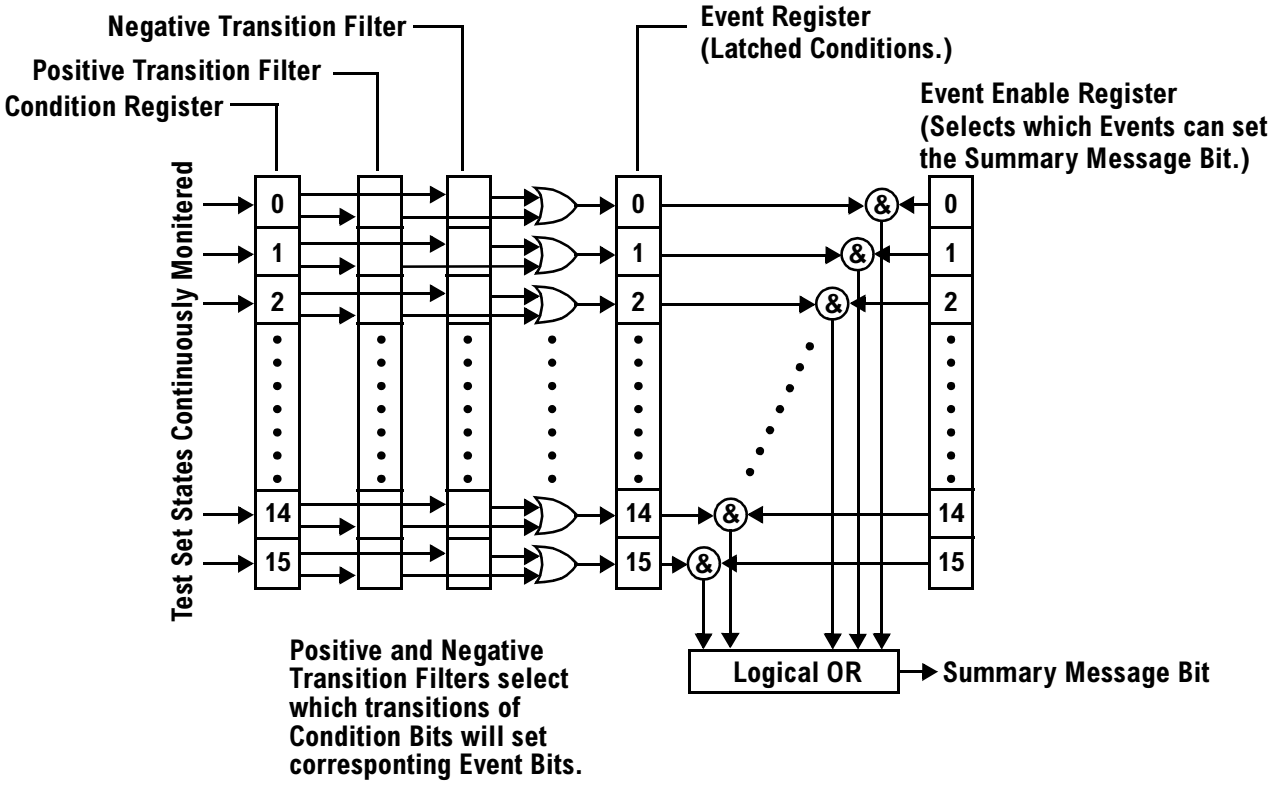
Status Reporting Structure For The TA 2000 Registers



Status Data Structure - Register Model

The generalized status register model consists of a Condition Register, Transition Filters, an Event Register,

an Enable Register, and a Summary Message Bit.



Condition Register

A condition is a test set state that is either TRUE or FALSE (a GPIB command error has occurred or a GPIB command error has not occurred). Each bit in a Condition Register is assigned to a particular test set state. A Condition Register continuously monitors the hardware and firmware states assigned to it. There is no latching or buffering of any bits in a Condition Register; it is updated in real time. Condition Registers are read-only. Condition Registers in the test set are 16 bits long and may contain unused bits. All unused bits return a zero value when read.

Transition Filters In the test set, the Transition Filters are implemented as two registers: a 16-bit positive transition (PTR) register and a 16-bit negative transition (NTR) register.

For each bit in the Condition Register, a Transition Filter bit determines the state transitions which will set a corresponding bit in the Event Register. Transition Filters may be set to pass positive transitions (PTR), negative transitions (NTR) or either (PTR or NTR). A positive transition refers to a condition bit which has changed from 0 to 1. A negative transition refers to a condition bit which has changed from 1 to 0.

A positive transition of a bit in the Condition register will be latched in the Event Register if the corresponding bit in the positive transition filter is set to 1. A positive transition of a bit in the Condition register will not be latched in the Event Register if the corresponding bit in the positive transition filter is set to 0.

A negative transition of a bit in the Condition register will be latched in the Event Register if the corresponding bit in the negative transition filter is set to 1. A negative transition of a bit in the Condition register will not be latched in the Event Register if the corresponding bit in the negative transition filter is set to 0. Either transition (PTR or NTR) of a bit in the Condition Register will be latched in the Event Register if the corresponding bit in both transition filters is set to 1. No transitions (PTR or NTR) of a bit in the Condition Register will be latched in the Event Register if the corresponding bit in both transition filters is set to 0.

Transition Filters are read-write.

Transition Filters are unaffected by a *CLS (clear status) command.

Transitions Filters are set to pass positive transitions (all 16 bits of the PTR register are set to 1 and all 16 bits of the NTR register are set to 0) at power on or after receiving the *RST (reset) command.

Event Register The Event Register captures bit-state transitions in the Condition Register as defined by the Transition Filters. Each bit in the Event Register corresponds to a bit in the Condition Register. Bits in the Event Register are latched, and, once set, they remain set until cleared by a query of the Event Register or a *CLS (clear status) command. This guarantees that the application can't miss a bit-state transition in the Condition Register. There is no buffering; so while an event bit is set, subsequent transitions in the Condition Register corresponding to that bit are ignored. Event Registers are read-only. Event Registers in the test set are 16 bits long and may contain unused bits. All unused bits return a zero value when read.

Event Enable Register The Event Enable Register defines which bits in the Event Register will be used to generate the Summary Message. Each bit in the Enable Register has a corresponding bit in the Event Register. The test set logically ANDs corresponding bits in the Event and Enable registers and then performs an inclusive OR on all the resulting bits to generate the Summary Message. By using the enable bits the application program can direct the test set to set the Summary Message to the 1 or TRUE state for a single event or an inclusive OR of any group of events. Enable Registers are read-write. Enable Registers in the test set are 16 bits long and may contain unused bits which correspond to unused bits in the associated Event Register. All unused bits return a zero value when read and are ignored when written to. Enable Registers are unaffected by a *CLS (clear status) command or queries.

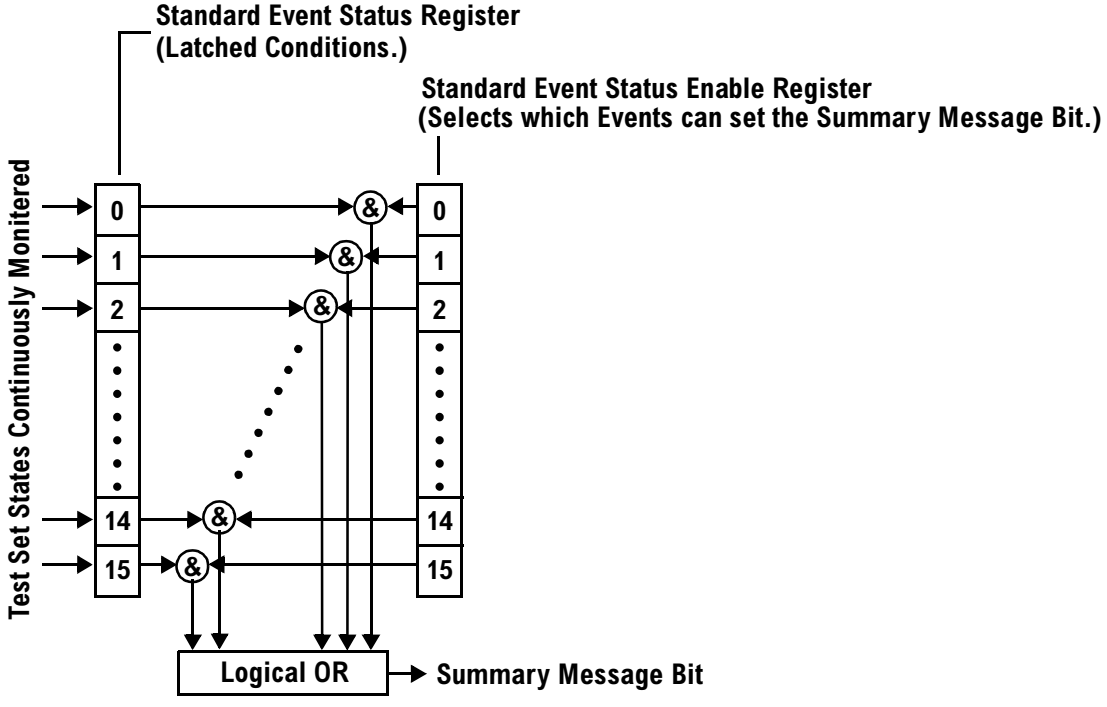
Summary Message Bit The Summary Message is a single-bit message which indicates whether or not one

or more of the enabled events have occurred since the last reading or clearing of the Event Register. The test set logically ANDs corresponding bits in the Event and Enable registers and then performs an inclusive OR on all the resulting bits to generate the Summary Message. By use of the enable bits, the application program can direct the test set to set the Summary Message to the 1, or TRUE, state for a single event or an inclusive OR of any group of events.

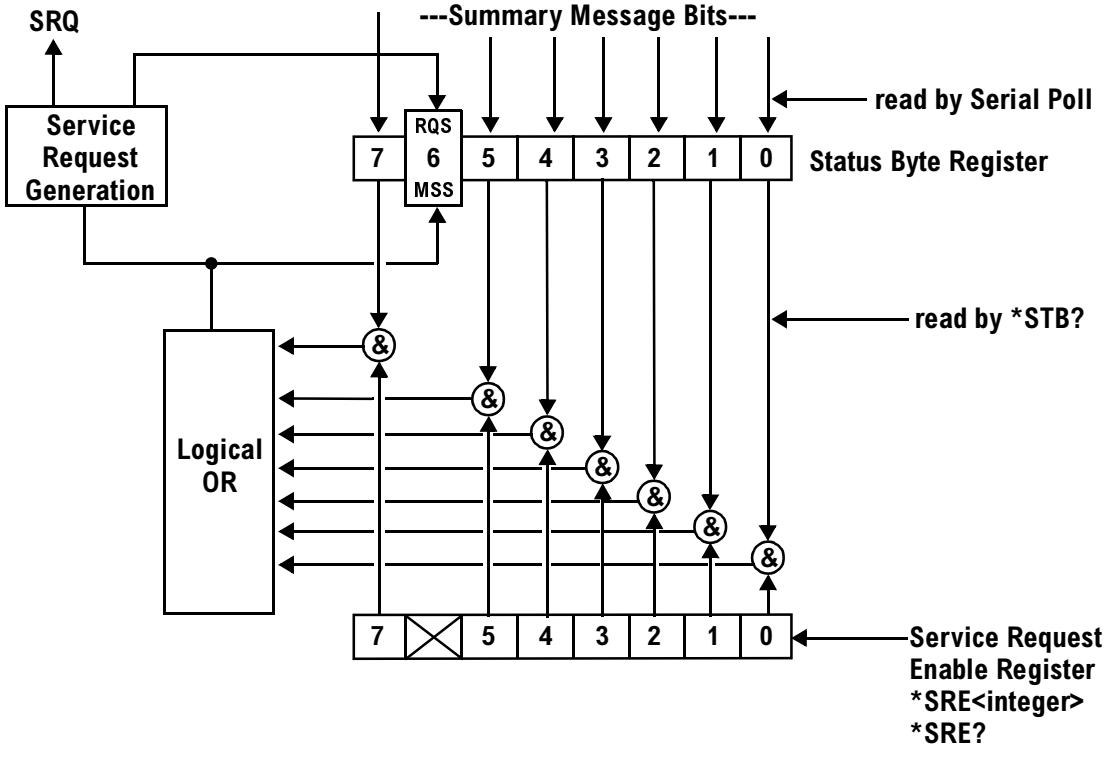
The Summary Message is TRUE, logic 1, if the register contains some information and an enabled event in the Event Register is set TRUE.

The Summary Message is FALSE, logic 0, if the queue is empty and no enabled events are TRUE. Registers s can be cleared by reading all the information from the queue. Registers can also be cleared using the *CLS (clear status) command.

Standard Event Status Register Model



Service Request Enabling Register Model



Measurement Event Synchronization

Description

Measurement event synchronization saves time by controlling the communication between the controller, the test set, and the mobile station, so that no device does something before it is supposed to (which can cause errors or do something well after it could have). Because some measurements can run concurrently, it is necessary that the control program know when individual measurement results are available.

Measurement event synchronization is accomplished using the INITiate subsystem's command INITiate:DONE? or the STATus:OPERation:NMRReady status registers.

INITiate:DONE?

The INITiate:DONE? query returns a string that indicates what, if any, measurements are ready to be fetched. This query should be used inside a loop, checking each measurement that was initiated. See "INITiate:DONE?" on page 273 for more details about this query.

The INITiate:DONE? query returns at least one of the following indicators for each pass through the loop:

- "CPOW" - The channel power measurement results are available.
- "DAP" - The digital average power measurement results are available.
- "WQU" - The waveform quality measurement results are available
- "WAIT" - There are one or more measurements which are in the measuring state which are not excluded from the query. See "INITiate:DONE:FLAG:<measurement mnemonic>" on page 274. When WAIT is returned at least one measurement is not ready to be fetched yet.
- "NONE" - There are no measurements currently in the measuring state. This assumes no measurements have been excluded. See "INITiate:DONE:FLAG:<measurement mnemonic>" on page 274. This would indicate that all measurements results are available or none have been initiated.

Programming Example

The following example assumes that the mobile is transmitting on a digital traffic channel and no measurements other than digital TX power (DTXP) and digital modulation accuracy (MACC) are being triggered. See "Triggering Process Description" on page 100.

```
10  OUTPUT 714;"SETup:DAPower:CONTinuous OFF" !Sets digital average power
20                                           !trigger mode to single.
30  OUTPUT 714;"SETUP:WQUality:CONTinuous OFF" !Sets wavrform quality
40                                        !trigger mode to single.
50  OUTPUT 714;"INITiate:DAPower;WQUality" !Begin digital average power and
60                                       !waveform quality measurements.
70  REPEAT
80  OUTPUT 714;"INITiate:DONE?" !Queries the test set for measurements
90                              !that are done
100 ENTER 714;Meas_done$ !String value representing DONE measurements,
110                      ! NONE if no measurements are done.
120 SELECT Meas_done$ !This variable will be set to WAIT until measurements
130                   !are DONE.
140 CASE "DAP" !Characters must be upper case.
150 OUTPUT 714;"FETCH:DAPower?" !If this case is selected,
160             !digital average power is FETCHed.
170 ENTER 714;Integrity,Dapower_meas
180 PRINT "Digital Average Power is ";Dapower_meas
190 CASE "WQU" !Characters must be uppercase.
200 OUTPUT 714;"FETCH:WQUality:RHO?" !If this case is selected,
210             !the rho measurement is FETCHed.
220 ENTER 714;rho_meas
230 PRINT "Rho is ";rho_meas
240 END SELECT
250 UNTIL Meas_done$="NONE"   !When all triggered measurements have completed,
260                           !the INITiate:DONE? query returns NONE.
270 END
```

STATUS:OPERATION:NMRREADY

NOTE Status subsystem features are not fully implemented in this early release.

The STATus:OPERation:NMRReady command allows the program to immediately branch to the next operation or command without continuing through a loop as in INITiate:DONE? See "STATus:OPERation:NMRReady Register Bit Assignments" on page 317 for more details about this command.

The user must enable the following so that as soon as the enabled NMRReady bit is true the program moves on.

- Positive or negative transition filter. See "Transition Filters" on page 90.
- STATus:OPERation:NMRReady bit for the measurement desired
- STATus:OPERation bit (512 for NMRReady). See "Status Subsystem Overview" on page 79.
- Service Request Enabling (*SRE 128 for NMRReady). See "Status Subsystem Overview" on page 79.

The "STATus:OPERation:NMRReady Register Bit Assignments" on page 317 status register provides status reporting on the following measurement completions:

- Analog TX Power
- Digital TX Power
- Adjacent Channel Power
- Loopback BER
- Frequency Stability
- Frequency Modulation
- MAHO Bit Error
- AF Analyzer (SINAD, Distortion, AC Level)

NOTE The following program example uses the E1960A GSM Mobile Test Application Bit Error Rate measurement for the example. Refer to "STATus:OPERation:NMRReady Register Bit Assignments" on page 317 for bit assignments for other Test Applications.

Example 1. Generating a Service Request (SRQ) Interrupt - Bit Error Rate NMRR

The following example illustrates the use of the STATus subsystem to generate a service request when a BERR measurement has completed. This code assumes a call is already connected and the BERR measurement is setup (mobile station must be in loopback type A or B).

```
10  OUTPUT 714;"STATUS:OPERATION:NMRREADY:PTR 256" !Enable positive transition
20                                                 !filter on fast BER bit.
30  OUTPUT 714;"STATUS:OPERATION:NMRREADY:ENABLE 256" !Enable the fast BER Bit to
40                                                    !generate a summary message.
50  OUTPUT 714;"STATUS:OPERATION:ENABLE 512" !Enable the Operation summary bit to
60                                           !generate a summary message.
70  OUTPUT 714;"*SRE 128" !Enable the service request enable register to generate SRQ.
80  OUTPUT 714;"*CLS" !Clear all status data structures.
90  ON INTR 7,15 CALL Meas_complete !Define interrupt-initiated branch with a priority
100                                 !of 15 (highest)
110 ENABLE INTR 7;2 !Enable interrupt on interface card 7 with a bit mask
120                 !(for interface's interrupt-enable register) of 2.
130 OUTPUT 714;"SETUP:FBER:CONTINUOUS OFF;:INITIATE:FBERROR" !Initiate a single
140                                                          !fast BER test.
150 LOOP
160 DISP "Waiting for BERR test to complete"
170 WAIT .1 !"Dummy" loop
180 END LOOP
190 !Instead of a "dummy" loop, controlling application could be performing setups,
200 !making measurements, etc.
210 END
220 SUB Meas_complete
230 DISP "BER test complete, OK to FETCh results now"
240 Clear_interrupt=SPOLL(714) !Clear the RQS message in the status byte register.
250 STOP
260 SUBEND
```

Operating Considerations

Only one indicator is returned per query.

To ensure that when a measurement completes it will remain in a state that qualifies it as DONE, use the SETup subsystem to set all active measurements to single (CONTinous:OFF) trigger mode.

Triggering of Measurements

Trigger Source Choices

For CDMA 2000, the trigger source choices are limited to:

- Immediate
- RF Rise

RF Rise is the only trigger source choice available for access probe measurements, and Immediate is the only choice available for all other measurements. No user control is provided for trigger sources.

Description

Trigger Source Description

A measurement trigger causes hardware (for example, a sampler) to capture data which is used by a measurement algorithm to produce a measurement result. Not all of the trigger source choices are available in every measurement, or every test application.

RF Rise Trigger Source: When RF rise triggering is selected, a measurement dependent threshold is used to define the trigger point on the envelope of the signal being measured. The envelope amplitude must fall below this threshold and remain there for a measurement-dependent period of time before the trigger is armed. After the trigger is armed, a trigger will occur as the envelope amplitude increases and passes through the threshold.

Protocol Trigger Source: When protocol triggering is selected, a data capture is triggered by a protocol generated signal. The test set's protocol engine knows when the DUT's signal should be present and generates a trigger signal for use by the measurement to trigger the data capture.

External Trigger Source: When external triggering is selected, the user supplies an external trigger signal via the rear panel TRIG IN connector in order to trigger data capture. The trigger will occur on the rising edge of this signal.

Immediate Trigger Source: When immediate triggering selected, the trigger occurs as soon as any pre-trigger samples required by the measurement algorithm are taken. Data capture is triggered when the measurement is initiated.

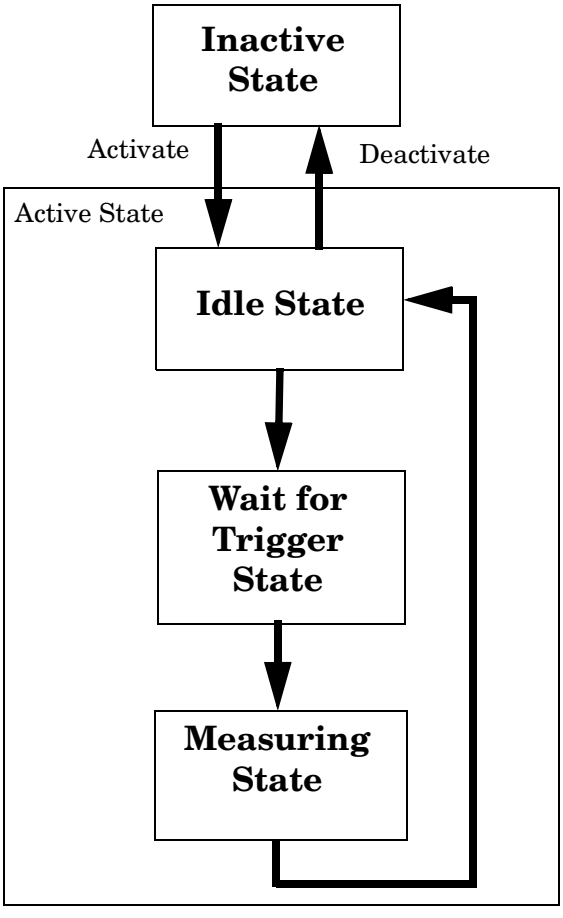
Auto Trigger Source: When auto triggering is selected, the test set automatically chooses the best trigger source for that measurement. This trigger source setting is convenient because the measurement trigger doesn't need to be changed when switching parameters. Auto trigger source is the best choice for most users.

Triggering Process Description

The triggering process controls the present and future states of the test set during the measurement cycle. Triggers are set up using the SETup commands and can be set up when a measurement is in the inactive state. A measurement is activated (selected) with an INITiate command. If a measurement is initiated while in its measurement cycle, it will terminate that measurement and restart it. The active state is not a single state but a collection of any state other than the inactive state. Deactivating (de-selecting) the measurement is accomplished through an INITiate:<MEAS>:OFF command.

Manually, a measurement is activated by selecting it from the Measurement Selection menu. A measurement is inactivated by pressing the Measurement Selection key, scrolling to measurement in the Measurement Selection menu, and then pressing F4 (Close Measurement).

Figure 3. The Test Set's Measurement States



Measurement States

The following examples describe states of the test set under various conditions. Refer to Figure 3. on page 100.

Example 2. Inactive State

If the test set has just been powered on, or any form of preset has been performed, then the measurement state is inactive.

Example 3. Wait for Trigger State

If a measurement has been initiated with the INITiate command but has not been triggered, or a measurement has been selected from the Measurement Selection menu but has not been triggered, then the measurement state is wait for trigger.

Example 4. Measuring and Idle States (Trigger Arm Single)

If the trigger arm is set to single, the trigger source is available, and the trigger qualifier (optional) is satisfied, the measurement state transitions to measuring and measurement results are now available to the user. After results are available, the state transitions to idle (awaiting another INITiate).

Example 5. Measuring State (Trigger Arm Continuous)

If the trigger arm is set to continuous, the trigger source is available, and the trigger qualifier (optional) is satisfied, the measurement state transitions to measuring and measurement results are now available to the user. The measurement is continually triggered until the measurement is deactivated. When the measurement is deactivated (INITiate:<MEAS>:OFF. or Close Measurement), it becomes inactive.

Trigger Arm (Single or Continuous) Description

Trigger arm determines if a measurement will make one measurement then return to idle (single), or automatically rearm on completion of a measurement and repeat the process (continuous).

NOTE When operating the test set remotely, trigger arm must be set to single, this causes the measurement cycle to transition to the idle state but remain active.

Pressing the Start Single key on the front panel will cause all currently active measurements with trigger arm set to single to arm and make the measurement.

Pressing Shift, Start Single (Stop) causes all measurements with trigger arm set to single to abort the measurement.

It is unnecessary to arm a measurement if trigger arm is set to continuous it will continue to cycle in the measuring state.

Table 2. Trigger Arm Default Settings

Action	Trigger Arm Default Setting
Power up of test set	Continuous
Manual Full Preset	Continuous

Table 2. Trigger Arm Default Settings

Action	Trigger Arm Default Setting
*RST (Remote) Full Preset	Single
Partial Preset	No change

Trigger Delay Description

Trigger delay controls the delay time between the trigger and the start of sampling. Resolution is 1 nanosecond per measurement and the units are in seconds. A negative value indicates the sampling should occur prior to the trigger. The default is zero seconds which is preferred for most measurements.

Related Topics

****

"Integrity Indicator"

****

3 Programming the Agilent Technologies 8960 Series 10 for CDMA 2000 Mobile Testing in Test Mode

Introduction

Conventions Used in This Programming Guide

Throughout this Programming Guide the term “test set” refers to an Agilent Technologies 8960 Series 10 E5515T wireless communications test set with the E1962A mobile test application installed.

Purpose of This Programming Guide

The test capabilities of the test set are accessible through a GPIB bus interface using a programming language. The purpose of this Programming Guide is to teach you how to write a control program. This program will perform fundamental manufacturing tests on an CDMA 2000 mobile station with the test set operating in test mode.

The lists of programming commands in this guide are not exhaustive and are best utilized for quick reference to common configuration parameters. Refer to the E1962A GPIB Syntax Guide for a complete listing of commands.

How This Programming Guide Is Organized

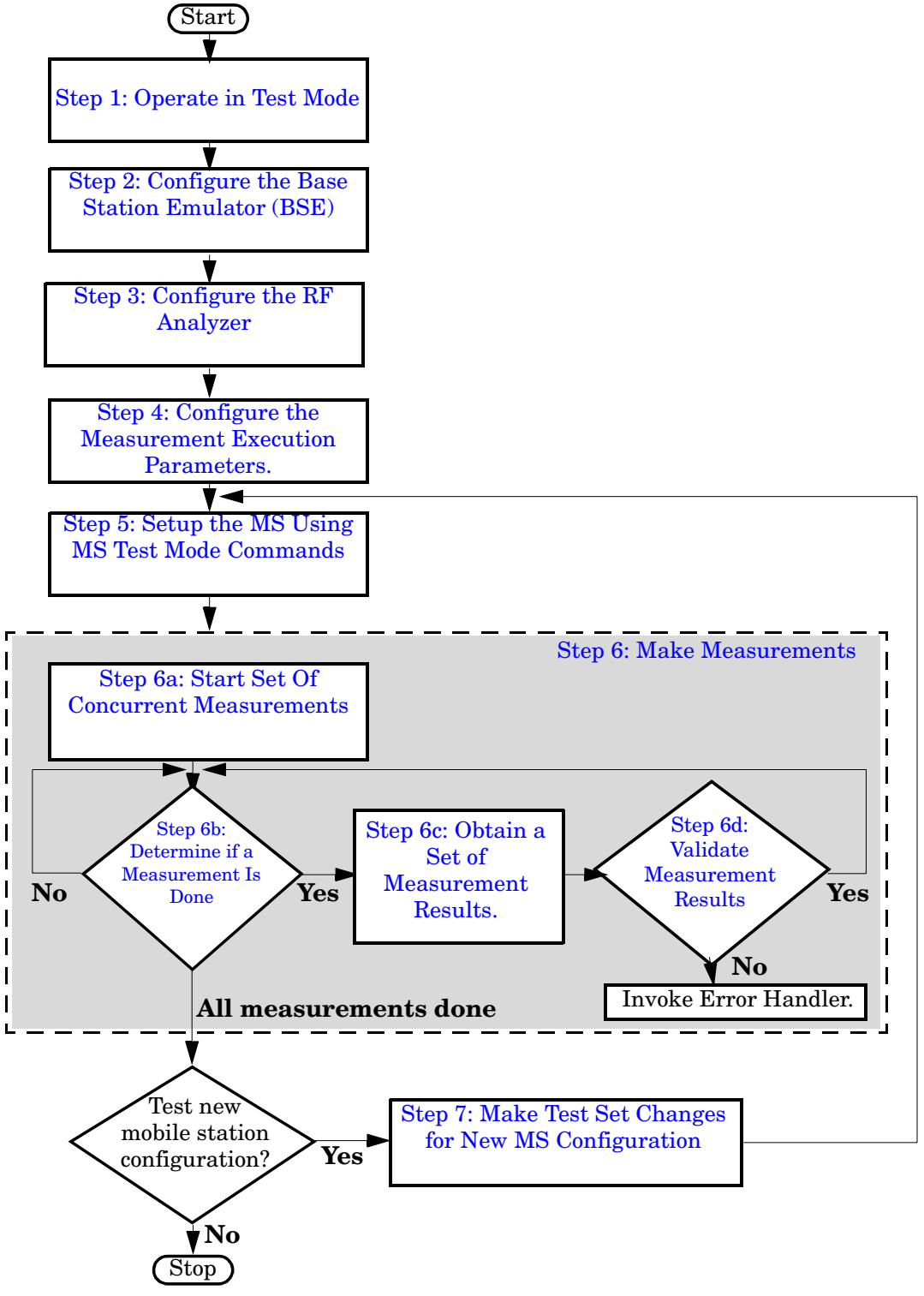
The Programming Guide is organized around a typical set of tasks a control program would normally perform when testing an CDMA 2000 mobile station in test mode in a manufacturing environment. The set of tasks is shown in “Figure 1. Typical Flow of Tasks Performed by Control Program” on page 105.

Typically in a manufacturing environment, step 4 is done once each time a production run is started and steps 5, 6, and 7 are done iteratively for each mobile tested during a production run. The number of iterations for steps 5, 6, and 7 is dependent upon how many mobile station operating conditions are being tested (that is, number of channels, number of power levels, and so fourth). Steps 1, 2, and 3 may or may not be repeated during any iteration of step 7.

How to Use This Programming Guide

This Programming Guide is divided into 8 sections. Sections 1 through 7 (step 1 through 7) should be read in sequence. Each section, in order, discusses one of the tasks to be performed by the control program, showing how to accomplish that task using the test set’s GPIB command set. As you progress through each section your understanding of how the test set’s GPIB interface operates will increase as you see the control program evolve.

Figure 1. Typical Flow of Tasks Performed by Control Program



About the Programming Examples Presented in This Programming Guide

Programming Language:

Programming examples presented in this Programming Guide are written in the BASIC programming language. The commands within these examples are able to be implemented using alternative programming environments.

Syntax Used in Programming Examples:

1. Programming examples use the shortened form of the command syntax to minimize GPIB bus transactions. The shortened form of a command is defined by use of capital letters in the command syntax.

   Example 1. Command Syntax:

   ```
   RFANalyzer:CONTrol:MEASurement:FREQuency:AUTO?
   ```

   Example 2. Shortened Form:

   ```
   RFAN:CONT:MEAS:FREQ:AUTO?
   ```

2. Programming examples do not include default nodes. Default nodes in the command syntax are defined by enclosing the node inside the [ ] brackets.

   Example 3. Command Syntax:

   ```
   CALL[:CELL]:POWer[:SAMPLitude] -80dBm
   ```

   Example 4. Command Syntax without Default Nodes:

   ```
   CALL:POW -80dBm
   ```

3. Programming examples make extensive use of compound commands using the ; and the : separators. Refer to the test set's reference information for information on the definition and use of these command separators.

Complex Commands

Complex commands are used to configure the state and assign values to parameters simultaneously. Complex commands can be used to save programming steps.

Example 5. Configuring a Parameter State

```
OUTPUT Test_set;"SET:DAP:TIM:STAT ON"
```

turns the state of the parameter on.

Example 6. Configuring a Parameter Value

```
OUTPUT Test_set;"SET:DAP:TIM:TIME 10 S"
```

assigns a value to the parameter.

Example 7. Single Complex Command to Configure a Parameter

```
OUTPUT Test_set;"SET:DAP:TIM:STIM 10 S"
```

would set the parameter state to ON and set the value of the parameter to 10 seconds. Note that in this example the optional command mnemonic :STIMe has been included to clarify that this complex command was used to set both the state and the value.

Example 8. Shortened Complex Command

```
OUTPUT Test_set;"SET:DAP:TIM 10 S"
```

would also set the state to ON and set the value to 10 seconds. Note that in this example, the optional command mnemonic :STIMe has been left off to shorten the complex command. This is the format that will be used throughout this programming guide.

Step 1: Operate in Test Mode

Background

The test set contains an CDMA 2000 base station emulator (BSE). The primary purpose of the BSE is to provide the call processing necessary for parametric measurements on the RF signals of an CDMA 2000 mobile station (MS).

An important characteristic of the test set's BSE is its operating mode. The operating mode sets the way in which the test set's BSE communicates with the mobile station.

When the MS is operating in test mode, the BSE provides necessary forward channel stimulus and makes reverse channel measurements. It does not provide over-the-air signaling.

This Programming Guide focuses on programming the test set's BSE in test mode.

Overview of Test Mode

In test mode, the test set's BSE generates a forward signal, but does no signaling with the MS.

General Test Mode Features

The basic features provided by the BSE when the operating mode is set to test mode are:

- The forward channel frequency setting may be specified by the user if the downlink frequency control is set to manual.
- All measurements supported in the test application are available.
- The BSE automatically controls the test set's receiver, unless the user sets receiver control to manual.

Setting the Test Set's Operating Mode to CDMA 2000 Test Mode

The test set's operating mode is set using the CALL:OPERating:MODE command.

Command Syntax

```
!*************************************************************
! Step 1: Set Test Set Cell Operating Mode To CDMA 2000 Test Mode
!*************************************************************
!
OUTPUT Test_set;"CALL:OPER:MODE D2KT"
```

Step 2: Configure the Base Station Emulator (BSE)

Background

While operating in test mode the test set's BSE, using the test set's modulated source, generates a forward (BSE to MS direction) CDMA channel which represents a cell. The MS can camp to this forward link, just as it would camp to a cell on a real network. Measurements can then be made under essentially identical conditions to those which the MS would experience on a real network.

When operating in test mode, the BSE, using the test set's modulated source, generates a forward link but does no signaling with the MS. This forward link stimulus is necessary for the MS (operating in test mode) to transmit so measurements can be made on the link from the BSE to the MS.

The BSE can emulate a cell or support test mode in any one of the following CDMA 2000 frequency bands:

- US Cellular (800 MHz)
- US PCS (1900 MHz)
- Japan CDMA (800 MHz)
- Korean PCS (1800 MHz)
- IMT-2000 (1900 MHz)

The task of configuring the BSE consists of numerous parameters that can be configured for the forward link. It may not be necessary to configure all the parameters all the time. The test set's default settings should allow a properly functioning MS to successfully camp on the cell under most circumstances.

In a manufacturing environment it may be desirable to explicitly configure all parameters to ensure that the settings have not been corrupted by someone setting a parameter's value through the test set's front panel.

Configuring the Base Station Emulator

The complete listing of the radio control (link) programming commands is located in the E1961A Option K03 GPIB Syntax Guide.

Example 6. Programming Example:

```
OUTPUT Test_set;"CALL:POW:AMPL:DIG -55 DBM"

OUTPUT Test_set;"CALL:BAND:DIG USPC"

OUTPUT Test_set;"CALL:CHAN:DIG 384"

OUTPUT Test_set;"CALL:CONT:DOWN:FREQ:AUTO OFF"

OUTPUT Test_set;"CALL:RFG:FREQ 820 MHZ"
```

Step 3: Configure the RF Analyzer

RF Analyzer

Normally, the BSE internal receiver parameters are controlled automatically based on what protocol expects the MS to be transmitting. However, there are times when this does not offer sufficient control for some measurement scenarios. The following internal parameters sometimes require manual control:

- Measurement Frequency
- Receiver Power
- Demodulator Frequency

Measurement Receiver Frequency Controls

These Receiver Frequency Controls define whether the BSE's frequency tuning of the measurement receivers is controlled automatically by the BSE or manually by the user.

Configuring the Measurement Receiver Frequency Parameters When the user sets the Measurement Receiver Frequency Control to "Manual", the measurement receiver frequency is tuned to the value of the Manual Measurement Frequency.

Measurement Receiver Frequency Control and Settable Parameters

Parameter	Command Syntax	Footnotes
Manual Measurement Receiver Frequency and Control	RFANalyzer:MANual:MEASurement[:MFRequency] <numeric value>[<GHZ|MHZ|KHZ|HZ>]	1
Measurement Receiver Frequency Control	RFANalyzer:CONtrol:MEASurement:FREQuency:AUTO <ON|1|OFF|0>	
Manual Measurement Frequency	RFANalyzer:MANual:MEASurement:FREQuency <numeric value>[<GHZ|MHZ|KHZ|HZ>]	

Table Footnotes

1 Sets frequency to <numeric value> and control to manual in one command.

Configuring the Manual Receiver Power Level

There is one Manual Receiver Power Level parameter:

- Manual CDMA 2000 Receiver Power Level <CDMA 2000>

This parameter stores the Manual Receiver Power Level in units of dBm and applied when the Receiver Input Power Control is set to Manual.

Manual Receiver Input Power Control and Settable Parameters

Parameter	Command Syntax
Receiver Input Power Control	RFANalyzer:CONtrol:POWer:AUTO <ON|1|OFF|0>
Manual CDMA 2000 Receiver Power Level	RFANalyzer:MANual:POWer:DIGital2000 <numeric value>[<DBM>]

Demodulator Frequency Control and Settable Parameters

Parameter	Command Syntax
Manual Demod Frequency Control	RFANalyzer:MANual:UPLink[:MFRequency] <numeric value>[<GHZ|MHZ|KHZ|HZ>]
Demod Receiver Frequency Control	RFANalyzer:CONtrol:UPLink:FREQuency:AUTO <ON|1|OFF|0>
Manual Demod Frequency	RFANalyzer:MANual:UPLink:FREQuency <numeric value>[<GHZ|MHZ|KHZ|HZ>]

The range of the Manual Receiver Power Level parameters (-129 dBm to +50 dBm) is beyond the capability of the hardware to support. The hardware range is -79 dBm to +30 dBm when the amplitude offset is zero. The actual offset is defined by adding the value of the Amplitude Offset to the range in the table. For Example, if the amplitude offset is -3.5 dBm, then the Manual Receiver Power Level range will be-82.5 dBm to 26.5 dBm.

NOTE The Manual Receiver Power Level parameters are never overwritten by settings made to the corresponding MS Level parameter.

Example 1. Programming Example

```
!*********************************************************************
! Step 3: Configure the RF Analyzer
!*********************************************************************
OUTPUT Test_set;"RFAN:MAN:MEAS 870 MHZ"
OUTPUT Test_set;"RFAN:CONT:POW:AUTO OFF"
OUTPUT Test_set;"RFAN:MAN:POW 25 DBM"
```

Step 4: Configure the Measurement Execution Parameters

Background

Measurement execution parameters control the conditions under which a measurement operates. The general set of measurement execution parameters and their generic categories are as follows:

- Statistical Measurements (used by all measurements)

  Measurement Count State
  Measurement Count Number

- Measurement Timeouts (used by all measurements)

  Measurement Timeout
  Measurement Timeout State
  Measurement Speed (used by channel power measurements)

- Measurement Triggering (used by all measurements)

  Trigger Arm (used by all measurements)

NOTE Not all measurements use all the execution parameters shown above. Additionally, some measurements have parameters that are specific to the measurement. Each measurement has its own set of parameters that are unique to it and have no effect on the execution of other measurements. Refer to the GPIB syntax listing for a detailed list of execution parameters for individual measurements.

Overview

The SETup subsystem is used to configure measurement parameters. Each individual measurement parameter can be set and queried using the associated SETup subsystem command. The general hierarchy of the SETup subsystem command structure is as follows:

```
SETup:<meas-mnemonic>:<measurement parameter><parameter setting/value>
```

The following table shows the measurements available in the Agilent E1962A CDMA 2000 mobile test application and their associated <meas-mnemonic> used in the SETup command syntax.

Measurement Mnemonics Used In The SETup Subsystem

Measurement	<meas-mnemonic>
Digital Average Power	DAPower
Channel Power	CPOWer
Waveform Quality	WQUality

Configuring Statistical Measurement Results Parameters

Statistical Measurement Results Parameters

Parameter	Command Syntax
Measurement Count Number and State	`SETup:<meas-mnemonic>:COUNt[:SNUMber] <numeric value>`
Measurement Count State	`SETup:<meas-mnemonic>:COUNt:STATe <ON|1|OFF|0>`
Measurement Count Number	`SETup:<meas-mnemonic>:COUNt:NUMBer <numeric value>`

Configuring Measurement Count State and Count Number Simultaneously

The measurement count state can be set to ON and the measurement count number can be set to some value using a single complex command.

Example 2. Programming Example:

```
OUTPUT Test_set;"SET:DAP:COUN 10"
```

would set the measurement count state to ON and set the number of averages to 10 for the digital average power measurement.

Measurement Count State Parameter

The Measurement Count State parameter is used to turn measurement averaging on and off.

Measurement Count Number Parameter

The Measurement Count Number parameter sets the number of measurement samples taken during each measurement cycle when the COUNt:STATe parameter is set to ON.

Configuring Measurement Triggering Parameters

Measurement Triggering Parameters

Parameter	Command Syntax
Trigger Arm	`SETup:<meas-mnemonic>:CONTinuous <ON|1|OFF|0>`

Trigger Arm Parameter

The Trigger Arm parameter determines whether a measurement will make one measurement then stop (single), or automatically re-arm upon completion of one measurement and repeat the process (continuous).

NOTE The recommended trigger arm setting for all measurements when programming the test set is single (CONTinuous OFF).

Example 3. Programming Example:

```
OUTPUT Test_set;"SET:CPOW:CONT OFF"
```

would set the trigger arming to single for the channel power measurement.

Configuring Measurement Timeout Parameters

Measurement Timeout Parameters

Parameters	Command Syntax
Measurement Timeout Time and State	`SETup:<meas-mnemonic>:TIMeout[:STIMe] <numeric value>[<suffix>]`
Measurement Speed	`SETup:<meas-mnemonic>:MSPeed <NORMal|FAST>`
Measurement Timeout State	`SETup:<meas-mnemonic>:TIMeout:STATe <ON|1|OFF|0>`
Measurement Timeout Time	`SETup:<meas-mnemonic>:TIMeout:TIME <numeric value>[<suffix>]`

Configuring Measurement Timeout State and Timeout Time Simultaneously

The measurement timeout state can be set to ON and the measurement timeout time can be set to some value using a single complex command.

Example 7. Programming Example:

```
OUTPUT Test_set;"SET:CPOW:TIM 10"
```

would set the measurement timeout state to ON and set the measurement timeout time to 10 seconds for the channel power measurement.

Measurement Timeout State Parameter

The Measurement Timeout State parameter is used to enable or disable measurement timeout functionality.

Example 8. Programming Example:

```
OUTPUT Test_set;"SET:CPOW:TIM:STAT ON"
```

would enable measurement timeouts for the channel power measurement.

Measurement Timeout Time Parameter

The Measurement Timeout Time parameter sets the maximum time that a measurement will execute before failing with a timeout error (when the TIMEout:STATe parameter is set to ON).

Example 4. Programming Example:

```
OUTPUT Test_set;"SET:CPOW:TIM:TIME 10 S"
```

would set the measurement timeout time to 10 seconds for the channel power measurement.

Example 9. Programming Example

```
!*********************************************************************
! Step 4: Configure Measurement Execution Parameters
!*********************************************************************
!
!  Configure Digital Average Power Measurement:
!
OUTPUT Test_set;"SET:DAP:COUN 5"        ! Example of using a complex
                                        ! command to set meas
                                        ! state and count at same time.
OUTPUT Test_set;"SET:DAP:CONT OFF"      ! Set trig mode to single.
OUTPUT Test_set;"SET:DAP:TIM 15"  ! Set timeout state to on and set timeout time to 15 sec.
!
! Configure Channel Power Measurement:
!
OUTPUT Test_set;"SET:CPOW:COUN 5"
OUTPUT Test-set;"SET:CPOW:CONT OFF"
OUTPUT Test_set;"SET:CPOW:TIM 15"
!
! Configure Waveform Quality Measurement:
!
OUTPUT Test_set;"SET:WQU:COUN 3"
OUTPUT Test_set;"SET:WQU:CONT OFF"
OUTPUT Test_set;"SET:WQU:TIM 10"
```

Step 5: Setup the MS Using MS Test Mode Commands

Background

In test mode, the test set provides forward link stimulus but has no control over or communication with the MS. At this point, either the control program via a serial bus or other interface, or the user with the mobile's keypad, must set up the MS in order for the test set to make measurements.

Establishing a "Forced Call" in Test Mode

The user may manually synchronize the MS with the test set's BSE, and then turn on the mobile station's own traffic channel. If this is the case and both the reverse and forward links use the same channel number, band, MS Tx Power Level, and timeslot, a "forced call" is in progress.

Characteristics of a "Forced Call"

- Demodulation and channel decoding of the reverse link are available, although no messages will be decoded.
- The traffic channel burst contains a repeating random pattern.
- No voice echo is supported with a "forced call".

MS and test set BSE parameters which must be the same for a "forced call" to be established

- Band
- Channel Number
- Timeslot
- MS Transmit Power Level

NOTE The method used to synchronize the MS with the test set is proprietary to the MS manufacturer. The base station emulator has no direct control of synchronization when the MS is operating in test mode.

Step 6: Make Measurements

Background

The multiple signal path, DSP based, multiple processor architecture of the test set allows the test set to make concurrent measurements. This means that:

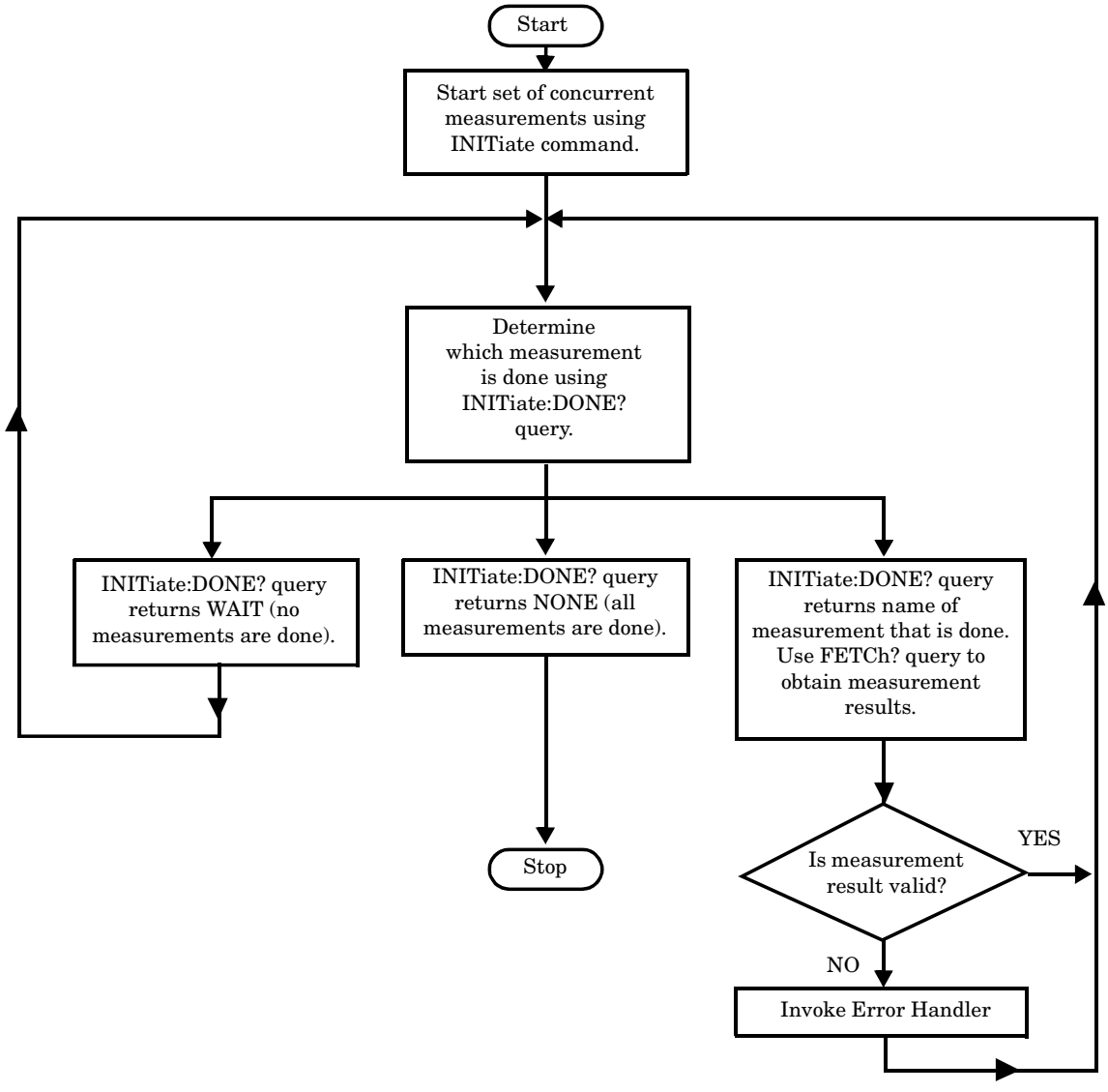
- multiple measurements can execute and finish at the same time (concurrently)
- individual measurement completion is not influenced by other measurement processes
- availability of measurement results is not dependent upon the sequence that the measurements were requested in
- results from measurements that take few processor cycles are available without having to wait for measurements that take many processor cycles

There are no special programming commands required to implement measurement concurrency.

"Step 6: Figure 1. Process for Making Concurrent Measurements" on page 124 shows the recommended process for making concurrent measurements using the test set's command set.

NOTE Step 6 explains how to initiate measurements concurrently and what process to use when fetching results. These can be applied to sequential measurements. It is unnecessary to use the commands in Step 6b when performing sequential measurements.

Step 6: Figure 1. Process for Making Concurrent Measurements



Example 1. Programming Example:

The following program segment illustrates making a digital transmit power measurement and a modulation accuracy measurement concurrently using the recommended process shown in "Step 6: Figure 1. Process for Making Concurrent Measurements" on page 124.

```
30   !************************************************************************
40   !  Step 6:  Make Measurments
50   !************************************************************************
60   !
70   !  Step 6a: Start Set of Concurrent Measurements:
80   !
90   OUTPUT Test_set;"INIT:CPOW;DAP"
100  !
110  !  Step 6b:  Determine if A Measurement Is Done:
120  !
130  LOOP
140     OUTPUT Test_set;"INIT:DONE?"
150     ENTER Test_set;Meas_done$
160  !
170  !  Step 6c: Obtain Measurement Results
180  !
190     SELECT Meas_done$
200       CASE "DAP"
210         OUTPUT Test_set;"FETC:DAP?"
220         ENTER Test_set;Integrity,Avg_dig_pow
230  !
240  !  Step 6d: Are Measurement Results Valid?
250  !
280       IF Integrity=0 THEN
290          PRINT "AVG DIG POW= ",Avg_dig_pow
300  ELSE
310          GOSUB Bad_int_ind ! Go to error handling subroutine
320       END IF
330     CASE "CPOW"
340       OUTPUT Test_set;"FETC:CPOW?"
350       ENTER Test_set;Integrity,Avg_chan_pow
360  !  Step 6d: Are Measurement Results Valid?
```

```
370  IF Integrity=0 THEN
380     PRINT "AVG CHAN POW= ",Avg_chan_pow
390  ELSE
400          GOSUB Bad_int_ind ! Go to error handling subroutine
410  END IF
420     END SELECT
430  EXIT IF Meas_done$="NONE"
440  END LOOP
```

Things That Can Go Wrong

Measurement Integrity Always Returns a Value of 6

Background A measurement integrity value of 6 indicates that some characteristic of the input signal is under range. Typically this will be the amplitude (power) of the DUT signal. This low amplitude will cause the level of the DSP sampler to be below a threshold required by the measurement algorithm to produce results of specified accuracy.

Possible Cause One of the most likely causes of a measurement underrange condition is DUT signal loss caused by fixture loss or cable loss.

Suggested Workaround Fixture loss or cable loss can be compensated for by using the RF IN/OUT port's amplitude offset parameter.

Parameter	Command Syntax	Footnotes
Amplitude Offset and Correction State ON	`SYSTem:CORRection[:SGAin] <numeric value>[<suffix>]`	1
Amplitude Offset	`SYSTem:CORRection:GAIN <numeric value>[<suffix>]`	
Correction State	`SYSTem:CORRection:STATe <1|ON|0|OFF>`	

Table Footnotes **1** Complex command to set the gain to <numeric value> and state to ON in one command.

Example 10. Programming Example:

```
OUTPUT Test_set;"SYST:CORR -6,-5.1,-2.5"
```

is a complex command that would set three offsets (you may set up to 20) for the RF IN/OUT port's amplitude to –6 dB, -5.1 dB, and -2.5 dB, and also set the correction state to ON.

Step 6a: Start Set Of Concurrent Measurements

Starting Measurements

Each measurement in a test application can be started using the INITiate command. The syntax of the INITiate command is as follows:

Example 1. Command Syntax:

```
INITiate:<meas-mnemonic>[:ON]
```

The following table shows the measurements available in the E1962A CDMA 2000 mobile test application and their associated <meas-mnemonic> used in the INITiate command syntax.

Measurement Mnemonics Used In The INITiate Subsystem

Measurement	<meas-mnemonic>
Channel Power	CPOWer
Digital Average Power	DAPower
Waveform Quality	WQUality

Example 2. Programming Example:

```
OUTPUT Test_set;”INIT:DAP[:ON]”
```

would start the digital average power measurement.

Using Compound Commands to Start Multiple Measurements

More than one measurement can be started using a single INITiate command. For example:

```
OUTPUT Test_set;"INIT:DAP;CPOW"
```

would start the digital average power measurement and the channel power measurement. These measurements would then run concurrently.

Step 6b: Determine if a Measurement Is Done

Background

After a set of concurrent measurements has been started, it is desirable that the control program be able to determine when individual measurement results are available. This enables the control program to request results for a completed measurement without having to wait for other measurements to finish.

Overview

The INITiate:DONE? query command is used to determine which measurement is finished.

As the name implies, the query returns the name of whichever active measurement is done so that the control program can request that measurement's results.

This command is query only and returns only one response per query. The responses returned and their meaning are shown in the following table.

Once a measurement is reported as being done via the INITiate:DONE? query it is removed from the done list (measurements are only reported as being done once). The design of the INITiate:DONE? query assumes the control program immediately fetches a measurement's results once it is reported as being done.

Responses Returned from INITiate:DONE? Query

Response	Meaning
CPOW	The channel power measurement is done.
DAP	The digital average power measurement is done.
WQU	The waveform quality measurement is done.
WAIT	There are one or more measurements that are in progress, but none of those measurements are done yet.
NONE	No measurements are in progress.

Example 1. Command Syntax:

```
INITiate:DONE?
```

Example 2. Programming Example:

See "Programming Example:" on page 125.

Step 6c: Obtain a Set of Measurement Results

Background

In order to minimize bus traffic in the manufacturing environment, the test set's high-level measurements have been designed to return multiple measured values in response to a single measurement request.

For example, if a digital average power measurement is initiated there will be three measurement results available as follows:

1. Measurement integrity value
2. Average value
3. Intermediate count of completed measurements

NOTE The Waveform Quality measurement has several additional results along with those listed above. These results are listed later in this section.

The test set has been designed with the capability to return the measurement results in a variety of formats to suit the needs of the measurement environment. For example, the digital average power measurement results can be returned as:

- Measurement integrity and average value

  OR

- Average value only

  OR

- Measurement integrity value only

  OR

- Intermediate count only

The formats available for individual measurements can be found in the test set's FETCh subsystem's GPIB command syntax reference information.

Overview

The measurement results from each measurement in a test application can be queried using the FETCh subsystem. The general hierarchy of the FETCh command structure is as follows:

```
FETCh:<meas-mnemonic>:<result format>?
```

The following table shows the measurements available in the E1962A CDMA 2000 mobile test application and their associated <meas-mnemonic> used in the FETCh command syntax.

The command syntax used to obtain the various measurement result formats (<result format>) for each measurement can be found in the test set's FETCh subsystem's GPIB command syntax reference information.

Measurement Mnemonics From FETCh Subsystem

Measurement	<meas-mnemonic>
Channel Power	CPOWer
Digital Average Power	DAPower
Waveform Quality	WQUality

Example 1. Command Syntax:

```
FETCh:<meas-mnemonic>:<result format>?
```

Example 2. Programming Example:

```
OUTPUT Test_set;"FETC:DAP:ICO?"
```

would return the intermediate count of completed measurements taken during the digital average power measurement (when number of samples taken >1). The returned value can be assigned to a variable using the following command:

```
ENTER Test_set;count
```

Example 11. Programming Example:

```
OUTPUT Test_set;”FETC:CPOW?”
```

would return the integrity value and the average value for the channel power measurement. The returned value can be assigned to a variable using the following command:

```
ENTER Test_set;Integrity,Avg_chan_pow
```

Step 6d: Validate Measurement Results

Validating measurement results is extremely important when using test mode. The test set will return a result if it is capable of making a measurement, even if this result was obtained under adverse conditions. The lack of signaling between the mobile and the test set prevents the test set from knowing the condition of the link. Therefore, the only indicator provided by the test set that measurement conditions were unacceptable becomes the integrity indicator. It is essential to check the value returned for the integrity indicator of each measurement.

For example, when a “forced call” is established the MS should be synchronized with the test set’s BSE. In some cases, the MS may not successfully synchronize to the test set’s BSE but will still begin to transmit. The test set will make measurements, but they will be triggered in the wrong place and the results will most likely be invalid. When making measurements in test mode, it is possible to set up the mobile on the correct channel and the wrong timeslot and still have the mobile’s transmitter turn on. The test set WILL return values for the measurements but will also return integrity indicators other than 0.

Overview

The integrity indicator is a measurement result and therefore is queried using the FETCh subsystem. Integrity indicator errors are 1 of 20 different messages that indicate if a measurement was valid. A value of 0 indicates that the measurement is valid. A value other than 0 indicates that an error occurred during the measurement process.

Integrity Indicators

Value	Description (also appears on Test Set)
0	Normal
1	No Result Available
2	Measurement Timeout
3	Hardware Not Installed
4	Hardware Error
5	Over Range
6	Under Range
7	Burst Short
8	Trigger Early or Fall Early
9	Trigger Late or Rise Late
10	Signal Too Noisy
11	Sync Not Found
12	Oven Out of Range
13	Unidentified Error
14	PCM Full Scale Warning
15	Questionable Result for PGSM
16	Questionable Result Due to Channel Mode
17	Cannot Correlate
18	Frequency Out of Range
19	Uncalibrated Due to Temperature

Example 12. Programming Example

```
OUTPUT Test_set;"FETC:DAP?"
ENTER Test_set;Integrity,Avg_dig_pow
IF Integrity=0 THEN
   PRINT "DIG AVG POW= ";Avg_dig_pow
ELSE
   PRINT "DAP Measurement Error"
   PRINT "DAP Measurement Integrity is ";Integrity
END IF
```

Step 7: Make Test Set Changes for New MS Configuration

Background

The test set's BSE must be put into any new configuration before the MS undergoes configuration changes in order for the MS to be able to synchronize to the test set's BSE. This involves repeating step 2, step 3, or both. It is only necessary to perform steps 1 and 4 once. Therefore, it is possible to set up several measurements all at once and later initiate them when the test set and MS are both configured properly.

Possible Test Set Changes

Repeat Step 2: Configure the Base Station Emulator

This step would be appropriate if testing at a new power level, channel, timeslot, or band.

Repeat Step 3: Configure the RF Analyzer

This step would be appropriate if testing at a new power level, frequency, timeslot, or band and control of the receiver was manual.

4 GPIB Command Syntax

Diagram Conventions

Description

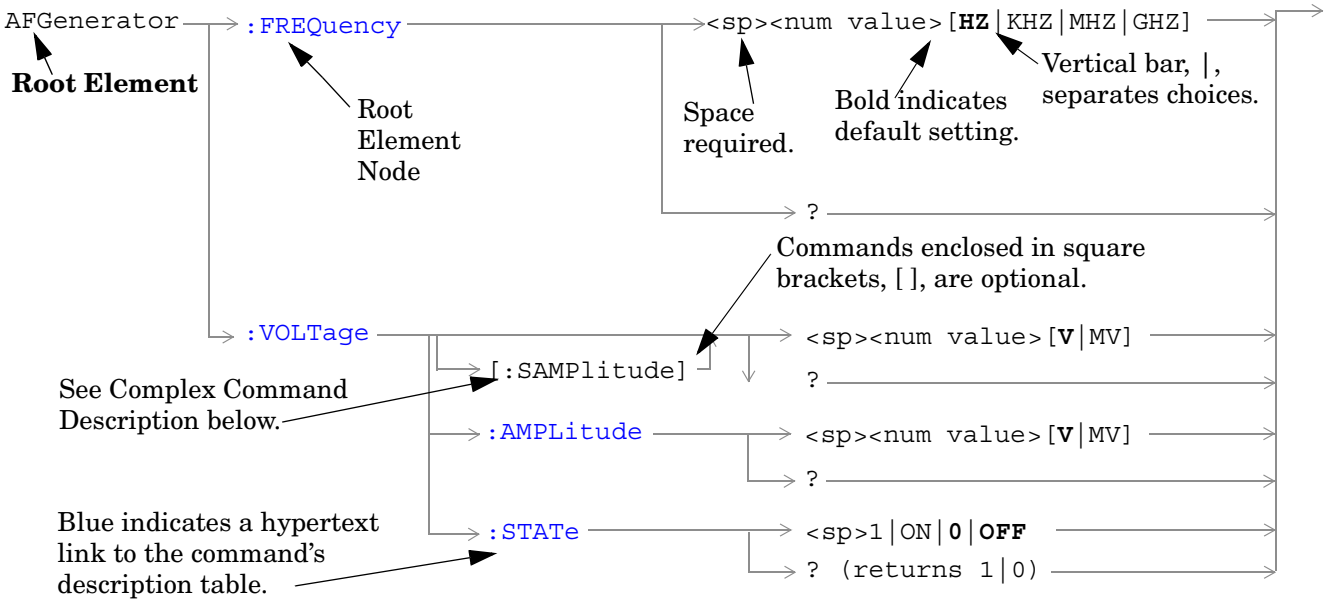


Diagram Description

Statement elements are connected by lines. Each line can be followed in only one direction, as indicated by the arrow at the end of the line. Any combination of statement elements that can be generated by starting at the **Root Element** and following the line the **directionof the arrow** is syntactically correct. The drawings show the proper use of spaces. Where spaces are required they are indicated by **<sp>**, otherwise no spaces are allowed between statement elements.

Complex Command Description A complex command sets the state of the parameter to ON, and is used to set a value for that parameter. These parameters; amplitude, frequency, gain, number, time, and value can be used as a complex command. Refer to the specific command for the parameter that applies.

Developing Code

It is recommended that you set the Test Set's operating environment to debug. To set the Test Set debug mode to "ON" use the following syntax:

```
SYSTem:COMMunicate:GPIB:DEBug ON
```

Units-of-Measure

If you do not specify units-of-measure in your code the following table indicates the default units-of-measure that will be assumed.

Amplitude (linear)	V
Frequency	Hz
Power (logarithmic)	dBm
Time	s

ABORt Subsystem

Description

The ABORt command causes a measurement cycle in progress to stop. If the measurement is not being continuously armed (trigger arm set to single) , the measurement will remain in the idle state after this event. If the measurement is being continuously armed (trigger arm set to continuous), a new measurement cycle will begin after ABORt. If an ABORt command is issued from any measurement state other than measuring, the command is ignored.

Other Commands that Execute an ABORt Action

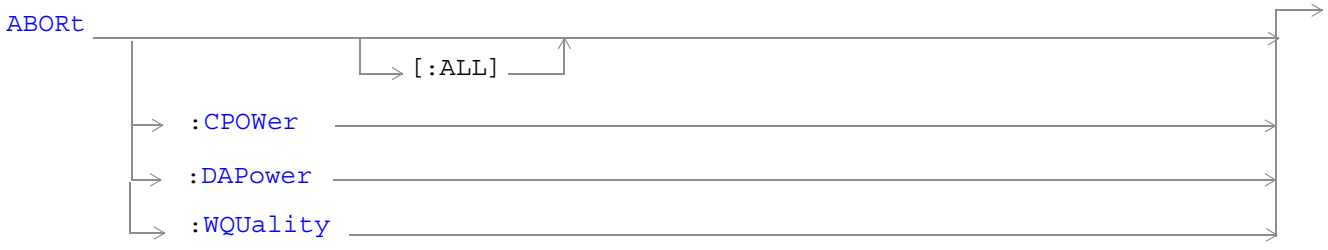
INITiate:<meas> will execute an ABORt:<meas> as part of the INITiate:<meas> command.

READ:<meas>? will execute an ABORt:<meas> action that aborts just one trigger sequence and then combines the INITiate and FETCh? commands.

Syntax Diagram and Command Descriptions

"ABORt"

ABORt



"Diagram Conventions" on page 141

ABORt[:ALL]

Function	Stops all measurements that are active. If the trigger arm is set to single, the measurements will go to the idle state. If the trigger arm is set to continuous, the measurements will re-arm and initiate again.
Setting	Range • AAUDio • CPOWer • DAPower • WQUality
Programming Example `OUTPUT 714;"ABORT:ALL" !Aborts all active measurements in progress.`	

ABORt:<meas-mnemonic>

Function	Stops the selected measurement if it is active. If the trigger arm is set to singlethe measurements will go to the idle state. If the trigger arm is set to continuous the measurements will re-arm and initiate again.
Setting	Range • CPOWer • DAPower • WQUality
Programming Example `OUTPUT 714;"ABORT:WQUALITY" !Aborts the waveform quality measurements.`	

AFGenerator Subsystem

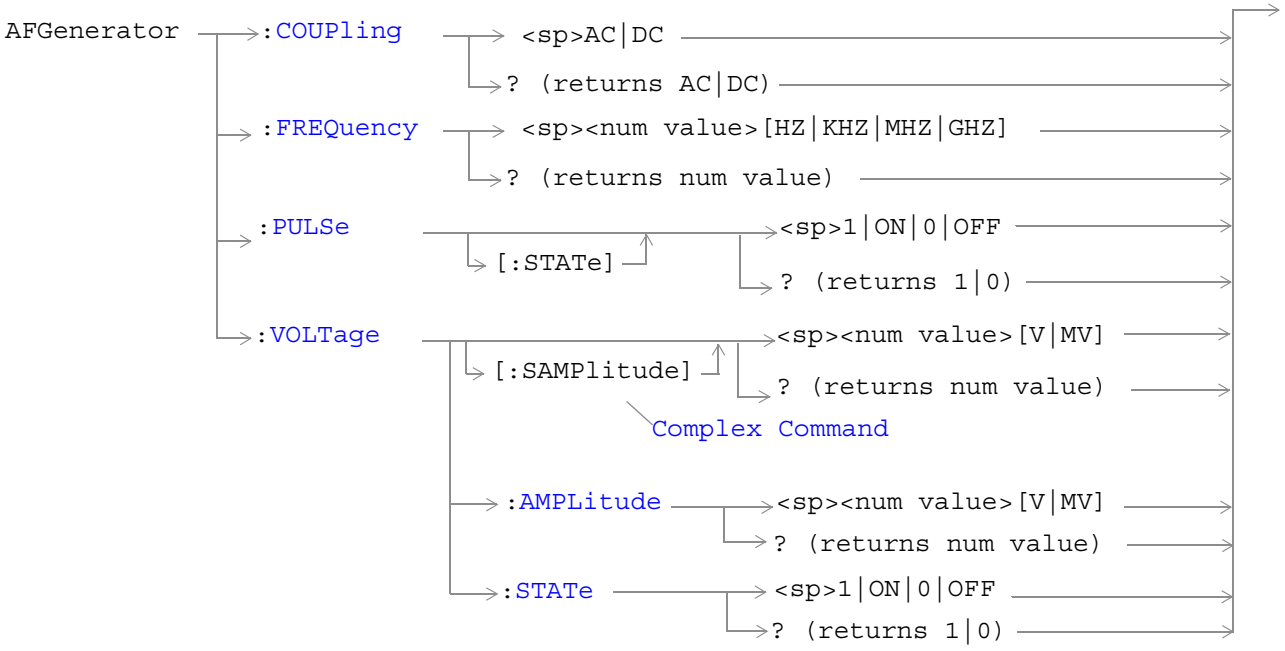
Description

The AFGenerator subsystem is used to control the audio source that is available at the Audio Output connector.

Syntax Diagram and Command Descriptions

"AFGenerator" on page 149

AFGenerator



"Diagram Conventions" on page 141

AFGenerator:FREQuency

Function	Sets/queries the frequency of the audio generator. The units (HZ|KHZ|MHZ|GHZ) are optional, if no units are specified then units default to HZ.
Setting	Range: 1 Hz to 20 kHz Resolution:0 .1 HZ
Query	Range: 1 Hz to 20 kHz Resolution: 0.1 Hz
*RST setting	1 kHz
Programming Example `OUTPUT 714;"AFGENERATOR:FREQUENCY 1000" !Sets the audio generator frequency to 1000 Hz.`	

AFGenerator:COUPling

Function	Sets/queries whether the audio output is ac or dc coupled.
Setting	Range: AC|DC
Query	Range: AC|DC
*RST setting	DC
Programming Example `OUTPUT 714;"AFGENERATOR:COUPLING AC" !Sets the audio generator to ac coupling.`	

AFGenerator:PULSe[:STATe]

Function	Sets/queries the audio generator pulse state. The pulse state must be on when the test set's audio generator is used for audio stimulation during a decoded audio measurement. When the state is on, the audio signal from the test set is pulsed at a 10 Hz rate with a 50% duty cycle. The amplitude and frequency of the pulse is set with afgenerator commands. See "AFGenerator" on page 149.
Setting	Range: 0 | OFF | 1 |ON
Query	Range: 0|1
*RST setting	0 (off)
Programming Example `OUTPUT 714;"AFGENERATOR:PULSE ON" !Sets the audio generator pulse to ON.`	

AFGenerator:VOLTage[:SAMPlitude]

Function	Sets /queries the amplitude of the audio generator in volts and turns the state to on. The units (V|MV) are optional, if no units are specified then units default to V.
Setting	Range: 0 to 9 V pk. Resolution: • 0.5 mV pk. <= 1 V pk. output • 5 mV pk. > 1 V pk. output
Query	Range: 0 to 9 V pk. Resolution: • 0.5 mV pk. <= 1 V pk. output • 5 mV pk. > 1 V pk. output
*RST setting	0 V

Programming Example
`OUTPUT 714;"AFGENERATOR:VOLTAGE 2.1" !Sets the state to on and the output` `!voltage to 2.1 volts.`

AFGenerator:VOLTage:AMPlitude

Function	Sets/queries the amplitude for the audio generator when the audio generator state is on. The units (V|MV) are optional, if no units are specified then units default to V.
Setting	Range: 0 to 9 V pk. Resolution: • 0.5 mV pk. <= 1 V pk. output • 5 mV pk. > 1 V pk. output
Query	Range: 0 to 9 V pk. Resolution: • 0.5 mV pk. <= 1 V pk. output • 5 mV pk. > 1 V pk. output
*RST setting	0 V
Programming Example	
`OUTPUT 714;"AFGENERATOR:VOLTAGE:AMPLITUDE 1.414" !Sets the audio generator output` `!voltage to 1.414 volts peak.`	

AFGenerator:VOLTage:STATe

Function	Sets/queries the audio generator state
Setting	0 | OFF | 1 |ON
Query	0|1
*RST setting	0 (off)
Programming Example `OUTPUT 714;"AFGENERATOR:VOLTAGE:STATE ON" !Set the audio generator state to ON.`	

CALibration Subsystem

Description

There are three calibrations that must be performed periodically on the test set:

- I/Q calibration

  This calibration is required if the Baseband Generator or the Vector Output modules are serviced or swapped. The CALibration:IQ subsystem should not be used as part of frequent (i.e. daily, weekly or monthly) test set calibration.

- Channel Power calibration

  This calibration generates calibration data for channel power measurements, access probe power measurements, and other test set functions.

NOTE Channel power calibration data are also used when performing test set functions other than channel power measurements. Waveform quality measurements are one such function.

  During calibration the internal temperature of the test set will be measured and calibration data will be generated that covers the measurement amplitude range of the available frequency bands. The test set will measure the internal temperature and compare it against the temperature measurement that was made when calibration data was generated.

  Channel Power calibration takes about two minutes.

  During Channel Power calibration no power should be applied to the front panel.

- Digital Average Power calibration

  Digital average power measurement calibration loops back a CDMA signal from within the test set to the average power meter to generate a table of calibration values.

  Digital Average Power measurement calibration takes about ten minutes.

  During Digital Average Power calibration no power should be applied to the front panel RF IN/OUT connector.

  Power must be cycled off then back on after this calibration routine has completed.

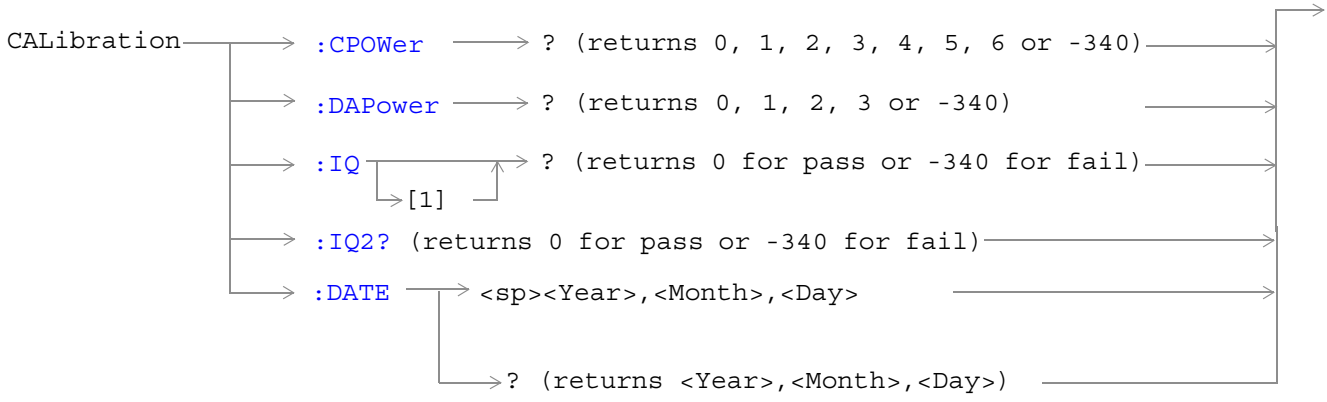
Remotely initiating any of the calibration routines is accomplished through the use of single query-only header. The test set returns a numeric value indicating the outcome of the calibration attempt.

Manually initiating the IQ calibration routines requires pressing the SYSTEM CONFIG hardkey, then pressing the 1 of 2 hardkey, then pressing the Service softkey. Manually initiating the channel power or digital average power calibrations is performed by selecting the measurement and pressing a softkey.

Syntax Diagram and Command Descriptions

"CALibration"

CALibration



"Diagram Conventions" on page 141

CALibration:CPOWer?

Function	Initiates IF level calibration used by access probe power and channel power measurements. No other GP-IB commands are processed until this calibration has completed.
Query	Range • 0 = Calibration passed • 1 = Channel power calibration failed due to temperature drift. Wait for temperature to stabilize. • 2 = Channel power calibration failed due to oven temperature out of range. • 3 = Channel power calibration failed due to loopback switch problem. • 4 = Channel power calibration failed due to under range condition. • 5 = Channel power calibration failed due to over range condition. • 6 = Channel power calibration failed due to correlation problem. • –340 = Calibration failed

Programming Example
`OUTPUT 714;"CALIBRATION:CPOWer?"`
`!Initiates the IF level calibration process and queries the pass/fail result.`	

CALibration:DAPower?

Function	Initiates digital average power measurement calibration. RF power must not be applied to the test set's front panel RF IN/OUT connector during calibration. Digital average power measurement calibration will take about 10 minutes. Power must be cycled when digital average power measurement calibration has completed. No other GP-IB commands are processed until this calibration has completed.
Query	Range • 0 = Calibration passed • 1 = Digital average power calibration failed due to temperature drift. Wait for temperature to stabilize. • 2 = Digital average power calibration failed due to oven temperature out of range. • 3 = Digital average power calibration failed due to loopback switch problem. • –340 = Calibration failed

Programming Example
`OUTPUT 714;"CALIBRATION:DAPower?"`
`!Initiates the digital average power measurement calibration process and queries the pass/fail result.`	

CALibration:IQ[:1]?

Function	Sets/queries the calibration of the IQ modulator for RF generator 1. It takes some time to complete calibration and can't be aborted except by cycling the power switch. • Calibrates the IQ modulator for RF generator 1. • Returns a value indicating success or failure of calibration.
Query	Range • 0 = Pass • –340 = Fail

Programming Example
`OUTPUT 714;"CALIBRATION:IQ1?"`
`!Performs a calibration of the IQ modulator for RF generator 1 and returns 0 or -340`	

NOTE When the the calibration is done the test set display will display:
IQ Calibration completed successfully for modulator 1. Cycle power to continue.

CALibration:IQ2?

Function	Sets/queries the calibration of the IQ modulator for RF generator 2. It takes some time to complete calibration and can't be aborted except by cycling the power switch. • Calibrates the IQ modulator for RF generator 2. • Returns a value indicating success or failure of calibration.
Query	Range • 0 = Pass • –340 = Fail

Programming Example
`OUTPUT 714;"CALIBRATION:IQ2?"`
`!Performs a calibration of the IQ modulator for RF generator 2 and returns 0 or -340`	

NOTE When the the calibration is done the test set display will display:
IQ Calibration completed successfully for modulator 2. Cycle power to continue.

CALibration:DATE

Function	Sets/queries the date of the last system calibration done to the test set; not the IQ calibration date. Returns a comma separated list YYYY,MM,DD in that order.
Setting	Sets the system calibration date. Range • Year = 0000 to 9999 • Month = 01 to 12 • Day = 01 to 31
Query	Returns the date when system calibration was performed. Range • Year = 0000 to 9999 • Month = 1 to 12 • Day = 1 to 31

Programming Example
`OUTPUT 714;"CALIBRATION:DATE 1999,01,04"`
`!Sets the date of the last system calibration year, month and day.`	

CALL Subsystem

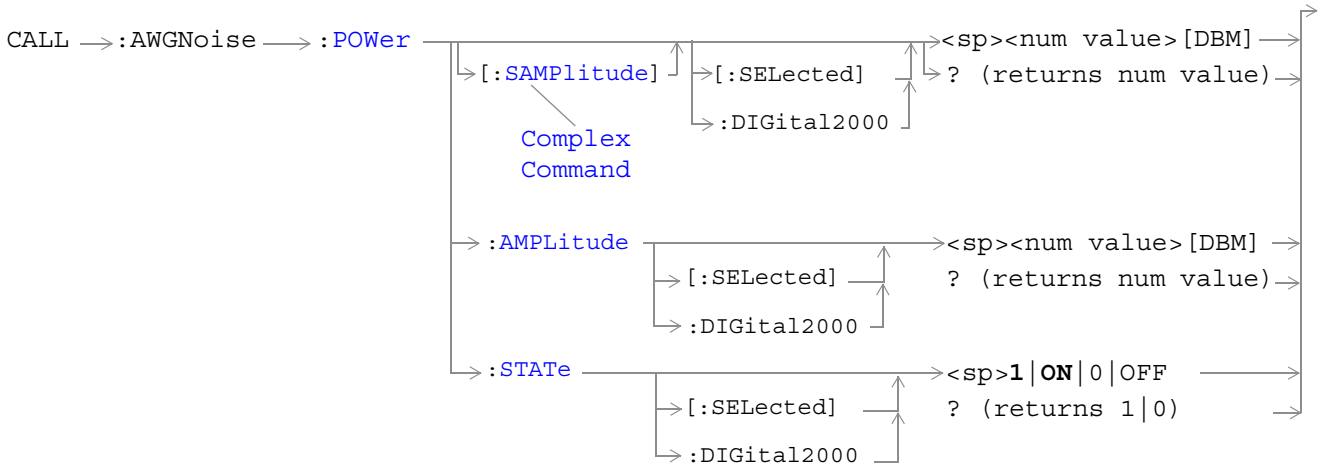
Description

The CALL subsystem handles all setup, control, and query functions for call processing. This includes mobile station (MS) and Base Station (cell) functions.

Syntax Diagrams and Command Descriptions

"CALL:AWGNoise:POWer" on page 161
"CALL:BAND" on page 165
"CALL:CHANnel" on page 167
"CALL[:CELL]:CLPControl" on page 169
"CALL[:CELL]:CONTrol:DOWNlink:FREQuency:AUTO" on page 171
"CALL:D2KTest" on page 173
"CALL[:CELL]:ESCape" on page 175
"CALL:FCHannel" on page 177
"CALL[:CELL]:MCCode" on page 181
"CALL[:CELL]:MNCode" on page 183
"CALL[:CELL]:NIDentity" on page 185
"CALL:OCNSource" on page 187
"CALL:OCNSource" on page 187
"CALL[:CELL]:OPERating" on page 191
"CALL:PAGing" on page 193
"CALL:PILot" on page 197
"CALL[:CELL]:PNOFfset" on page 199
"CALL[:CELL]:POWer" on page 201
"CALL[:CELL]:PROTocol" on page 205
"CALL:QPCHannel" on page 207
"CALL[:CELL]:RCONfig" on page 211
"CALL[:CELL]:RFGenerator" on page 213
"CALL[:CELL]:RLGain" on page 215
"CALL:SCHannel" on page 217
"CALL[CELL]:SIDentity" on page 223
"CALL:STATus" on page 225
"CALL:SYNC" on page 235
"CALL:TRAFfic" on page 239
"CALL:TRIGger[:OUTPut]:TYPE" on page 241

CALL:AWGNoise:POWer



"Diagram Conventions" on page 141

CALL:AWGNoise:POWer[:SAMPlitude][:SELected]

Function	The setting form of this command performs two functions: (1) sets the additive white gaussian noise (AWGN) level and (2) turns the AWGN on/off state to on. The query form returns the AWGN power level or NAN. The optional [:SELected] keyword in this command specifies that the AWGN power level being queried applies to the current system type. At this time there is only one system type choice, DIGital2000. Specifying DIGital2000 will have the same effect as using the optional [:SELected] keyword. AWGN and cell power (see "CALL[:CELL]:POWer") are absolute power levels and make up the total forward channel RF output power. Depending on the cell power setting, an AWGN level may be within the range listed below but cause an error message to be displayed. Possible causes are: • Sum of AWGN and cell power causing total RF power limits to be exceeded (see "CALL:STATus:TOTal:POWer[:AMPLitude][:SELected]?" for the allowable range of total RF power.) • Greater than 10 dB difference between cell power and AWGN. • Amplitude offset causing total RF power limits to be exceeded (see "SYSTem:CORRection:GAIN" to set or query the amplitude offset value).
Setting	Range: -120 dBm/1.23 MHz to -15 dBm/1.23 MHz, NAN Resolution: 0.01 dB

Query	Range: -120 dBm/1.23 MHz to -15 dBm/1.23 MHz, NAN Resolution: 0.01 dB
*RST Setting	NAN

Programming Example

```
OUTPUT 714;"CALL:AWGNOISE:POWER:SAMPLITUDE -30" !Sets the AWGN power level to -30 dBM/1.23 MHz and
turns the state on.
```

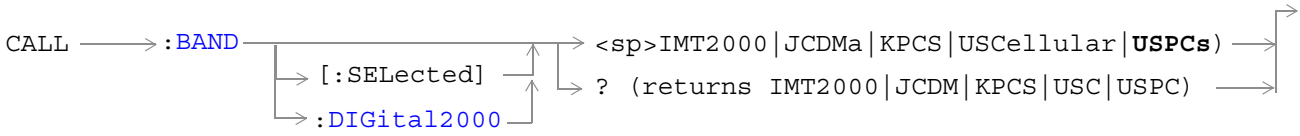
CALL:AWGNoise:POWer:AMPLitude[:SELected]

Function	Sets/queries the additive white gaussian noise (AWGN) level. The optional [:SELected] keyword in this command specifies that the AWGN power level being queried applies to the current system type. At this time there is only one system type choice, DIGital2000. Specifying DIGital2000 will have the same effect as using the optional [:SELected] keyword. AWGN and cell power (see "CALL[:CELL]:POWer") are absolute power levels and make up the total forward channel RF output power. Depending on the cell power setting, an AWGN level may be within the range listed below but cause an error message to be displayed. Possible causes are: • Sum of AWGN and cell power causing total RF power limits to be exceeded (see "CALL:STATus:TOTal:POWer[:AMPLitude][:SELected]?" for range of total RF power.) • Greater than 10 dB difference between cell power and AWGN. • Amplitude offset causing total RF power limits to be exceeded (see "SYSTem:CORRection:GAIN" to set or query the amplitude offset value).
Setting	Range: -120 dBm/1.23 MHz to -15 dBm/1.23 MHz, NAN Resolution: 0.01 dB
Query	Range: -120 dBm/1.23 MHz to -15 dBm/1.23 MHz, NAN Resolution: 0.01 dB
*RST Setting	NAN
Programming Example `OUTPUT 714;"CALL:AWGNOISE:POWER:AMPLITUDE -30" !Set the AWGN level to -30 dBM/1.25 MHz.`	

CALL:AWGNoise:POWer:STATe[:SELected]

Function	Sets/queries the additive white gaussian noise (AWGN) state. The optional [:SELected] keyword in this command specifies that the AWGN power level being queried applies to the current system type. At this time there is only one system type choice, DIGital2000. Specifying DIGital2000 will have the same effect as using the optional [:SELected] keyword. AWGN and cell power (see "CALL[:CELL]:POWer") are absolute power levels and make up the total forward channel RF output power. Depending on the cell power setting, an AWGN level may be within the range listed below but cause an error message to be displayed. Possible causes are: • Sum of AWGN and cell power causing total RF power limits to be exceeded (see "CALL:STATus:TOTal:POWer[:AMPLitude][:SELected]?" for range of total RF power.) • Greater than 10 dB difference between cell power and AWGN. • Amplitude offset causing total RF power limits to be exceeded (see "SYSTem:CORRection:GAIN" to set or query the amplitude offset value).
Setting	Range: 1|ON|0|OFF
Query	Range: 1|0
*RST Setting	OFF
Programming Example `OUTPUT 714;"CALL:AWGNOISE:POWER:STATE:SELECTED ON" !Turns on AWGN.`	

CALL:BAND

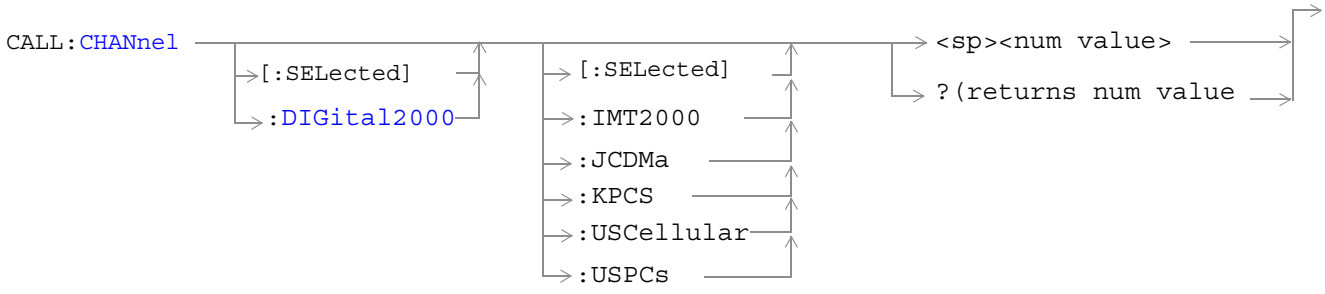


"Diagram Conventions" on page 141

CALL:BAND:[:SELected]

Function	Sets/queries a frequency band for the system type specified by the command's system type parameter. The optional [:SELected] keyword in this command specifies that the frequency band being set/queried applies to the current system type. At this time there is only one system type choice, DIGital2000. Specifying DIGital2000 will have the same effect as using the optional [:SELected] keyword.
Setting	Range: IMT2000|JCDMa (Japan CDMA)|KPCS (Korean PCS)|USCellular (U.S. Cellular)|USPCs (U.S PCS)
Query	Range: IMT2000|JCDMa (Japan CDMA)|KPCS (Korean PCS)|USCellular (U.S. Cellular)|USPCs (U.S PCS)
*RST Setting	U. S. PCS
Programming Example `OUTPUT 714;"CALL:BAND KPCS" !Selects the Korean PCS cell band.`	

CALL:CHANnel



"Diagram Conventions" on page 141

CALL:CHANnel[:SELected][:SELected]

Function	Sets/queries the physical channel number for the system type and frequency band specified by command parameters. The first optional [:SELected] keyword in this command specifies that the channel being set/queried applies to the current system type. At this time there is only one system type choice, DIGital2000. Specifying DIGital2000 will have the same effect as using the optional [:SELected] keyword. The second optional [:SELected] keyword in this command specifies that the channel being set/queried applies to the current cell band. Specifying a non-current band when setting a channel number will cause the test set to store the channel number for use when the specified band is made current. Specifying a non-current band when querying a channel number will return a stored channel number that is not the current channel the test set is transmitting. To set (make current) a frequency band or query the current frequency band, use the "CALL:BAND" command.
Setting	Range: • IMT2000: 0 to 1199 • JCDM (Japanese CDMA): 1 to 799, 801 to 1039, 1041 to 1199 • KPCS (Korean PCS): 0 to 599 • USC (U.S. Cellular): 1 to 799, 991 to 1023 • USPC (U.S. PCS): 0 to 1199

Query	Range: • IMT2000: 0 to 1199 • JCDM (Japanese CDMA): 1 to 799, 801 to 1039, 1041 to 1199 • KPCS (Korean PCS): 0 to 599 • USC (U.S. Cellular): 1 to 799, 991 to 1023 • USPC (U.S. PCS): 0 to 1199: 0 to 1199
*RST Setting	Channel 384 (IS-2000 system, US PCS band)

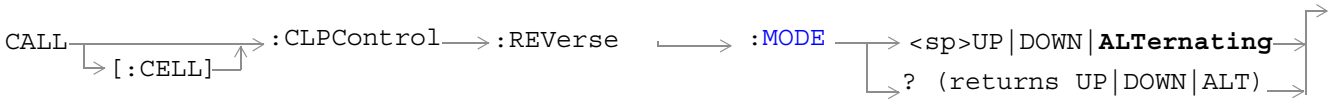
Programming Example

```
OUTPUT 714;"CALL:CHANNEL?"
!Queries the channel number of the currently selected system and band.

OUTPUT 714;"CALL:CHANNEL 384"
!Sets the channel number of the currently selected system and band.


OUTPUT 714;"CALL:CHANNEL:DIGital2000:KPCS 384"
!Sets the channel number for the Digital 2000 system and Korean PCS band to 384. If this system and
band are not current the value 384 is stored and will be transmitted when Digital 2000 and Korean
PCS are current.
```

CALL[:CELL]:CLPControl



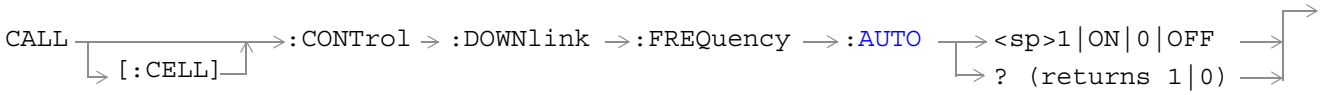
"Diagram Conventions" on page 141

CALL[:CELL]:CLPControl:REVerse:MODE

Function	Sets/queries the reverse CDMA channel closed loop power control mode. When UP is selected, the test set sends all 0 (up) power control bits. When DOWN is selected, the test set sends all 1 (down) power control bits. When ALTernate is selected, the test set sends alternating up/down power control bits.
Setting	Range: UP|DOWN|ALTernate
Query	Range: UP|DOWN|ALT
*RST Setting	ALTernate

Programming Example
`OUTPUT 714;"CALL:CELL:CLPCONTROL ALTERNATE"`
`!Sets the closed loop power control mode to alternating up, down bits.`	

CALL[:CELL]:CONTrol:DOWNlink:FREQuency:AUTO



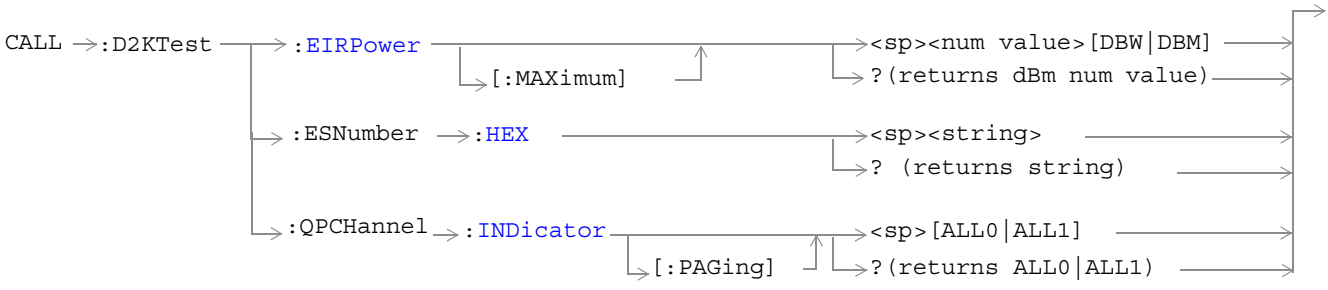
"Diagram Conventions" on page 141

CALL[:CELL]:CONTrol:DOWNlink:FREQuency:AUTO

Function	Sets/queries whether the user or the base station emulator is in control of the RF generator's CDMA forward channel frequency setting. If set to auto (1), the base station emulator is in control. If set to manual (0), the user is in control. Refer to "CALL[:CELL]:RFGenerator" to set the CDMA forward channel frequency.
Setting	Range: 1|ON|0|OFF
Query	Range: 1|0
*RST Setting	1 (auto)

Programming Example
`OUTPUT 714;"CALL:CELL:CONTROL:DOWNLINK:FREQUENCY:AUTO OFF"`
`!Enables manual frequency setting.`	

CALL:D2KTest



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CALL:D2KTest:EIRPower[:MAXimum]

Function	Sets/queries the test mode maximum EIRP (Effective Isotropic Radio Power). The test set will adjust its receiver power range expecting a normal open loop power control response from the mobile station. However, when cell power is lowered the expected power to the test set's receiver will not increase beyond max EIRP. If an amplitude offset is turned on (see "SYSTem:CORRection[:SGAin]"), the test set will automatically adjust the max EIRP value to correct for path loss.
Setting	Range: -30 to +10 dBW Resolution: 1 dBW
Query	Range: -30 to +10 dBW Resolution: 1 dBW
*RST Setting	-7 dBW
Programming Example `OUTPUT 714;"CALL:D2KTEST:EIRPOWER -7" !Sets the mobile station max EIRP to -7 dBW.`	

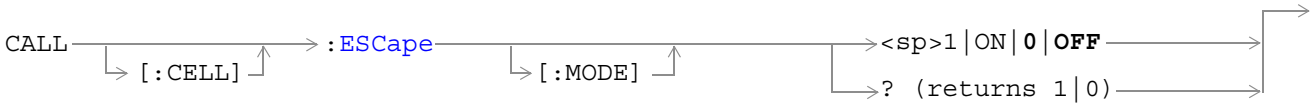
CALL:D2KTest:ESNumber:HEX

Function	Sets/queries the test mode ESN (Electronic Serial Number).
Setting	Range: Up to eight characters containing alphanumerics ‘0123456789ABCDEF” or NULL
Query	Range: String of up to eight characters containing alphanumerics ‘0123456789ABCDEF” or NULL
*RST Setting	“00000000”
Programming Example `OUTPUT 714;”CALL:D2KTEST:ESNUMBER ‘88888888’” !Sets the mobile station’s ESN to ‘88888888’.`	

CALL:D2KTest:QPCHannel:INDicator[:PAGing]

Function	Sets/queries the QPCH (Quick Paging Channel) paging indicators. Setting this parameter to ALL1 will cause the slotted mode mobile station operating in the idle state to monitor the paging channel during each assigned slot. When this parameter is set to ALL0 the mobile station will not monitor the paging channel. Note: QPCH configuration change indicators are not settable. The test set will always transmit configuration change indicators as 0 bits.
Setting	Range: ALL0|ALL1
Query	Range: ALL0|ALL1
*RST Setting	ALL0
Programming Example `OUTPUT 714;”CALL:D2KTEST:QPCH:IND ALL0” !Sets the paging indicators to 0 (off).`	

CALL[:CELL]:ESCape



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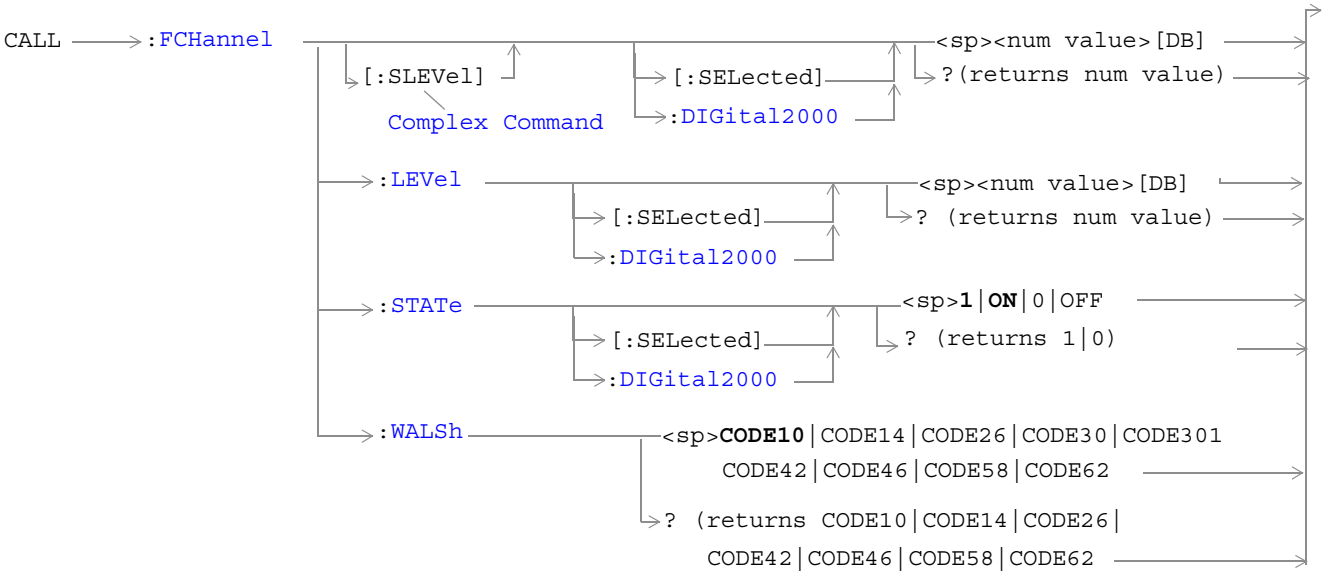
CALL[:CELL]:ESCape[:MODE]

Function	Sets/queries escape mode. When escape mode is on, the test set is configured as a base station that sends (in its overhead messages) all 1's in the messaging fields used to signal mobile country code (MCC) and mobile network code (MNC). A mobile station that supports escape mode will respond by assuming MCC/MNC compatability and perform registrations using only the mobile station identification number (MSIN).
Setting	Range: 1|ON|0|OFF
Query	Range: 0|1
*RST Setting	0 (off)
Programming Example `OUTPUT 714;"CALL:CELL:ESCAPE:MODE 1" !Sets call escape mode on.`	

CALL:FCHannel



"Diagram Conventions" on page 141

CALL:FCHannel[:SLEVel][:SELected]

Function	The setting form of this command performs two functions: (1) sets the forward fundamental channel (FCH) level, and (2) turns the FCH state to ON. The query form of this command returns the FCH level. The optional [:SELected] keyword in this command specifies that the frequency band being set/queried applies to the current system type. At this time there is only one system type choice, DIGital2000. Specifying DIGital2000 will have the same effect as using the optional [:SELected] keyword.
Setting	Range: 0 to -30 dB Resolution: 0.01 dB
Query	Range: 0 to -30 dB Resolution: 0.01 dB
*RST Setting	-15.6 dB

Programming Example
`OUTPUT 714;"CALL:FCHANNEL:SLEVEL:DIGITAL2000 -10 dB"`
`!Sets the forward fundamental channel (FCH) state to ON and sets the level to -10 dB.`	

CALL:FCHannel:LEVel[:SELected]

Function	Sets/queries the level of the forward fundamental channel (FCH). The optional [:SELected] keyword in this command specifies that the frequency band being set/queried applies to the current system type. At this time there is only one system type choice, DIGital2000. Specifying DIGital2000 will have the same effect as using the optional [:SELected] keyword.
Setting	Range: 0 to -30 dB Resolution: 0.01 dB
Query	Range: 0 to -30 dB Resolution: 0.01 dB
*RST Setting	-15.6 dB
Programming Example `OUTPUT 714;"CALL:FCHANNEL:LEVEL:SELECTED -10 dB"`	

CALL:FCHannel:STATe[:SELected]

Function	Sets/queries the on/off state of the forward fundamental channel (FCH). The optional [:SELected] keyword in this command specifies that the frequency band being set/queried applies to the current system type. At this time there is only one system type choice, DIGital2000. Specifying DIGital2000 will have the same effect as using the optional [:SELected] keyword.
Setting	Range: 1|ON|0|OFF
Query	Range: 1|0
*RST Setting	ON

Programming Example
`OUTPUT 714;"CALL:FCHANNEL:STATE:DIGITAL2000 OFF"`
`!Turns off the forward fundamental channel.`	

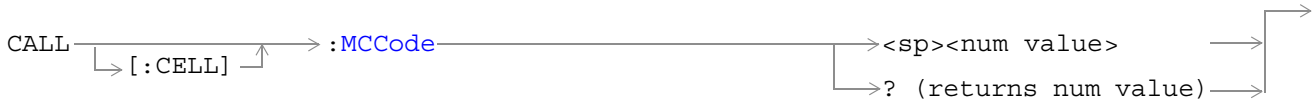
CALL:FCHannel:WALSh

Function	Sets/queries the Walsh code used for the forward fundamental channel. The Walsh codes allowed for use with this command are part of a reserved codespace that has been created by fixing other code channels to pre-determined values. Reserving this codespace eliminates the possibility of conflicts that can arise with lower walsh code sets which are used in certain radio configurations.
Setting	Range: CODE10 | CODE14 | CODE26 | CODE30 | CODE42 | CODE46 | CODE58 | CODE62
Query	Range: CODE10 | CODE14 | CODE26 | CODE30 | CODE42 | CODE46 | CODE58 | CODE62
*RST Setting	CODE10

Programming Example

```
OUTPUT 714;"CALL:FCHANNEL:WALSH CODE14"
!Sets the forward fundamental channel walsh code to 14.
```

CALL[:CELL]:MCCode



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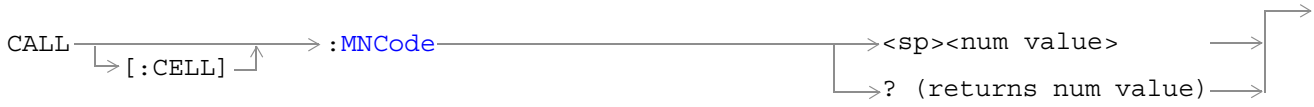
CALL[:CELL]:MCCode

Function	Sets/queries the mobile country code (MCC). This parameter can be set any time and will be sent out in the next overhead message. When escape mode is on (see "CALL[:CELL]:ESCape" command description), this parameter is not used.
Setting	Range: 0 to 999
Query	Range: 0 to 999
*RST Setting	310
Programming Example `OUTPUT 714;"CALL:CELL:MCCODE 310" !Sets the mobile country code to 310.`	

CALL[:CELL]:MNCode



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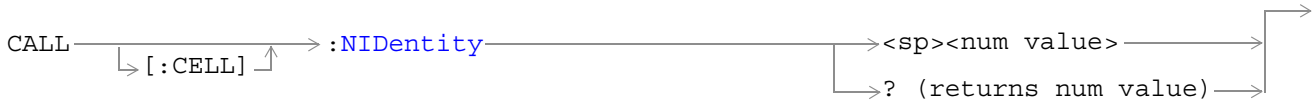
CALL[:CELL]:MNCode

Function	Sets/queries the mobile network code (MNC or IMSI_11_12). This parameter can be set any time and will be sent out in the next overhead message. When escape mode is on (see "CALL[:CELL]:ESCape" command description), this parameter is not used.
Setting	Range: 0 to 99
Query	Range: 0 to 99
*RST Setting	0
Programming Example `OUTPUT 714;"CALL:CELL:MNCODE 10" !Sets the mobile network code to 10.`	

CALL[:CELL]:NIDentity



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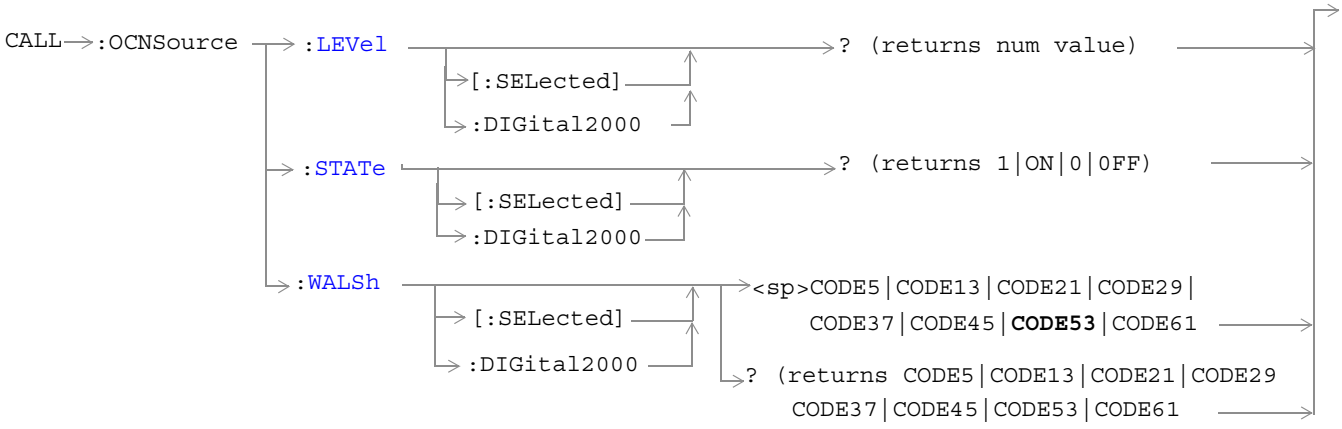
CALL[:CELL]:NIDentity

Function	Sets/queries the network ID (NID). This parameter can be set any time and will be sent out in the next overhead message.
Setting	Range: 0 to 65535
Query	Range: 0 to 65595
*RST Setting	1
Programming Example `OUTPUT 714;"CALL:CELL:NIDENTITY 3056" !Sets the network identifier to 3056.`	

CALL:OCNSource



"Diagram Conventions" on page 141

CALL:OCNSource:LEVel[:SELected]

Function	Queries the level of the orthogonal channel noise simulator (OCNS). The optional [:SELected] keyword in this command specifies that the OCNS level being queried applies to the current system type. At this time there is only one system type choice, DIGital2000. Specifying DIGital2000 will have the same effect as using the optional [:SELected] keyword. The OCNS level is a calculated value used to balance the relative power levels of the following channels to sum to 100%: • OCNS • Paging (PCH) • Pilot (PICH) • Sync (SCH) • Fundamental (FCH) • Supplemental (SCH) • Quick Paging (QPCH) If the contribution of OCNS is calculated to be -30 dB or less, the OCNS state is turned off.
Query	Range: 0 to -20 dB, NAN Resolution: 0.01 dB
*RST Setting	NAN
Programming Example `OUTPUT 714;"CALL:CELL:OCNSOURCE:LEVEL?" !Queries the current OCNS level.`	

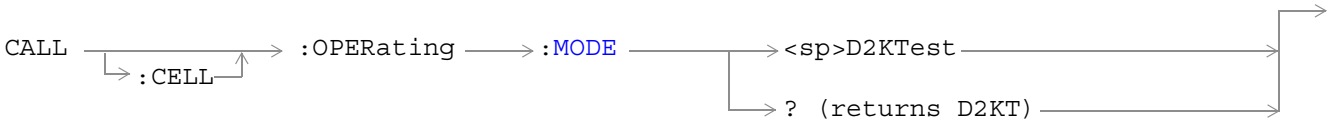
CALL:OCNSource:STATe[:SELected]

Function	Queries the on/off state of the orthogonal channel noise simulator (OCNS) The optional [:SELected] keyword in this command specifies that the OCNS on/off state being queried applies to the current system type. At this time there is only one system type choice, DIGital2000. Specifying DIGital2000 will have the same effect as using the optional [:SELected] keyword The OCNS level is a calculated value used to balance the relative power levels of the following channels to sum to 100%: • OCNS • Paging (PCH) • Pilot (PICH) • Sync (SCH) • Fundamental (FCH) • Supplemental (SCH) • Quick Paging (QPCH) If the contribution of OCNS is calculated to be -30 dB or less, the OCNS state is turned off.
Setting	Range: 1|ON|0|OFF
*RST Setting	ON
Programming Example `OUTPUT 714;"CALL:CELL:OCNSOURCE:STATE OFF" !Turns off the OCNS.`	

CALL:OCNSource:WALSh[:SELected]

Function	Sets/queries the Walsh code used for the orthogonal channel noise simulator (OCNS). The optional [:SELected] keyword in this command specifies that the OCNS Walsh code being set/queried applies to the current system type. At this time there is only one system type choice, DIGital2000. Specifying DIGital2000 will have the same effect as using the optional [:SELected] keyword. The Walsh codes allowed for use with this command are part of a reserved codespace that has been created by fixing other code channels to pre-determined values. Reserving this codespace eliminates the possibility of conflicts that can arise with lower walsh code sets which are used in certain radio configurations.
Setting	Range: CODE5|CODE13|CODE21|CODE29|CODE37|CODE45|CODE53|CODE61
Query	Range: CODE5|CODE13|CODE21|CODE29|CODE37|CODE45|CODE53|CODE61
*RST Setting	CODE53
Programming Example `OUTPUT 714;"CALL:CELL:OCNSOURCE:WALSH 10" !Sets the traffic channel walsh code to 10.`	

CALL[:CELL]:OPERating

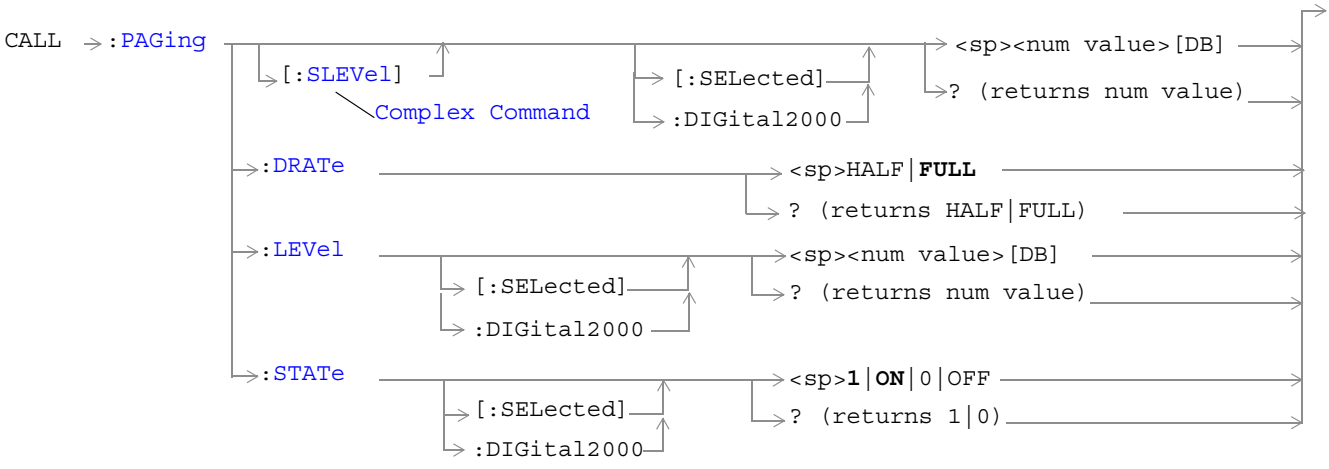


"Diagram Conventions" on page 141

CALL[:CELL]:OPERating:MODE

Function	Sets/queries the mode of the base station emulator. At this time the only choice is digital IS-2000 test mode (D2KT)
Setting	Range: D2KTest
Query	Range: D2KT
*RST Setting	D2KT
Programming Example `OUTPUT 714;"CALL:CELL:OPERATING:MODE D2KTEST" !Selects IS-2000 test mode.`	

CALL:PAGing



"Diagram Conventions" on page 141

CALL:PAGing[:SLEVel][:SELected]

Function	The setting form of this command performs two functions: (1) sets the forward paging channel (PCH) level, and (2) turns the PCH state to ON. The query form returns the PCH level. The optional [:SELected] keyword in this command specifies that the frequency band being set/queried applies to the current system type. At this time there is only one system type choice, DIGital2000. Specifying DIGital2000 will have the same effect as using the optional [:SELected] keyword.
Setting	Range: 0 to -20 dB
Query	Range: 0 to -20 dB, NAN
*RST Setting	-12 dB
Programming Example `OUTPUT 714;"CALL:PAGING:SLEVEL:SELECTED -10.`	

CALL:PAGing:DRATe

Function	Sets/queries the forward paging channel (PCH) data rate.
Setting	Range: FULL|HALF
Query	Range: FULL|HALF
*RST Setting	FULL
Programming Example `OUTPUT 714;"CALL:PAGING:DRATE HALF" sets the PCH data rate to half.`	

CALL:PAGing:LEVel[:SELected]

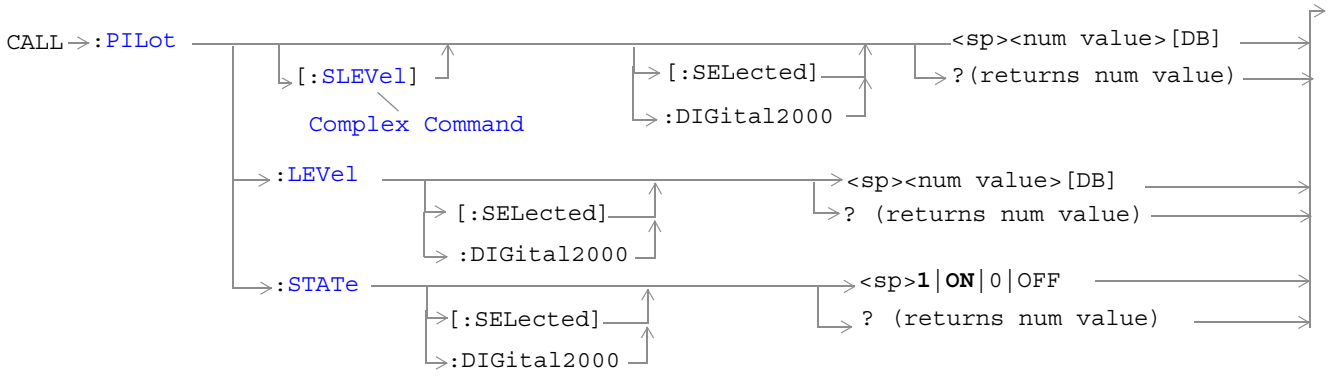
Function	Sets/queries the paging level. The optional [:SELected] keyword in this command specifies that the frequency band being set/queried applies to the current system type. At this time there is only one system type choice, DIGital2000. Specifying DIGital2000 will have the same effect as using the optional [:SELected] keyword.
Setting	Range: 0 to -20 dB
Query	Range: 0 to -20 dB, NAN
*RST Setting	-12 dB
Programming Example `OUTPUT 714;"CALL:PAGING:LEVEL:SELECTED -10.`	

CALL:PAGing:STATe[:SELected]

Function	Sets/queries the paging state. The optional [:SELected] keyword in this command specifies that the frequency band being set/queried applies to the current system type. At this time there is only one system type choice, DIGital2000. Specifying DIGital2000 will have the same effect as using the optional [:SELected] keyword.
Setting	Range: 1|ON|0|OFF
Query	Range: 1|0
*RST Setting	1 (on)

Programming Example
`OUTPUT 714;"CALL:PAGING:STATE:DIGITAL2000 OFF.`
`!Sets the IS-2000 paging state off.`	

CALL:PILot



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CALL:PILOT[:SLEVel][:SELected]

Function	The setting form of this command performs two functions: (1) sets the forward pilot channel (PICH) level, and (2) turns the PICH state to ON. The query form returns the PICH level. The optional [:SELected] keyword in this command specifies that the frequency band being set/queried applies to the current system type. At this time there is only one system type choice, DIGital2000. Specifying DIGital2000 will have the same effect as using the optional [:SELected] keyword.
Setting	Range: 0 to -10 dB Resolution: 0.01 dB
Query	Range: 0 to -10 dB Resolution: 0.01 dB
*RST Setting	-7 dBm

Programming Example
`OUTPUT 714;"CALL:PILOT:SLEVel -10"`
`!Sets the cell pilot state to ON and sets the level to -10 dB.`	

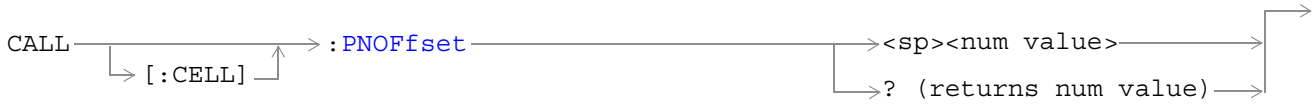
CALL:PILOT:LEVel[:SELected]

Function	Sets/queries the forward pilot channel (PICH) level. The optional [:SELected] keyword in this command specifies that the frequency band being set/queried applies to the current system type. At this time there is only one system type choice, DIGital2000. Specifying DIGital2000 will have the same effect as using the optional [:SELected] keyword.
Setting	Range: 0 to -10 dB Resolution: 0.01 dB
Query	Range: 0 to -10 dB Resolution: 0.01 dB
*RST Setting	-7 dB
Programming Example `OUTPUT 714;"CALL:PILOT:LEVEL -10"`	

CALL:PILOT:STATe[:SELected]

Function	Sets/queries the forward pilot channel (PICH) state. The optional [:SELected] keyword in this command specifies that the frequency band being set/queried applies to the current system type. At this time there is only one system type choice, DIGital2000. Specifying DIGital2000 will have the same effect as using the optional [:SELected] keyword.
Setting	Range: 1|ON|0|OFF
Query	Range: 1|0
*RST Setting	1 (on)
Programming Example `OUTPUT 714;"CALL:PILOT:STATE OFF"`	

CALL[:CELL]:PNOFfset

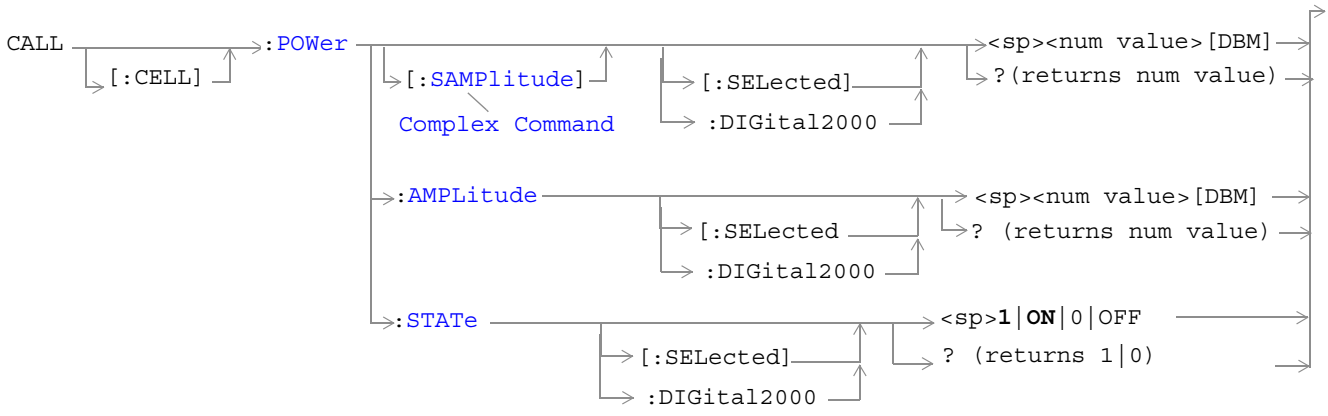


"Diagram Conventions" on page 141

CALL[:CELL]:PNOFfest

Function	Sets/queries the pseudonoise (PN) offset. The PN offset is the timing of the cell's short codes relative to system time. This command may take up to 2 seconds to complete.
Setting	Range: 0 to 511
Query	Range: 0 to 511
*RST Setting	12
Programming Example `OUTPUT 714;"CALL:CELL:PNOFFSET 333" sets the PN offset to 333.`	

CALL[:CELL]:POWer



"Diagram Conventions" on page 141

CALL[:CELL]:POWer[:SAMPlitude][:SELected]

Function	The setting form of this command performs two functions: (1) sets the cell power level and (2) turns the cell power on/off state to on. The query form returns the cell power level (including compensation for amplitude offset) or NAN. The optional [:SELected] keyword in this command specifies that the cell power level being set or queried applies to the current system type. At this time there is only one system type choice, DIGital2000. Specifying DIGital2000 will have the same effect as using the optional [:SELected] keyword. Cell power and AWGN (see "CALL:AWGNoise:POWer") are absolute power levels and make up the total forward channel RF output power. Depending on the cell power setting, a cell power level may be within the range listed below but cause an error message to be displayed. Possible causes are: • Sum of cell power and AWGN causing total RF power limits to be exceeded (see "CALL:STATus:TOTal:POWer[:AMPLitude][:SELected]?" for the allowable range of total RF power levels.) • Greater than 10 dB difference between cell power and AWGN. • Amplitude offset causing total RF power limits to be exceeded (see "SYSTem:CORRection:GAIN" to set or query the amplitude offset value).
Setting	Range: -120 dBm/1.23 MHz to -15 dBm/1.23 MHz Resolution 0.01 dB
Query	Range: -120 dBm/1.23 MHz to -15 dBm/1.23 MHz Resolution 0.01 dB
*RST Setting	-55 dBm/1.23 MHz

Programming Example
 	
`OUTPUT 714;"CALL:CELL:POWER:SAMPLITUDE -30"`
`!Sets the cell power state to ON and sets RF output power to -30 dBm/1.23 MHz.`	

CALL[:CELL]:POWer:AMPLitude[:SELected]

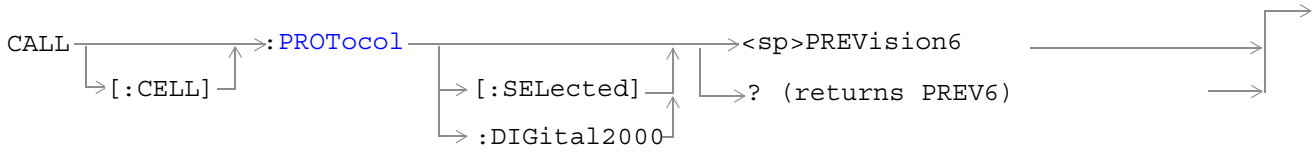
Function	Sets/queries the cell power level (including compensation for amplitude offset). The optional [:SELected] keyword in this command specifies that the cell power level being set or queried applies to the current system type. At this time there is only one system type choice, DIGital2000. Specifying DIGital2000 will have the same effect as using the optional [:SELected] keyword. Cell power and AWGN (see "CALL:AWGNoise:POWer") are absolute power levels and make up the total forward channel RF output power. Depending on the cell power setting, a cell power level may be within the range listed below but cause an error message to be displayed. Possible causes are: • Sum of cell power and AWGN causing total RF power limits to be exceeded (see "CALL:STATus:TOTal:POWer[:AMPLitude][:SELected]?" for the allowable range of total RF power levels.) • Greater than 10 dB difference between cell power and AWGN. • Amplitude offset causing total RF power limits to be exceeded (see "SYSTem:CORRection:GAIN" to set or query the amplitude offset value).
Setting	Range: -120 dBm/1.23 MHz to -15 dBm/1.23 MHz Resolution 0.01 dB
Query	Range: -120 dBm/1.23 MHz to -15 dBm/1.23 MHz Resolution 0.01 dB
*RST Setting	-55 dBm/1.23 MHz

Programming Example
 	
`OUTPUT 714;"CALL:CELL:POWER:AMPLITUDE -30"`
`!Sets the cell power level -30 dBm/1.23 MHz.`	

CALL[:CELL]:POWer:STATe[:SELected]

Function	Sets/queries the cell power state. The optional [:SELected] keyword in this command specifies that the cell power state being set or queried applies to the current system type. At this time there is only one system type choice, DIGital2000. Specifying DIGital2000 will have the same effect as using the optional [:SELected] keyword. Cell power and AWGN (see "CALL:AWGNoise:POWer") are absolute power levels and make up the total forward channel RF output power. Depending on the cell power setting, a cell power level may be within the range listed below but cause an error message to be displayed. Possible causes are: • Sum of cell power and AWGN causing total RF power limits to be exceeded (see "CALL:STATus:TOTal:POWer[:AMPLitude][:SELected]?" for the allowable range of total RF power levels.) • Greater than 10 dB difference between cell power and AWGN. • Amplitude offset causing total RF power limits to be exceeded (see "SYSTem:CORRection:GAIN" to set or query the amplitude offset value).
Setting	Range: 1|ON|0|OFF
Query	Range: 1|0
*RST Setting	ON
Programming Example `OUTPUT 714;"CALL:CELL:POWER:STATE OFF" !Turns off cell power.`	

CALL[:CELL]:PROTocol



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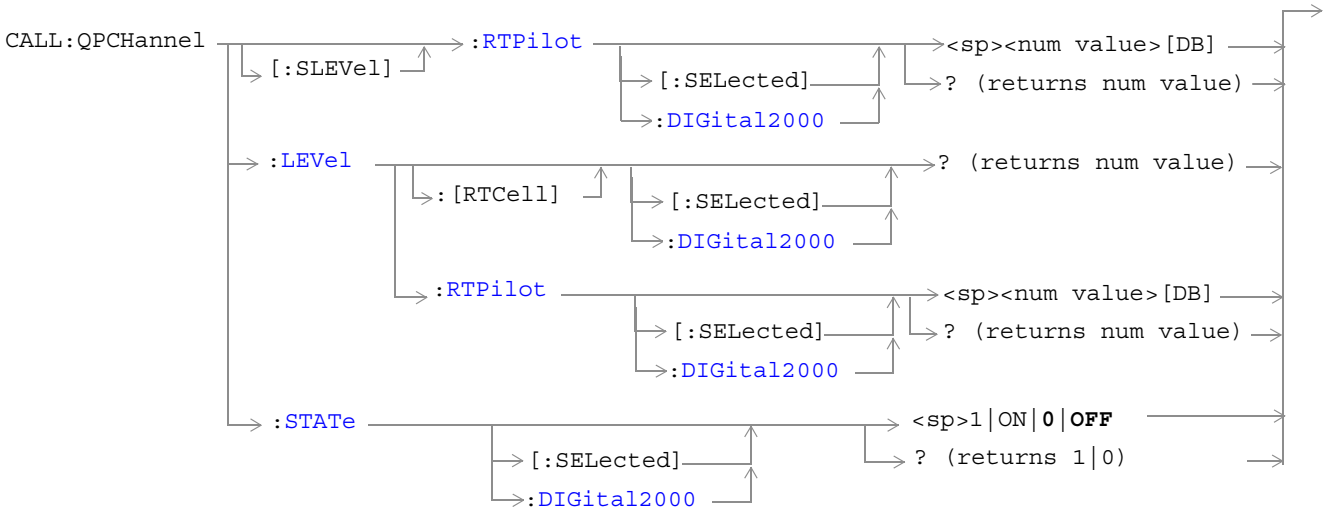
CALL[:CELL]:PROTocol[:SELected]

Function	Sets/queries the protocol standard. At this time there is only one choice, PREV6 (IS-2000 Rev 0). The protocol standard can only be changed when call status is idle. If call status in not idle, the call is dropped with no signaling to the mobile.
Setting	Range: PREV6
Query	Range: PREV6
*RST Setting	
Programming Example `OUTPUT 714;"CALL:CELL:PROT PREV6"`	

CALL:QPCHannel



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CALL:QPCHannel[:SLEVel]:RTPilot[:SELected]

Function	The setting form of this command performs two functions: (1) sets the forward quick paging channel (QPCH) level relative to the pilot level, and (2) turns the QPCH state to ON. The query form returns the QPCH level relative to the pilot level. The optional [:SELected] keyword in this command specifies that the frequency band being set/queried applies to the current system type. At this time there is only one system type choice, DIGital2000. Specifying DIGital2000 will have the same effect as using the optional [:SELected] keyword. The QPCH channel is slotted (pulsed). When the state of the QPCH is on, OCNS is calculated based on the channel power when QPCH is present in the signal. When QPCH is not present, the output power is not fully calibrated.
Query	Range: +2 to -5 dB Resolution: integer
*RST Setting	-3

Programming Example

```
OUTPUT 714;"CALL:QPCHANNEL:SLEVEL:RTPILOT:SELECTED?"
! Sets the QPCH level state to on and queries the QPCH level relative to the pilot power.
```

CALL:QPCHannel:LEVel[:RTCell][:SELected]?

Function	Queries the forward quick paging channel (QPCH) level relative to the cell power level. The optional [:SELected] keyword in this command specifies that the frequency band being set/queried applies to the current system type. At this time there is only one system type choice, DIGital2000. Specifying DIGital2000 will have the same effect as using the optional [:SELected] keyword. The QPCH channel is slotted (pulsed). When the state of the QPCH is on, OCNS is calculated based on the channel power when QPCH is present in the signal. When QPCH is not present, the output power is not fully calibrated.
Query	Range: 0 to -15 dB, NAN Resolution: 0.01 dB
*RST Setting	-10 dB
Programming Example `OUTPUT 714;"CALL:QPCHANNEL:LEVEL:RTCELL:DIGITAL2000?"`	

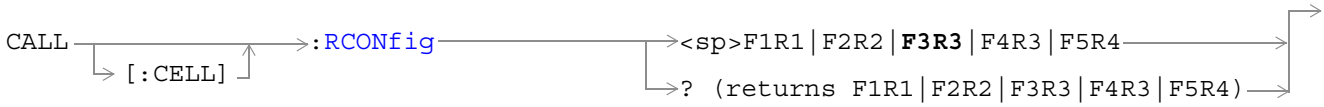
CALL:QPCHannel:LEVel:RTPilot[:SELected]

Function	Sets/queries the forward quick paging channel (QPCH) level relative to the pilot level The optional [:SELected] keyword in this command specifies that the frequency band being set/queried applies to the current system type. At this time there is only one system type choice, DIGital2000. Specifying DIGital2000 will have the same effect as using the optional [:SELected] keyword. The QPCH channel is slotted (pulsed). When the state of the QPCH is on, OCNS is calculated based on the channel power when QPCH is present in the signal. When QPCH is not present, the output power is not fully calibrated.
Query	Range: +2 to -5 dB Resolution: integer
*RST Setting	-3
Programming Example `OUTPUT 714;"CALL:QPCHANNEL:LEVEL:RTPILOT:SELECTED?" !queries the QPCH level relative to the pilot level.`	

CALL:QPCHannel:STATe

Function	Sets/queries the forward quick paging channel's (QPCH) state. The QPCH channel is slotted (pulsed). When the state of the QPCH is on, OCNS is calculated based on the channel power when QPCH is present in the signal. When QPCH is not present, the output power is not fully calibrated.
Setting	Range: 1|ON|0|OFF
Query	Range: 1|0
*RST Setting	0 (off)
Programming Example `OUTPUT 714;"CALL:QPCHANNEL:STATE ON" !Turns on the quick paging channel.`	

CALL[:CELL]:RCONfig



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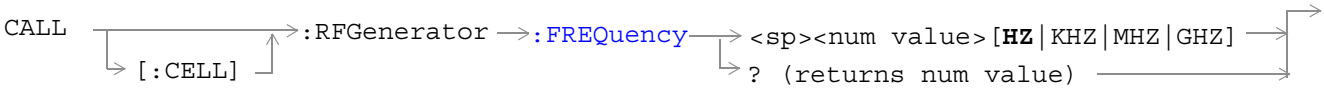
CALL[:CELL]:RCONfig

Function	Sets/queries the current radio configuration. The radio configuration specifies the base data rate and service options supported. Data rates for the F-FCH can be set using the "CALL:TRAFfic" commands. Data rates for the F-SCH can be set using the "CALL:SCHannel" commands. Radio configurations are often referred to in a shorthand terms. These terms are: • RC1 (F1R1) • RC2 (F2R2) • RC3 (F3R3) • RC4 (F4R3) • RC5 (F5R4)
Setting	Range: F1R1 | F2R2 | F3R3 | F4R3 | F5R4
Query	Range: F1R1 | F2R2 | F3R3 | F4R3 | F5R4
*RST Setting	F3R3
Programming Example `OUTPUT 714;"CALL:CELL:RCONFIG F1R1" !Sets the radio configuration to RC1.`	

CALL[:CELL]:RFGenerator



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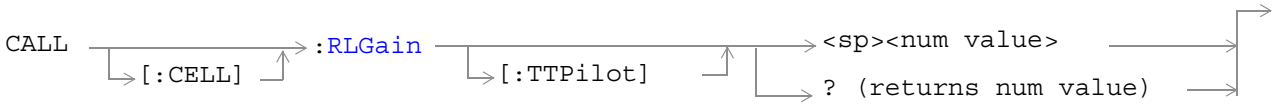
CALL[:CELL]:RFGenerator:FREQuency

Function	Sets/queries the RF generator CDMA forward channel frequency. If no units are specified the setting defaults to Hz. The test set will tune to the frequency entered using this command when the "CALL[:CELL]:CONTrol:DOWNlink:FREQuency:AUTO" command is set to manual.
Setting	Range: 292 MHz to 2700 MHz Resolution: 0.1 Hz
Query	Range: 292 MHz to 2700 MHz Resolution: 0.1 Hz
*RST Setting	851 MHz
Programming Example `OUTPUT 714;"CALL:CELL:RFGENERATOR:FREQUENCY 450 MHZ" sets the CDMA forward channel frequency to 450 MHz.`	

CALL[:CELL]:RLGain



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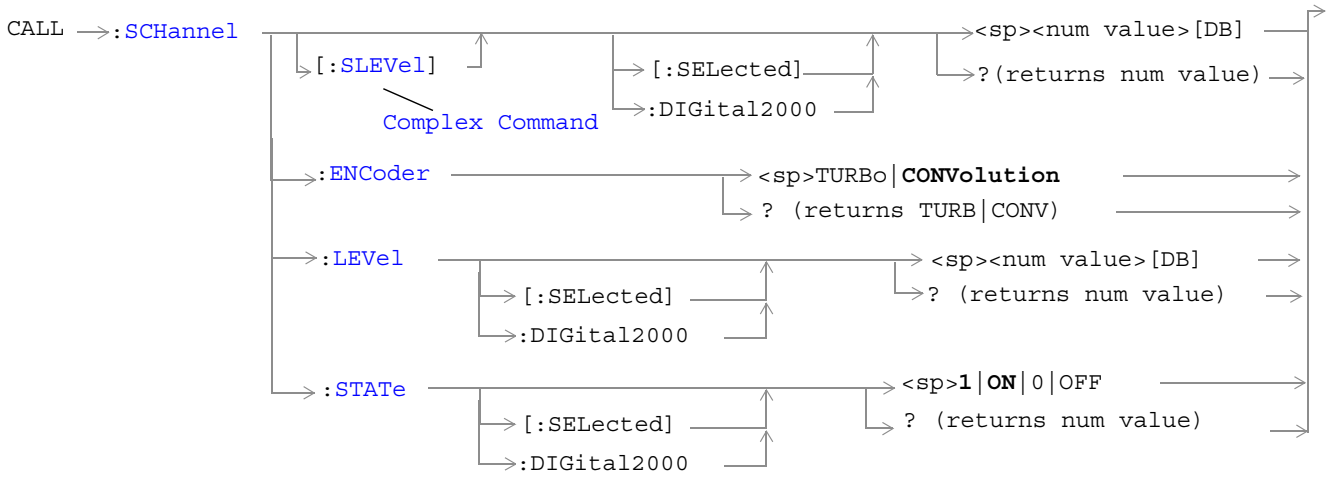
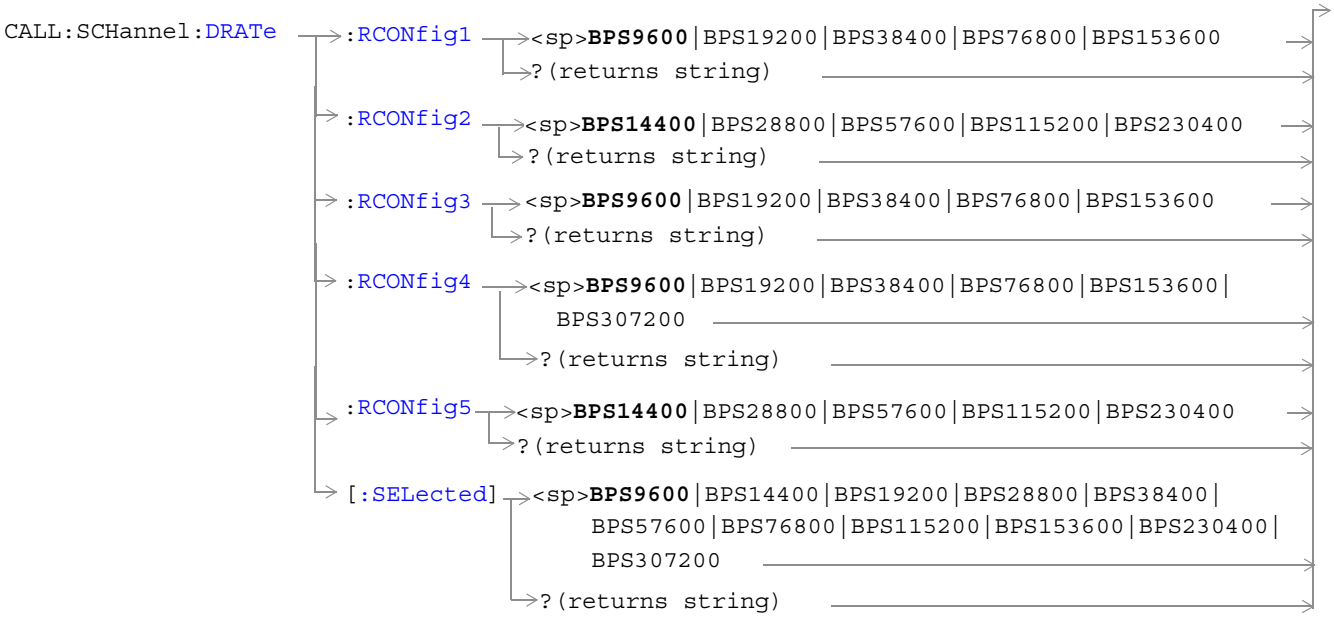
CALL:RLGain[:TTPilot]

Function	Sets/queries reverse link, traffic-to-pilot level (RLGAIN_TRAFFIC_PILOT) gain. RLGAIN_TRAFFIC_PILOT is sent in an overhead message to the mobile station and is used by the mobile station to determine initial reverse channel traffic channel level, relative to the reverse channel pilot. Each integer translates into a 1/8 dB step.
Setting	Range: -32 to +31 Resolution: integer
Query	Range: -32 to+31 Resolution: integer
*RST Setting	0
Programming Example `OUTPUT 714;"CALL:RLGAIN:TTPILOT 10"`	

CALL:SCHannel





Note: Data rates used with the SELected keyword must be compatible with the currently selected radio configuration. If a data rate that does not belong to the selected radio configuration's rate set is used, an error message will be generated.

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CALL:SCHannel[:SLEVel][:SELected]

Function	The setting form of this command performs two functions: (1) sets the level of the forward supplemental channel (SCH), and (2) turns the state of the SCH on. The query form of this command returns the level of the SCH. The optional [:SELected] keyword in this command specifies that the frequency band being set/queried applies to the current system type. At this time there is only one system type choice, DIGital2000. Specifying DIGital2000 will have the same effect as using the optional [:SELected] keyword.
Setting	Range: 0 to -20 dB Resolution: 0.01 dB
Query	Range: 0 to -20 dB Resolution: 0.01 dB
*RST Setting	-15.6 dB

Programming Example
 	
`OUTPUT 714;"CALL:SCHANNEL:SLEVel:SELECTED -10"`
`!Sets the cell's forward supplemental channel state to on and the level to -10 dB.`	

CALL:SCHannel:ENCoder

Function	Sets/queries which encoder is used for the supplemental data. If the SCH data rate has been set to the base rate for the current radio configuration (base rates are data rates below 19.2 kbps), the convolutional encoder is used regardless of this parameter setting. If the SCH data rate has been set to the highest rate available for the current radio configuration, the convolutional encoder is used regardless of this parameter setting. The current radio configuration is selected by the "CALL[:CELL]:RCONfig" command.
Setting	Range: TURBo|CONVolution
Query	Range: TURB|CONV
*RST Setting	CONVolution
Programming Example `OUTPUT 714;"CALL:SCHANNEL:ENCODER TURBO" !Sets the SCH encoder to turbo mode.`	

CALL:SCHannel:LEVel[:SELected]

Function	Sets/queries the level of the forward supplemental channel (SCH). The optional [:SELected] keyword in this command specifies that the frequency band being set/queried applies to the current system type. At this time there is only one system type choice, DIGital2000. Specifying DIGital2000 will have the same effect as using the optional [:SELected] keyword.
Setting	Range: 0 to -20 dB Resolution: 0.01 dB
Query	Range: 0 to -20 dB Resolution: 0.01 dB
*RST Setting	-15.6 dB
Programming Example `OUTPUT 714;"CALL:SCHANNEL:LEVEL:SELECTED -10"`	

CALL:SCHannel:STATe[:SELected]

Function	Sets/queries the on/off state of the forward supplemental channel (SCH). The optional [:SELected] keyword in this command specifies that the frequency band being set/queried applies to the current system type. At this time there is only one system type choice, DIGital2000. Specifying DIGital2000 will have the same effect as using the optional [:SELected] keyword.
Setting	Range: 1|ON|0|OFF
Query	Range: 1|0
*RST Setting	ON

Programming Example
`OUTPUT 714;"CALL:SCHANNEL:STATE:SELECTED OFF"`
`!Turns off the forward supplemental channel.`	

CALL:SCHannel:DRATe:[:SELected]

Function	Sets the data rate of the currently selected radio configuration. To find out which radio configuration is currently selected, see "CALL[:CELL]:RCONfig" . Entering a data rate that is not included in the radio configuration's set of valid entries will cause the test set to generate an error message.
Setting	Range: See command descriptions for RCONfig1 through RCONfig5.
Query	Range: See command descriptions for RCONfig1 through RCONfig5.
*RST Setting	BPS9600
Programming Example `OUTPUT 714;"CALL:SCHANNEL:DRATE? Queries the data rate for the currently selected radio configuration`	

CALL:SCHannel:DRATe:RCONfig1

Function	Sets/queries the data rate of the radio configuration 1 (RC1) forward supplemental channel (SCH) in bits per second.
Setting	Range: BPS9600 | BPS19200 | BPS38400 | BPS76800 | BPS153600
Query	Range: BPS9600 | BPS19200 | BPS38400 | BPS76800 | BPS153600
*RST Setting	BPS9600
Programming Example `OUTPUT 714;"CALL:SCHANNEL:DRATE:RCONFIG1 BPS38400"`	

CALL:SCHannel:DRATe:RCONfig2

Function	Sets/queries the data rate of the radio configuration 3 (RC3) forward supplemental channel (SCH) in bits per second.
Setting	Range: BPS14400 | BPS28800 | BPS57600 | BPS115200 | BPS230400
Query	Range: BPS14400 | BPS28800 | BPS57600 | BPS115200 | BPS230400
*RST Setting	BPS14400
Programming Example `OUTPUT 714;"CALL:SCHANNEL:DRATE:RCONFIG2 BPS38400"`	

CALL:SCHannel:DRATe:RCONfig3

Function	Sets/queries the data rate of the radio configuration 3 (RC3) forward supplemental channel (SCH) in bits per second.
Setting	Range: BPS9600 | BPS19200 | BPS38400 | BPS76800 | BPS153600
Query	Range: BPS9600 | BPS19200 | BPS38400 | BPS76800 | BPS153600
*RST Setting	BPS9600
Programming Example `OUTPUT 714;"CALL:SCHANNEL:DRATE:RCONFIG3 BPS38400"`	

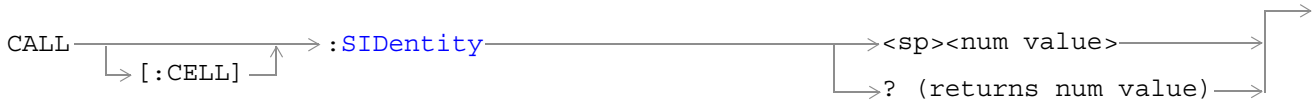
CALL:SCHannel:DRATe:RCONfig4

Function	Sets/queries the data rate of the radio configuration 4 (RC4) forward supplemental channel (SCH) in bits per second.
Setting	Range: BPS9600 | BPS19200 | BPS38400 | BPS76800 | BPS153600 | BPS307200
Query	Range: BPS9600 | BPS19200 | BPS38400 | BPS76800 | BPS153600 | BPS307200
*RST Setting	BPS9600
Programming Example `OUTPUT 714;"CALL:SCHANNEL:DRATE:RCONFIG4 BP76800"`	

CALL:SCHannel:DRATe:RCONfig5

Function	Sets/queries the data rate of the radio configuration 5 (RC5) forward supplemental channel (SCH) in bits per second.
Setting	Range: BPS14400 | BPS28800 | BPS57600 | BPS115200 | BPS230400
Query	Range: BPS14400 | BPS28800 | BPS57600 | BPS115200 | BPS230400
*RST Setting	BPS14400
Programming Example `OUTPUT 714;"CALL:SCHANNEL:DRATE:RCONFIG5 BPS57600"`	

CALL[CELL]:SIDentity



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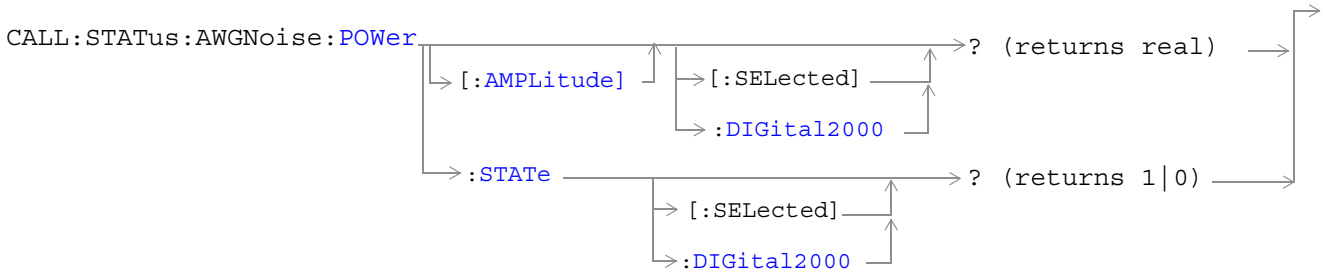
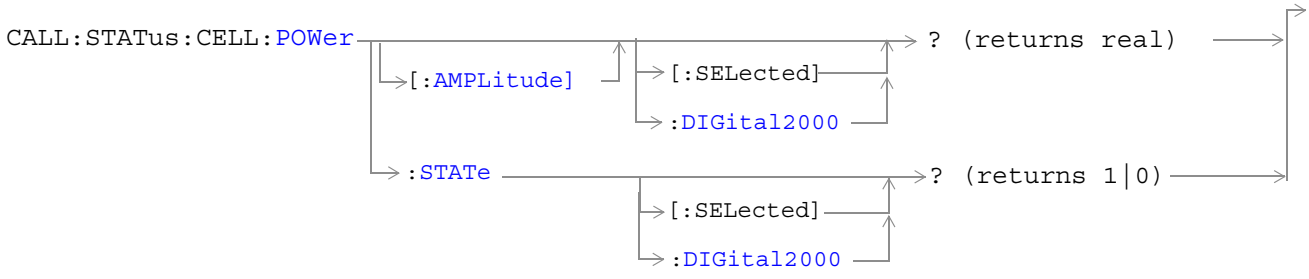
CALL[:CELL]:SIDentity

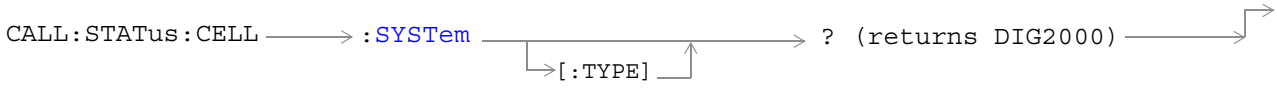
Function	Sets/queries the system identification number.
Setting	Range: 0 to 32767
Query	Range: 0 to 32767
*RST Setting	231
Programming Example `OUTPUT 714;"CALL:CELL:SIDENTITY 231" !Sets the system identifier to 231.`	

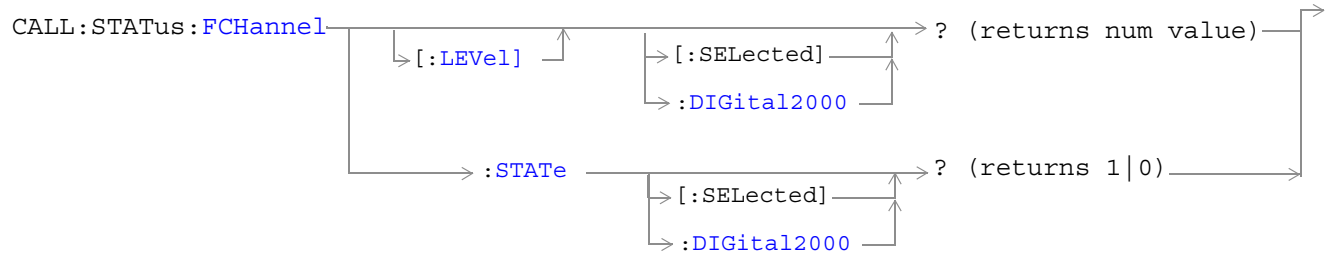
CALL:STATus

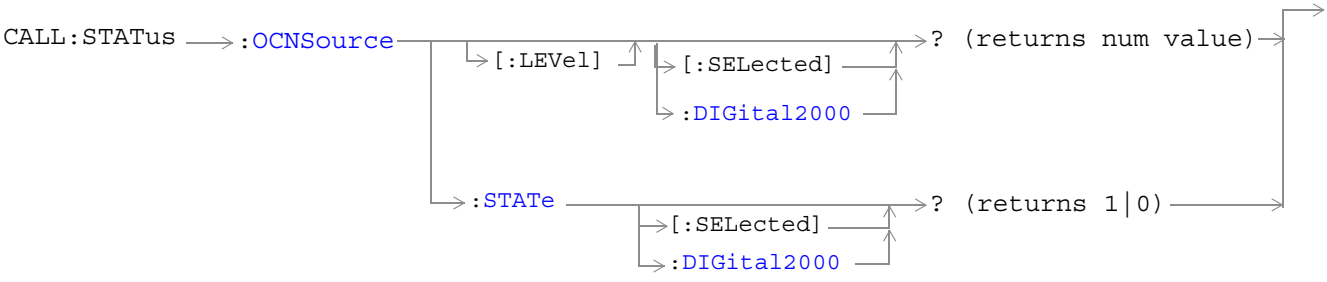
NOTE The **CALL:STATus** commands are query only. They return values that indicate the test set's actual hardware settings. Actual hardware settings can differ from settings the user has entered, most frequently due to an error condition. When no error conditions exist, the commands used to enter values will return the same results as the commands used to query actual hardware settings. For example, **"CALL:AWGNoise:POWer?"** will return the same value as **"CALL:STATus:AWGNoise:POWer?"** when no error conditions exist.

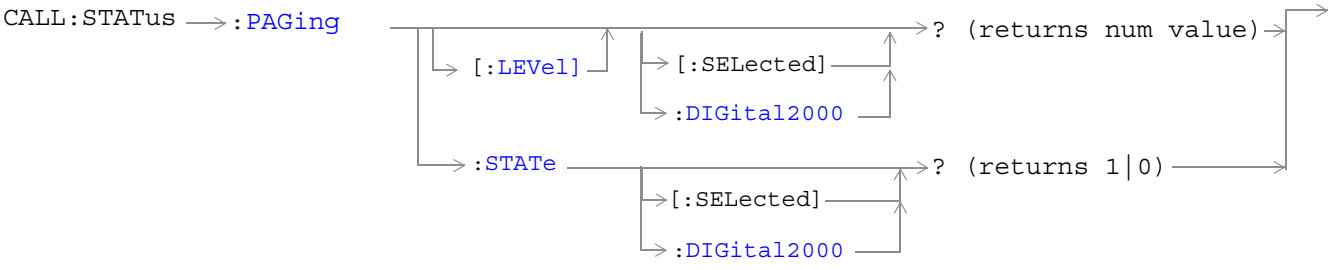


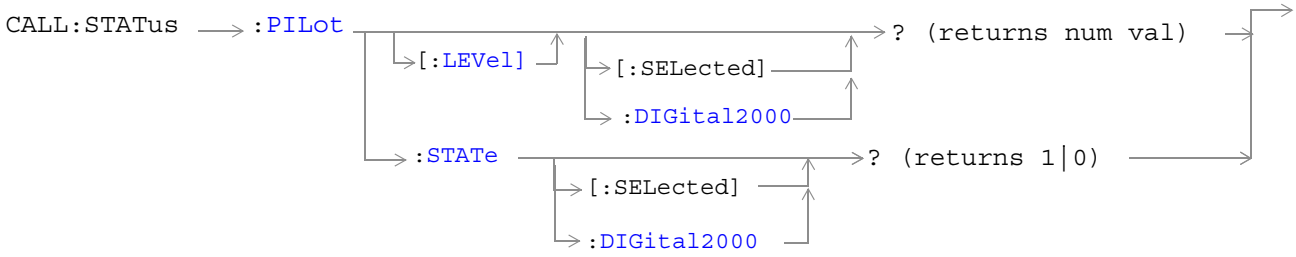


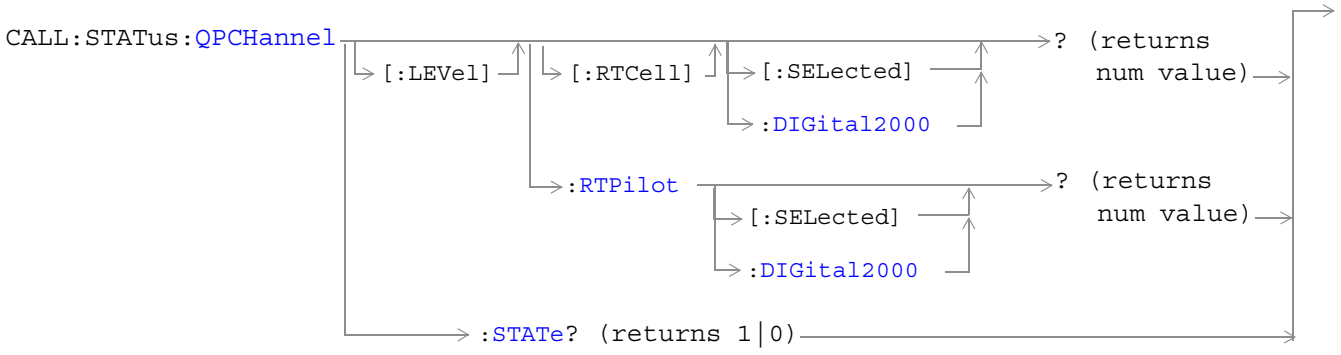


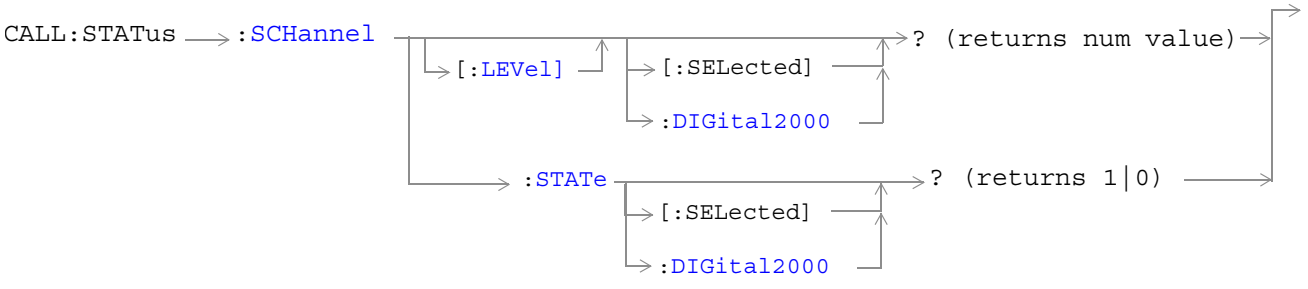

CALL:STATus:FCHannel
[:LEVel]
[:SELected]
:DIGital2000
? (returns num value)
:STATe
[:SELected]
:DIGital2000
? (returns 1|0)

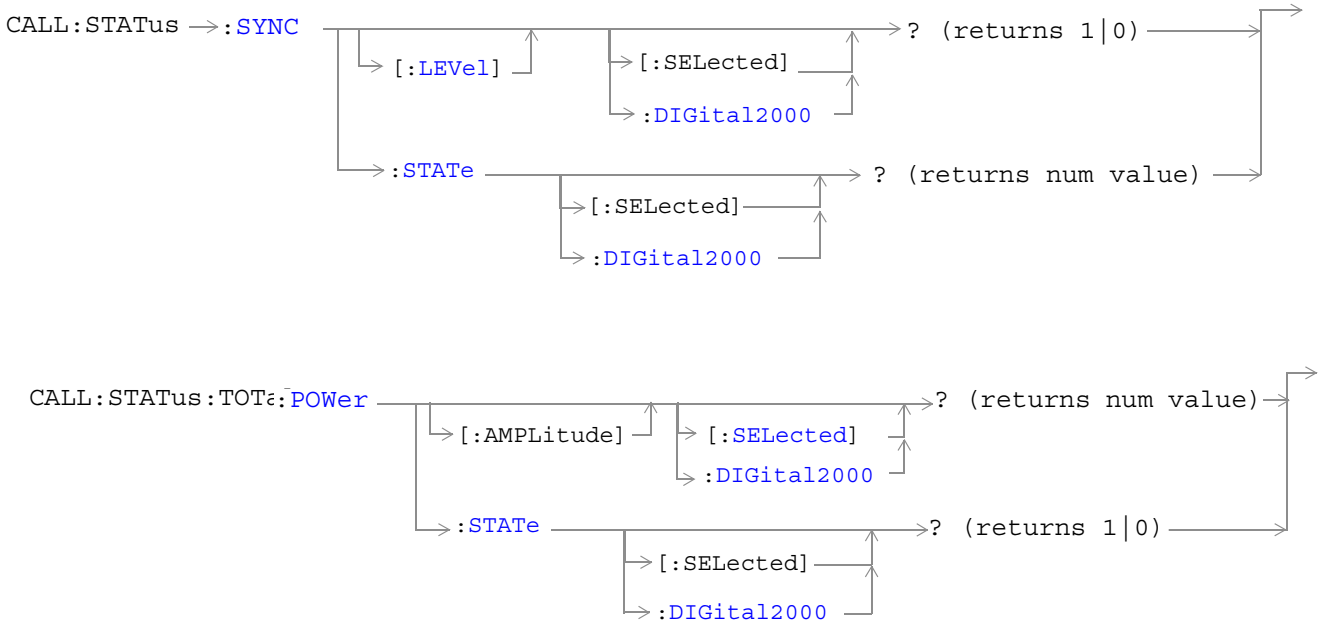

CALL:STATus
:OCNSource
[:LEVel]
[:SELected]
:DIGital2000
? (returns num value)
:STATe
[:SELected]
:DIGital2000
? (returns 1|0)


CALL:STATus
:PAGing
[:LEVel]
[:SELected]
:DIGital2000
? (returns num value)
:STATe
[:SELected]
:DIGital2000
? (returns 1|0)


CALL:STATus
:PILot
[:LEVel]
[:SELected]
:DIGital2000
? (returns num val)
:STATe
[:SELected]
:DIGital2000
? (returns 1|0)


CALL:STATus:QPCHannel
[:LEVel]
[:RTCell]
[:SELected]
:DIGital2000
? (returns num value)
:RTPilot
[:SELected]
:DIGital2000
? (returns num value)
:STATe? (returns 1|0)


CALL:STATus
:SCHannel
[:LEVel]
[:SELected]
:DIGital2000
? (returns num value)
:STATe
[:SELected]
:DIGital2000
? (returns 1|0)



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CALL:STATus:AWGNoise:POWer:AMPLitude[:SELected]?

Function	Queries the additive white Gaussian noise (AWGN) power for the currently selected system type.
Query	Range: -120 dBm/1.23 MHz to -15 dBm/1.23 MHz Resolution: 0.01 dB
*RST Setting	-54.0 dBm/1.23 MHz

Programming Example
`OUTPUT 714;"CALL:STATUS:AWGNOISE:POWER:AMPLITUDE:SELECTED?"`
`!Queries the IS-2000 AWGN power.`	

CALL:STATus:AWGNoise:POWer:STATe[:SELected]?

Function	Queries the state of the additive white Gaussian noise (AWGN) power measurement for the currently selected system type. The output power of the test set is referred to as total RF power. It is the sum of the cell power plus the AWGN. If the AWGN state is off, AWGN is not included in the total power calculation. If both AWGN power and cell power are set to off, the total RF power will be 9.91 E+37.
Query	Range: 1|0
*RST Setting	0 (Off)
Programming Example `OUTPUT 714;"CALL:STATUS:AWGNOISE:POWER:STATE:SELECTED?"`	

CALL:STATus:CELL:POWer:AMPLitude[:SELected]?

Function	Queries the cell power for the selected system type.
Query	Range: -120 dBm/1.23 MHz to -15 dBm/1.23 MHz Resolution: 0.01 dB
*RST Setting	-55.0 dBm/1.23 MHz
Programming Example `OUTPUT 714;"CALL:STATUS:CELL:POWER:AMPLITUDE:SELECTED?"`	

CALL:STATus:CELL:POWer:STATe[:SELected]?

Function	Queries the state of the cell power measurement for the currently selected system type. The output power of the test set is referred to as total RF power. It is the sum of the cell power plus the additive white Gaussian noise (AWGN) . If the cell power state is off, cell power is not included in the total power calculation. If both cell power and AWGN power are set to off, the total RF power will be 9.91 E+37.
Query	Range: 1|0
*RST Setting	0 (Off)
Programming Example `OUTPUT 714;"CALL:STATUS:CELL:POWER:STATE:SELECTED?"`	

CALL:STATus:CELL:SYSTem:TYPE?

Function	Queries the current cellular system type.
Query	Range: IS-2000
*RST Setting	IS-2000
Programming Example `OUTPUT 714;"CALL:STATUS:CELL:SYSTEM:TYPE?"`	

CALL:STATus:FCHannel:LEVel[:SELected]?

Function	Queries the forward fundamental channel (FCH) level.
Query	Range: 0 to 30 dB, 9.91 E+37 Resolution: 0.01 dB
*RST Setting	9.91 E+37
Programming Example `OUTPUT 714;"CALL:STATUS:FCHANNEL:LEVEL?"`	

CALL:STATus:FCHannel:STATe[:SELected]?

Function	Queries the state of the forward fundamental channel (FCH).
Query	Range: 1|0
*RST Setting	0 (Off)
Programming Example `OUTPUT 714;"CALL:STATUS:FCHANNEL:STATE:DIGITAL2000?"`	

CALL:STATus:OCNSource[:LEVel][:SELected]?

Function	Queries the orthogonal channel noise source (OCNS) level for the selected system type.
Query	Range: 0 to -20 dB, 9.91 E+37 Resolution: 0.01 dB
*RST Setting	9.91 E+37
Programming Example `OUTPUT 714;"CALL:STATUS:OCNSOURCE:LEVEL:SELECTED?"`	

CALL:STATus:OCNSource:STATe[:SELected]?

Function	Queries the state of the orthogonal channel noise source (OCNS) for the selected system type.
Query	Range: 1|0
*RST Setting	0 (Off)
Programming Example `OUTPUT 714;"CALL:STATUS:OCNSOURCE:STATE:SELECTED?"`	

CALL:STATus:PAGing:LEVel[:SELected]?

Function	Queries paging level of the currently selected system type.
Query	Range: 0 to -20 dB, 9.91 E+37 Resolution: 0.01 dB
*RST Setting	9.91 E+37
Programming Example `OUTPUT 714;"CALL:STATUS:PAGING:LEVEL:SELECTED?"`	

CALL:STATus:PAGing:STATe[:SELected]?

Function	Queries the paging state of the currently selected system type.
Query	Range: 1|0
*RST Setting	0 (Off)
Programming Example `OUTPUT 714;"CALL:STATUS:PAGING:STATE:SELECTED?"`	

CALL:STATus:PILot:LEVel[:SELected]?

Function	Queries pilot level of the currently selected system type.
Query	Range: 0 to -10 dB, 9.91 E+37 Resolution: 0.01 dB
*RST Setting	9.91 E+37
Programming Example `OUTPUT 714;"CALL:STATUS:PILOT:LEVEL:SELECTED?"`	

CALL:STATus:PILot:STATe[:SELected]?

Function	Queries the pilot state of the currently selected system type.
Query	Range: 1|0
*RST Setting	0 (Off)
Programming Example `OUTPUT 714;"CALL:STATUS:PILOT:STATE:SELECTED?"`	

CALL:STATus:QPCHannel[:LEVel][:RTCell][:SELected]?

Function	Queries the forward quick paging channel (QPCH) level, relative to cell power level.
Query	Range: 0 to -15 dB, 9.91 E+37 Resolution: 0.01 dB
*RST Setting	9.91 E+37
Programming Example `OUTPUT 714;"CALL:STATUS:QPCHANNEL:LEVEL:RTCELL:DIGITAL2000?"`	

CALL:STATus:QPCHannel[:LEVel]:RTPilot[:SELected]?

Function	Queries the forward quick paging channel (QPCH) level, relative to the pilot level.
Query	Range: +2 to -5 dB, 9.91 E+37 Resolution: integer
*RST Setting	9.91 E+37
Programming Example `OUTPUT 714;"CALL:STATUS:QPCHANNEL:LEVEL:RTPILOT:SELECTED?"`	

CALL:STATus:QPCHannel:STATe?

Function	Queries the state of the forward quick paging channel (QPCH). When the QPCH is set to off, the current QPCH level will be set to 9.91 E+37.
Query	Range: 1|0
*RST Setting	0 (Off)
Programming Example `OUTPUT 714;"CALL:STATUS:QPCHANNEL:STATE?"`	

CALL:STATus:SCHannel:LEVel[:SELected]?

Function	Queries the forward supplemental channel (SCH) level.
Query	Range: 0 to 30 dB, 9.91 E+37 Resolution: 0.01 dB
*RST Setting	9.91 E+37
Programming Example `OUTPUT 714;"CALL:STATUS:SCHANNEL:LEVEL?"`	

CALL:STATus:SCHannel:STATe[:SELected]?

Function	Queries the state of the forward supplemental channel (SCH).
Query	Range: 1|0
*RST Setting	0 (Off)
Programming Example `OUTPUT 714;"CALL:STATUS:SCHANNEL:STATE?"`	

CALL:STATus:SYNC:LEVel[:SELected]?

Function	Queries sync level of the currently selected system type.
Query	Range: 0 to -20 dB, 9.91 E+37 Resolution: 0.01 dB
*RST Setting	9.91 E+37
Programming Example `OUTPUT 714;"CALL:STATUS:SYNC:LEVEL:SELECTED?"`	

CALL:STATus:SYNC:STATe[:SELected]?

Function	Queries the sync state of the currently selected system type.
Query	Range: 1|0
*RST Setting	0 (Off)
Programming Example `OUTPUT 714;"CALL:STATUS:SYNC:STATE:SELECTED?"`	

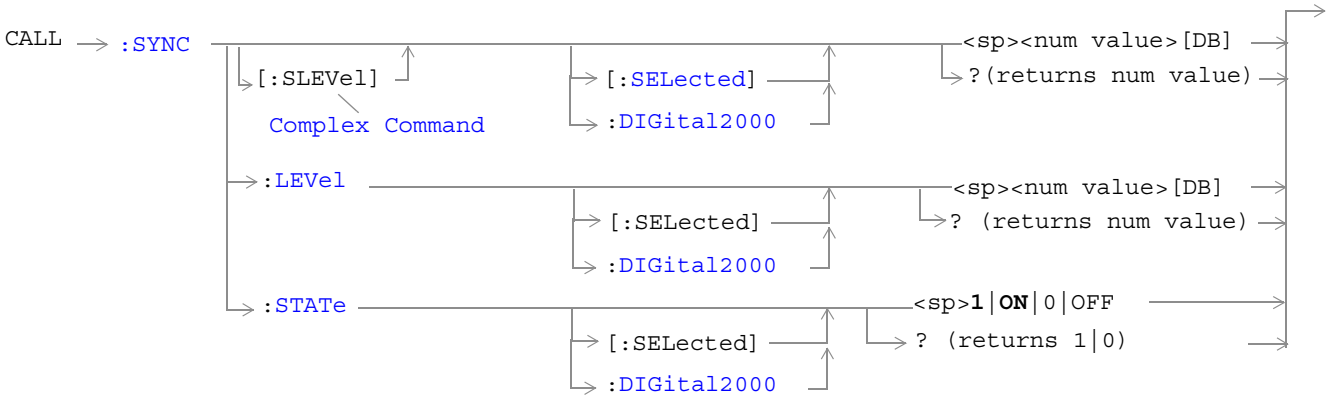
CALL:STATus:TOTal:POWer[:AMPLitude][:SELected]?

Function	Queries the total RF power of the currently selected system type. Total RF Power = Cell Power + AWGN Power
Query	Range: -120 dBm/1.23 MHz to -15 dBm/1.23 MHz, 9.91 E+37 Resolution: 0.01 dB
*RST Setting	9.91 E+37
Programming Example `OUTPUT 714;"CALL:STATUS:TOTAL:POWER:AMPLITUDE:SELECTED?"`	

CALL:STATus:TOTal:POWer:STATe[:SELected]?

Function	Queries the total RF power measurement's state for the currently selected system type. The output power of the test set is referred to as total RF power. It is the sum of the cell power plus the AWGN. If the AWGN state is off, AWGN is not included in the total power calculation. If both AWGN power and cell power are set to off, the total RF power will be 9.91 E+37.
Query	Range: 1|0
*RST Setting	0 (off)
Programming Example `OUTPUT 714;"CALL:STATUS:TOTAL:POWER:STATE:SELECTED?"`	

CALL:SYNC



"Diagram Conventions" on page 141

CALL:SYNC[:SLEVel][:SELected]

Function	The setting form of this command performs two functions: (1) sets the sync channel (SYNCH) level, and (2) turns the SYNCH state to ON. The query form returns the PICH level. The optional [:SELected] keyword in this command specifies that the frequency band being set/queried applies to the current system type. At this time there is only one system type choice, DIGital2000. Specifying DIGital2000 will have the same effect as using the optional [:SELected] keyword.
Setting	Range: 0 to -20 dB Resolution: 0.01 dB
Query	Range: 0 to -20 dB Resolution: 0.01 dB
*RST Setting	-16 dB
Programming Example	`OUTPUT 714;"CALL:SYNC:SLEVel -16"` `!Sets the SYNCH state to ON and sets the level to -16 dB.`

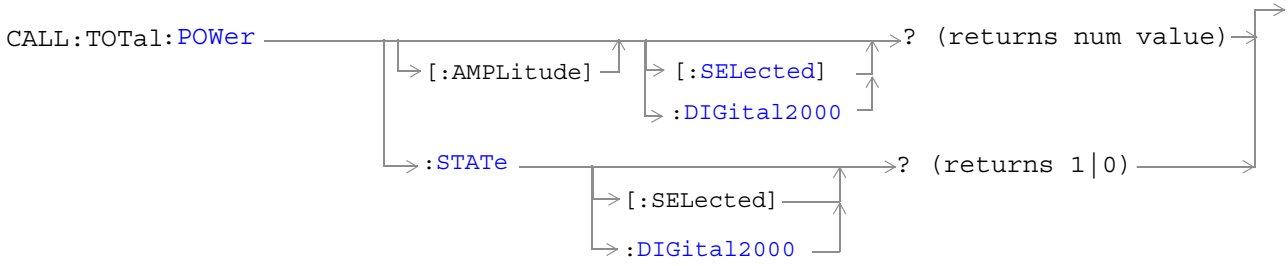
CALL:SYNC:LEVel[:SELected]

Function	Sets/queries the forward pilot channel (SYNCH) level. The optional [:SELected] keyword in this command specifies that the frequency band being set/queried applies to the current system type. At this time there is only one system type choice, DIGital2000. Specifying DIGital2000 will have the same effect as using the optional [:SELected] keyword.
Setting	Range: 0 to -20 dB Resolution: 0.01 dB
Query	Range: 0 to -20 dB Resolution: 0.01 dB
*RST Setting	-16 dB
Programming Example `OUTPUT 714;"CALL:SYNC:LEVEL -16" !Set the SYNCH channel level to -16 dB.`	

CALL:SYNC:STATe[:SELected]

Function	Sets/queries the synchronization (SYNCH) channel state. The optional [:SELected] keyword in this command specifies that the frequency band being set/queried applies to the current system type. At this time there is only one system type choice, DIGital2000. Specifying DIGital2000 will have the same effect as using the optional [:SELected] keyword.
Setting	Range: 1|ON|0|OFF
Query	Range: 1|0
*RST Setting	ON
Programming Example `OUTPUT 714;"CALL:SYNC:STATE OFF" !Turns off the SYNCH channel.`	

CALL:TOTal:POWer



"Diagram Conventions" on page 141

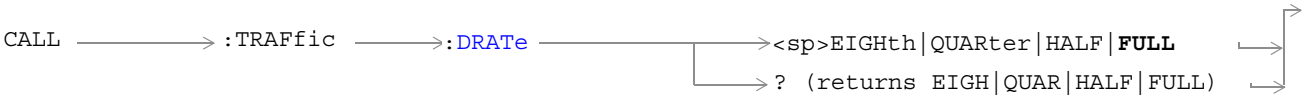
CALL:TOTal:POWer[:AMPLitude][:SELected]?

Function	Queries the total RF power settings for the current system type. Total RF power = cell power level + AWGN power level. The return value for this query is not necessarily the power level being transmitted by the test set at the moment this command is processed by the test set. It may return a value that the test set has been requested to transmit, but that has been pended or delayed for some reason. To query the power level the test set is transmitting at the moment, use the "CALL:STATus:TOTal:POWer[:AMPLitude][:SELected]?" command. The optional [:SELected] keyword in this command specifies that the frequency band being set/queried applies to the current system type. At this time there is only one system type choice, DIGital2000. Specifying DIGital2000 will have the same effect as using the optional [:SELected] keyword.
Query	Range: -120 dBm/1.23 MHz to -15 dBm/1.23 MHz, 9.91 E+37 Resolution: 0.01 dB
*RST Setting	9.91 E+37
Programming Example `OUTPUT 714;"CALL:TOTAL:POWER:AMPLITUDE:SELECTED?"`	

CALL:TOTal:POWer:STATe[:SELected]?

Function	Queries the total RF power state for the current system type. The total RF power state is 1 (on) if either cell power or AWGN power is on. The return value for this query is not necessarily the total power state at the moment this command is processed by the test set. This command may return a state that has been requested of the test set, but that has been pended or delayed for some reason.To query the power state of the test set at the moment, use the "CALL:STATus:TOTal:POWer:STATe[:SELected]?" command. The optional [:SELected] keyword in this command specifies that the frequency band being set/queried applies to the current system type. At this time there is only one system type choice, DIGital2000. Specifying DIGital2000 will have the same effect as using the optional [:SELected] keyword.
Query	Range: 1|0
*RST Setting	0 (off)
Programming Example `OUTPUT 714;"CALL:TOTAL:POWER:STATE:SELECTED?"`	

CALL:TRAFfic

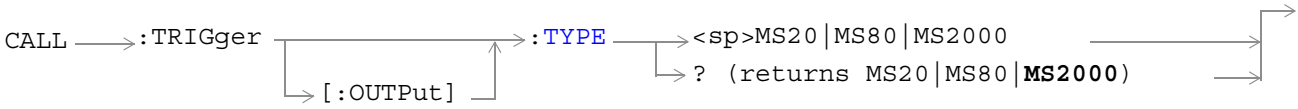


"Diagram Conventions" on page 141

CALL:TRAFfic:DRATe

Function	Sets/queries the traffic channel (TCH) and fundamental channel (FCH) data rates. TCH data rate is not applied in echo mode (service options 1,3,17, and 32768). If the service option is set to an echo mode when this parameter is set, the TCH data rate is stored.
Setting	Range: EIGHth | QUARter | HALF | FULL
Query	Range: EIGH | QUAR | HALF | FULL
*RST Setting	Full
Programming Example `OUTPUT 714;"CALL:TRAFfic:DRATE HALF" !Set the data rate to half.`	

CALL:TRIGger[:OUTPut]:TYPE



"Diagram Conventions" on page 141

CALL:TRIGger[:OUTPut]:TYPE

Function	Sets/queries the trigger signal that is output from the TRIG OUT rear panel connector. See "Rear Panel Connectors" on page 395. Each choice consists of a CDMA frame clock period preceded by MS, which indicates milliseconds. The triggers are based on the test set's internally generated frame clock. Frame clock signals are used to trigger mobile station measurements. There is no on/off state setting for external triggers.
Setting	Range: MS20 | MS80 | MS2000
Query	Range: MS20 | MS80 | MS2000
*RST Setting	MS2000 (2 seconds)

Programming Example
`OUTPUT 714;"CALL:TRIGGER:TYPE MS20"`
`!Sets the external trigger signal to 20 ms`	

IEEE 488.2 Common Commands

Description

***CLS**

The *CLS, clear status command, is defined in “IEEE Std 488.2-1992”, 10.3. This command will also clear and close the error message screen on the test set’s display.

***ESE**

The *ESE, standard event status enable command, is defined in “IEEE Std 488.2-1992”, 10.10.

***ESE?**

The *ESE?, standard event status enable query, is defined in “IEEE Std 488.2-1992”, 10.11.

***ESR?**

The *ESR?, standard event status register query, is defined in “IEEE Std 488.2-1992 “,10.12.

***IDN?**

The *IDN?, identification query, is defined in “IEEE Std 488.2-1992”, 10.14.*IDN? is used to retrieve information about the test set in ASCII format.

*IDN?, returns ASCII codes 32 through 126 excluding comma and semicolon in four comma separated fields. Field 1 returns the manufacturer, field 2 returns the instrument model number, field 3 returns the serial number, field 4 returns 0.

***OPC**

The *OPC, operation complete command, is defined in “IEEE 488.2-1992”, 10.18. *OPC causes the test set to continuously sense the No Operation Pending flag. When the No Operation Pending flag becomes TRUE, the OPC event bit in the standard event status register (ESR) is set to indicate that the state of all pending operations is completed. The *OPC common command is not recommended for use as an overlapped command.

***OPC?**

The *OPC?, operation complete query, is defined in “IEEE Std 488.2-1992”, 10.19. The *OPC? query allows synchronization between the controller and the test set using either the message available (MAV) bit in the status byte, or a read of the output OPC?. The *OPC? query does not effect the OPC event bit in the Standard Event Status Register (ESR). The *OPC? common command is not recommended for use as an overlapped command.

***OPT?**

The *OPT?, option identification query, is defined in “IEEE Std 488.2-1992”, 10.20. Each option will have a unique name, that name will be retuned with the query.

***RST**

The *RST, full preset command, is defined in “IEEE Std 488.2-1992”, 10.32. A full preset is also accomplished using the SYStem:PRESet2 command. A full preset restores the majority of settings to their default values and sets measurement trigger arm to single.

***SRE**

The *SRE, service request enable command, is defined in “IEEE Std 488.2-1992”, 10.34. The parameter range for this command is 0 through 255.

***SRE?**

The *SRE?, service request enable query, is defined in “IEEE Std 488.2-1992”, 10.35. Values returned by this query range from 0 through 255.

***STB?**

The *STB?, read status byte query, is defined in “IEEE Std 488.2-1992”, 10.36. Values returned by this query range from 0 through 255.

***WAI**

The *WAI, wait-to-continue command, is defined in “IEEE Std 488.2-1992”, 10.39. The *WAI command prevents the test set from executing any further commands or queries until all pending operation flags are false. The *WAI common command is not recommended for use as an overlapped command.

Related Topics

****

“Measurement Event Synchronization” on page 95

“Preset Descriptions” on page 391

“Obtaining Test Application Information” on page 421

****

DISPlay Subsystem

Description

The DISPlay subsystem is used to configure the test set's display mode or display brightness . Use of the DISPlay subsystem is not required to set or query any data or results.

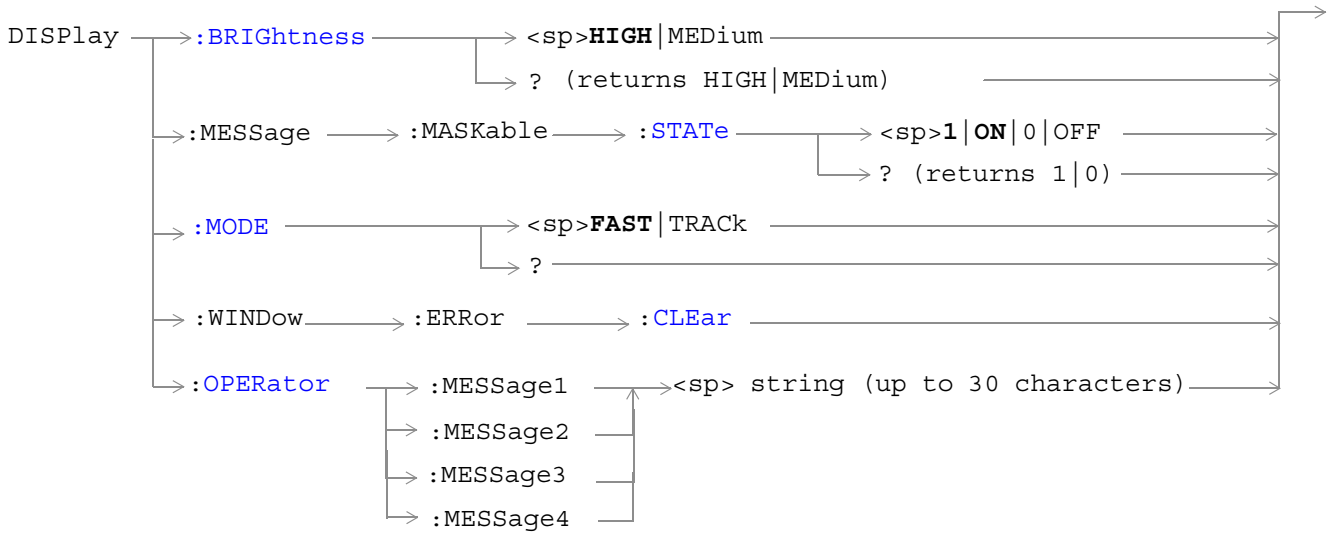
Display Backlight Dimming

The test set's display brightness parameter has two settings at this time, high and medium. The life of the display's backlight will be maximized when brightness is set to medium. The test set has an auto dimming feature that will lower the display brightness automatically if approximately 10 minutes pass without a key being pressed on the test set's front panel. The display will return to the brightness level shown in the Display Brightness field when the test set is set to local and any front panel key is pressed. There is no other user control for this feature.

Syntax Diagram and Command Descriptions

"DISPlay"

DISPlay



"Diagram Conventions" on page 141

DISPlay:BRIGhtness

Function	Sets/queries the test set's display brightness. A display backlight dimming feature lowers the display brightness after approximately 10 minutes without any manual user interaction with the test set. See "Display Backlight Dimming" on page 245.
Setting	Range: MEDium | HIGH
Query	Range: MED | HIGH
Factory setting	HIGH (this parameter is not affected by any reset operation and can only be changed by direct user access)
Programming Example `OUTPUT 714;"DISPLAY:BRIGHTNESS MEDIUM" !Sets display brightness to medium.`	

DISPlay:MESSage:MASKable:STATe

Function	Blocks maskable messages from appearing on the test set display display screen but not from the Message Log. Maskable messages are reported to the Message Log in either state. See "Error Message List and Summary" on page 433.
Setting	Range: On | Off
Query	Range: On | Off
Factory setting	On
Programming Example `OUTPUT 714;"DISPLAY:MESSAGE:MASKABLE:STATE OFF" !Prevents certain messages from appearing on the display.`	

DISPlay:MODE

Function	Sets/queries the test set's display mode. See "Display Mode" for a description of fast and track display modes.
Setting	Range: FAST | TRACK
Query	Range: FAST | TRAC
*RST setting	TRACK
Programming Example `OUTPUT 714;"DISPLAY:MODE FAST" !Sets display mode to fast.`	

DISPlay:WINDow:ERRor:CLEar

Function	Clears the error message from the display screen but not from the Message Log.
Programming Example `OUTPUT 714;"DISPLAY:WINDOW:ERROR:CLEAR" !Clears an error message from the display.`	

DISPlay:OPERator:MESSage

Function	Allows the operator to enter up to four messages, each up to 30 characters in length. These messages will be printed to the display when the command is sent and "DISPlay:MODE" is set to FAST.
Setting	1|2 |3|4 1=uppermost field, 4=lowermost field
Factory setting	Each message is initialized to a null string. Nothing will be displayed until one or more of the four GPIB messages is sent to the test set.
Programming Example `OUTPUT 714;"DISP:OPER:MESS1'Press F6 to stop test'"!Writes the message "Press F6 to stop test" to the uppermost display field.`	

FETCh? Subsystem

Description

The FETCh? query is a function that allows users to query results from a measurement that was previously INITiated or READ. It does NOT begin a measurement. If no measurement is in progress it will return the integrity and measurement values from the last measurement made, or return an integrity of No Result Available and results of NAN. If a measurement is in process, the query will hang until the results are available, or the measurement fails or times out. The exact results returned with a FETCh? will depend on the specific measurement. A measurement may have a number of different results or combination of results for a FETCh?. The FETCh? queries are intended to be used to provide overlapped operation access to measurement results from the test set. When used along with SETup and INITiate commands , FETCh? is the primary way for the user to retrieve measurement results. In order to use the test set's concurrent test capabilities the overlapped commands of INITiate and FETCh? must be used. Overlapped commands allow the user to send commands and not wait for completion.

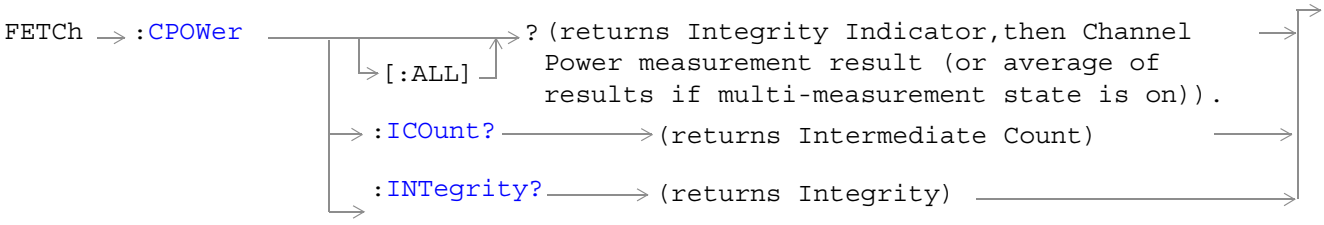
Syntax Diagrams and Command Descriptions

"FETCh:CPOWer" on page 253

"FETCh:DAPower" on page 255

"FETCh:WQUality" on page 257

FETCh:CPOWer



"Diagram Conventions" on page 141

FETCh:CPOWer[:ALL]?

Function	Queries a channel power measurement result. This query returns an integrity indicator followed by a channel power measurement result. If the multi-measurement state is on, the result represents the *average* of a number of channel power measurements. Multi-measurement state, by default, is off. To set up multi-measurements, see "SETup:CPOWer:COUNt[:SNUMber]" .
Query	• Range: -100 to 100 dBm, 9.91 E+37 • Resolution: 0.01 dBm

Programming Example

```
OUTPUT 714;"FETCH:CPOWER:ALL?" !Returns integrity, channel power measurement.
```

FETCh:CPOWer:ICOunt?

Function	Queries the intermediate count of measurements completed in a multi-measurement. To set up multi-measurements, see "SETup:CPOWer:COUNt[:SNUMber]" .
Query	Range: 0 to 999

Programming Example

```
OUTPUT 714;"FETCH:CPOWER:ICOUNT?" !Returns the intermediate count of channel power
multi-measurements.
```

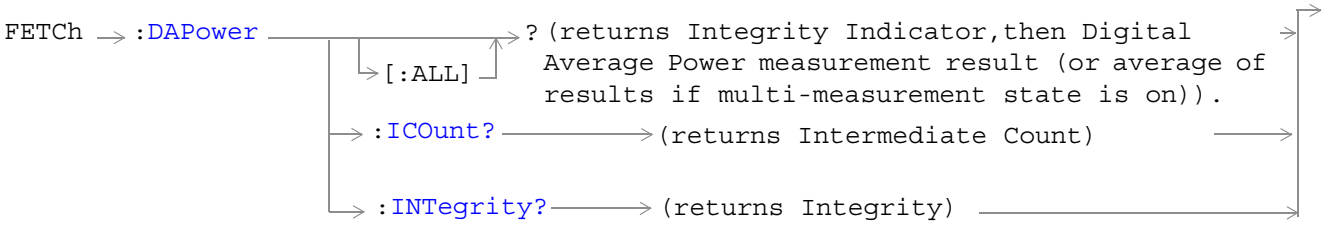
FETCh:CPOWer:INTegrity?

Function	Queries the measurement integrity indicator for the last channel power measurement completed. Zero indicates a normal measurement. See "Integrity Indicator" on page 67 for information about non-zero integrity results.
Query	Range: 1 through 16

Programming Example

```
OUTPUT 714;"FETCH:CPOWER:INTegrity?"
!Queries the integrity indicator for the channel channel power results.
```

FETCh:DAPower



"Diagram Conventions" on page 141

FETCh:DAPower[:ALL]?

Function	Queries a digital average power measurement result. This query returns an integrity indicator followed by a digital average power measurement result. If the multi-measurement state is on, the result represents the *average* of a number of digital average power measurements. Multi-measurement state, by default, is off. To set up multi-measurements, see "SETup:DAPower:COUNt[:SNUMber]" .
Query	• Range: -100 to 100 dBm, 9.91 E+37 • Resolution: 0.01 dB

Programming Example

```
OUTPUT 714;"FETCH:DAPOWER:ALL?" !Returns integrity, average transmit power.
```

FETCh:DAPower:ICOunt?

Function	Queries the intermediate count of measurements completed in a multi-measurement. The multi-measurement state, by default, is off. To set up multi-measurements, see "SETup:DAPower:COUNt[:SNUMber]"
Query	Range: 0 to 999

Programming Example

```
OUTPUT 714;"FETCH:DAPOWER:ICOUNT?"
```

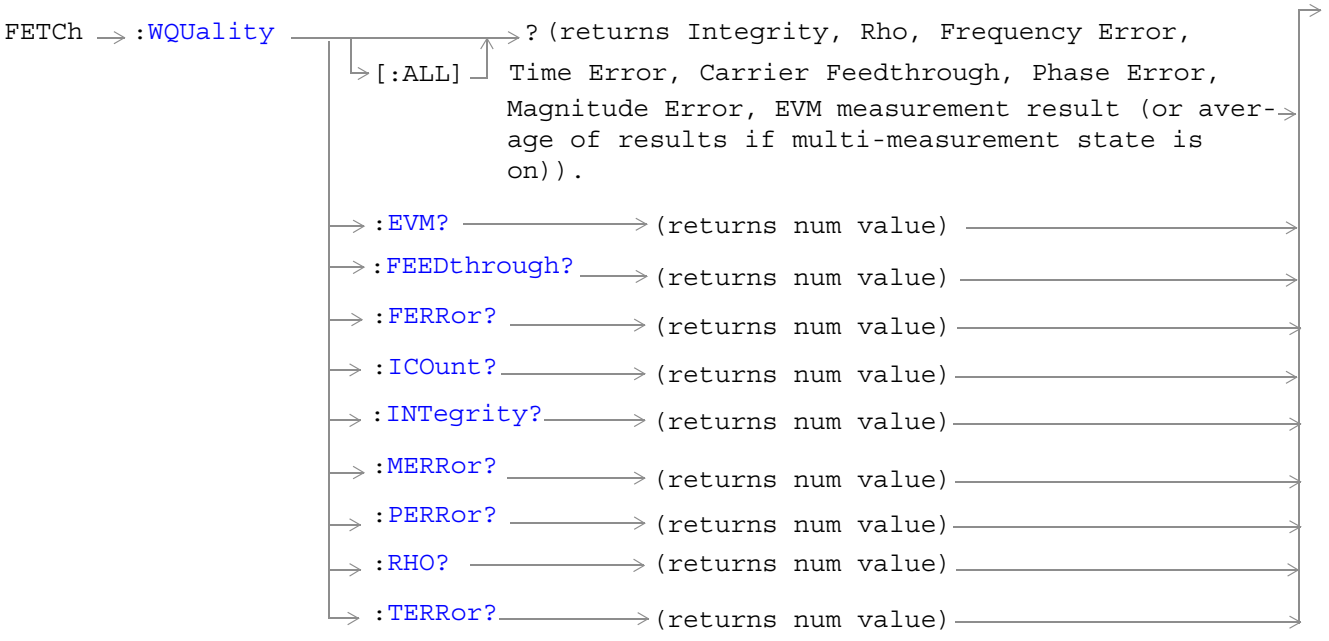
FETCh:DAPower:INTegrity?

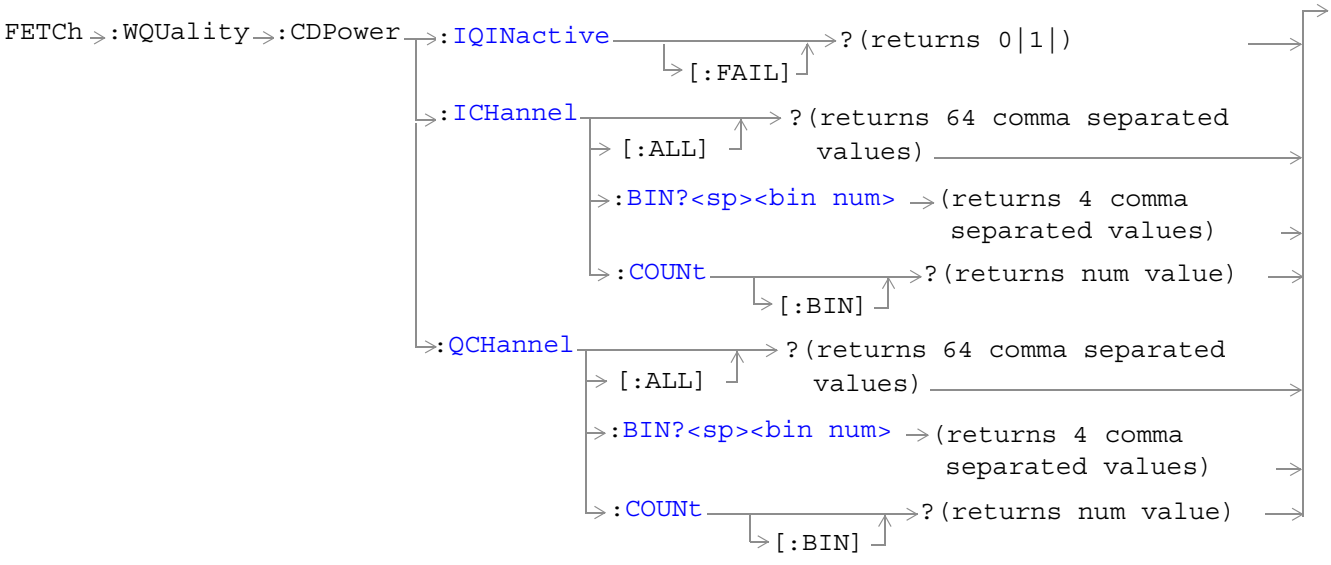
Function	Queries the measurement integrity indicator for the last digital average power measurement completed. Zero indicates a normal measurement. See "Integrity Indicator" on page 67 for information about non-zero integrity results.
Query	Range: 1 through 16

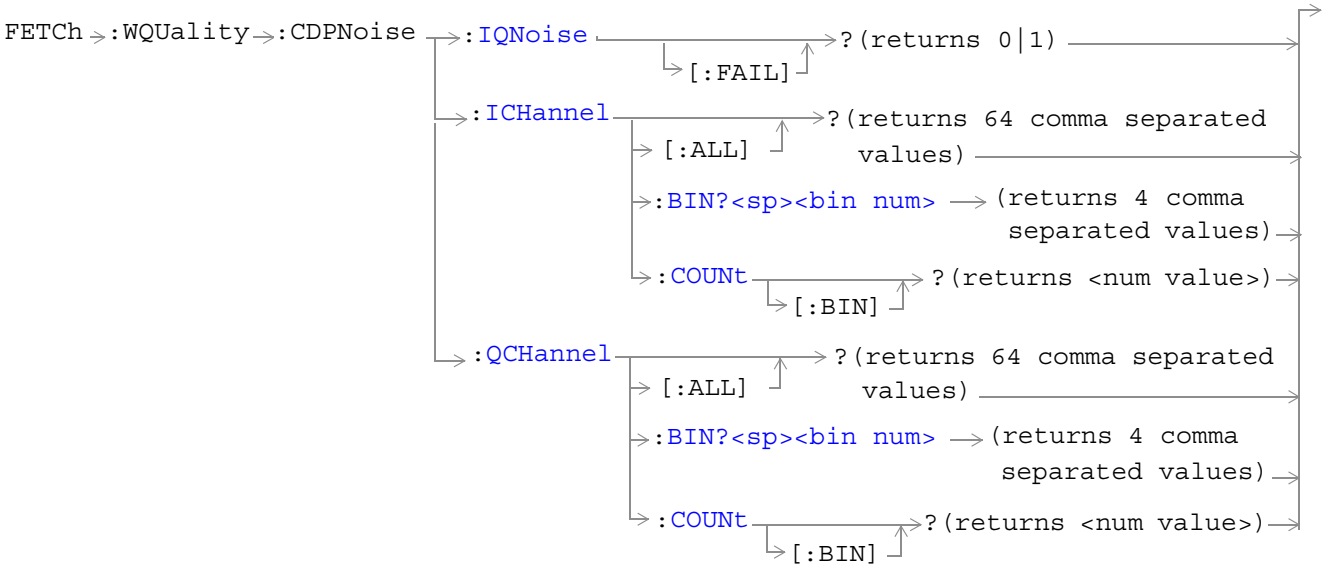
Programming Example

```
OUTPUT 714;"FETCH:DAPOWER:INTegrity?"
!Queries the inegrity indicator for the average digital tranmit power results.
```

FETCh:WQUality







"Diagram Conventions" on page 141

FETCh:WQUality[:ALL]?

Function	Queries the waveform quality measurements. Measurement results are returned in the following order: integrity, rho, frequency error, time error, carrier feedthrough, phase error, magnitude error, and error vector magnitude (EVM). If the multi-measurement state is on, each result represents the *average* of a number of waveform quality measurements. Multi-measurement state, by default, is off. To set up multi-measurements, see "SETup:WQUality:COUNt[:SNUMber]" .
Query	Integrity • Range: 0 to 16 • Resolution: 1 Rho • Range: 0.000 to 1.000, 9.91 E+37 • Resolution: 0.001 Frequency Error • Range: -9999.0 to 9999.0 Hz, 9.91 E+37 • Resolution: 0.1 Hz Time Error • Range-99.99 to 99.99 µs, 9.91 E+37 • Resolution: 0.01 µs Carrier Feedthrough • Range: -100 to 0.0 dB, 9.91 E+37 • Resolution: 0.1 Phase Error • Range: -180.0 to 180.0 degrees • Resolution: 0.1 Magnitude Error • Range: 0 to 100%, 9.91 E+37 • Resolution: 0.01 Error Vector Magnitude (EVM) • Range: 0 to 100% • Resolution: 0.01%

Programming Example

```
OUTPUT 714;"FETCH:WQUALITY:ALL?"
!Returns integrity, rho, frequency error, time error, carrier feedthrough, phase error,
!magnitude error, EVM.
```

FETCh:WQUality:ICOunt?

Function	Queries the intermediate count of measurements completed in a multi-measurement.
Query	Range: 0 to 999

Programming Example

```
OUTPUT 714;"FETCH:WQUALITY:ICOUNT?"
```

FETCh:WQUality:CDPower:IQINactive[:FAIL]?

Function	Queries the code domain measurement's pass/fail result indicating whether the power level in the inactive code channels exceeded the level set using the "SETup:WQUality:CDPower:IQINactive[:LIMit]" command.
Query	Range: 0 | 1, 9.91E+37 0 (passed), 1 (failed), 9.91 E+37 (undefined)

Programming Example

```
OUTPUT 714;"FETCH:WQUALITY:CDPOWER:IQINACTIVE:FAIL?"
```

FETCh:WQUality:CDPower:ICHannel[:ALL]?

Function	Queries the code domain power in the I-channel. This query returns 64 comma-separated values. These values consist of the following four pieces of information for each of 16 bins (maximum). (Each bin corresponds to a bar displayed on the code domain power measurement graph.) • Active (1) or Inactive (0) indicator. • Walsh code. In the case of bins with spread factors less than 16, this value will be the bin's left-most Walsh code on the graph, and there will be less than 16 valid bins in the return values. • Spread factor. This value indicates the number of Walsh codes occupying the bin. If all spread factors are one, values will be returned for 16 bins. • Power. If there are less than 16 bins displayed on the graph, which is the case when the spread factor is less than 16 for any of the bins, this query will return 9.91 E+37 for each of the four values representing the higher numbered bins. This ensures a consistent number of values for each query, which is 64.
Query	Range: • Active/inactive indication: 0 | 1, 9.91 E+37 • Walsh code: 0 to 15, 9.91 E+37 • Spread factor: 2 | 4 | 8 | 16, 9.91 E+37 • Power: -100 to 0 dB

Programming Example

```
OUTPUT 714;"FETCH:WQUALITY:CDPOWER:ICHANNEL:ALL?" !returns 64 comma-separated values describing
the I channel code domain power measurement results.
```

FETCh:WQUality:CDPower:ICHannel:BIN? <bin num>

Function	Queries a specific bin on the code domain graph. The bars on the graph (bins) are referenced in numeric order starting with 0 and continuing through (up to) 15 starting from the left side of the graph to the right side of the graph. This query returns 4 comma separated values: 1 (active) or 0 (inactive), Walsh code, spread factor, and power for the specified bin.
Query	Range: • Bin num: 0 to 15 • Active/inactive indication: 0|1, 9.91 E+37 • Walsh code: 0 to 15, 9.91 E+37 • Spread factor: 2|4|8|16|0.91 E+37 • Power: -100 to 0 dB

Programming Example

```
OUTPUT 714;"FETCH:WQUALITY:CDPOWER:ICHANNEL:BIN? 0"

!Queries the return values for the left-most bin on the code domain power I channel graph.
```

FETCh:WQUality:CDPower:ICHannel:COUNt[:BIN]?

Function	This query indicates how many bins contain measurement data. (Bins correspond to bars on the code domain measurement graph.) For example, if 13 is returned, bins 0 through 12 contain measurement data and bins 13 through 15 contain 9.91 E+37 results.
Query	Range: 0 to 15

Programming Example

```
OUTPUT 714;"FETCH:WQUALITY:CDPOWER:ICHANNEL:COUNT:BIN?" returns the number of bins on the graph
currently displayed on the code domain power measurement view.
```

FETCh:WQUality:CDPower:QCHannel[:ALL]?

Function	Queries the code domain power in the Q-channel. This query returns 64 comma-separated values. These values consist of the following four pieces of information for each of 16 bins (maximum). (Each bin corresponds to a bar displayed on the code domain power measurement graph.) • Active (1) or Inactive (0) indicator. • Walsh code. In the case of bins with spread factors less than 16, this value will be the bins left-most Walsh code on the graph, and there will be less than 16 valid bins in the return values. • Spread factor. This value indicates the number of Walsh codes occupying the bin. If all spread factors are one, values will be returned for 16 bins. • Power. If there are less than 16 bins displayed on the graph, which is the case when the spread factor is less than 16 for any of the bins, this query will return 9.91 E+37 for each of the four values representing the higher numbered bins. This ensures a consistent number of values for each query, which is 64.
Query	Range: • Active/inactive indication: 0|1, 9.91 E+37 • Walsh code: 0 to 15, 9.91 E+37 • Spread factor: 2|4|8|16, 9.91 E+37 • Power: -100 to 0 dB

Programming Example

```
OUTPUT 714;"FETCH:WQUALITY:CDPOWER:QCHANNEL:ALL?" !returns 64 comma-separated values describing
the Q channel code domain power measurement results.
```

FETCh:WQUality:CDPower:QCHannel:BIN? <bin num>

Function	Queries a specific bin on the code domain graph. The bars on the graph (bins) are referenced in numeric order starting with 0 and continuing through (up to) 15 starting from the left side of the graph to the right side of the graph. This query returns 4 comma separated values: 1 (active) or 0 (inactive), Walsh code, spread factor, and power for the specified bin.
Query	Range: • Bin num: 0 to 15 • Active/inactive indication: 0|1, 9.91 E+37 • Walsh code: 0 to 15, 9.91 E+37 • Spread factor: 2|4|8|16|0.91 E+37 • Power: -100 to 0 dB

Programming Example

```
OUTPUT 714;"FETCH:WQUALITY:CDPOWER:QCHANNEL:BIN? 0"

!Queries the return values for the left-most bin on the code domain power Q channel graph.
```

FETCh:WQUality:CDPower:QCHannel:COUNt[:BIN]?

Function	This query indicates how many bins contain measurement data. (Bins correspond to bars on the code domain measurement graph.) For example, if 13 is returned, bins 0 through 12 contain measurement data and bins 13 through 15 contain 9.91 E+37 results.
Query	Range: 0 to 15

Programming Example

```
OUTPUT 714;"FETCH:WQUALITY:CDPOWER:QCHANNEL:COUNT:BIN?" returns the number of bins on the graph
currently displayed on the code domain power Q channel measurement view.
```

FETCh:WQUality:CDPNoise:IQNoise[:FAIL]?

Function	Queries the code domain measurement pass/fail result indicating whether the power level in the inactive code channels exceeded the level set using the "SETup:WQUality:CDPNoise:IQNoise[:LIMit]" command.
Query	Range: 0 | 1, 9.91 E+37 0 (passed), 1 (failed), 9.91 E+37 (undefined)

Programming Example

```
OUTPUT 714;"FETCH:WQUALITY:CDPNOISE:IQNOISE:FAIL?" !returns the pass/fail result for the last code
domain power and noise measurement.
```

FETCh:WQUality:CDPNoise:ICHannel[:ALL]?

Function	Queries the code domain power and noise measurement for the I-channel. This query returns 64 comma-separated values. These values consist of the following four pieces of information for each of 16 bins (maximum). (Each bin corresponds to a bar displayed on the code domain power measurement graph.) • Walsh code. In the case of bins with spread factors less than 16, this value will be the bin's left-most Walsh code on the graph, and there will be less than 16 valid bins in the return values • Spread factor. This value indicates the number of Walsh codes occupying the bin. If all spread factors are one, values will be returned for 16 bins. • Noise power. • Power. If there are less than 16 bins displayed on the graph, which is the case when the spread factor is less than 16 for any of the bins, this query will return 9.91 E+37 for each of the four values representing the higher numbered bins. This ensures a consistent number of values for each query, which is 64.
Query	Range • Walsh code: 0 to 15, 9.91 E+37 • Spread factor: 2|4|8|16, 9.91 E+37 • Noise power: -100 to 0 dB • Power: -100 to 0 dB

Programming Example

```
OUTPUT 714;"FETCH:WQUALITY:CDPNOISE:ICHANNEL:ALL?" !returns 64 comma-separated values describing
the I channel code domain power and noise measurement results.
```

FETCh:WQUality:CDPNoise:ICHannel:BIN? <bin num>

Function	Queries a specific bin on the code domain power and noise graph. The bars on the graph (bins) are referenced in numeric order starting with 0 and continuing through (up to) 15 starting from the left side of the graph to the right side of the graph. This query returns 4 comma separated values: Walsh code, spread factor, noise power, and power for the specified bin.
Query	Range: • Bin num: 0 to 15 • Walsh code: 0 to 15, 9.91 E+37 • Spread factor: 2|4|8|16, 9.91 E+37 • Noise and power: -100 to 0 dB • Power: -100 to 0 dB

Programming Example

```
OUTPUT 714;"FETCH:WQUALITY:CDPNOISE:ICHANNEL:BIN? 0"

!Queries the return values for the left-most bin on the code domain power and noise I channel
graph.
```

FETCh:WQUality:CDPNoise:ICHannel:COUNt[:BIN]?

Function	This query indicates how many bins contain measurement data. (Bins correspond to bars on the code domain measurement graph.) For example, if 13 is returned, bins 0 through 12 contain measurement data and bins 13 through 15 contain 9.91 E+37 results.
Query	Range: 0 to 15, 9.91 E+37

Programming Example

```
OUTPUT 714;"FETCH:WQUALITY:CDPNOISE:ICHANNEL:COUNT:BIN?"
```

FETCh:WQUality:CDPNoise:QCHannel[:ALL]?

Function	Queries the code domain power and noise measurement for the Q-channel. This query returns 64 comma-separated values. These values consist of the following four pieces of information for each of 16 bins (maximum). (Each bin corresponds to a bar displayed on the code domain power measurement graph.) • Walsh code. In the case of bins with spread factors less than 16, this value will be the bin's left-most Walsh code on the graph, and there will be less than 16 valid bins in the return values • Spread factor. This value indicates the number of Walsh codes occupying the bin. If all spread factors are one, values will be returned for 16 bins. • Noise power. • Power. If there are less than 16 bins displayed on the graph, which is the case when the spread factor is less than 16 for any of the bins, this query will return 9.91 E+37 for each of the four values representing the higher numbered bins. This ensures a consistent number of values for each query, which is 64.
Query	Range: • Walsh code: 0 to 15, 9.91 E+37 • Spread factor: 2|4|8|16|9.91 E+37 • Noise power: -100 to 0 dB • Power: -100 to 0 dB

Programming Example

```
OUTPUT 714;"FETCH:WQUALITY:CDPNOISE:QCHANNEL:ALL?"
!returns 64 comma-separated values describing the Q channel code domain power and noise measurement
results.
```

FETCh:WQUality:CDPNoise:QCHannel:BIN? <bin num>

Function	Queries a specific bin on the code domain power and noise graph. The bars on the graph (bins) are referenced in numeric order starting with 0 and continuing through (up to) 15 starting from the left side of the graph to the right side of the graph. This query returns 4 comma separated values: Walsh code, spread factor, noise power, and power for the specified bin.
Query	Range: • Bin num: 0 to 15 • Walsh code: 0 to 15, 9.91 E+37 • Spread factor: 2|4|8|16, 9.91 E+37 • Noise and power: -100 to 0 dB • Power: -100 to 0 dB

Programming Example

```
OUTPUT 714;"FETCH:WQUALITY:CDPNOISE:QCHANNEL:BIN? 0"

!Queries the return values for the left-most bin on the code domain power and noise Q channel
graph.
```

FETCh:WQUality:CDPNoise:QCHannel:COUNt[:BIN]?

Function	This query indicates how many bins contain measurement data. For example, if 13 is returned, bins 0 through 12 contain measurement data and bins 13 through 15 contain 9.91 E+37 results.
Query	Range: 0 to 15

Programming Example

```
OUTPUT 714;"FETCH:WQUALITY:CDPNOISE:QCHANNEL:COUNT:BIN?"
```

INITiate Subsystem

Syntax Diagrams and Command Descriptions

"INITiate" on page 271

Description

INITiate Command Functions

The INITiate subsystem is used to:

- Start (activate) individual or multiple (concurrent) measurements.
- Turn individual measurements off.
- Determine the number of measurements currently active (INIT:COUNT?).
- Determine the names of the measurements currently active (INIT:ON?).
- Determine which measurements are finished (INIT:DONE?).

What Happens When a Measurement is INITiated?

When a measurement is started using INITiate commands, a new measurement cycle is started. If the selected measurement is currently in a measurement cycle, it is aborted. If a timeout is specified, the timeout period begins when a measurement is initiated.

NOTE The INITiate subsystem is derived from SCPI, but has some modifications to make it more compatible with the manual operation of the test set. Most notably, the choice of single or continuous measurement triggering is made using the SETup subsystem.

INITiate Programming Examples (how INIT commands are used)

The INITiate command is used to start measurements. INITiate commands allow multiple measurements to be started without waiting for other measurement processes to complete. For example, the following code starts the Digital Transmit Power and Modulation Accuracy measurements, and then uses the INITiate:DONE? command in a loop to query the status of these measurements, see "Measurement Event Synchronization" on page 95.

When the measurements are done, the FETCh command is used to acquire the results, and the results are entered into variables in the controlling application. The program ends when the INITiate:DONE? command returns the string "NONE" indicating that all initiated measurements have gone through the measuring state see "Measurement States" on page 101.

NOTE Trigger arming for each measurement is controlled in the SETup subsystem. The choices are single or continuous. The best practice (during remote operation) is to use single measurement mode. This simplifies the tasks of starting concurrent measurements, then using the INIT

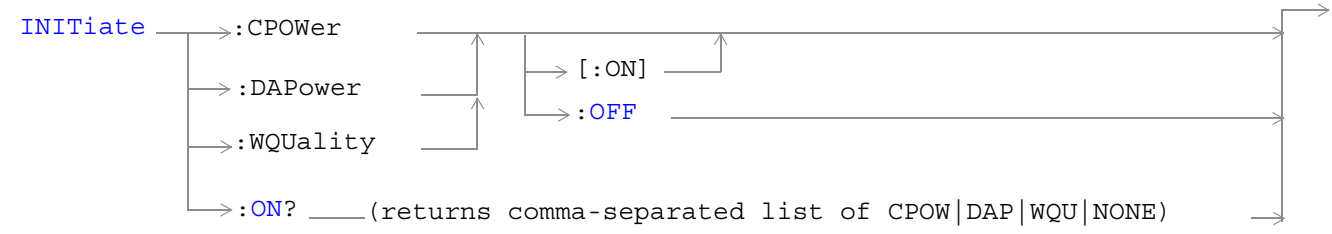
subsystem commands to determine which measurements are ready to be FETChed.

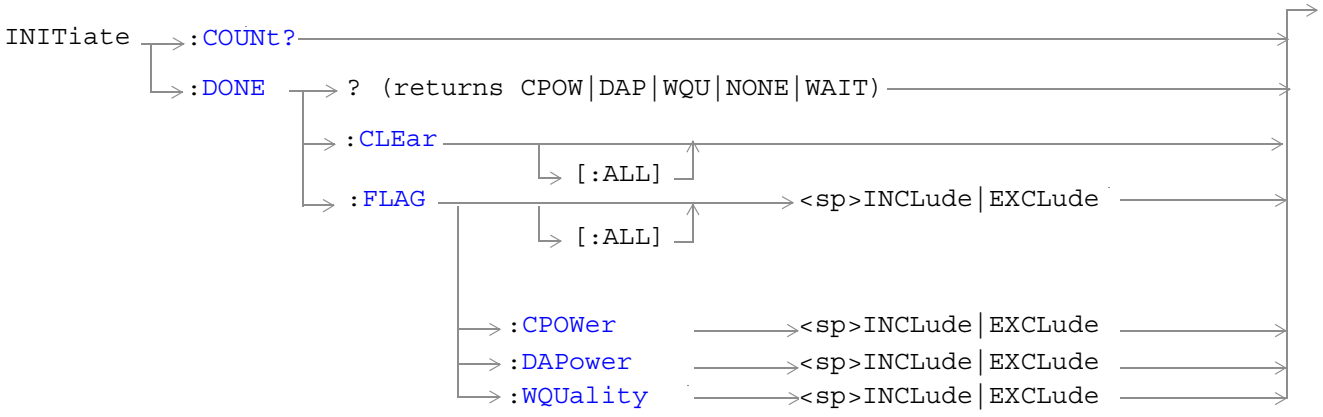
```
10 OUTPUT 714;"SETup:ALL:CONTinuous:OFF" ! selects single trigger  mode.
20 OUTPUT 714;"INITiate:DTXPower;MACCuracy" ! starts digital TX power and
30                                          !modulation accuracy measurements.
40 LOOP
50 OUTPUT 714;"INITiate:DONE?" !query to find out if any measurements are done.
60 ENTER 714;Meas_complete$
70 SELECT Meas_complete$
80 CASE "DTXP" !tests for the string "DTXP", indicating digital TX power measurement is done.
90 OUTPUT 714;"FETCh:DTXPower:POWer?" !Queries average digital TX power measurement.
100 ENTER 714;Dtxpower
110 CASE "MACC" !tests for the string "MACC", indicating that the modulation accuracy
120                                                                  !measurement is done.
130 OUTPUT 714;"FETCh:MACCuracy:EVM?" !Queries maximum error vector magnitude over 1 burst.
140 ENTER 714;Max_evm1
150 END SELECT
160 EXIT IF Meas_complete$="NONE"
170 END LOOP
180 END
```

INITiate commands should be sent only when the test set has finished performing any operations, such as handoffs, that require settling. For example, the following code performs a handoff from a digital traffic channel to an analog voice channel (AVC), verifies that the mobile is on an AVC, then initiates an analog TX power measurement.

```
10    !The mobile is on a digital traffic channel up to this point.
20    !Call setup parameters have been configured for handoff to an AVC.
30    OUTPUT 714;"CALL:HANDOFF"
40    LOOP
50    OUTPUT 714;"CALL:STATus:TCHannel:TYPE?" !See if the mobile is on an AVC yet.
60    ENTER 714;Tch_type$
70    SELECT Tch_type$
80    CASE "AVC"  !If the mobile is on an AVC, go ahead and measure analog TX power.
90    OUTPUT 714;"INIT:ATXPOWER"  !Start the analog TX power measurement.
100   OUTPUT 714;"FETCH:ATXPOWER:POWER?" !Query the analog TX power result.
110   ENTER 714;Atx_power  !Enter the returned measurement value into a variable.
120   CASE "DTC"  !The mobile is not on an AVC yet, so don't start ATX power yet.
130   END SELECT
140   EXIT IF Tch_type$="AVC" !The measurement was made; continue to next routine.
150   END LOOP
160   End
```

INITiate





"Diagram Conventions" on page 141

INITiate:<measurement mnemonic>[:ON]

Function	This command initiates (starts) the following measurements: • CPOW - Channel Power • DAP - Digital Average Power • WQU - Waveform Quality/Code Domain Power This command also queries the active state using the ON? keyword in place of a measurement mnemonic. The INITiate command is associated with the SETup "SETup Subsystem" on page 287 and the "FETCh? Subsystem" on page 251. One or more measurements can be initiated with the same program line (see "Concurrent Measurements" on page 63 and the Programming Example below). This command is also used to activate a measurement. See "INITiate Programming Examples (how INIT commands are used)" on page 267.
Range	CPOW|DAP|WQU|ON?

Programming Example
`OUTPUT 714;"INITIATE:CPOWER;WQUALITY:ON"`
`!Initiates a channel power and a waveform quality measurement.`	

INITiate:ON?

Function	Queries the measurements that are on. Returns a comma separated list of measurement mnemonics.
Query	Range: CPOW|DAP|WQU|NONE
Programming Example `OUTPUT 714;"INITIATE:ON?"`	

INITiate:<measurement mnemonic>:OFF

Function	Deactivates the selected measurement. See "Measurement States" on page 101. Only one measurement can be deactivated at a time. To stop one or more measurements and leave them in the active state, use "ABORt" on page 145.
Programming Example `OUTPUT 714;"INITIATE:CPOWER:OFF" !Deactivates the channel power measurement.`	

INITiate:COUNt?

Function	Queries the number of measurements that have been initiated (are active). See "Measurement States" on page 101.
Query	Range: 0 to 10
Programming Example `OUTPUT 714;"INITIATE:COUNT?"`	

INITiate:DONE?

Function	Queries (one at a time) which measurements, if any, are finished or have timed-out. See "Measurement Event Synchronization" on page 95 for how to use this command. See "Measurement States" on page 101 to understand the test set's measurment states. See "INITiate:DONE:FLAG:<measurement mnemonic>" on page 274 for include or exclude commands.
Query	Range: CPOW | DAP | WQU | NONE | WAIT

INITiate:DONE:CLEar

Function	Clears the done flag from all measurements.
Programming Example `OUTPUT 714;"INITIATE:DONE:CLEAR" !Clears the done flag.`	

INITiate:DONE:FLAG[:ALL]

Function	Specifies that all measurements are either included or excluded when the INITitate:DONE? query is sent. If a measurement trigger arm is left in continuous mode, the done flag for that measurement will toggle between DONE and WAIT. The INITiate:DONE? query will probably not be able to catch the measurement at the instant it is done; therefore, the measurement will never appear to be done. If a measurement's triggering must be continously armed, you should exclude the measurement using "INITiate:DONE:FLAG:<measurement mnemonic>" . Use INITitate:DONE:FLAG:ALL EXCLude to exclude all measurements. Once INITiate:DONE:FLAG has been set to EXCLude for a measurement, the user must send the INCLude command for that measurement in order to query that measurement with the INITiate:DONE? query. The test set will not reset any excluded measurement with any type of preset.
Setting	Range: INCLude | EXCLude

Programming Example
`OUTPUT 714;"INITIATE:DONE:FLAG:ALL INCLUDE"`
`!Includes all measurements in the INITIATE:DONE? query.`	

INITiate:DONE:FLAG:<measurement mnemonic>

Function	Specifies if a measurement done flag is considered (using the INCLude or EXCLude settings) when the INITitate:DONE? query is sent. If more than one measurement is active, and one or more measurement trigger arm states is continuous, the INITiate:DONE? query may not be effective. The best solution is to change the arm state of all measurements to single using the "SETup[:ALL]:CONTinuous" command. However, if a measurement must be continously triggered, you should exclude the measurement using the EXCLude setting provided by this command if you want to use INITiate:DONE? to query measurement done status. The test set will not reset any excluded measurement to included with any type of preset.
Setting	Range: INCLude | EXCLude

Programming Example

```
OUTPUT 714;"INITIATE:DONE:FLAG:DAP EXCLUDE"
!Excludes the digital average power measurement from responding to the INITIATE:DONE? query.
```

READ? Subsystem

Syntax Diagram and Command Descriptions

"READ" on page 277

Description

The READ? command provides a sequential method to make measurements and retrieve the results. READ? will hang the GPIB bus until the measurement is completed, or until the timeout value has been exceeded. Associated SETup commands (for each measurement) are used with the READ? command to retrieve desired measurement results in a sequential manner.

Sending a READ? command is equivalent to an INITiate/FETCh cycle for a measurement. A READ? command executes an abort action on that measurement followed by an INITiate and a FETCH?.

READ? commands can be mixed with FETCH? queries in order to make combinations of sequential and overlapped operations. One measurement can be issued a READ? command (sequential), and the next measurement can be issued INITiate/FETCh? commands (overlapped), if necessary.

The advantage of using the READ? commands to obtain measurement results, as opposed to the INITiate/FETCh method is:

- It is simpler. Fewer commands are required to obtain measurement results.

Some disadvantages of using READ? over INITiate and FETCh are:

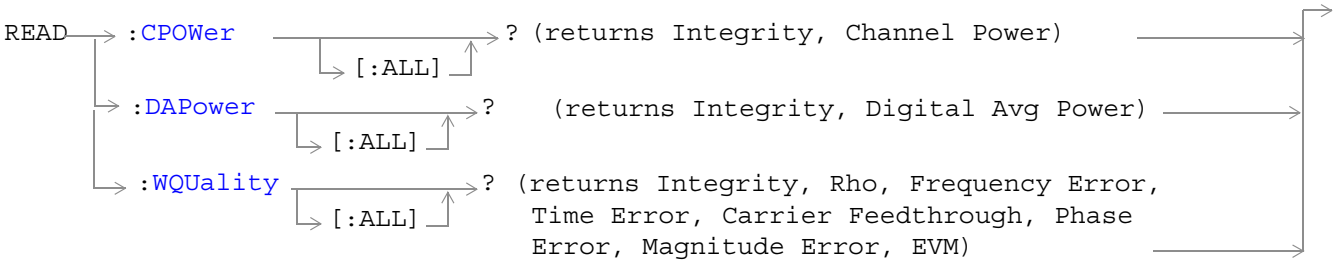
- The test set does not process any additional GPIB commands until the requested measurement results are available.
- The sequential nature of the READ? command does not allow the user to make concurrent measurements. Concurrent measurements require the overlapped commands INITiate, DONE? and FETCh? .
- The READ? command does not provide measurement results such as statistics that are available using the INITiate/FETCh method.
- The READ? commands have pre-defined measurement results. If additional results are needed from a measurement they may be obtained with a FETCh? query.

NOTE Trigger arming for each measurement is controlled in the SETup subsystem. Best practice during remote operation is to set trigger arm to single (Continuous Off).

Program Example - READ:DTXPower?

```
OUTPUT 714;"READ:DTXPower?" !Starts digital TX power measurement. As soon as the
                            !measurement cycle has completed, the test set
                            !provides the digital TX power measurement results to the
                            !controlling application.
ENTER 714;Integrity, Digital_power !Enters the integity indicator and
                                   !digital TX power measurement values into
                                   !controlling application.
```

READ



"Diagram Conventions" on page 141

READ:CPOWer[:ALL]?

Function	Initiates and fetches a channel power measurement as a sequential operation. Measurement results are returned in the following order: integrity, average channel power. If the multi-measurement state is on, the result represents the average of a number of channel power measurements. Multi-measurement state, by default, is off. To set up multi-measurements, see "SETup:CPOWer:COUNt[:SNUMber]" .
Query	Channel power • Range: -100 to 100 dBm • Resolution: 0.01 dB

READ:DAPower[:ALL]?

Function	Initiates and fetches a digital average power measurement as a sequential operation. Measurement results are returned in the following order: integrity, digital average transmit power. If the multi-measurement state is on, the result represents the *average* of a number of digital average power measurements. Multi-measurement state, by default, is off. To set up multi-measurements, see "SETup:DAPower:COUNt[:SNUMber]" .
Query	Digital average power: • Range: -100 to 100 dBm, 9.91 E+37 • Resolution: 0.01 dB

READ:WQUality[:ALL]?

Function	Initiates and fetches the waveform quality measurements as a sequential operation. Measurement results are returned in the following order: integrity, rho, frequency error, time error, carrier feedthrough, phase error, magnitude error, EVM. If the multi-measurement state is on, each result represents the *average* of a number of waveform quality measurements. Multi-measurement state, by default, is off. To set up multi-measurements, see "SETup:WQUality:COUNt[:SNUMber]" .
Query	Integrity • Range: 0 to 16 • Resolution: 1 Rho • Range: 0.000 to 1.000, 9.91 E+37 • Resolution: 0.001 Frequency Error • Range: -9999.0 to 9999.0 Hz, 9.91 E+37 • Resolution: 0.1 Hz Time Error • Range-99.99 to 99.99 µs, 9.91 E+37 • Resolution: 0.01 µs Carrier Feedthrough • Range: -100 to 0.0 dB, 9.91 E+37 • Resolution: 0.1 Phase Error • Range: -180.0 to 180.0 degrees • Resolution: 0.1 Magnitude Error • Range: 0 to 100%, 9.91 E+37 • Resolution: 0.01 Error Vector Magnitude (EVM) • Range: 0 to 100% • Resolution: 0.01%

RFANalyzer Subsystem

Description

The RFANalyzer command subsystem performs “lower-level” functions that control the test set's measuring receiver. The measuring receiver includes three separate signal paths:

- Power detector
- Demodulation
- Measurement

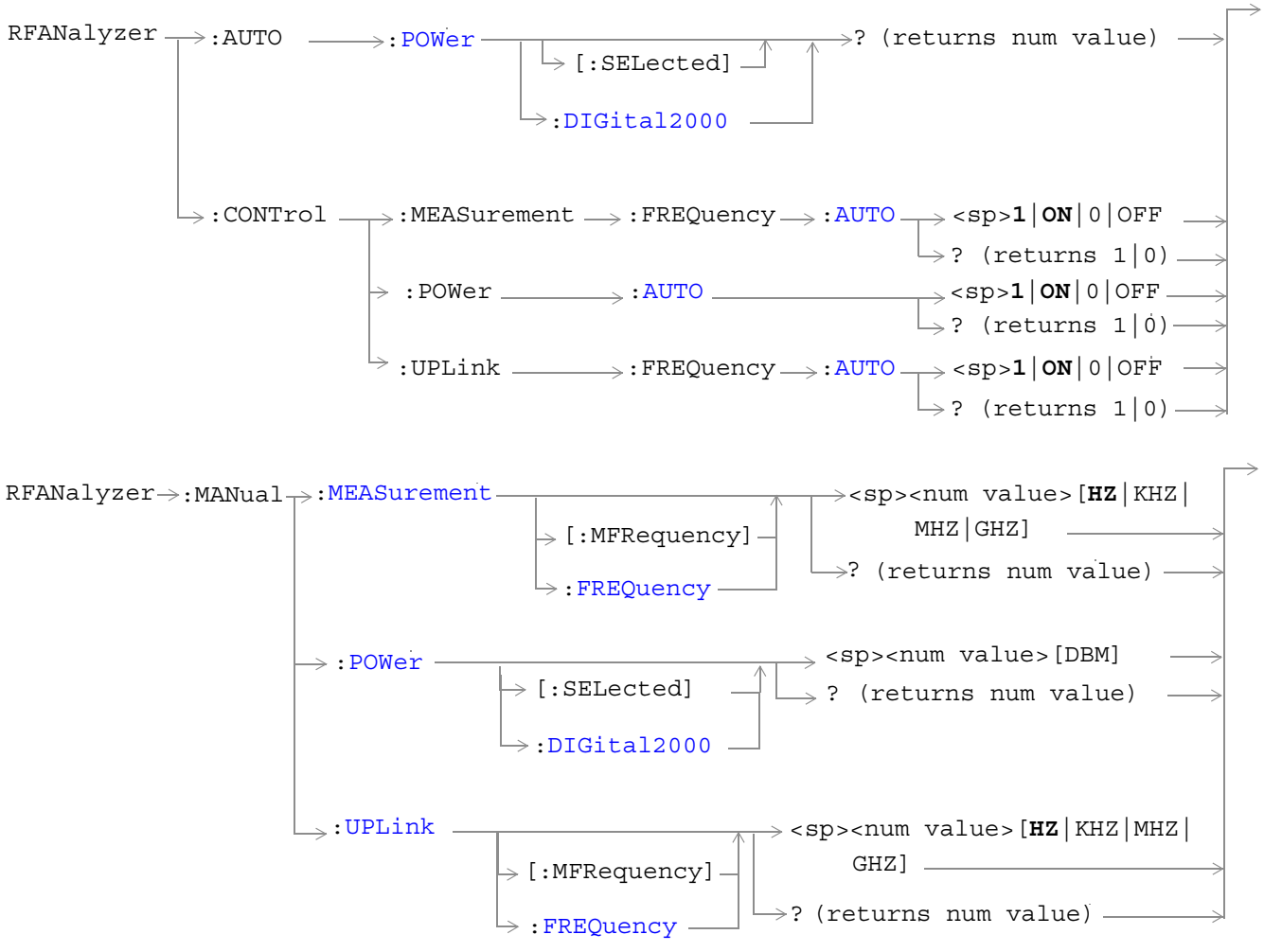
Refer to the “Block Diagram” on page 383 for a description of the signal paths.

The RFANalyzer commands allow manual settings to the tune frequency or expected power level to each of these paths if it is necessary to override automatic settings.

Syntax Diagrams and Command Descriptions

“RFANalyzer” on page 281

RFANalyzer



"Diagram Conventions" on page 141

RFANalyzer:AUTO:POWer[:SELected]?

Function	Queries the expected input power for the currently selected system type when the test set's power detector control mode is set to automatic. The test set's power control mode is set by the "RFANalyzer:CONTrol:POWer:AUTO" command.
Query	Range: -69 dBm to +30 dBm Resolution: 0.01 dBm
*RST setting	13 dBm

Programming Example

```
OUTPUT 714;"RFANalyzer:AUTO:POWER:SELECTED?" !Queries the expected input power for the currently
selected system type when the power detector is set to automatic control mode.
```

RFANalyzer:AUTO:POWer:DIGital2000?

Function	Queries the expected input power for the IS-2000 system type when the test set's power detector control mode is set to automatic. The test set's power control mode is set by the "RFANalyzer:CONTrol:POWer:AUTO" command.
Query	Range:-69 dBm to +30 dBm
*RST setting	9.91 E+37

Programming Example

```
OUTPUT 714;"RFANalyzer:AUTO:POWER:DIGITAL2000?" !Queries the expected input power for the IS-2000
system type when the power detector is set to automatic control mode
```

RFANalyzer:CONTrol:MEASurement:FREQuency:AUTO

Function	Sets/queries the test set's measurement signal path tune frequency control mode. ON = automatic OFF = manual
Setting	Range: 1|ON|0|OFF
Query	Range: 1|0
*RST setting	1 (on)

Programming Example

```
OUTPUT 714;"RFANalyzer:CONTrol:MEASurement:FREQuency:AUTO OFF"
!Enables manual control of the measurement signal path tune frequency.
```

RFANalyzer:CONTrol:POWer:AUTO

Function	Sets/queries the test set's expected input power control mode. ON = automatic OFF = manual
Setting	Range: 1|ON|0|OFF
Query	Range: 1|0
*RST setting	1 (on)
Programming Example `OUTPUT 714;"RFANALYZER:CONTROL:POWER:AUTO OFF" !Enables manual control of the expected input power level.`	

RFANalyzer:CONTrol:UPLink:FREQuency:AUTO

Function	Sets/queries the test set's demodulation signal path tune frequency control mode. ON = automatic OFF = manual.
Setting	Range: 1|ON|0|OFF
Query	Range: 1|0
*RST setting	1 (on)
Programming Example `OUTPUT 714;"RFANALYZER:CONTROL:UPLINK:FREQUENCY:AUTO OFF" !Enables manual control of the demodulation signal path tune frequency.`	

RFANalyzer:MANual:POWer[:SELected]

Function	Sets/queries the expected input power for the currently selected system type when the test set's expected input power control mode is set to manual. The test set's input power control mode is set by the "RFANalyzer:CONTrol:POWer:AUTO" command. The test set's measuring receiver will include amplitude offsets along with this setting to set expected power.
Setting	Range: Test application and system type dependent (approximately -25 to +43 dBm). Resolution: 0.01 dBm
Query	Range: Test application and system type dependent (approximately -25 to +43 dBm).
*RST setting	-75 dBm
Programming Example `OUTPUT 714;"RFANALYZER:MANUAL:POWER:SELECTED 24 DBM" !Sets the manual power control mode expected input power level for the currently selected system type to 24 dBm.`	

RFANalyzer:MANual:POWer:DIGital2000

Function	Sets/queries the expected input power while operating in the IS-2000 system. The test set's measuring receiver will include amplitude offsets along with this setting to set expected power.
Setting	Range: Test application and system type dependant (approximately -25 to +43 dBm). Resolution: 0.01 dBm
Query	Range: Test application and system type dependant (approximately -25 to +43 dBm).
*RST setting	-75 dBm
Programming Example `OUTPUT 714;"RFANalyzer:MANual:POWER:DIGITAL2000 24 DBM" !Sets the manual power control mode expected input power for the IS-2000 system type to 24 dBm.`	

RFANalyzer:MANual:MEASurement[:MFRequency]

Function	The setting form of this command performs two functions: (1) sets the tune frequency of the test set's measurement signal path, and (2) selects manual tune mode for the test set's measurement signal path. The query form of this command returns the tune frequency of the test set's measurement signal path. The tune mode for the test set's measurement signal path can be returned to auto using the "RFANalyzer:CONTrol:MEASurement:FREQuency:AUTO" command.
Setting	Range: 292.5 MHz to 2700 MHz Resolution: 0.1 Hz
Query	Range: 292.5 MHz to 2700 MHz
*RST setting	896 MHz

Programming Example
`OUTPUT 714;"RFANalyzer:MANual:MEASurement:MFRequency 942.6 MHZ"`
`!Enables manual control of the measurement signal path tune frequency and sets the tune frequency to 942.6 MHz.`	

RFANalyzer:MANual:MEASurement:FREQuency

Function	Sets/queries the tune frequency of the test set's measurement signal path. This setting is applied when manual mode is selected (see "RFANalyzer:CONTrol:MEASurement:FREQuency:AUTO").
Setting	Range: 292.5 MHz to 2700 MHz Resolution: 0.1 Hz
Query	Range: 292.5 MHz to 2700 MHz
*RST setting	896 MHz

Programming Example
`OUTPUT 714;"RFANalyzer:MANual:MEASurement:FREQency 942.6 MHZ"`
`!Sets the measurement signal path tune frequency to 942.6 MHz when manual control mode is used.`	

RFANalyzer:MANual:UPLink[:MFRequency]

Function	The setting form of this command performs two functions: (1) sets the tune frequency of the test set's demodulation signal path, and (2) selects manual tune mode for the test set's demodulation signal path. The query form of this command returns the tune frequency of the test set's demodulation signal path. The tune mode for the test set's demodulation path can be returned to auto using the "RFANalyzer:CONTrol:UPLink:FREQuency:AUTO" command.
Setting	Range: 292.5 MHz to 2700 MHz Resolution: 0.1 Hz
Query	Range: 292.5 MHz to 2700 MHz
*RST setting	896 MHz

Programming Example
`OUTPUT 714;"RFANalyzer:MANual:UPLink:MFRequency 1955.030 MHz"`
`!Enables manual control of the demodulation signal path tune frequency and sets the tune frequency to 1955.030 MHz.`	

RFANalyzer:MANual:UPLink:FREQuency

Function	Sets/queries the tune frequency of the test set's demodulation signal path. This setting is applied when manual mode is selected (see "RFANalyzer:CONTrol:UPLink:FREQuency:AUTO").
Setting	Range: 292.5 MHz to 2700 MHz Resolution: 0.1 Hz
Query	Range: 292.5 MHz to 2700 MHz
*RST setting	896 MHz

Programming Example
`OUTPUT 714;"RFANalyzer:MANual:UPLink:FREQuency 942.6 MHZ"`
`!Sets the test set's demodulation signal path tune frequency to 942.6 MHz.`	

SETup Subsystem

Description

The SETup subsystem is used to configure the test set for each measurement. Typical settings include:

- Multi-Measurement Count, how many measurements will be made each time a measurement is initiated.
- Trigger Arm, determines if a measurement will make one measurement then return to idle (single), or automatically rearm on completion of a measurement and repeat the process (continuous).
- Trigger Source, how a measurement is triggered.
- Trigger Delay, controls the delay time between the trigger and the start of sampling.
- Measurement Timeout, length of time before a measurement times out.

NOTE Trigger arming for each measurement is controlled in the SETup subsystem. The choices are single or continuous. In most cases, it is a best practice (during remote operation) to use “single” measurement mode. This simplifies the tasks of starting concurrent measurements, using the INIT subsystem commands to determine which measurements are ready to be fetched, then using the FETCh subsystem to obtain results. The command “SETup:CONTinuous:OFF sets all measurements to “single” trigger mode.

Syntax Diagrams and Command Descriptions

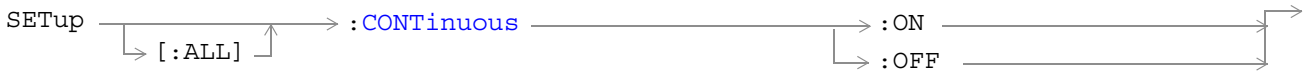
“SETup:CPOWer” on page 291

“SETup:DAPower” on page 295

“SETup:WQUality” on page 299

“SETup[:ALL]:CONTinuous” on page 289

SETup[:ALL]:CONTinuous

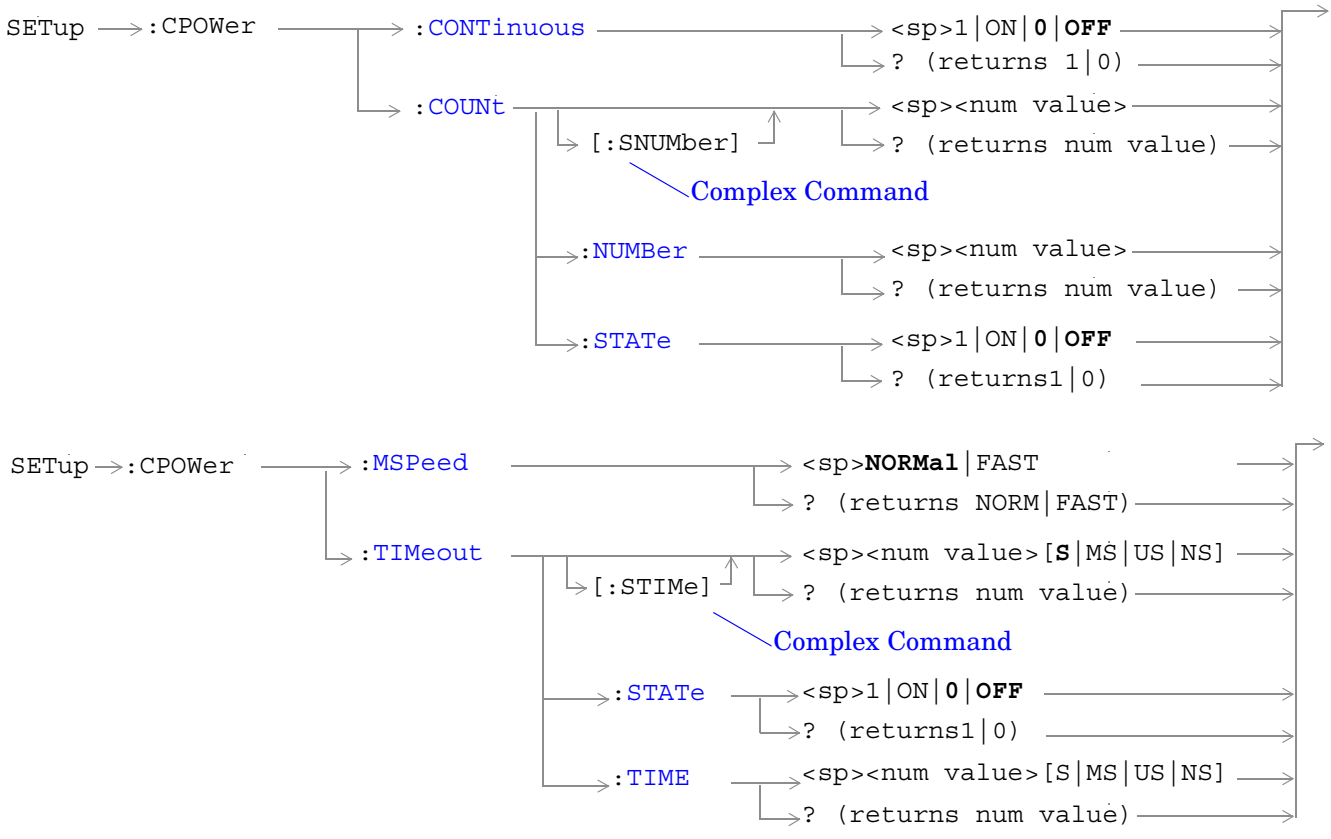


"Diagram Conventions" on page 141

SETup[:ALL]:CONTinuous

Function	Sets/queries the trigger arm state for all measurements. Determines whether all measurements will make one measurement then stop (OFF (single)), or automatically rearm upon completion of one measurement and repeat the process (ON (continuous)). This setting overrides previously set trigger arm settings for individual measurements.
Programming Example `OUTPUT 714;"SETup:ALL:CONTinuous:OFF" !Sets all measurements to single trigger mode.`	

SETup:CPOWer



"Diagram Conventions" on page 141

SETup:CPOWer:CONTinuous

Function	Sets/queries the trigger arm state for the channel power measurement. The trigger arm state determines whether the channel power measurement will be made once then stop (0|OFF (single)), or automatically re-arm upon completion of one measurement and repeat the process (1|ON (continuous)).
Setting	Range: 1|ON|0|OFF
Query	Range: 1|0
*RST Setting	0 (off)

Programming Example
`OUTPUT 714;"SETUP:CPOWER:CONTINUOUS OFF"`
`!Sets measurement to single trigger mode.`	

SETup:CPOWer:COUNt[:SNUMber]

Function	The setting form of this command performs two functions: (1) sets the number of channel power measurements to be made in a multi-measurement, and (2) sets the multi-measurement STATe command to 1 (on). The query form returns the number of channel power multi-measurements to be made when mulit-measurement state is ON.
Setting	Range: 1 to 999
Query	Range: 1 to 999
*RST Setting	Off (10 when STATe = On)

Programming Example
`OUTPUT 714;"SETUP:CPOWER:COUNT:SNUMBER 5"`
`!Turns on multi-measurements and sets the number of measurements to 5.`	

SETup:CPOWer:COUNt:NUMBer

Function	Sets/queries the number of channel power measurements to be made when the mulit-measurement state is ON.
Setting	Range: 1 to 999
Query	Range: 1 to 999
*RST Setting	10

Programming Example
`OUTPUT 714;"SETUP:CPOWER:COUNT:NUMBER 5"`
`!Sets the number of channel power multi-measurements to 5.`	

SETup:CPOWer:COUNt:STATe

Function	Sets/queries the channel power multi-measurement state.
Setting	Range: 1 | ON | 0 | OFF
Query	Range: 1 | 0
*RST Setting	0 (off)
Programming Example `OUTPUT 714;"SETUP:CPOWER:COUNT:STATE ON" !Turns on channel power multi-measurements.`	

SETup:CPOWer:MSPeed

Function	Sets/queries the channel power measurement speed. Channel power measurement speed is determined by the measurement sampling period. NORMal channel power measurements are sampled for 10 milliseconds, while FAST channel power measurements are sampled for 1.25 milliseconds. NORMal speed channel power measurements are compatible with both gated (RF) or non-gated signals. Since NORMal channel power measurements are slower than FAST measurements, use NORMal when measuring gated input signals. Gated input signals occur when radio configuration 1 or 2 are selected and any data rate other than full is selected. See "CALL:TRAFfic" and "CALL[:CELL]:RCONfig" . FAST channel power measurement speed is compatible only with non-gated (RF) signals. Non-gated signals occur when radio configuration 3, 4, or 5 are selected or radio configuration 1 or 2 is selected with full rate. See "CALL:TRAFfic" and "CALL[:CELL]:RCONfig" .
Setting	Range: NORMal | FAST
Query	Range: NORM | FAST
*RST Setting	NORM
Programming Example `OUTPUT 714;"SETUP:CPOWER:MSPEED FAST" !Sets up fast channel power measurements.`	

SETup:CPOWer:TIMeout[:STIMe]

Function	The setting form of this command performs two functions: (1) sets the channel power measurement's timeout (see "Timeouts") value, and (2) sets the channel power measurement's timeout STATe to 1 (on). The query form returns the channel power measurement's timeout value.
Setting	Range: 0.1 to 999.9 seconds Resolution: 0.1 second
Query	Range: 0.1 to 999.9
*RST Setting	10 seconds, on

Programming Example
`OUTPUT 714;"SETUP:CPOWER:TIMEOUT:STIME 5 S"`
`!Sets timeout state to ON and sets the timeout time to 5 seconds.`	

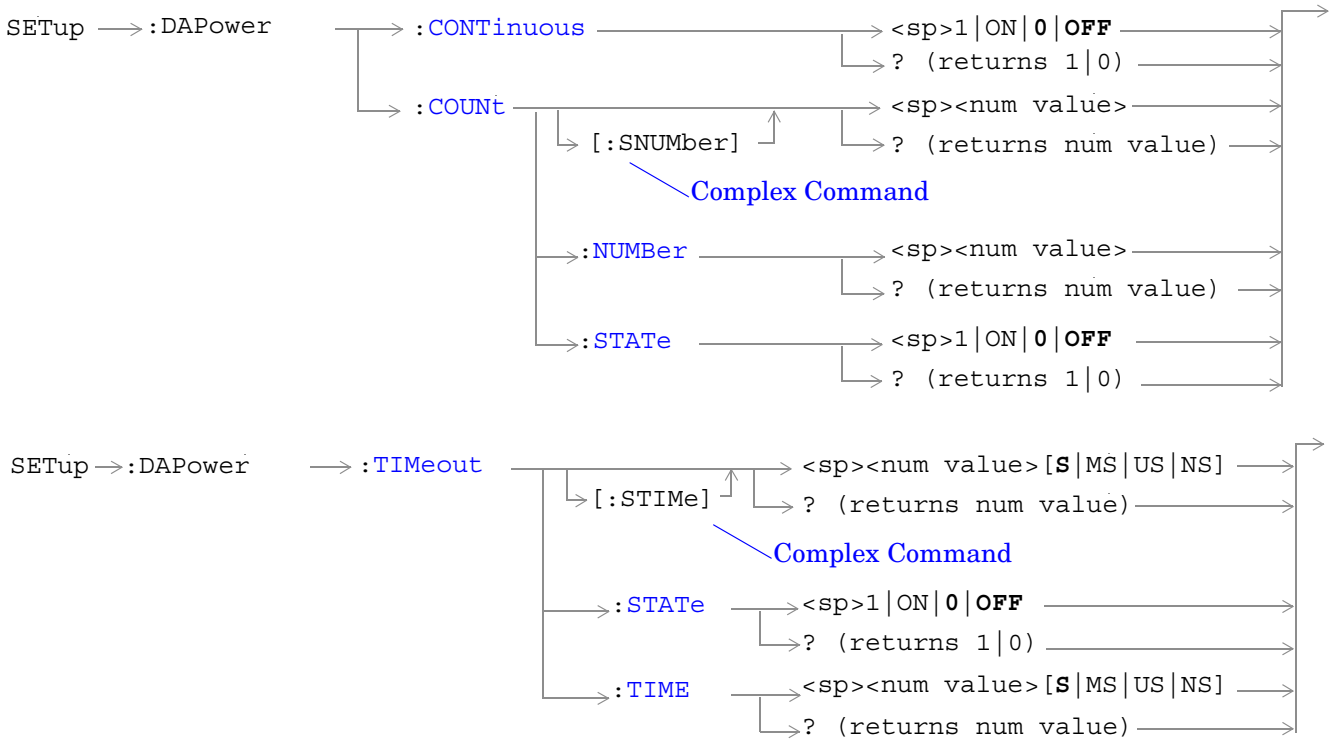
SETup:CPOWer:TIMeout:STATe

Function	Sets/queries the channel power measurement's timeout (see "Timeouts") state.
Setting	Range: 1|ON|0|OFF
Query	Range: 1|0
*RST Setting	0 (off)
Programming Example `OUTPUT 714;"SETUP:CPOWER:TIMEOUT:STATE ON"`	

SETup:CPOWer:TIMeout:TIME

Function	Sets/queries the channel power measurement's timeout (see "Timeouts") setting to be used when the timeout state is set to ON.
Setting	Range: 0.1 to 999.9 seconds Resolution: 0.1 second
Query	Range: 0.1 to 999.9
*RST Setting	10 seconds
Programming Example `OUTPUT 714;"SETUP:CPOWER:TIMEOUT:TIME 5 S"`	

SETup:DAPower



"Diagram Conventions" on page 141

SETup:DAPower:CONTinuous

Function	Sets/queries the trigger arm state for the digital average power measurement. The trigger arm state determines whether the digital average measurement will be made once then stop (0|OFF (single)), or automatically re-arm upon completion of one measurement and repeat the process (1|ON (continuous)).
Setting	Range: 1|ON|0|OFF
Query	Range: 1|0
*RST Setting	0 (off)

Programming Example
`OUTPUT 714;"SETUP:DAPOWER:CONTINUOUS OFF"`
`!Sets measurement to single trigger mode.`	

SETup:DAPower:COUNt[:SNUMber]

Function	The setting form of this command performs two functions: (1) sets the number of digital average power measurements to be made in a multi-measurement, and (2) sets the multi-measurement STATe command to 1 (on). The query form returns the number of digital average power multi-measurements to be made when multi-measurement state is ON.
Setting	Range: 1 to 999
Query	Range: 1 to 999
*RST Setting	Off (10 when STATe = On)

Programming Example
`OUTPUT 714;"SETUP:DAPOWER:COUNT:SNUMBER 5"`
`!Turns on multi-measurements and sets the number of measurements to 5.`	

SETup:DAPower:COUNt:NUMBer

Function	Sets/queries the number of digital average power measurements to be made when the multi-measurement state is ON.
Setting	Range: 1 to 999
Query	Range: 1 to 999
*RST Setting	10

Programming Example
`OUTPUT 714;"SETUP:DAPOWER:COUNT:NUMBER 5"`
`!Sets the number of measurements to 5 when the multi-measurement state is set to ON.`	

SETup:DAPower:COUNt:STATe

Function	Sets/queries the multi-measurement state of the digital average power measurement.
Setting	Range: 1|ON|0|OFF
Query	Range: 1|0
*RST Setting	0 (off)
Programming Example `OUTPUT 714;"SETUP:DAPOWER:COUNT:STATE ON" !Turns on multi-measurements.`	

SETup:DAPower:TIMeout[:STIMe]

Function	The setting form of this command performs two functions: (1) sets the digital average power measurement's timeout (see "Timeouts") value, and (2) sets the digital average power measurement's timeout STATe to 1 (on). The query form returns the channel power measurement's timeout value.
Setting	Range: 0.1 to 999.9 seconds Resolution: 0.1 second
Query	Range: 0.1 to 999.9
*RST Setting	10 seconds, on

Programming Example
`OUTPUT 714;"SETUP:DAPOWER:TIMEOUT:STIME 5 S"`
`!Sets timeout state to ON and sets the timeout time to 5 seconds.`	

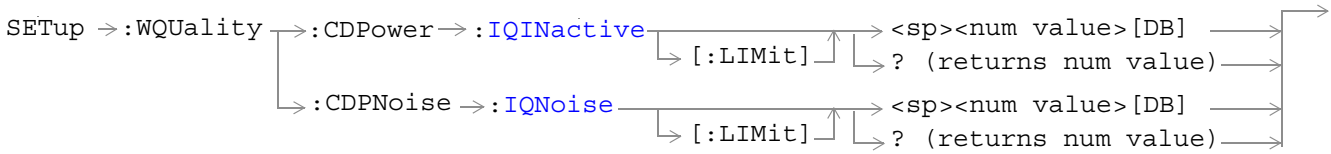
SETup:DAPower:TIMeout:STATe

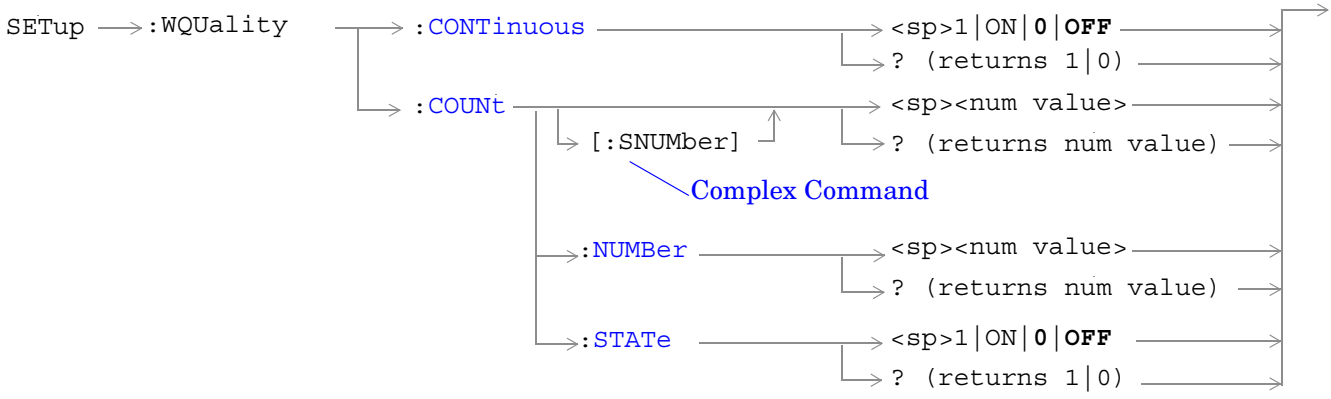
Function	Sets/queries the digital average power measurement's timeout (see "Timeouts") state.
Setting	Range: 1|ON|0|OFF
Query	Range: 1|0
*RST Setting	0 (off)
Programming Example `OUTPUT 714;"SETUP:DAPOWER:TIMEOUT:STATE ON"`	

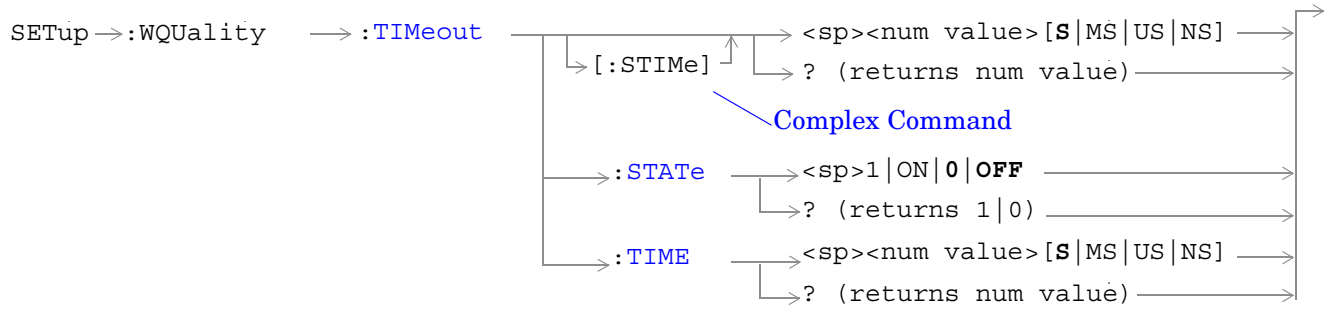
SETup:DAPower:TIMeout:TIME

Function	Sets/queries the digital average power measurement's timeout (see "Timeouts") setting to be used when the timeout state is set to ON.
Setting	Range: 0.1 to 999.9 seconds Resolution: 0.1 second
Query	Range: 0.1 to 999.9
*RST Setting	10 seconds
Programming Example `OUTPUT 714;"SETUP:DAPOWER:TIMEOUT:TIME 5 S"`	

SETup:WQUality







"Diagram Conventions" on page 141

SETup:WQUality:CDPower:IQINactive[:LIMit]

Function	Sets/queries the pass/fail limit for inactive channel power on the code domain power measurement. The level set using this command is applied to both the I and Q graphs, and is displayed as a horizontal line.
Setting	Range: -100 to 0 dB Resolution: 0.01 dB
Query	Range: -100 to 0 dB Resolution: 0.01 dB
*RST Setting	-26 dB

Programming Example
`OUTPUT 714;"SETUP:WQUALITY:CDPOWER:IQINACTIVE:LIMIT -26 DB"`
`!Sets code domain power measurement's inactive channel power pass/fail limit to -26 dB.`	

SETup:WQUality:CDPNoise:IQNoise[:LIMit]

Function	Sets/queries the pass/fail limit for noise energy measured by the code domain power and noise measurement. The level set using this command is applied to both the I and Q graphs, and is displayed as a horizontal line.
Setting	Range: -100 to 0 dB Resolution: 0.01 dB
Query	Range: -100 to 0 dB Resolution: 0.01 dB
*RST Setting	-26 dB

Programming Example
`OUTPUT 714;"SETUP:WQUALITY:CDPNOISE:IQNOISE:LIMIT -26"`
`!Sets code domain power and noise measurement's I and Q noise pass/fail limit to -26 dB.`	

SETup:WQUality:CONTinuous

Function	Sets/queries the trigger arm state for the waveform quality measurement. The trigger arm state determines whether the waveform quality measurement will be made once then stop (0|OFF (single)), or automatically re-arm upon completion of one measurement and repeat the process (1|ON (continuous)).
Setting	Range: 1|ON|0|OFF
Query	Range: 1|0
*RST Setting	0 (off)

Programming Example
`OUTPUT 714;"SETUP:WQUALITY:CONTINUOUS OFF"`
`!Sets measurement to single trigger mode.`	

SETup:WQUality:COUNt[:SNUMber]

Function	The setting form of this command performs two functions: (1) sets the number of waveform quality measurements to be made in a multi-measurement, and (2) sets the multi-measurement STATe command to 1 (on). The query form returns the number of waveform quality multi-measurements to be made when multi-measurement state is ON.
Setting	Range: 1 to 999
Query	Range: 1 to 999
*RST Setting	Off (10 when STATe = On)

Programming Example
`OUTPUT 714;"SETUP:WQUALITY:COUNT:SNUMBER 5"`
`!Turns on multi-measurements and sets the number of measurements to 5.`	

SETup:WQUality:COUNt:NUMBer

Function	Sets/queries the number of waveform quality measurements to be made when the multi-measurement state is ON.
Setting	Range: 1 to 999
Query	Range: 1 to 999
*RST Setting	10

Programming Example
`OUTPUT 714;"SETUP:WQUALITY:COUNT:NUMBER 5"`
`!Sets the number of measurements to 5 when the multi-measurement state is set to ON.`	

SETup:WQUality:COUNt:STATe

Function	Sets/queries the multi-measurement state of the waveform quality measurement.
Setting	Range: 1 | ON | 0 | OFF
Query	Range: 1 | 0
*RST Setting	0 (off)
Programming Example `OUTPUT 714;"SETUP:WQUALITY:COUNT:STATE ON" !Turns on multi-measurements.`	

SETup:WQUality:TIMeout[:STIMe]

Function	The setting form of this command performs two functions: (1) sets the waveform quality measurement's timeout (see "Timeouts") value, and (2) sets the channel power measurement's timeout STATe to 1 (on). The query form returns the waveform quality measurement's timeout value.
Setting	Range: 0.1 to 999.9 seconds Resolution: 0.1 second
Query	Range: 0.1 to 999.9
*RST Setting	10 seconds, on

Programming Example
`OUTPUT 714;"SETUP:WQUALITY:TIMEOUT:STIME 5 S"`
`!Sets timeout state to ON and sets the timeout time to 5 seconds.`	

SETup:WQUality:TIMeout:STATe

Function	Sets/queries the waveform quality measurement's timeout (see "Timeouts") state.
Setting	Range: 1 | ON | 0 | OFF
Query	Range: 1 | 0
*RST Setting	0 (off)
Programming Example `OUTPUT 714;"SETUP:WQUALITY:TIMEOUT:STATE ON"`	

SETup:WQUality:TIMeout:TIME

Function	Sets/queries the waveform quality measurement's timeout (see "Timeouts") setting to be used when the timeout state is set to ON.
Setting	Range: 0.1 to 999.9 seconds Resolution: 0.1 second
Query	Range: 0.1 to 999.9
*RST Setting	10 seconds
Programming Example `OUTPUT 714;"SETUP:WQUALITY:TIMEOUT:TIME 5 S"`	

STATus Subsystem

Description

The STATus subsystem is used to communicate current test set status information to the controlling application program.

Syntax Diagrams and Command Descriptions

"STATus:OPERation:" on page 307

"STATus:PRESet" on page 325

"STATus:QUEStionable" on page 327

"Standard Event Status Register" on page 345

"Status Byte Register" on page 343

Status Register Bit Definitions

"Status Byte Register Bit Assignments" on page 343

"Standard Event Status Register Bit Assignment" on page 346

"STATus:QUEStionable Condition Register Bit Assignment" on page 331

"STATus:QUEStionable:ERRors Condition Register Bit Assignment" on page 332

"STATus:QUEStionable:ERRors:CDMA Register Bit Assignments" on page 334

"STATus:QUEStionable:HARDware Condition Register Bit Assignment" on page 342

"STATus:OPERation Register Bit Assignments" on page 312

"STATus:OPERation:NMRReady:CDMA Register Bit Assignments" on page 319

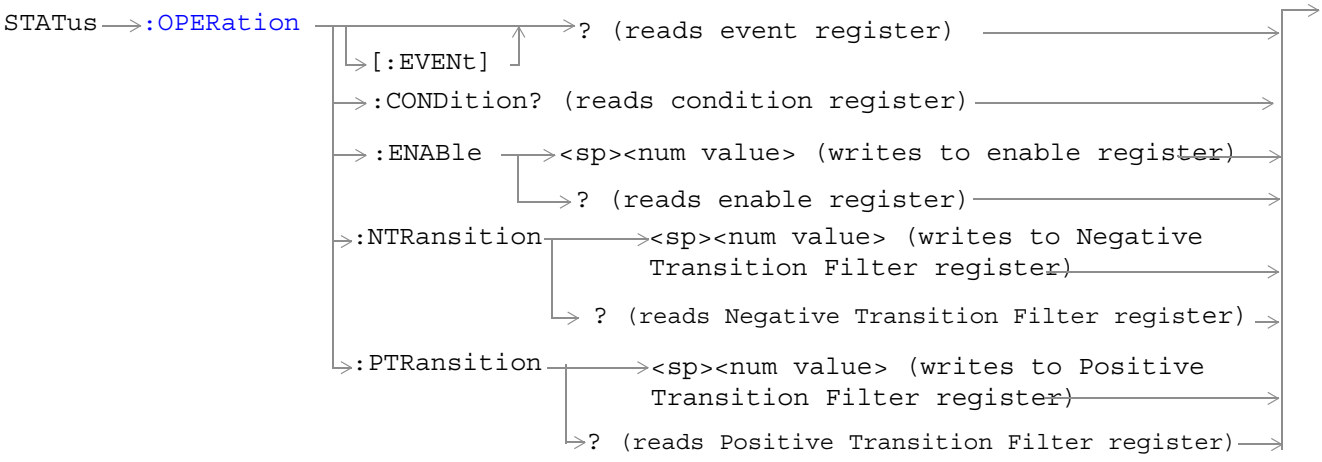
Related Topics

****

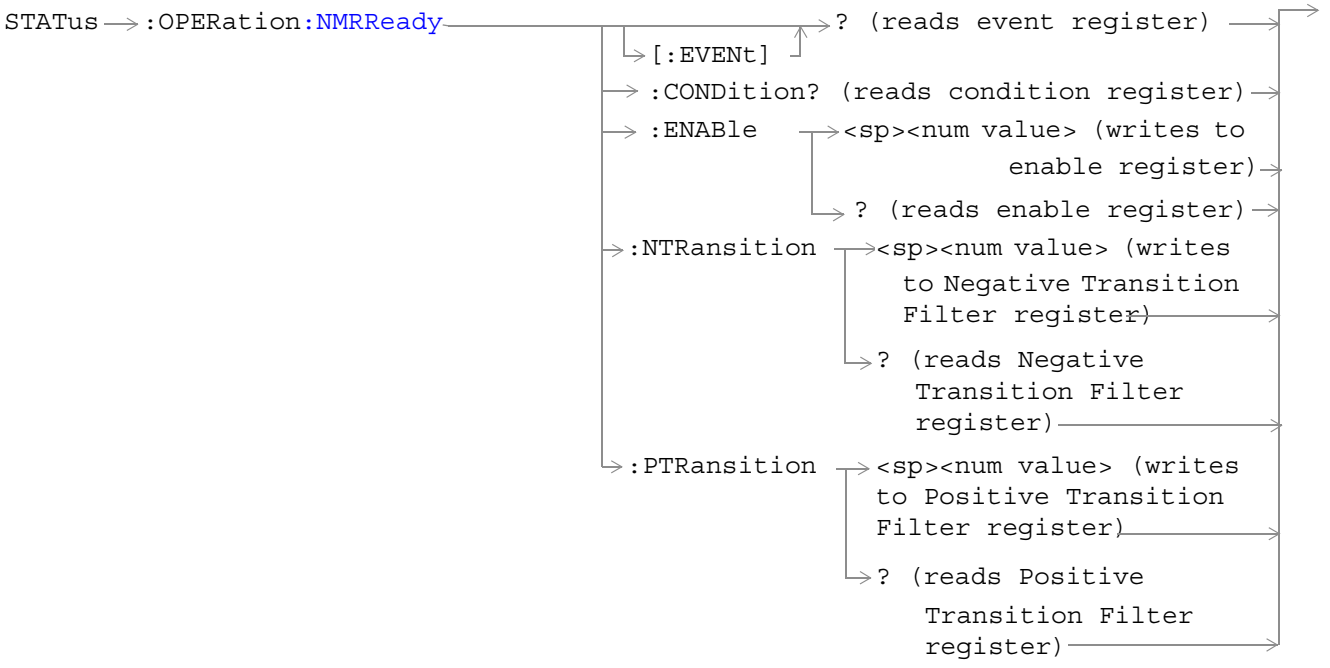
"Status Subsystem Overview" on page 79

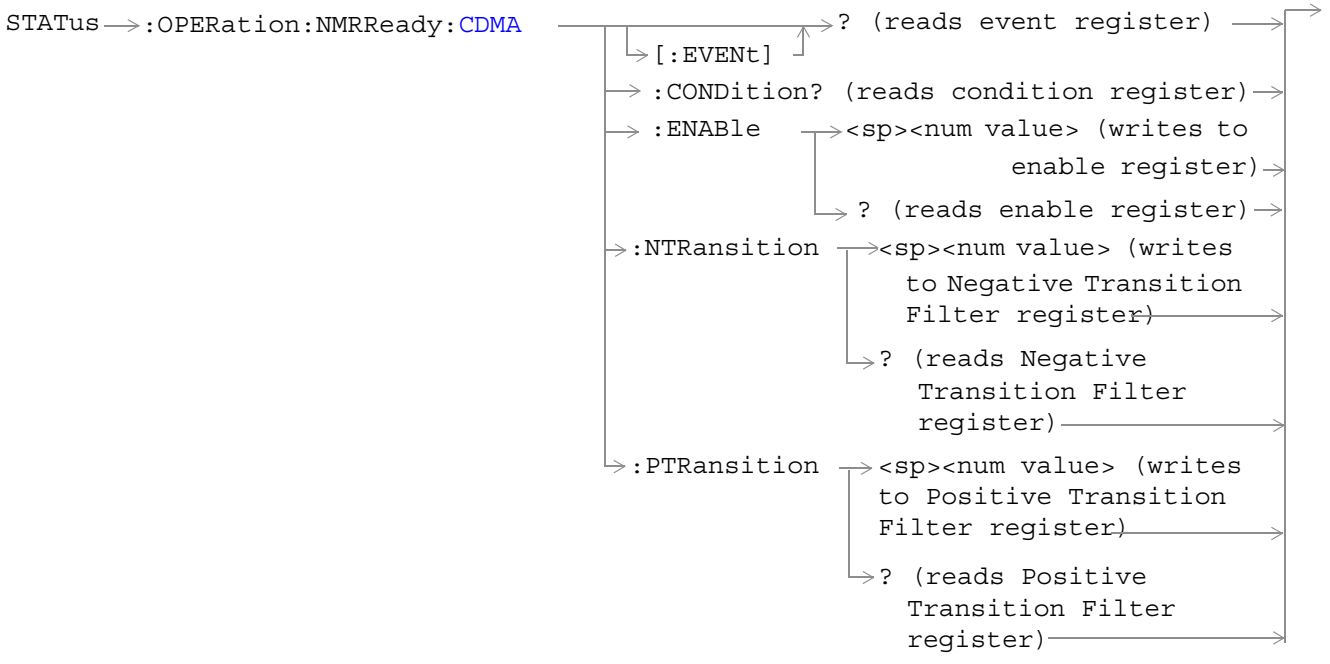
****

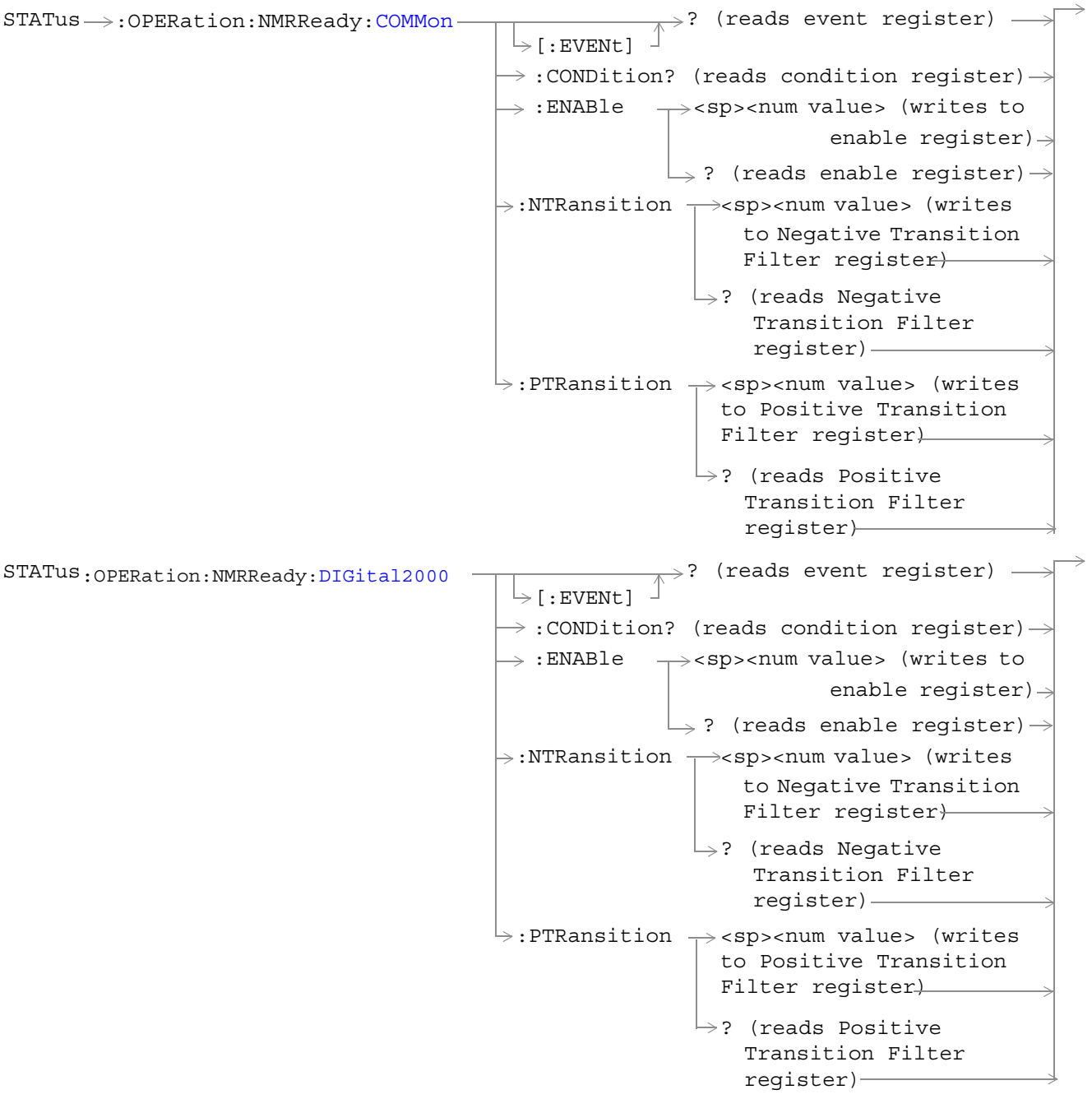
STATus:OPERation:

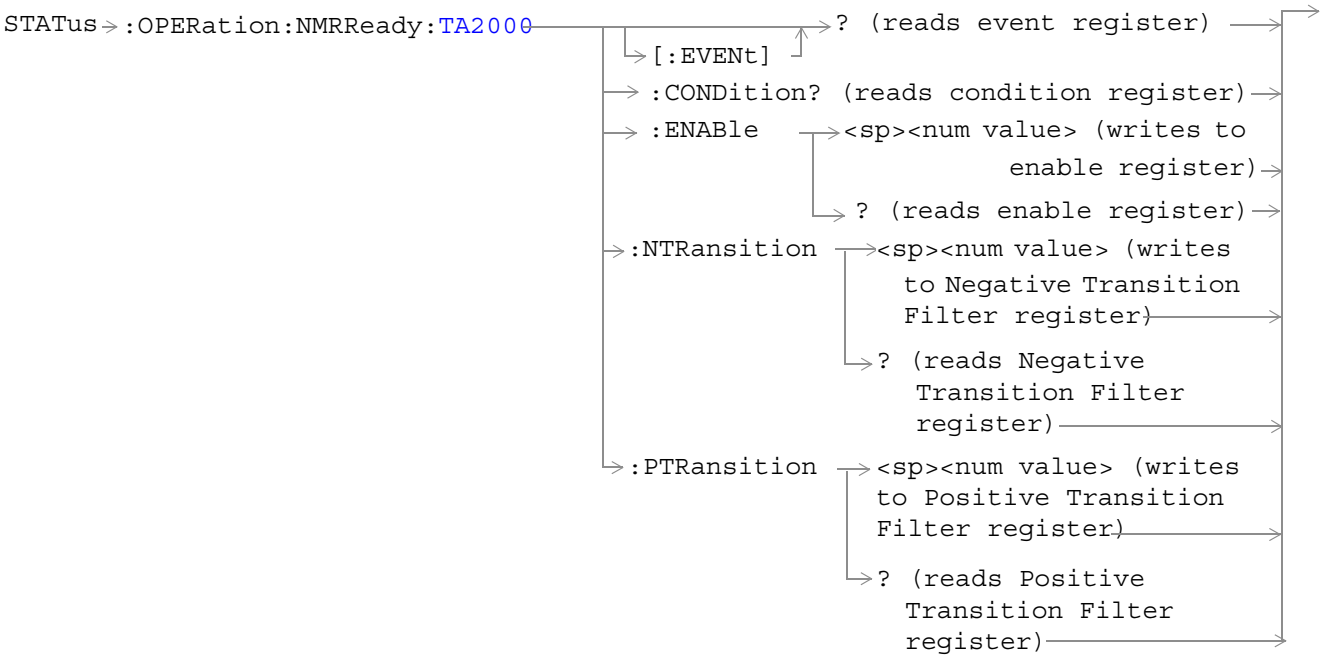


STATus:OPERation:HARDware
? (reads event register)
[:EVENt]
:CONDition? (reads condition register)
:ENABle
<sp><num value> (writes to enable register)
? (reads enable register)
:NTRansition
<sp><num value> (writes to Negative Transition Filter register)
? (reads Negative Transition Filter register)
:PTRansition
<sp><num value> (writes to Positive Transition Filter register)
? (reads Positive Transition Filter register)
STATus:OPERation:KEYPressed
? (reads event register)
[:EVENt]
:CONDition? (reads condition register)
:ENABle
<sp><num value> (writes to enable register)
? (reads enable register)
:NTRansition
<sp><num value> (writes to Negative Transition Filter register)
? (reads Negative Transition Filter register)
:PTRansition
<sp><num value> (writes to Positive Transition Filter register)
? (reads Positive Transition Filter register)


STATus
:OPERation:NMRReady
? (reads event register)
[:EVENt]
:CONDition? (reads condition register)
:ENABle
<sp><num value> (writes to enable register)
? (reads enable register)
:NTRansition
<sp><num value> (writes to Negative Transition Filter register)
? (reads Negative Transition Filter register)
:PTRansition
<sp><num value> (writes to Positive Transition Filter register)
? (reads Positive Transition Filter register)


STATus
:OPERation:NMRReady:CDMA
? (reads event register)
[:EVENt]
:CONDition? (reads condition register)
:ENABle
<sp><num value> (writes to enable register)
? (reads enable register)
:NTRansition
<sp><num value> (writes to Negative Transition Filter register)
? (reads Negative Transition Filter register)
:PTRansition
<sp><num value> (writes to Positive Transition Filter register)
? (reads Positive Transition Filter register)


STATus
:OPERation:NMRReady:COMMon
[:EVENt]
? (reads event register)
:CONDition? (reads condition register)
:ENABle
<sp><num value> (writes to enable register)
? (reads enable register)
:NTRansition
<sp><num value> (writes to Negative Transition Filter register)
? (reads Negative Transition Filter register)
:PTRansition
<sp><num value> (writes to Positive Transition Filter register)
? (reads Positive Transition Filter register)
STATus
:OPERation:NMRReady:DIGital2000
[:EVENt]
? (reads event register)
:CONDition? (reads condition register)
:ENABle
<sp><num value> (writes to enable register)
? (reads enable register)
:NTRansition
<sp><num value> (writes to Negative Transition Filter register)
? (reads Negative Transition Filter register)
:PTRansition
<sp><num value> (writes to Positive Transition Filter register)
? (reads Positive Transition Filter register)



"Diagram Conventions" on page 3

STATus:OPERation Register Bit Assignments

The OPERation status register set contains bits which give an indication of conditions that are part of the test set's normal operation.

Bit Number	Binary Weighting	Condition	Description
15	32768	Not Used. Defined by SCPI.	This bit will always be 0.
14	16384	Reserved for future use.	This bit will always be 0.
13	8192	Reserved for future use.	This bit will always be 0.
12	4096	Processing SYSTem:SYNChronized Command	This condition bit will be "pulsed" by the SYSTem:SYNChronized command. This will allow the status system to indicate that the input buffer is synchronized to the point where this command is parsed and that all prior sequential commands are completed and all prior overlapped commands have started.
11	2048	Reserved for future use	This bit will always be 0.
10	1024	CALL Summary	This bit is the summary message bit for the STATus:OPERation:CALL register.
9	512	NMRReady (New Measurement Result Ready) Summary	This bit is the summary message bit for the STATus:OPERation:NMRReady register.
8	256	Reserved for future use.	This bit will always be 0.
7	128	Reserved for future use.	This bit will always be 0.
6	64	Reserved for future use.	This bit will always be 0.
5	32	Reserved for future use.	This bit will always be 0.
4	16	Reserved for future use.	This bit will always be 0.
3	8	Reserved for future use.	This bit will always be 0.
2	4	Reserved for future use.	This bit will always be 0.
1	2	Reserved for future use.	This bit will always be 0.
0	1	Extension Bit	This bit will always be 0.

Program Examples - STATus:OPERation

```
OUTPUT 714;"STATUS:OPERATION:EVENT?" !Queries the Operation Event
                                     !Register.
OUTPUT 714;"STATUS:OPERATION:CONDITION?" !Queries the Operation Condition
                                         !Register.
OUTPUT 714;"STATUS:OPERATION:ENABLE 1024" !Sets the Operation Enable
                                          !Register for bit 1024.
OUTPUT 714;"STATUS:OPERATION:NTR 1024" !Sets the Operation Negative Transition
                                       !Register for bit 1024.
OUTPUT 714;"STATUS:OPERATION:PTR 512" !Sets the Operation Event
                                      !Register.
```

STATus:OPERation:HARDware Register Bit Assignments

The STATus:OPERation:HARDware register bits indicate information about the test set's hardware during normal operation.

Bit Number	Binary Weighting	Condition	Description
15	32768	Not Used. Defined by SCPI.	This bit will always be 0.
14	16384	Reserved for future use.	This bit will always be 0.
13	8192	Reserved for future use.	This bit will always be 0.
12	4096	Reserved for future use.	This bit will always be 0.
11	2048	Reserved for future use.	This bit will always be 0.
10	1024	Reserved for future use.	This bit will always be 0.
9	512	Reserved for future use.	This bit will always be 0.
8	256	Reserved for future use.	This bit will always be 0.
7	128	Reserved for future use.	This bit will always be 0.
6	64	Reserved for future use.	This bit will always be 0.
5	32	Reserved for future use.	This bit will always be 0.
4	16	Reserved for future use.	This bit will always be 0.
3	8	Reserved for future use.	This bit will always be 0.
2	4	Reserved for future use.	This bit will always be 0.
1	2	External Timebase in use	This bit is a 1 if a suitable external timebase is connected to the test set's 10 MHz REF IN connector on the rear panel of the test set.
0	1	Extension Bit	This bit will always be 0.

Program Examples - STATus:OPERation:HARDware

```
OUTPUT 714;"STATUS:OPERATION:HARDWARE:EVENT?" !Queries the
                                              !Hardware Event Register.
OUTPUT 714;"STATUS:OPERATION:HARDWARE:CONDITION?" !Queries the
                                                  !Hardware
                                                  !Condition Register.
OUTPUT 714;"STATUS:OPERATION:HARDWARE:ENABLE 16" !Sets New Measurement Results
                                                 !Hardware
                                                 !for bit 16.
OUTPUT 714;"STATUS:OPERATION:HARDWARE:NTR 2" !Sets the Hardware
                                             !Negative Transition
                                             !Register for bit 4.
OUTPUT 714;"STATUS:OPERATION:HARDWARE:PTR 4" !Sets the
                                             !Hardware Positive
                                             !Transition Register
                                             !for bit 4
```

STATus:OPERation:KEYPressed Register Bit Assignments

The STATus:OPERation:KEYpressed register bits indicate when a softkey on the test set's front panel has been pressed while the test set is in remote operating mode.

Bit Number	Binary Weighting	Condition	Description
15	32768	Not Used. Defined by SCPI.	This bit will always be 0.
14	16384	Reserved for future use.	This bit will always be 0.
13	8192	Reserved for future use.	This bit will always be 0.
12	4096	Reserved for future use.	This bit will always be 0.
11	2048	F12 softkey	
10	1024	F11 softkey	
9	512	F10 softkey	
8	256	F9 softkey	
7	128	F8 softkey	
6	64	F7 softkey	
5	32	F6 softkey	
4	16	F5 softkey	
3	8	F4 softkey	
2	4	F3 softkey	
1	2	F2 softkey	
0	1	F1 softkey	

Program Examples - STATus:OPERation:KEYPressed

```
OUTPUT 714;”STATUS:OPERATION:KEYPRESSED:EVENT?” !Queries the Keypressed Event Register.
```

STATus:OPERation:NMRReady Register Bit Assignments

The STATus:OPERation:NMRReady register bits indicate when a measurement has been completed and new measurement results are available.

Bit Number	Binary Weighting	Condition	Description
15	32768	Not Used. Defined by SCPI.	This bit will always be 0.
14	16384	Reserved for future use.	This bit will always be 0.
13	8192	Reserved for future use.	This bit will always be 0.
12	4096	Reserved for future use.	This bit will always be 0.
11	2048	Reserved for future use.	This bit will always be 0.
10	1024	Reserved for future use.	This bit will always be 0.
9	512	TA2000 Summary bit	This bit is the summary message bit for the STATus:OPERation:NMRReady:TA2000 register.
8	256	CDMA Summary bit	This bit is the summary message bit for the STATus:OPERation:NMRReady:CDMA register.
7	128	DIGital2000 Summary bit	This bit is the summary message bit for the STATus:OPERation:NMRReady:DIGital2000 register.
6	64	DIGital95 Summary bit	This bit is the summary message bit for the STATus:OPERation:NMRReady:DIGital2000 register.
5	32	TA136 Summary bit	This bit is the summary message bit for the STATus:OPERation:NMRReady:TA136 register.
4	16	DIGITAL136 Summary bit	This bit is the summary message bit for the STATus:OPERation:NMRReady:DIGITAL136 register.
3	8	AMPS Summary bit	This bit is the summary message bit for the STATus:OPERation:NMRReady:AMPS register.
2	4	GSM Summary bit	STATus:This bit is the summary message bit for the OPERation:NMRReady:GSM register.
1	2	COMMON Summary bit	This bit is the summary message bit for the STATus:OPERation:NMRReady:COMMon register.
0	1	Extension Bit	This bit will always be 0.

Program Examples - STATus:OPERation:NMRReady

```
OUTPUT 714;"STATUS:OPERATION:NMRREADY:EVENT?" !Queries the New Measurement
                                              !Results Ready Event Register.
OUTPUT 714;"STATUS:OPERATION:NMRREADY:CONDITION?" !Queries the New Measurement
                                                  !Results Ready
                                                  !Condition Register.
OUTPUT 714;"STATUS:OPERATION:NMRREADY:ENABLE 16" !Sets New Measurement Results
                                                 !Ready Enable Regigter
                                                 !for bit 16.
OUTPUT 714;"STATUS:OPERATION:NMRREADY:NTR 2" !Sets the New Measurement Results
                                             !Ready Negative Transition
                                             !Register for bit 4.
OUTPUT 714;"STATUS:OPERATION:NMRREADY:PTR 4" !Sets the New Measurement
                                             !Results Ready Positive
                                             !Transition Register
                                             !for bit 4
```

STATus:OPERation:NMRReady:CDMA Register Bit Assignments

The STATus:OPERation:NMRReady:CDMA register bits indicate when a measurement has been completed and new measurement results are available.

Bit Number	Binary Weighting	Condition	Description
15	32768	Not Used. Defined by SCPI.	This bit will always be 0.
14	16384	Reserved for future use.	This bit will always be 0.
13	8192	Reserved for future use.	This bit will always be 0.
12	4096	Reserved for future use.	This bit will always be 0.
11	2048	Reserved for future use.	This bit will always be 0.
10	1024	Reserved for future use.	This bit will always be 0.
9	512	Reserved for future use.	This bit will always be 0.
8	256	Reserved for future use.	This bit will always be 0.
7	128	Reserved for future use.	This bit will always be 0.
6	64	Reserved for future use.	This bit will always be 0.
5	32	Reserved for future use.	This bit will always be 0.
4	16	Reserved for future use.	This bit will always be 0.
3	8	CPOWer New Measurement Result Ready	This bit will be a 1 if the measurement has been completed and has produced new results. This bit will be a zero at power on, after a preset and while a measurement is in Measuring States. See "Triggering of Measurements" on page 99.
2	4	WQUality New Measurement Result Ready	This bit will be a 1 if the measurement has been completed and has produced new results. This bit will be a zero at power on, after a preset and while a measurement is in Measuring States. See "Triggering of Measurements" on page 99.
1	2	DAPower New Measurement Result Ready	This bit will be a 1 if the measurement has been completed and has produced new results. This bit will be a zero at power on, after a preset and while a measurement is in Measuring States. See "Triggering of Measurements" on page 99.
0	1	Extension Bit	This bit will always be 0.

Program Examples - STATus:OPERation:NMRReady:CDMA

```
OUTPUT 714;"STATUS:OPERATION:NMRREADY:CDMA:EVENT?" !Queries the New Measurement
                                                   !Results Ready CDMA Event Register.
OUTPUT 714;"STATUS:OPERATION:NMRREADY:CDMA:CONDITION?" !Queries the New Measurement
```

```
                                                    !Results Ready CDMA
                                                    !Condition Register.
OUTPUT 714;"STATUS:OPERATION:NMRREADY:CDMA:ENABLE 8" !Sets New Measurement Results
                                                   !Ready CDMA Enable Regigter
                                                   !for bit 8.
OUTPUT 714;"STATUS:OPERATION:NMRREADY:CDMA:NTR 2" !Sets the New Measurement Results
                                                 !Ready CDMA Negative Transition
                                                 !Register for bit 4.
OUTPUT 714;"STATUS:OPERATION:NMRREADY:CDMA:PTR 4" !Sets the New Measurement
                                                 !Results Ready CDMA Positive
                                                 !Transition Register
                                                 !for bit 4
```

STATus:OPERation:NMRReady:COMMon Register Bit Assignments

The STATus:OPERation:NMRReady:COMMon register bits indicate when a measurement has been completed and new measurement results are available.

Bit Number	Binary Weighting	Condition	Description
15	32768	Not Used. Defined by SCPI.	This bit will always be 0.
14	16384	Reserved for future use.	This bit will always be 0.
13	8192	Reserved for future use.	This bit will always be 0.
12	4096	Reserved for future use.	This bit will always be 0.
11	2048	Reserved for future use.	This bit will always be 0.
10	1024	Reserved for future use.	This bit will always be 0.
9	512	Reserved for future use.	This bit will always be 0.
8	256	Reserved for future use.	This bit will always be 0.
7	128	Reserved for future use.	This bit will always be 0.
6	64	Reserved for future use.	This bit will always be 0.
5	32	Reserved for future use.	This bit will always be 0.
4	16	Reserved for future use.	This bit will always be 0.
3	8	Reserved for future use.	This bit will always be 0.
2	4	Reserved for future use.	This bit will always be 0.
1	2	Audio Analyzer	This is the summary message bit for the STATus:OPERation:NMRReady:COMMon Audio Analyzer register.
0	1	Extension Bit	This bit will always be 0.

Program Examples - STATus:OPERation:NMRReady:COMMon

```
OUTPUT 714;"STATUS:OPERATION:NMRREADY:COMMON:EVENT?" !Queries the New Measurement
                                                !Results Ready Common Event Register.
OUTPUT 714;"STATUS:OPERATION:NMRREADY:COMMON:CONDITION?" !Queries the New Measurement
                                                    !Results Ready Common
                                                    !Condition Register.
OUTPUT 714;"STATUS:OPERATION:NMRREADY:COMMON:ENABLE 2" !Sets New Measurement Results
                                                   !Ready Common Enable Regigter
                                                   !for bit 2.

OUTPUT 714;"STATUS:OPERATION:NMRREADY:COMMON:NTR 2" !Sets the New Measurement Results
                                                  !Ready Common Negative Transition
                                                  !Register for bit 2.
OUTPUT 714;"STATUS:OPERATION:NMRREADY:COMMON:PTR 2" !Sets the New Measurement
                                                  !Results Ready Common Positive
                                                  !Transition Register
                                                  !for bit 2
```

STATus:OPERation:NMRReady:DIGital2000 Register Bit Assignments

The STATus:OPERation:NMRReady:DIGital2000 register bits indicate when a measurement has been completed and new measurement results are available.

Bit Number	Binary Weighting	Condition	Description
15	32768	Not Used. Defined by SCPI.	This bit will always be 0.
14	16384	Reserved for future use.	This bit will always be 0.
13	8192	Reserved for future use.	This bit will always be 0.
12	4096	Reserved for future use.	This bit will always be 0.
11	2048	Reserved for future use.	This bit will always be 0.
10	1024	Reserved for future use.	This bit will always be 0.
9	512	Reserved for future use.	This bit will always be 0.
8	256	Reserved for future use.	This bit will always be 0.
7	128	Reserved for future use.	This bit will always be 0.
6	64	Reserved for future use.	This bit will always be 0.
5	32	Reserved for future use.	This bit will always be 0.
4	16	Reserved for future use.	This bit will always be 0.
3	8	Reserved for future use.	This bit will always be 0.
2	4	Reserved for future use.	This bit will always be 0.
1	2	Reserved for future use.	This bit will always be 0.
0	1	Extension Bit	This bit will always be 0.

STATus:OPERation:NMRReady:TA2000 Register Bit Assignments

The STATus:OPERation:NMRReady:TA2000 register bits indicate when a measurement has been completed and new measurement results are available. These registers are not available at this time

Bit Number	Binary Weighting	Condition	Description
15	32768	Not Used. Defined by SCPI.	This bit will always be 0.
14	16384	Reserved for future use.	This bit will always be 0.
13	8192	Reserved for future use.	This bit will always be 0.
12	4096	Reserved for future use.	This bit will always be 0.
11	2048	Reserved for future use.	This bit will always be 0.
10	1024	Reserved for future use.	This bit will always be 0.

Bit Number	Binary Weighting	Condition	Description
9	512	Reserved for future use.	This bit will always be 0.
8	256	Reserved for future use.	This bit will always be 0.
7	128	Reserved for future use.	This bit will always be 0.
6	64	Reserved for future use.	This bit will always be 0.
5	32	Reserved for future use.	This bit will always be 0.
4	16	Reserved for future use.	This bit will always be 0.
3	8	Reserved for future use.	This bit will always be 0.
2	4	Reserved for future use.	This bit will always be 0.
1	2	Reserved for future use.	This bit will always be 0.
0	1	Extension Bit	This bit will always be 0.

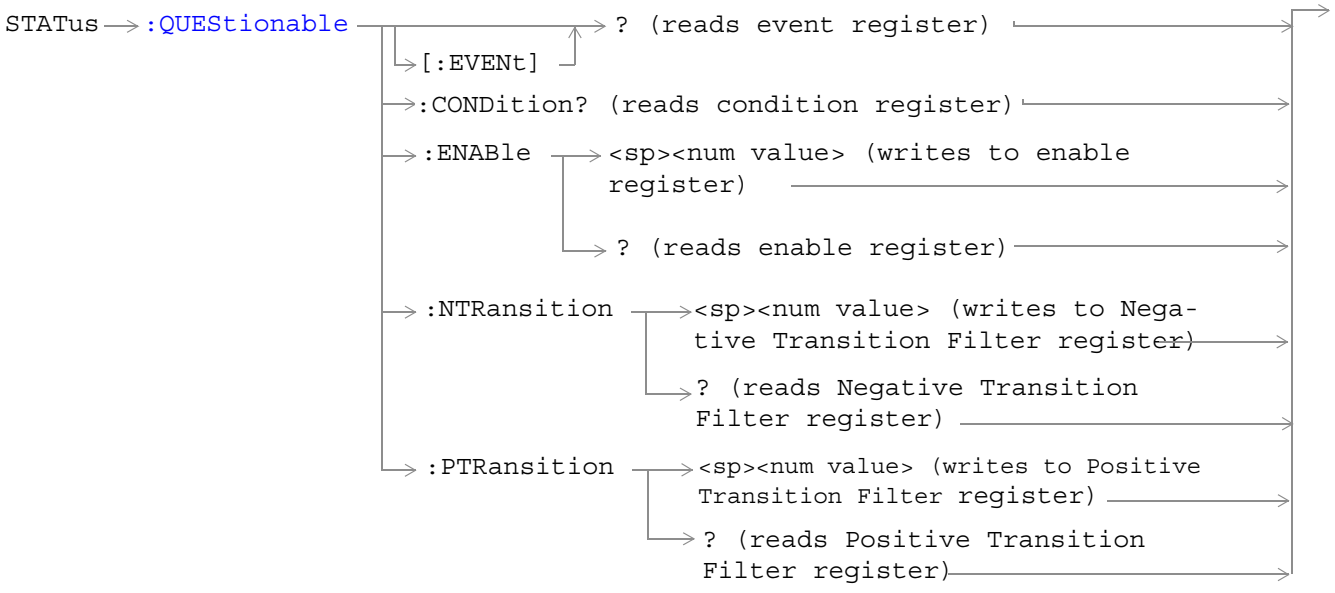
STATus:PRESet

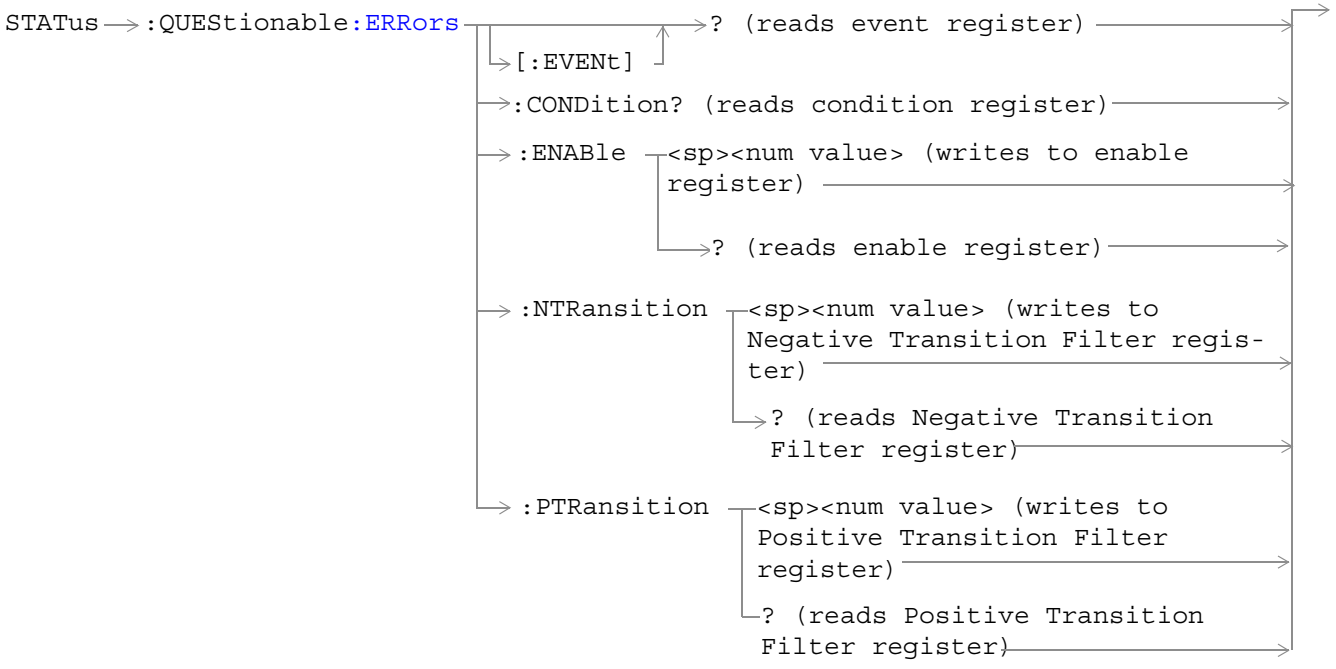
"Diagram Conventions" on page 141

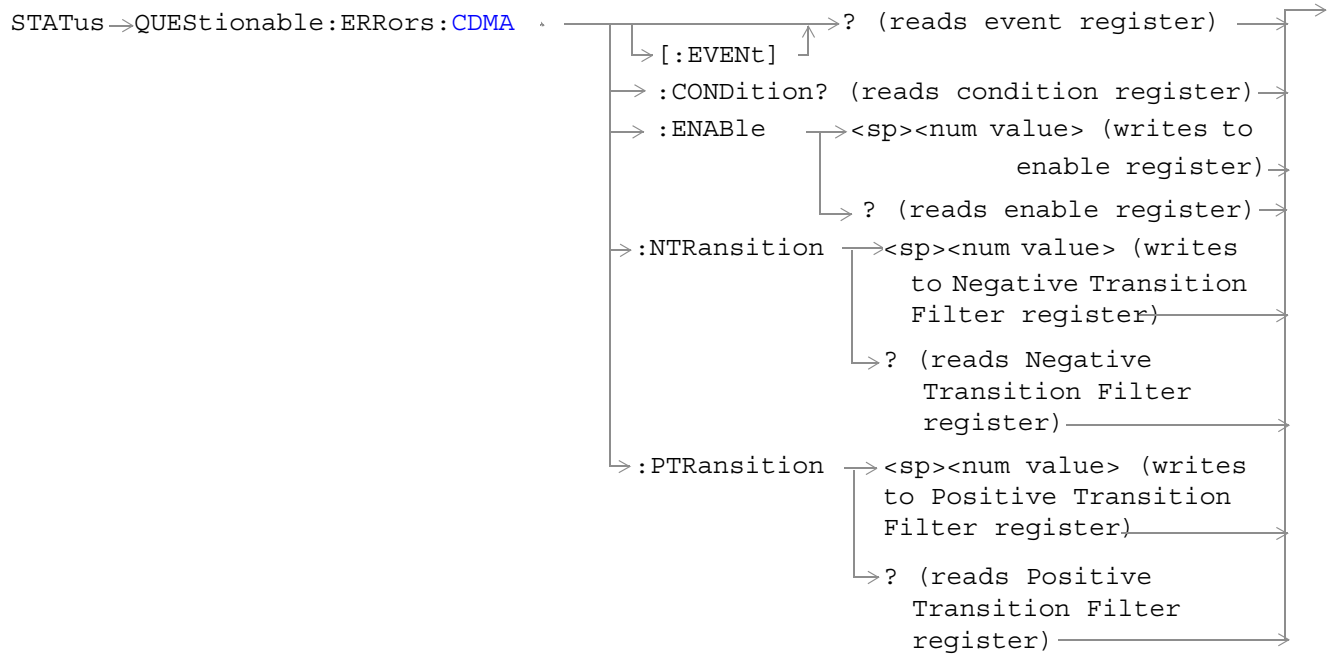
STATus:PRESet

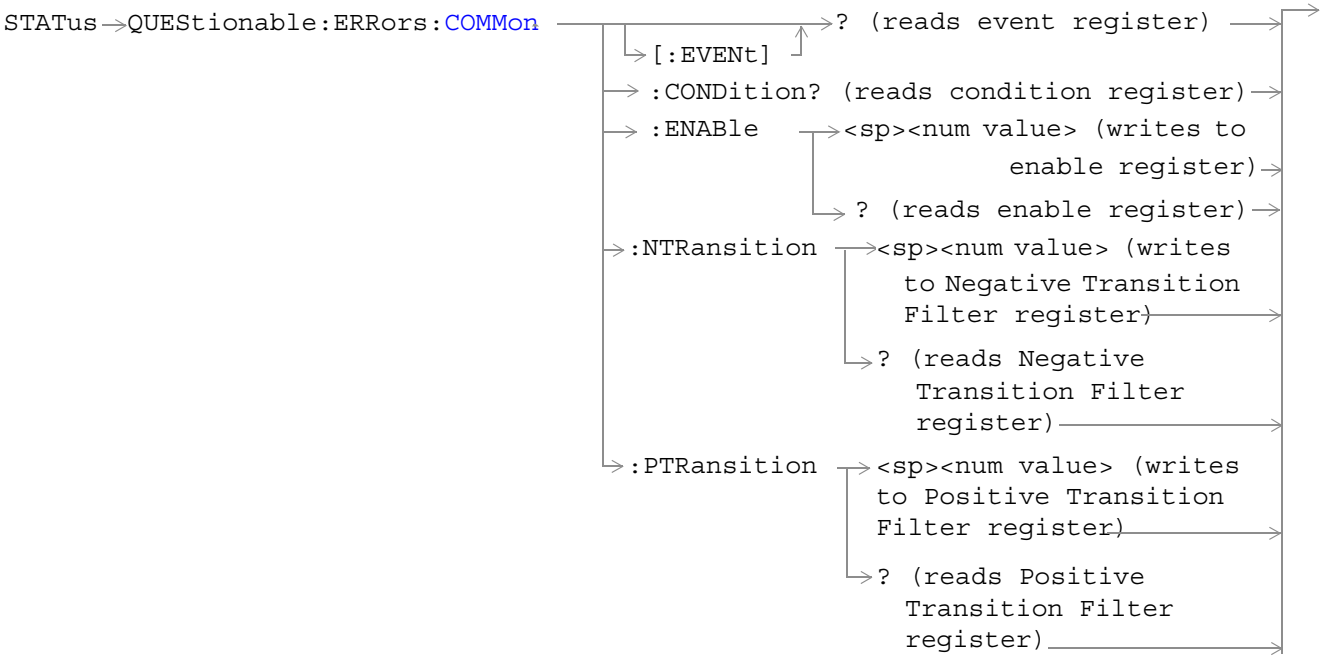
Function	Presets the status subsystem. Presetting the status subsystem performs the following functions: • All enable registers are set to 0 (not enabled) • All Positive Transition Registers (PTR's) are set to 1 (positive transitions enabled). • All Negative Transition Registers (NTR's) are set to 0 (negative transitions disabled).

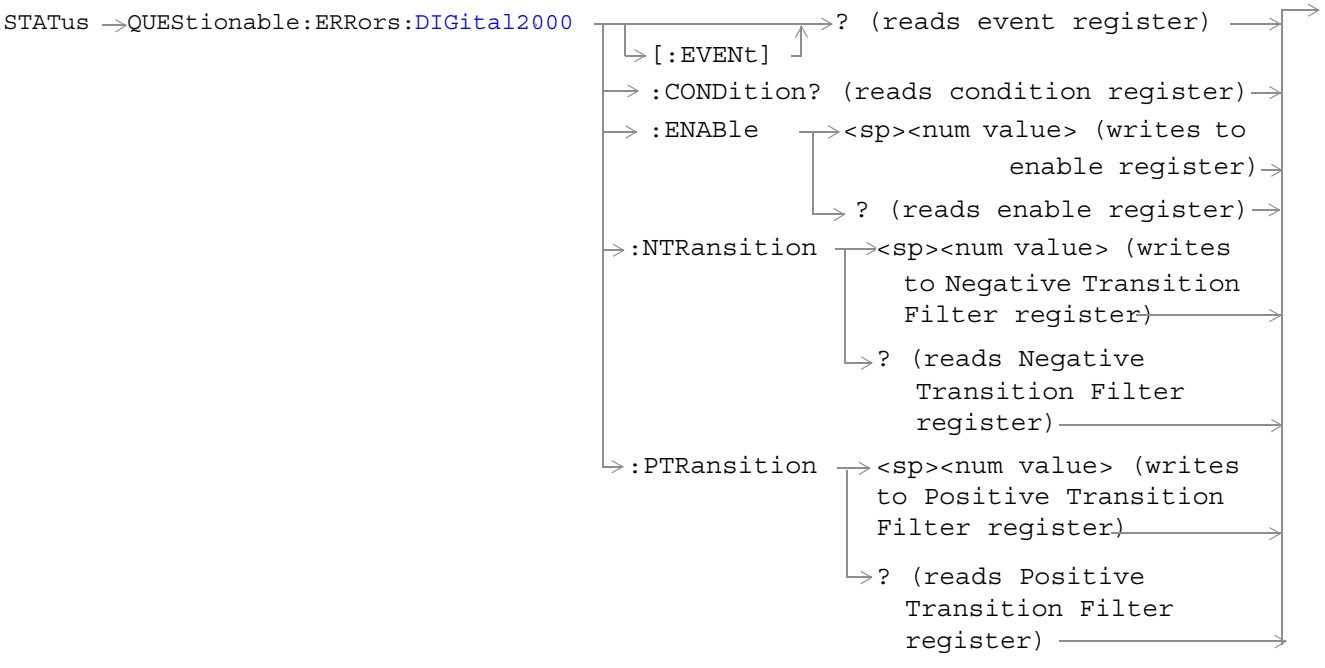
STATus:QUEStionable

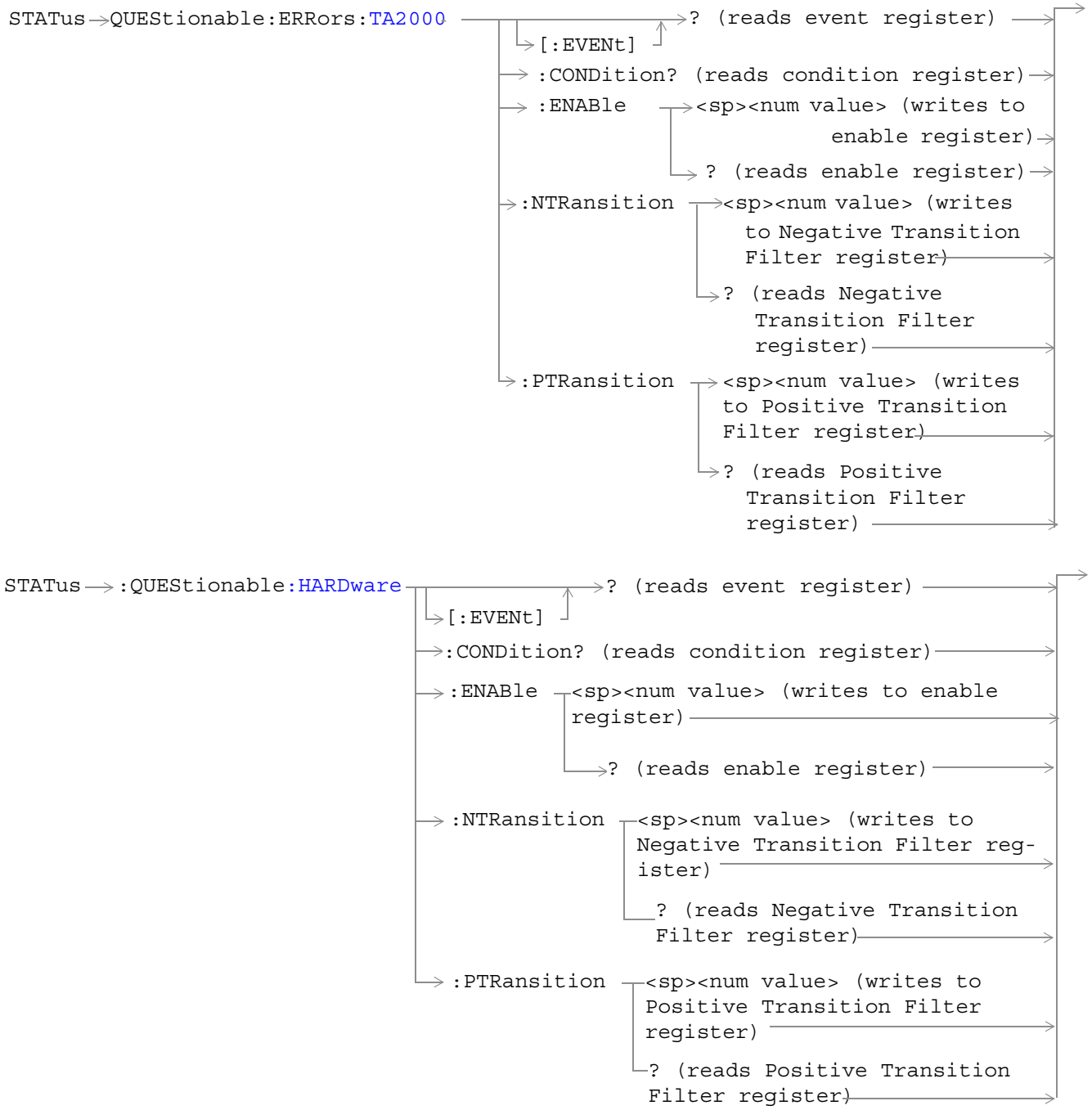



STATus
:QUEStionable:ERRors
[:EVENt]
? (reads event register)
:CONDition? (reads condition register)
:ENABle
<sp><num value> (writes to enable register)
? (reads enable register)
:NTRansition
<sp><num value> (writes to Negative Transition Filter register)
? (reads Negative Transition Filter register)
:PTRansition
<sp><num value> (writes to Positive Transition Filter register)
? (reads Positive Transition Filter register)


STATus
QUEStionable:ERRors:CDMA
[:EVENt]
? (reads event register)
:CONDition? (reads condition register)
:ENABle
<sp><num value> (writes to enable register)
? (reads enable register)
:NTRansition
<sp><num value> (writes to Negative Transition Filter register)
? (reads Negative Transition Filter register)
:PTRansition
<sp><num value> (writes to Positive Transition Filter register)
? (reads Positive Transition Filter register)


STATus:QUEStionable:ERRors:COMMon
[:EVENt]
? (reads event register)
:CONDition? (reads condition register)
:ENABle
<sp><num value> (writes to enable register)
? (reads enable register)
:NTRansition
<sp><num value> (writes to Negative Transition Filter register)
? (reads Negative Transition Filter register)
:PTRansition
<sp><num value> (writes to Positive Transition Filter register)
? (reads Positive Transition Filter register)


STATus:QUEStionable:ERRors:DIGital2000
[:EVENt]
? (reads event register)
:CONDition? (reads condition register)
:ENABle
<sp><num value> (writes to enable register)
? (reads enable register)
:NTRansition
<sp><num value> (writes to Negative Transition Filter register)
? (reads Negative Transition Filter register)
:PTRansition
<sp><num value> (writes to Positive Transition Filter register)
? (reads Positive Transition Filter register)



"Diagram Conventions" on page 3

STATus:QUEStionable Condition Register Bit Assignment

The STATus:QUEStionable register contains bits which give an indication that the data currently being acquired or generated is of questionable quality due to some condition affecting the functionality associated with that bit.

Bit Number	Binary Weighting	Condition	Description
15	32768	Not Used. Defined by SCPI.	This bit will always be 0.
14	16384	Reserved for future use.	This bit will always be 0.
13	8192	Reserved for future use.	This bit will always be 0.
12	4096	Reserved for future use.	This bit will always be set to 0.
11	2048	QUEStionable:HARDware summary	This bit is the summary message bit for the STATus:QUEStionable:HARDware register.
10	1024	QUEStionable:CALL summary	This bit is the summary message bit for the STATus:QUEStionable:CALL register.
9	512	Reserved for future use.	This bit will always be 0.
8	256	Reserved for future use.	This bit will always be 0.
7	128	Reserved for future use.	This bit will always be 0.
6	64	Reserved for future use.	This bit will always be 0.
5	32	Reserved for future use.	This bit will always be 0.
4	16	Reserved for future use.	This bit will always be 0.
3	8	Reserved for future use.	This bit will always be 0.
2	4	Reserved for future use.	This bit will always be 0.
1	2	QUEStionable:ERRors summary	This bit is the summary message bit for the STATus:QUEStionable:ERRors register.
0	1	Reserved for future use.	This bit will always be 0.

Program Example - STATus:QUEStionable Register Bit Assignments

```
OUTPUT 714;"STATUS:QUESTIONABLE:EVENT?" !Queries and clears the Questionable Event
                                        !Register
OUTPUT 714;"STATUS:QUESTIONABLE:CONDITION?" !Queries and clears the Questionable Condition
                                           !Register
OUTPUT 714;"STATUS:QUESTIONABLE:ENABLE 1024" !Sets the Questionable Enable Register
                                            !for bit 10
OUTPUT 714;"STATUS:QUESTIONABLE:NTRANSITION 2" !Sets the Questionable Negative
                                               !Transition Filter Register for bit 1
OUTPUT 714;"STATUS:QUESTIONABLE:PTRANSITION 2" !Sets the Questionable Positive
                                               !Transition Filter Register for bit 1
```

STATus:QUEStionable:ERRors Condition Register Bit Assignment

The STATus:QUEStionable:ERRors register bits will be used to indicate information about test set device-specific errors (positive error numbers).

Bit Number	Binary Weighting	Condition	Description
15	32768	Not Used. Defined by SCPI.	This bit will always be 0.
14	16384	Reserved for future use.	This bit will always be 0.
13	8192	Reserved for future use.	This bit will always be 0.
12	4096	Reserved for future use.	This bit will always be 0.
11	2048	Reserved for future use.	This bit will always be 0.
10	1024	Reserved for future use.	This bit will always be 0.
9	512	TA2000 Summary bit	This bit is the summary message bit for the STATus:QUEStionable:ERRors:TA2000 register.
8	256	CDMA Summary bit	This bit is the summary message bit for the STATus:QUEStionable:ERRors:CDMA register.
7	128	DIGital2000 Summary bit	This bit is the summary message bit for the STATus:QUEStionable:ERRors:DIGital2000 register.
6	64	DIGital95 Summary bit	This bit is the summary message bit for the STATus:QUEStionable:ERRors:DIGital2000 register.
5	32	TA136 Summary bit	This bit is the summary message bit for the STATus:QUEStionable:ERRors:TA136 register.
4	16	DIGital136 Summary bit	This bit is the summary message bit for the STATus:QUEStionable:ERRors:DIGital136 register.
3	8	AMPS Summary bit	This bit is the summary message bit for the STATus:QUEStionable:ERRors:AMPS register.
2	4	GSM Summary bit	This bit is the summary message bit for the STATus:QUEStionable:ERRors:GSM register.
1	2	COMMon Summary bit	This bit is the summary message bit for the STATus:QUEStionable:CALL:ERRors register.
0	1	Extension Bit	This bit will always be 0.

Program Example - STATus:QUEStionable:ERRors Register Bit Assignments

```
OUTPUT 714;"STATUS:QUESTIONABLE:ERRORS:EVENT?" !Queries and clears the Questionable
                                               !Errors Event Register
OUTPUT 714;"STATUS:QUESTIONABLE:ERRORS:CONDITION?" !Queries and clears the Questionable
                                                   !Errors Condition Register
OUTPUT 714;"STATUS:QUESTIONABLE:ERRORS:ENABLE 1024" !Sets the Questionable
                                                    !Errors Enable
                                                    !Register for bit 10
OUTPUT 714;"STATUS:QUESTIONABLE:ERRORS:NTRANSITION 2" !Sets the Questionable Errors
                                                      !Negative Transition Filter Register
                                                      !for bit 1
OUTPUT 714;"STATUS:QUESTIONABLE:ERRORS:PTRANSITION 2" !Sets the Questionable Errors
                                                      !Positive Transition Filter Register
                                                      !for bit 1
```

STATus:QUEStionable:ERRors:CDMA Register Bit Assignments

The STATus:QUEStionable:ERRors:CDMA register bits will be used to indicate information about CDMA related test set device-specific errors (positive error numbers).

Bit Number	Binary Weighting	Condition	Description
15	32768	Not Used. Defined by SCPI.	This bit will always be 0.
14	16384	Reserved for future use.	This bit will always be 0.
13	8192	Reserved for future use.	This bit will always be 0.
12	4096	Reserved for future use.	This bit will always be 0.
11	2048	Reserved for future use.	This bit will always be 0.
10	1024	Reserved for future use.	This bit will always be 0.
9	512	+900 Errors	The condition bit will be pulsed to a 1 and immediately back to 0 if an error in the +900 to +999 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you may query the Event Register to find out which of these errors occurred.
8	256	+800 Errors	The condition bit will be pulsed to a 1 and immediately back to 0 if an error in the +800 to +899 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you may query the Event Register to find out which of these errors occurred.
7	128	+700 Errors	The condition bit will be pulsed to a 1 and immediately back to 0 if an error in the +700 to +799 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you may query the Event Register to find out which of these errors occurred.
6	64	+600 Errors	The condition bit will be pulsed to a 1 and immediately back to 0 if an error in the +600 to +699 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you may query the Event Register to find out which of these errors occurred.
5	32	+500 Errors	The condition bit will be pulsed to a 1 and immediately back to 0 if an error in the +500 to +599 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you may query the Event Register to find out which of these errors occurred.

Bit Number	Binary Weighting	Condition	Description
4	16	+400 Errors	The condition bit will be pulsed to a 1 and immediately back to 0 if an error in the +400 to +499 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you may query the Event Register to find out which of these errors occurred.
3	8	+300 Errors	The condition bit will be pulsed to a 1 and immediately back to 0 if an error in the +300 to +399 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you may query the Event Register to find out which of these errors occurred.
2	4	+200 Errors	The condition bit will be pulsed to a 1 and immediately back to 0 if an error in the +200 to +299 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you may query the Event Register to find out which of these errors occurred.
1	2	+100 Errors	The condition bit will be pulsed to a 1 and immediately back to 0 if an error in the +100 to +199 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you may query the Event Register to find out which of these errors occurred.
0	1	Extension Bit	This bit will always be 0.

Program Example - STATus:QUEStionable:ERRors:CDMA Condition Register Bit Assignment

```
OUTPUT 714;"STATUS:QUESTIONABLE:ERRORS:CDMA:EVENT?" !Queries and clears the Questionable
                                                    !Errors CDMA Event Register
OUTPUT 714;"STATUS:QUESTIONABLE:ERRORS:CDMA:CONDITION?" !Queries and clears the Questionable
                                                        !Errors CDMA Condition Register
OUTPUT 714;"STATUS:QUESTIONABLE:ERRORS:CDMA:ENABLE 1024" !Sets the Questionable
                                                         !Errors CDMA Enable
                                                         !Register for bit 10
OUTPUT 714;"STATUS:QUESTIONABLE:ERRORS:CDMA:NTRANSITION 2" !Sets the Questionable Errors
                                                           !CDMA Negative Transition
                                                           !Filter Register for bit 1
OUTPUT 714;"STATUS:QUESTIONABLE:ERRORS:CDMA:PTRANSITION 2" !Sets the Questionable Errors
                                                           !CDMA Positive Tranasition
                                                           !Filter Register for bit 1
```

STATus:QUEStionable:ERRors:COMMon Register Bit Assignments

The STATus:QUEStionable:ERRors:COMMon register bits will be used to indicate information about the

COMMon test set device-specific errors (positive error numbers).

Bit Number	Binary Weighting	Condition	Description
15	32768	Not Used. Defined by SCPI.	This bit will always be 0.
14	16384	Reserved for future use.	This bit will always be 0.
13	8192	Reserved for future use.	This bit will always be 0.
12	4096	Reserved for future use.	This bit will always be 0.
11	2048	Reserved for future use.	This bit will always be 0.
10	1024	Reserved for future use.	This bit will always be 0.
9	512	+900 Errors	The condition bit will be pulsed to a 1 and immediately back to 0 if an error in the +900 to +999 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you may query the Event Register to find out which of these errors occurred.
8	256	+800 Errors	The condition bit will be pulsed to a 1 and immediately back to 0 if an error in the +800 to +899 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you may query the Event Register to find out which of these errors occurred.
7	128	+700 Errors	The condition bit will be pulsed to a 1 and immediately back to 0 if an error in the +700 to +799 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you may query the Event Register to find out which of these errors occurred.
6	64	+600 Errors	The condition bit will be pulsed to a 1 and immediately back to 0 if an error in the +600 to +699 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you may query the Event Register to find out which of these errors occurred.
5	32	+500 Errors	The condition bit will be pulsed to a 1 and immediately back to 0 if an error in the +500 to +599 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you may query the Event Register to find out which of these errors occurred.

Bit Number	Binary Weighting	Condition	Description
4	16	+400 Errors	The condition bit will be pulsed to a 1 and immediately back to 0 if an error in the +400 to +499 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you may query the Event Register to find out which of these errors occurred.
3	8	+300 Errors	The condition bit will be pulsed to a 1 and immediately back to 0 if an error in the +300 to +399 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you may query the Event Register to find out which of these errors occurred.
2	4	+200 Errors	The condition bit will be pulsed to a 1 and immediately back to 0 if an error in the +200 to +299 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you may query the Event Register to find out which of these errors occurred.
1	2	+100 Errors	The condition bit will be pulsed to a 1 and immediately back to 0 if an error in the +100 to +199 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you may query the Event Register to find out which of these errors occurred.
0	1	Extension Bit	This bit will always be 0.

Program Example - STATus:QUEStionable:ERRors:COMMon Register Bit Assignments

```
OUTPUT 714;"STATUS:QUESTIONABLE:ERRORS:COMMON:EVENT?" !Queries and clears the Questionable
                                                      !Errors Common Event Register
OUTPUT 714;"STATUS:QUESTIONABLE:ERRORS:COMMON:CONDITION?" !Queries the and clears the
                                                          !Questionable Errors
                                                          !Common Condition Register
OUTPUT 714;"STATUS:QUESTIONABLE:ERRORS:COMMON:ENABLE 1024" !Sets the Questionable
                                                           !Errors Common Enable
                                                           !Register for bit 10
OUTPUT 714;"STATUS:QUESTIONABLE:ERRORS:COMMON:NTRANSITION 2" !Sets the Questionable Errors
                                                             !Common Negative Transition
                                                             !Register for bit 1
OUTPUT 714;"STATUS:QUESTIONABLE:ERRORS:COMMON:PTRANSITION 2" !Sets the Questionable Errors
                                                             !Common Positive Tranasition
                                                             !Register for bit 1
```

STATus:QUEStionable:ERRors:DIGital2000Condition Register Bit Assignment

The STATus:QUEStionable:ERRors:DIGital2000 register bits will be used to indicate information about DIGital2000 related test set device-specific errors (positive error numbers).

Bit Number	Binary Weighting	Condition	Description
15	32768	Not Used. Defined by SCPI.	This bit will always be 0.
14	16384	Reserved for future use.	This bit will always be 0.
13	8192	Reserved for future use.	This bit will always be 0.
12	4096	Reserved for future use.	This bit will always be 0.
11	2048	Reserved for future use.	This bit will always be 0.
10	1024	Reserved for future use.	This bit will always be 0.
9	512	+900 Errors	The condition bit will be pulsed to a 1 and immediately back to 0 if an error in the +900 to +999 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you may query the Event Register to find out which of these errors occurred.
8	256	+800 Errors	The condition bit will be pulsed to a 1 and immediately back to 0 if an error in the +800 to +899 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you may query the Event Register to find out which of these errors occurred.
7	128	+700 Errors	The condition bit will be pulsed to a 1 and immediately back to 0 if an error in the +700 to +799 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you may query the Event Register to find out which of these errors occurred.
6	64	+600 Errors	The condition bit will be pulsed to a 1 and immediately back to 0 if an error in the +600 to +699 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you may query the Event Register to find out which of these errors occurred.
5	32	+500 Errors	The condition bit will be pulsed to a 1 and immediately back to 0 if an error in the +500 to +599 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you may query the Event Register to find out which of these errors occurred.

Bit Number	Binary Weighting	Condition	Description
4	16	+400 Errors	The condition bit will be pulsed to a 1 and immediately back to 0 if an error in the +400 to +499 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you may query the Event Register to find out which of these errors occurred.
3	8	+300 Errors	The condition bit will be pulsed to a 1 and immediately back to 0 if an error in the +300 to +399 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you may query the Event Register to find out which of these errors occurred.
2	4	+200 Errors	The condition bit will be pulsed to a 1 and immediately back to 0 if an error in the +200 to +299 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you may query the Event Register to find out which of these errors occurred.
1	2	+100 Errors	The condition bit will be pulsed to a 1 and immediately back to 0 if an error in the +100 to +199 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you may query the Event Register to find out which of these errors occurred.
0	1	Extension Bit	This bit will always be 0.

Program Example - STATus:QUEStionable:ERRors:DIGital2000 Condition Register Bit Assignment

```
OUTPUT 714;"STATUS:QUESTIONABLE:ERRORS:DIGITAL2000:EVENT?" !Queries and clears the
                                                        !Questionable Errors
                                                        !DIGITAL2000 Event Register
OUTPUT 714;"STATUS:QUESTIONABLE:ERRORS:DIGITAL2000:CONDITION?" !Queries and clears the
                                                             !Qestionable Errors
                                                             !DIGITAL2000 Condition Register
OUTPUT 714;"STATUS:QUESTIONABLE:ERRORS:DIGITAL2000:ENABLE 1024" !Sets the Questionable
                                                              !Errors DIGITAL2000 Enable
                                                              !Register for bit 10
OUTPUT 714;"STATUS:QUESTIONABLE:ERRORS:DIGITAL2000:NTRANSITION 2" !Sets the Questionable
                                                                !Errors DIGITAL2000 Negative
                                                                !Transition Filter
                                                                !Register for bit 1
OUTPUT 714;"STATUS:QUESTIONABLE:ERRORS:DIGITAL2000:PTRANSITION 2" !Sets the Questionable
                                                                !Errors DIGITAL2000 Positive
                                                                !Transition Filter
                                                                !Register for bit 1
```

STATus:QUEStionable:ERRors:TA2000 Register Bit Assignments

The STATus:QUEStionable:ERRors:TA2000 register bits will be used to indicate information about TA2000 related test set device-specific errors (positive error numbers).

Bit Number	Binary Weighting	Condition	Description
15	32768	Not Used. Defined by SCPI.	This bit will always be 0.
14	16384	Reserved for future use.	This bit will always be 0.
13	8192	Reserved for future use.	This bit will always be 0.
12	4096	Reserved for future use.	This bit will always be 0.
11	2048	Reserved for future use.	This bit will always be 0.
10	1024	Reserved for future use.	This bit will always be 0.
9	512	+900 Errors	The condition bit will be pulsed to a 1 and immediately back to 0 if an error in the +900 to +999 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you may query the Event Register to find out which of these errors occurred.
8	256	+800 Errors	The condition bit will be pulsed to a 1 and immediately back to 0 if an error in the +800 to +899 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you may query the Event Register to find out which of these errors occurred.
7	128	+700 Errors	The condition bit will be pulsed to a 1 and immediately back to 0 if an error in the +700 to +799 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you may query the Event Register to find out which of these errors occurred.
6	64	+600 Errors	The condition bit will be pulsed to a 1 and immediately back to 0 if an error in the +600 to +699 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you may query the Event Register to find out which of these errors occurred.
5	32	+500 Errors	The condition bit will be pulsed to a 1 and immediately back to 0 if an error in the +500 to +599 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you may query the Event Register to find out which of these errors occurred.

Bit Number	Binary Weighting	Condition	Description
4	16	+400 Errors	The condition bit will be pulsed to a 1 and immediately back to 0 if an error in the +400 to +499 range occurs. Query the Event Register to find out if one of these errors occurred.
3	8	+300 Errors	The condition bit will be pulsed to a 1 and immediately back to 0 if an error in the +300 to +399 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you may query the Event Register to find out which of these errors occurred.
2	4	+200 Errors	The condition bit will be pulsed to a 1 and immediately back to 0 if an error in the +200 to +299 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you may query the Event Register to find out which of these errors occurred.
1	2	+100 Errors	The condition bit will be pulsed to a 1 and immediately back to 0 if an error in the +100 to +199 range occurs. After setting the Positive Transition Filter and the Negative Transition Filter you may query the Event Register to find out which of these errors occurred.
0	1	Extension Bit	This bit will always be 0.

Program Example - STATus:QUEStionable:ERRors:TA2000 Condition Register Bit Assignment

```
OUTPUT 714;"STATUS:QUESTIONABLE:ERRORS:TA2000:EVENT?" !Queries and clears the
                                                      !Questionable Errors
                                                      !TA2000 Event Register
OUTPUT 714;"STATUS:QUESTIONABLE:ERRORS:TA2000:CONDITION?" !Queries and clears the
                                                          !Qestionable Errors
                                                          !TA2000 Condition Register
OUTPUT 714;"STATUS:QUESTIONABLE:ERRORS:TA2000:ENABLE 1024" !Sets the Questionable
                                                           !Errors TA2000 Enable
                                                           !Register for bit 10
OUTPUT 714;"STATUS:QUESTIONABLE:ERRORS:TA2000:NTRANSITION 2" !Sets the Questionable
                                                             !Errors TA2000 Negative
                                                             !Transition Filter
                                                             !Register for bit 1
OUTPUT 714;"STATUS:QUESTIONABLE:ERRORS:TA2000:PTRANSITION 2" !Sets the Questionable
                                                             !Errors TA2000 Positive
                                                             !Transition Filter
                                                             !Register for bit 1
```

STATus:QUEStionable:HARDware Condition Register Bit Assignment

The STATus:QUEStionable:HARDware register bits give an indication that the data/signals currently being acquired or generated are of questionable quality.

Bit Number	Binary Weighting	Condition	Description
15	32768	Not Used. Defined by SCPI.	This bit will always be 0.
14	16384	Reserved for future use.	This bit will always be 0.
13	8192	Reserved for future use.	This bit will always be 0.
12	4096	Reserved for future use.	This bit will always be 0.
11	2048	Reserved for future use.	This bit will always be 0.
10	1024	Reserved for future use.	This bit will always be 0.
9	512	Reserved for future use.	This bit will always be 0.
8	256	Reserved for future use.	This bit will always be 0.
7	128	Reserved for future use.	This bit will always be 0.
6	64	Reserved for future use.	This bit will always be 0.
5	32	Reserved for future use.	This bit will always be 0.
4	16	Power-up Self Test(s) Failed	This bit will be a 1 if the power-up self tests failed.
3	8	Reserved for future use.	This bit will always be 0.
2	4	Reserved for future use.	This bit will always be 0.
1	2	Reserved for future use.	This bit will always be 0.
0	1	Extension Bit.	This bit will always be 0.

Program Example - STATus:QUEStionable:HARDware Condition Register Bit Assignment

```
OUTPUT 714;"STATUS:QUESTIONABLE:HARDWARE:EVENT?" !Queries and clears the Questionable
                                                 !Hardware Event Register
OUTPUT 714;"STATUS:QUESTIONABLE:HARDWARE:CONDITION?" !Queries and clears the Questionable
                                                     !Hardware Condition Register
OUTPUT 714;"STATUS:QUESTIONABLE:HARDWARE:ENABLE 1024" !Sets the Questionable
                                                      !Hardware Enable
                                                      !Register for bit 10
OUTPUT 714;"STATUS:QUESTIONABLE:HARDWARE:NTRANSITION 2" !Sets the Questionable
                                                        !Hardware Negative Transition Filter
                                                        !Register for bit 1
OUTPUT 714;"STATUS:QUESTIONABLE:HARDWARE:PTRANSITION 2" !Sets the Questionable
                                                        !Hardware Positive Transition Filter
                                                        !Register for bit 1
```

Status Byte Register

*STB?

NOTE The Status Byte Register can also be read with a serial poll. For example, the command "Status_byte = SPOLL(714)" would perform a serial poll of the Status Byte Register, returning and releasing RQS (bit 6).

Status Byte Register Bit Assignments

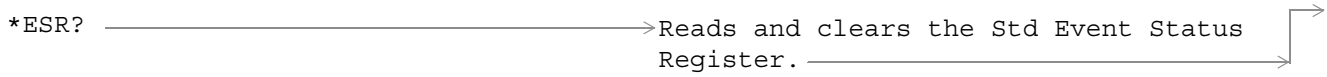
Bit Number	Binary Weighting	Label	Description
7	128	STATus: OPERation	Summarizes the STATus: OPERation Status Register, which fans out to the NMRReady and CALL Status Registers.
6	64	RQS (SRQ TRUE?)/Master Summary Status	RQS is read by a serial poll (SPOLL) Master Summary Status is read by a *STB? query - defined by IEEE 488.2
5	32	Standard Event Status Register	Summarizes the Standard Event Status Register
4	16	Message Available	SCPI - Defined
3	8	STATus: QUEStionable Status Register	Summary Message comes from the STATus: QUEStionable Status Register, which fans out to the CALL and HARDware Status Registers
2	4	Error/ Event Queue	SCPI - Defined
1	2	Reserved	
0	1	Reserved	

Program Example - Status Byte Register Bit Assignments

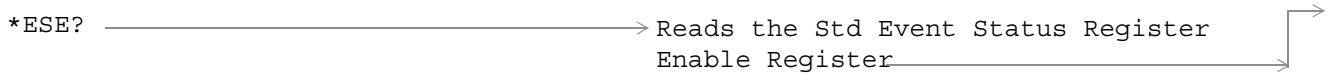
```
OUTPUT 714;"*STB?" !Queries the Status Byte.
```

Standard Event Status Register

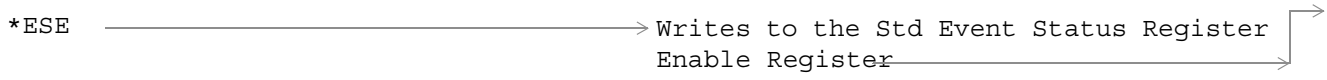
*ESR?



*ESE?



*ESE



"Diagram Conventions" on page 141

Standard Event Status Register Bit Assignment

Bit Number	Binary Weighting	Condition	Description
15	32768	Reserved by IEEE.	This bit will always be 0.
14	16384	Reserved by IEEE.	This bit will always be 0.
13	8192	Reserved by IEEE.	This bit will always be 0.
12	4096	Reserved by IEEE.	This bit will always be 0.
11	2048	Reserved by IEEE.	This bit will always be 0.
10	1024	Reserved by IEEE.	This bit will always be 0.
9	512	Reserved by IEEE.	This bit will always be 0.
8	256	Reserved by IEEE.	This bit will always be 0.
7	128	Power On	This bit is set to 1 if the power supply has been turned off and on since the last time this register was read or otherwise cleared. Defined in "IEEE Std. 488.2-1992",11.5.1.1.2
6	64	Reserved for future use.	This bit will always be 0.
5	32	Command Error	This bit is set to 1 if the test set detects an error while trying to process a command. The following events cause a command error: • An IEEE 488.2 syntax error. The test set received a message that did not follow the syntax defined by the standard. • A semantic error. For example the test set received an incorrectly spelled command. • The test set received a group execution trigger (GET) inside a program message
4	16	Execution Error	This bit is set to 1 if the test set detects an error while trying to execute a command. The following events cause a execution error: • A <PROGRAM DATA> element received in a command is outside the legal range for the test set, or it is inconsistent with the operation of the test set. • The test set could not execute a valid command due to some test set hardware/firmware condition.
3	8	Device Dependent Error	This bit is set to 1 if a test set operation does not execute properly due to an internal condition (such as, overrange). This bit indicates that the error was not a command, query, or execution error.

Bit Number	Binary Weighting	Condition	Description
2	4	Query Error	This bit is set to 1 if an error has occurred while trying to read the test set's output queue. The following events cause a query error: • An attempt is made to read data from the output queue when no data is present or is pending. • Data in the output queue has been lost. An example of this would be an output queue overflow.
1	2	Reserved for future use.	This bit will always be 0.
0	1	Operation Complete	This bit is set to 1 when the test set has completed all pending operations and is ready to accept new commands. This bit is only generated in response to the *OPC IEEE 488.2 common command.

Program Example - Standard Event Status Register

```
OUTPUT 714;"*ESR?" !Queries (reads) the Standard Event Status Register.
```

SYSTem Subsystem

Description

The SYSTem subsystem performs system level configuration functions of the test set.

Syntax Diagrams and Command Descriptions

"SYSTem:APPLication" on page 351

"SYSTem:BEEPer" on page 357

"SYSTem:COMMunicate" on page 359

"SYSTem:CONFigure:INFormation:HARDware:VERBose?" on page 363

"SYSTem:CORRection" on page 365

"SYSTem:APPLication" on page 351

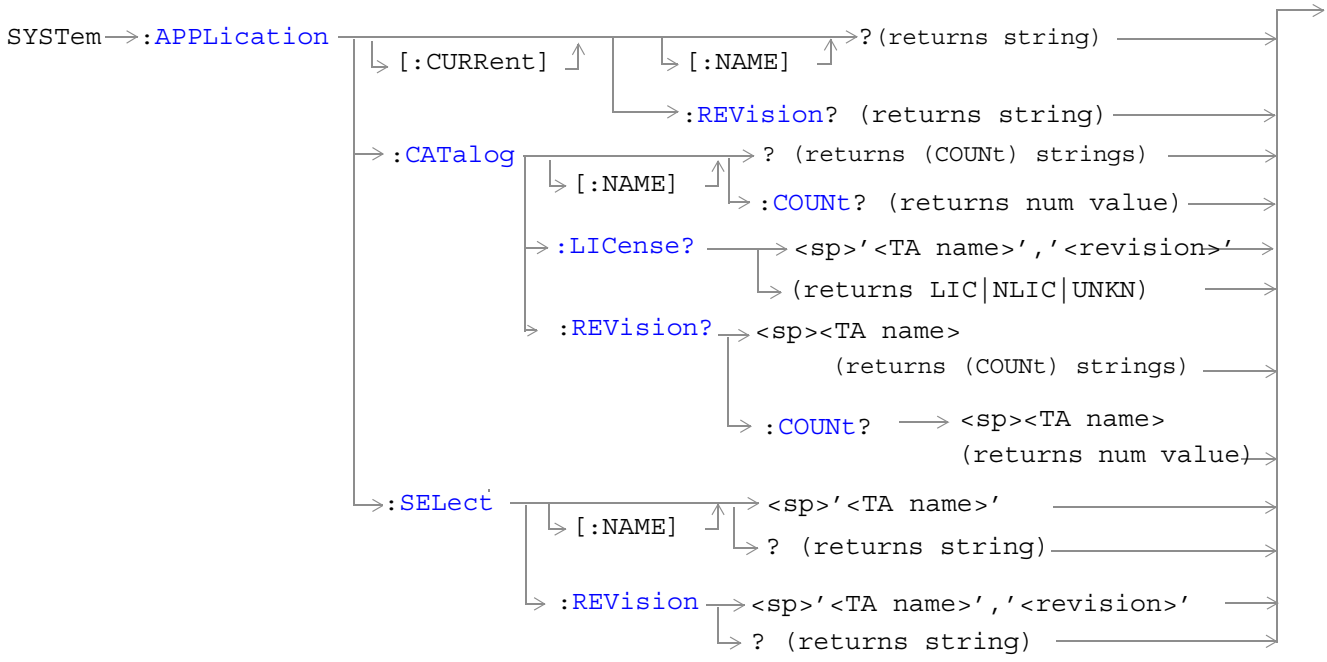
"SYSTem:ERRor?" on page 371

"SYSTem:MEASurement:RESet" on page 373

"SYSTem:PRESet" on page 375

"SYSTem:SYNChronized" on page 379

SYSTem:APPLication



"Diagram Conventions" on page 141

SYSTem:APPLication:CATalog:LICense? '<test application name>','<revision>'

Function	Query the license status for a selected revision. The query must include two strings separated by a comma. The test application name and revision must be entered as they appear in the test application Setup menu, with the exception that the string is not case sensitive and can be entered in any combination of upper and lower case letters. The returned values are: • "LIC" indicates this is a licensed test application. • "NLIC" indicates this is not a licensed test application. • "UNKN" indicates that license status is unknown.
Query	Range: LIC | NLIC | UNKN
Programming Example `OUTPUT 714;"SYSTEM:APPLICATION:CATALOG:LICENSE? 'GSM mobile test','A.04.00'"`	

SYSTem:APPLication:CATalog:REVision? '<test application name>'

Function	Query the test set for all of the revision numbers stored on the test set's hard drive. You must specify a test application. The test application name must be entered as it appears in the test application Setup menu, with the exception that the string is not case sensitive and can be entered in any combination of upper and lower case letters.
Query	Range: One or more comma separated strings including a null string
Programming Example `OUTPUT 714;"SYSTEM:APPLICATION:CATALOG:REVISION? 'AMPS/136 MOBILE TEST'"`	

SYSTem:APPLication:CATalog:REVision:COUNt? '<test application name>'

Function	Query the test set for the number of revisions present on the hard disk for a specified test application. Up to 30 revisions can be stored for a test application. The test application name must be entered as it appears in the test application Setup menu, with the exception that the string is not case sensitive and can be entered in any combination of upper and lower case letters.
Query	Range: 0 through 30
Programming Example `OUTPUT 714;"SYSTEM:APPLICATION:CATALOG:REVISION:COUNT? 'AMPS/136 MOBILE TEST'"`	

SYSTem:APPLication:CATalog[:NAME]?

Function	Query the test set for all of the names of the test applications stored on the hard drive. This query returns one or more strings, each string is separated by a comma.
Query	Range: AMPS/136 Mobile Test CDMA 2000 Test Mode GSM Mobile Test GPRS Mobile Test
Programming Example `OUTPUT 714;"SYSTEM:APPLICATION:CATALOG:NAME?"`	

SYSTem:APPLication:CATalog[:NAME]:COUNt?

Function	Query the test set for the total number test application names stored on the hard drive. Up to 30 test applications can be stored.
Query	Range: 0 through 30
Programming Example `OUTPUT 714;"SYSTEM:APPLICATION:CATALOG:NAME:COUNT?"`	

SYSTem:APPLication[:CURRent][:NAME]?

Function	Query the test set for the name of the currently running test application.
Query	Range: AMPS/136 Mobile Test CDMA 2000 Test Mode GSM Mobile Test GPRS Mobile Test null string
Programming Example `OUTPUT 714;"SYSTEM:APPLICATION:CURRENT:NAME?"`	

SYSTem:APPLication[:CURRent]:REVision?

Function	Query the test set for the currently running test application revision number.
Query	Range: Any string up to 20 characters including null. A typical example would be A.01.01 for a licensed version.
Programming Example `OUTPUT 714;"SYSTEM:APPLICATION:CURRENT:REVISION?"`	

SYSTem:APPLication:SELect[:NAME] '<test application name>'

Function	Selects a test application and reboots the test set. This will switch the test application to the revision already selected. There is no need to re-select the revision before switching. The reboot process takes about 1 minute. Queries the test set for the test application that is selected and will run after the next reboot of the test set. This string is not case sensitive. The test application name must be entered as it appears in the test application Setup menu, with the exception that the string is not case sensitive and can be entered in any combination of upper and lower case letters. **NOTE** Selecting the correct name and the desired revision of a test application is important. This information should be reviewed before proceeding. The directions for how to determine test application name and revision are found in this document.
Setting	Range: AMPS/136 Mobile Test CDMA 2000 Test Mode GSM Mobile Test GPRS Mobile Test
Query	Range: AMPS/136 Mobile Test CDMA 2000 Test Mode GSM Mobile Test GPRS Mobile Test null string

Programming Example
`OUTPUT 714;"SYSTEM:APPLICATION:SELECT:NAME 'AMPS/136 MOBILE TEST'"`
`OUTPUT 714;"SYSTEM:APPLICATION:SELECT:NAME?"`	

SYSTem:APPLication:SELect:REVision '<test application name>','<revision>'

Function	Selects a test application revision and a test application. The revision does not need to be set in order to switch test applications. The only time you select revisions is to change revisions. Queries the test set for the revision of a specified test application. The test application name and revision must be entered as they appear in the test application Setup menu, with the exception that the string is not case sensitive and can be entered in any combination of upper and lower case letters. **NOTE** GSM Mobile Test; revisions before A.04.00 did not have test application switching and provide no way to return to revisions that have switching. Users will need to reload a revision that has test application switching following the download process for upgrading firmware.
Setting	Range: A valid test application name and revision number for any licensed test application.
Query	Range: Any string up to 20 characters including null.

Programming Example

```
OUTPUT 714;"SYSTEM:APPLICATION:SELECT:REVISION 'GSM MOBILE TEST','A.04.00'"
OUTPUT 714;"SYSTEM:APPLICATION:SELECT:REVISION? 'GSM MOBILE TEST'"
```

Related Topics

****

"Selecting a Radio Personality" on page 423

"Obtaining Test Application Information" on page 421

****

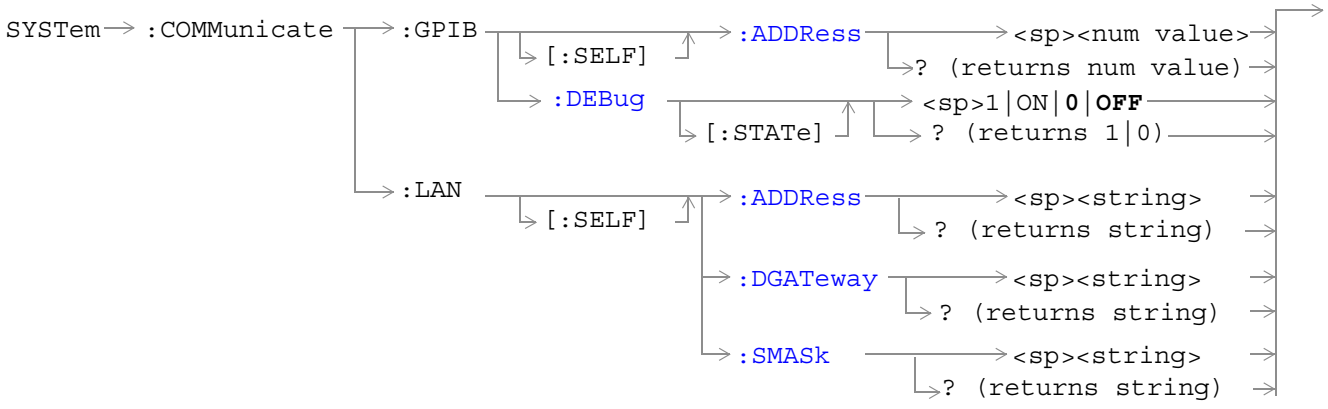
SYSTem:BEEPer

"SYSTem:BEEPer" on page 357

SYSTem:BEEPer:STATe

Function	Sets/queries the beeper state of the test set.
Setting	0|OFF | 1|ON
Query	0|1
*RST Setting	1 (on)
Related Topics	"Test Set Beeper"
Programming Example `OUTPUT 714;"SYSTEM:BEEPER:STATE OFF" !Sets beeper state to off.`	

SYSTem:COMMunicate



"Diagram Conventions" on page 141

SYSTem:COMMunicate:GPIB:[:SELF]:ADDRess

Function	Sets/queries the test set's GPIB address.
Setting	Range: 0 to 30 Resolution: 1
Query	Range: 0 to 30 Resolution: 1
Factory setting	14 (this parameter is not affected by any reset operation and can only be changed by direct user access)
Related Topics	"Configuring the Test Set's GPIB" on page 409
Programming Example `OUTPUT 714;"SYSTEM:COMMUNICATE:GPIB:SELF:ADDRESS 14" !Sets the GPIB address to 14.`	

SYSTem:COMMunicate:GPIB:DEBug[:STATe]

Function	Sets/queries the test set's SCPI debugger state. When the state is on; enhanced error messages (generated from GPIB commands with syntax errors) are shown the test set display. The error message is printed along with the syntax. <ERR> is displayed at the end of the incorrect node. Non-printable characters will be replaced with the $ symbol. See "Error Message List and Summary" on page 433 for a list of the errors. The debugger state should be set to on only during GPIB code development. Test times will increase if the debugger state is left on.
Setting	Range: 0|OFF | 1|ON
Query	0|1
*RST setting	0|off
Programming Example `OUTPUT 714;"SYSTEM:COMMUNICATE:GPIB:DEBUG:STATE ON" !Sets debugger to on.`	

SYSTem:COMMunicate:LAN[:SELF]:ADDRess

Function	Sets/queries the test set's LAN IP address. The value of A is used to determine the subnet mask, see "SYSTem:COMMunicate:LAN[:SELF]:SMASk" on page 361. If the LAN address is changed the subnet mask should be checked to insure that it is set to the proper class for that LAN address.
Setting	Range: 15 characters formatted as follows: A.B.C.D where A= 0 to 223 B,C,D = 0 to 255 (no embedded spaces)
Query	Range: 15 characters formatted as follows: A.B.C.D where A= 0 to 223 B,C,D = 0 to 255 (no embedded spaces)
Factory setting	0.0.0.0 (this parameter is not affected by any reset operation and can only be changed by direct user access)
Related Topics	"Configuring the Test Set's LAN" on page 415
Programming Example `OUTPUT 714;"SYSTEM:COMMUNICATE:LAN:SELF:ADDRESS '130.015.156.255'" !Sets the !LAN IP !address.`	

SYSTem:COMMunicate:LAN[:SELF]:DGATeway

Function	Sets/queries the LAN IP router/gateway address for the test set.
Setting	Range: 15 characters formatted as follows: A.B.C.D where A= 0 to 223 B,C,D = 0 to 255 (no embedded spaces), blank field
Query	Range: 15 characters formatted as follows: A.B.C.D where A,B,C,D = 0 to 255 (no embedded spaces). blank field
Factory setting	blank field, (this parameter is not affected by any reset operation)

Programming Example

```
OUTPUT 714;"SYSTEM:COMMUNICATE:LAN:SELF:DGATEWAY '130.2.6.200'"
```

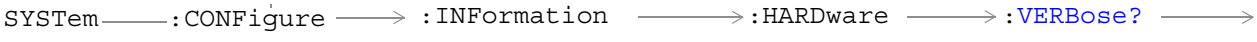
SYSTem:COMMunicate:LAN[:SELF]:SMASk

Function	Sets/queries the subnet mask of the test set based on the LAN IP address selected. The subnet mask changes according to the value of A used for the LAN IP address. If A is less than or equal to 127, the subnet mask is 255.0.0.0. If A is greater than 127 and less or equal to 191, the subnet mask is 222.255.0.0. If A is grater than 191, the subnet mask is 255.255.255.0. If the LAN address is changed the subnet mask should be checked to insure that it is set to the proper class for that LAN address.
Setting	Range: 15 characters formatted as follows: A.B.C.D where A,B,C,D are between = 0 to 255 (no embedded spaces)
Query	Range: 15 characters formatted as follows: A.B.C.D where A,B,C,D are between = 0 to 255 (no embedded spaces)
Factory setting	0.0.0.0 (this parameter is not affected by any reset operation and can only be changed by direct user access)

Programming Example

```
OUTPUT 714;"SYSTEM:COMMUNICATE:LAN:SELF:SMASK '255.2.6.200'"
```

SYSTem:CONFigure:INFormation:HARDware:VERBose?



"Diagram Conventions" on page 141

SYSTem:CONFigure:INFormation:HARDware:VERBose?

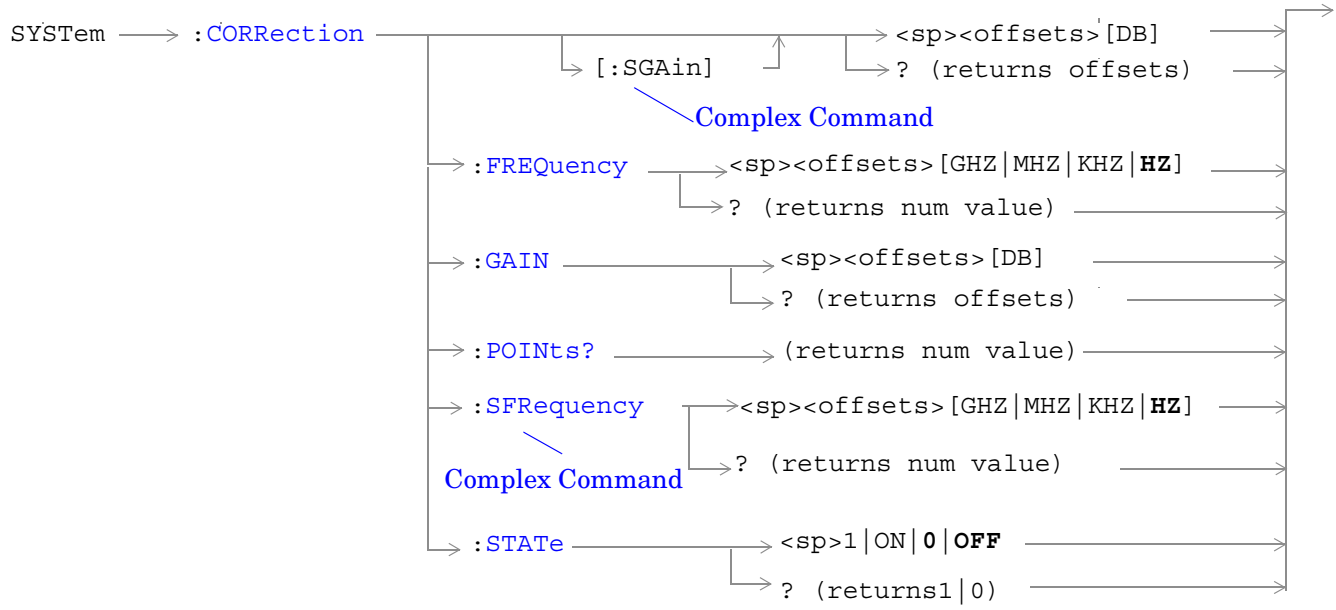
Function	Query the manufacturer, model number, model number of the test application running, serial number, revision, board ID, and cal file information. The information provided by the query represents the configuration that existed when the test set was powered up.
*RST Setting	Resets have no effect on this information. The information is gathered during the power up cycle.
Related topics	"Hardware Configuration Report"

Programming Example

```
OUTPUT 714;"SYSTEM:CONFIGURE:INFORMATION:HARDWARE:VERBOSE?" !Queries system hardware.
```

SYSTem:CONFigure:INFormation:HARDware:VERBose?

SYSTem:CORRection



"Diagram Conventions" on page 141

SYSTem:CORRection[:SGAin]

Function	Sets/queries up to 20 comma-separated amplitude offset values in dB. This command sets the state to On. See "Measurement Related Configuration" on page 417. The units, dB, are optional. If no units are specified then units default to dB. Sending a null list (no values) sets the state of all offsets to Off.
Setting	Range: 0 to 20 values between –100 to +100 Resolution: 0.01
Query	Range: 1 to 20 values between –100 to +100, and NAN (9.91E+37) Resolution: 0.01
Factory Setting	Offsets 1 through 20, are set to 0.00 dB, state is set to Off

Programming Example

```
OUTPUT 714;"SYSTEM:CORRECTION:SGAIN -2.55,-3.12,-3.68,-4.23,-4.74,-5.3"
!A complex command that sets up to 20 comma separated offsets
!and sets the state to On for the frequencies, offsets and
!RF IN/OUT Amplitude Offset State

OUTPUT 714;"SYSTEM:CORRECTION:SGAIN"
!Sets the state for all frequencies and offsets to Off
```

SYSTem:CORRection:FREQuency

Function	Sets/queries up to 20 comma-separated frequency values in MHz. The units, (GHz, MHz, kHz, Hz) are optional. If no units are specified, units default to Hz. See "Measurement Related Configuration" on page 417. Sending a null list (no values) sets the state of all frequencies to Off.
Setting	Range: 0 to 20 comma separated values ranging from 292.5 MHz to 2700 MHz Resolution: 1 Hz
Query	Range: 1 to 20 comma separated values ranging from 292.5 MHz to 2700 MHz, and NAN (9.91E+37) Resolution: 1 HZ
Factory Setting	1. 800.00 MHz Off 2. 810.00 MHz Off 3. 820.00 MHz Off 4. 830.00 MHz Off 5. 840.00 MHz Off 6. 850.00 MHz Off 7. 860.00 MHz Off 8. 870.00 MHz Off 9. 880.00 MHz Off 10. 890.00 MHz Off 11. 900.00 MHz Off 12. 910.00 MHz Off 13. 920.00 MHz Off 14. 930.00 MHz Off 15. 940.00 MHz Off 16. 950.00 MHz Off 17. 960.00 MHz Off 18. 970.00 MHz Off 19. 980.00 MHz Off 20. 990.00 MHz Off

Programming Example

```
OUTPUT 714;"SYSTEM:CORRECTION:FREQUENCY 1784.8 MHZ,1879.8 MHZ"
!Sets up to 20 comma separated frequencies

OUTPUT 714;"SYSTEM:CORRECTION:FREQUENCY"
!Sets the state for all frequencies and offsets to Off
```

SYSTem:CORRection:GAIN

Function	Sets/queries the up to 20 comma separated offset values in dB. See "Measurement Related Configuration" on page 417. The units, dB, are optional. If no units are specified, units default to dB. Sending a null list (no values) sets the state of all offsets to Off.
Setting	Range: 0 to 20 values between –100 to +100 Resolution: 0.01
Query	Range: 1 to 20 values between –100 to +100, and NAN (9.91E+37) Resolution: 0.01
Factory Setting	Offsets 1 through 20, are set to 0.00 dB, state is set to off

Programming Example

```
OUTPUT 714;"SYSTEM:CORRECTION:GAIN -3.12,-3.68,-4.23"
!Sets up to 20 comma separated offset values

OUTPUT 714;"SYSTEM:CORRECTION:GAIN"
!Sets the state for all frequencies and offsets to Off
```

SYSTem:CORRection:POINts

Function	Query returns the number of offsets that are in their On state when the RF IN/OUT Amplitude Offset State is also set to On. See "Measurement Related Configuration" on page 417.
Query	Range: 1 to 20, and NAN (9.91E+37) Resolution: 1

Programming Example

```
OUTPUT 714;"SYSTEM:CORRECTION:POINTS?"
!Returns the number of frequencies and offsets
!with their state set to On
```

SYSTem:CORRection:SFRequency

Function	Sets/queries up to 20 comma separated frequency values in MHz. This command sets the state to On. The units (GHz, MHz, kHz, Hz) are optional. If no units are specified, units default to MHz. See "Measurement Related Configuration" on page 417. Sending a null list (no values) sets the state of all frequencies to Off.
Setting	Range: 0 to 20 comma separated values from 292.5 MHz to 2700 MHz Resolution: 1 Hz
Query	Range: 1 to 20 comma separated values from 292.5 MHz to 2700 MHz, and NAN (9.91E+37) Resolution: 1 HZ
Factory Setting	1. 800.00 MHz Off 2. 810.00 MHz Off 3. 820.00 MHz Off 4. 830.00 MHz Off 5. 840.00 MHz Off 6. 850.00 MHz Off 7. 860.00 MHz Off 8. 870.00 MHz Off 9. 880.00 MHz Off 10. 890.00 MHz Off 11. 900.00 MHz Off 12. 910.00 MHz Off 13. 920.00 MHz Off 14. 930.00 MHz Off 15. 940.00 MHz Off 16. 950.00 MHz Off 17. 960.00 MHz Off 18. 970.00 MHz Off 19. 980.00 MHz Off 20. 990.00 MHz Off

Programming Example

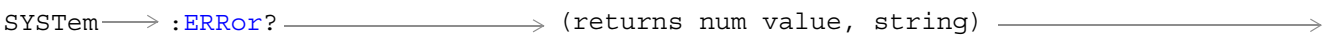
```
OUTPUT 714;"SYSTEM:CORRECTION:SFREQUENCY 1710.2 MHZ,1805.2 MHZ,1784.8 MHZ,1879.8 MHZ"
!Sets up to 20 comma separated frequencies and sets the state to On for the frequency,
!offset, and RF IN/OUT Amplitude Offset State


OUTPUT 714;"SYSTEM:CORRECTION:SFREQUENCY"
!Sets the state for all frequencies and offsets to Off
```

SYSTem:CORRection:STATe

Function	Sets/queries the RF IN/OUT Amplitude Offset State. The state must be On before any of the offsets are active regardless of the state for any of the frequencies or offsets. When the RF IN/OUT Amplitude Offset State is On, the Instrument Status Area will indicate "Offset" regardless of the state for any of the frequencies or offsets. Setting any of the frequency or offset states to On will set the RF IN/OUT Amplitude Offset State to On. See "Measurement Related Configuration" on page 417.
Setting	0|OFF | 1|ON
Query	0|1
Factory Setting	0|off

Programming Example
`OUTPUT 714;"SYSTEM:CORRECTION:STATE ON" !Sets the RF IN/OUT`
`!Amplitude Offset State to On`	

SYSTem:ERRor?



"Diagram Conventions" on page 141

SYSTem:ERRor?

Function	Queries the contents of the error/event queue. The error/event queue may contain one or more messages with an error or event description. Manual users may view the message log from the SYSTEM CONFIG screen. The contents of the error/event queue and the message log may not match. For example, manual user errors are not displayed with SYSTem:ERRor? They are viewed from the Message Log. See "Error Message List and Summary" .
Query	Error/Event Queue • Range: 0 to 100 messages up to 255 characters in length
Programming Example `OUTPUT 714;"SYSTEM:ERROR?" !`Query the contents of the Error/Event Queue	

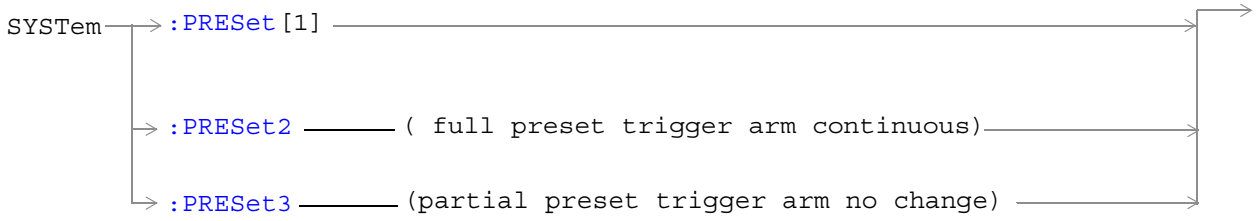
SYSTem:MEASurement:RESet

"Diagram Conventions" on page 141

SYSTem:MEASurement:RESet

Function	Aborts all measurements. If continous triggering is enabled, measurements will begin a new measurement cycle.
Setting	Measurement results are set to their default values when measurement reset occurs.

SYSTem:PRESet



"Diagram Conventions" on page 141

SYSTem:PRESet[1] (not recommended for use)

Function	Not recommended for use at this time. See "SYSTem:PRESet3" for a recommended partial preset. Performs a partial preset. This command is intended to be used when changing from remote operation to manual operation and a partial preset is needed. Any call in process is disconnected and all measurements are aborted and inactivated. Measurement parameters are not changed. A partial preset will not modify any measurement settings including trigger arm. See "Trigger Arm (Single or Continuous) Description" on page 101.
Related Topics	See "Partial Preset" on page 391 for more details
Programming Example `OUTPUT 714;"SYSTEM:PRESET" !Partial preset when changing from remote to manual operation.`	

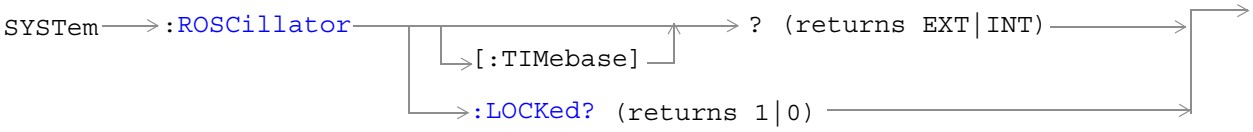
SYSTem:PRESet2

Function	Performs a full preset of the test set. This is the remote equivalent of pressing the SHIFT Preset keys on the front panel of the test set. All parameters are set to their default values. All measurements are aborted the trigger arm is set to continuous. See "Trigger Arm (Single or Continuous) Description" on page 101. The *RST command will set the trigger arm to single.
Related Topics	See "Full Preset" on page 391 for details about the *RST full preset.
Programming Example `OUTPUT 714;"SYSTEM:PRESET2" !Full preset, trigger arm set to continuous.`	

SYSTem:PRESet3

Function	Performs a partial preset. This is the recommended command for users when a partial preset is needed during remote operation of the test set. Any call in process is disconnected and all measurements are aborted and inactivated. Measurement parameters are not changed. A partial preset will not modify any measurement settings including trigger arm. See "Trigger Arm Default Settings"
Related Topics	See "Partial Preset" for more details.
Programming Example `OUTPUT 714;"SYSTEM:PRESET3" !Partial preset when in remote operation.`	

SYSTem:ROSCillator



"Diagram Conventions" on page 141

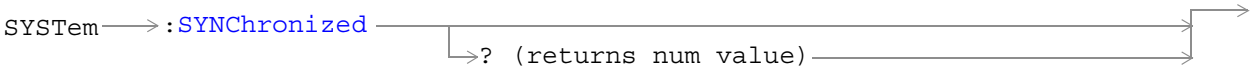
SYSTem:ROSCillator[:TIMebase]?

Function	Queries the timebase source. If an external timebase is used, it must have these characteritics: • an output level of 0 to +13 dBm • frequency of 10 MHz
Query	Range: INT = internal source EXT = external source

SYSTem:ROSCillator:LOCKed?

Function	Queries the timebase to find out if it is locked or unlocked. Returns 0 or 1.
Query	Range: 0 = unlocked 1 = locked

SYSTem:SYNChronized



"Diagram Conventions" on page 141

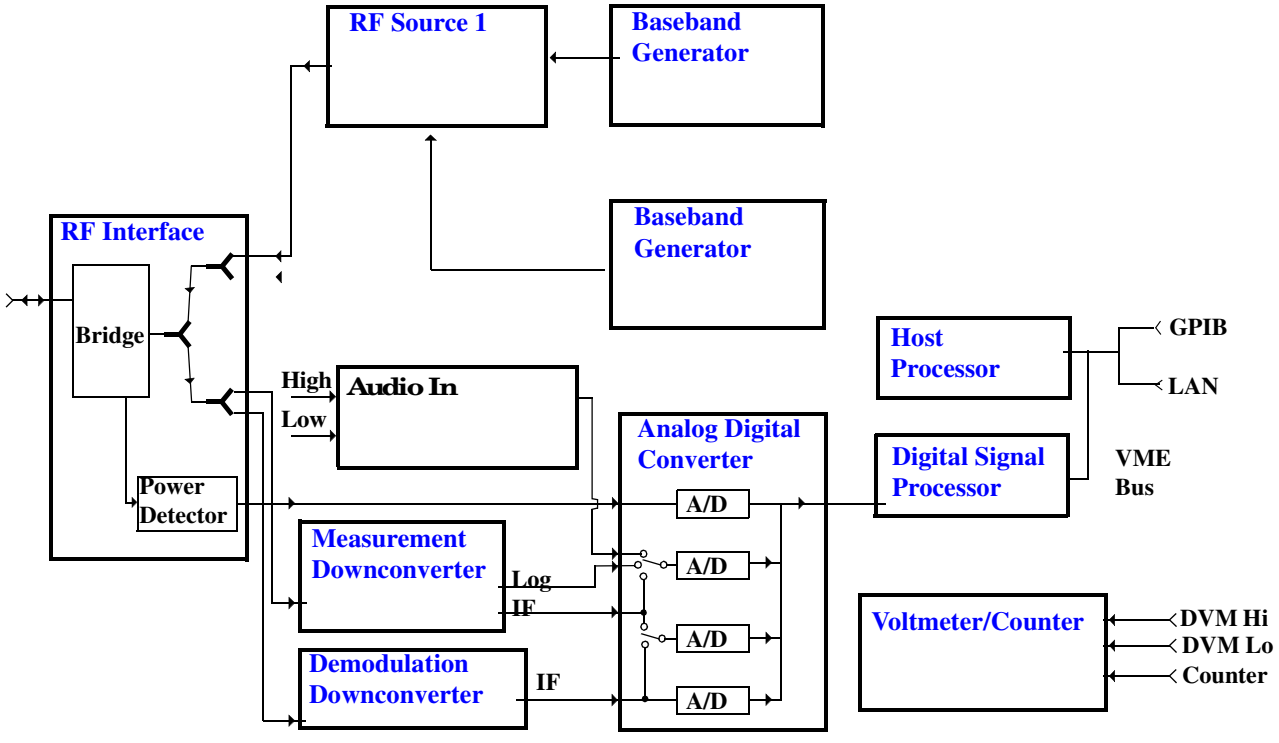
SYSTem:SYNChronized

Function	Sets/queries the test set to see that all prior sequential commands have completed or that all prior overlapped commands have started, indicating that the input buffer is synchronized.
Setting	Bit 12 of the status operation condition register is pulsed.
Query	Range: 1

5 General Usage

Block Diagram

Description



RF Interface Module

Input and output signals are routed through the RF Interface module. The RF Interface module consists of a directional bridge for sampling incoming power and hybrid power splitters which create 4 bidirectional ports, (two receiver ports and two source ports), RF amplifiers, video gain circuits, and fast and slow power detectors.

The sampled input power from the directional bridge is routed to a fast power detector or a slow detector. The fast power detector has a response time of several microseconds, allowing measurements on single RF bursts.

The RF Interface module provides two identical RF Source path connections to the In/Out port of the instrument. There is about 25 dB of isolation between the two source paths. There is about 35 dB of isolation between the source paths and either receiver path. The RFIO module has nominally 23 dB of insertion loss in the source path. A temperature sensing circuit facilitates compensation for path loss variation with temperature.

The sampled input power from the directional bridge can be amplified by as many as two 18 dB range amplifiers and then can be directed to the fast detector, or the slow detector. The input power to the fast detector is detected by a diode detector that is part of a feedback loop. The input to the slow detector is measured in a bridge using a pair of RMS thermal detectors in a feedback loop. Signals from the fast and slow power detectors are calibrated with Gain DAC's. Video gain can be applied in 6 dB and 1.5 dB steps.

Signal Downconversion

The test set's downconversion receiver section has two downconversion modules; a high performance Measurement Downconversion Module for making measurements, and a Demodulation Downconversion Module for maintaining the radio link.

Measurement Downconverter Module The Measurement Downconverter module is a part of the receiver, it provides high quality (wide dynamic range, spurious free) signals to the Analog to Digital Converter module's measurement sampler input. These signals are:

- 10 KHz - 6 MHz Intermediate Frequency signal
- detected envelope of the Intermediate Frequency signal

The Measurement Downconverter module is designed for very high performance operation to ensure accurate and repeatable measurement results. The Measurement Downconverter module contains two downconversion stages, two local oscillators, and a logarithmic IF envelope detector . Both first and second LO synthesizers are tunable. The first LO is used when tuning to the RF input frequency, and the second LO is used when setting second IF frequency, which is fed to the measurement sampler on the Analog to Digital Converter module.

Demodulation Downconverter Module The Demodulation Downconverter module is used as part of the demodulation receiver to maintain the radio link of a given TA. The IF signal from the Demodulation Downconverter is sent to the Analog to Digital Converter.

Analog to Digital Converter Module

Following the Measurement Downconverter and Demodulation Downconverter modules is the Analog to Digital Converter module. The purpose of the Analog to Digital Converter module is to convert the downconverted analog signals into digital data streams which can be processed by the Digital Signal Processing module.

In order to maintain the radio link of a given TA, the downconversion path through the Demodulation Downconverter module has a dedicated A/D conversion path.

In order to optimize measurement throughput, the fast RF power detector also has a single dedicated A/D path. This allows power measurements, in many cases, to be made concurrently with other measurements. The two outputs from the Measurement Downconverter module, and the Audio In signal share a single multiplexed A/D path.

The outputs of the various analog to digital converters on the Analog to Digital Converter module share a common data bus to the Digital Signal Processing module.

Digital Signal Processing Module

The Digital Signal Processing (DSP) module is responsible for a variety of tasks within the overall test set architecture. These tasks are:

- demodulating data from the radio under test (data received from the Demodulation Downconverter module).
- execute a variety of signal processing algorithms to perform measurements on the radio system of the currently loaded TA (data received from the power detector ADC, the measurement ADC and, in some cases, data received from the Demodulation Downconverter ADC)

The DSP processor communicates with the Host Processor, as well as controlling the configuration and synchronization of the Analog to Digital Converter module.

Host Processor Module

The Host Processor module is responsible for a variety of tasks within the overall test set architecture. These tasks include:

- control of the manual user interface (MUI)
- executing commands and processing data received from the LAN interface
- executing commands and processing data received from the GPIB interface
- controlling disk access
- control of all RF and audio hardware modules
- routing measurement results received form the Digital Signal Processing module to the appropriate output device (display, GPIB, LAN, serial, etc.)

RF Source

The RF source is used to provide a digitally modulated RF carrier for use in parametric testing of mobile stations. In general, the source has a frequency range of 45 MHz to 2.7 GHz and an amplitude range of -13 dBm to -135 dBm.

The RF source consists of a Synthesized Signal Generator module followed by a Vector Output module and an RF Attenuator module. Baseband modulation information is supplied to the RF source from Baseband Generator modules.

Baseband Generator

The purpose of the Baseband Generator modules is to provide, for the modulation type currently in effect, properly formatted baseband signals to the modulation circuits on the RF Source module.

Forward Channel Description

October 20, 2000

Description

The forward channel code channels transmitted by the test set include:

- PICH (pilot channel)
- SCH (sync channel)
- PCH (paging channel (overhead messages only))
- 1 QPCH (quick paging channel (all on or all off indicators))
- 1 TCH (traffic channel) or FCH (fundamental channel) (depending on the radio configuration)
- 1 SCH (supplemental channel (RC (radio configuration) 3, RC4 or RC5 only)
- 1 OCNS (orthogonal channel noise simulator) channel

In addition, a broadband AWGN (additive white gaussian noise) source is also available.

Relative power levels can be set for all channels except for OCNS, which is used to simulate other users on the forward CDMA channel. OCNS is calculated to make the sum of the walsh coded channels sum up to the cell power setting. Cell power is set using the "CALL[:CELL]:POWer" commands.

Data Patterns/Rates

All data patterns are CCITT 2^{15} -1 PRBS (pseudo-random bit sequence).

Data rates available on the TCH/FCH depend on the RC and include:

Table 3. Forward FCH Data Rates

Rate	RC1	RC2	RC3	RC4	RC5
Eighth	1.2 kbps	1.8 kbps	1.5 kbps	1.5 kbps	1.8 kbps
Quarter	2.4 kbps	3.6 kbps	2.7 kbps	2.7 kbps	3.6 kbps
Half	4.8 kbps	7.2 kbps	4.8 kbps	4.8 kbps	7.2 kbps
Full	9.6 kbps	14.4 kbps	9.6 kbps	9.6 kbps	14.4 kbps

TCH/FCH data rates can be set using the "CALL:TRAFfic" commands.

Data rates available on the SCH also depend on the RC and include those listed in table 2:

Table 4. Forward SCH Data Rates

RC3	RC4	RC5
9.6 kbps	9.6 kbps	14.4 kbps
19.2 kbps	19.2 kbps	28.8 kbps
38.4 kbps	38.4 kbps	57.6 kbps
76.8 kbps	76.8 kbps	115.2 kbps
153.6 kbps	153.6 kbps	230.4 kbps
	307.2 kbps	

SCH data rates can be set using the "CALL:SCHannel" commands.

Closed Loop Power Control

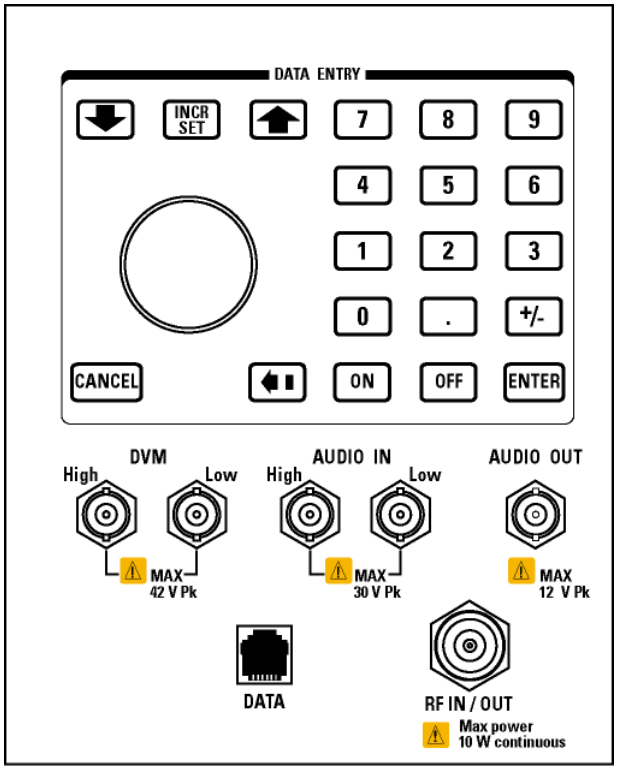
There is no active (closed loop) power control on the forward channel. The only closed loop power control bit patterns available are:

- Alternating up/down
- All up
- All down

Closed loop power control bit patterns can be set using the "CALL[:CELL]:CLPControl" commands.

Front Panel Connectors

Description



AUDIO IN

The input to the audio analyzer is a floating input differential amplifier. Both the AUDIO IN High and AUDIO IN Low BNC connectors should be connected to provide noise immunity. Refer to the technical specifications for more information.

AUDIO OUT

This BNC connector accesses to the test set's audio generator. Refer to the technical specifications for more information.

DATA

The RJ-45 DATA connector provides LAN access at the front panel of the test set.

The the DATA connector on the front panel is connected internally to the ETHERNET TO FRONT PANEL connector on the rear panel. In order to use the front panel DATA connector, connect the rearpanel LAN PORT,

to the rearpanel ETHERNET TO FRONT PANEL connector with the LAN jumper cable.

The LAN jumper cable, part number E5515-61160, is supplied with the test set.

DVM

Not functional for this release.

RF IN/OUT

This Type-N connector is the path for all RF signals in or out of the test set. Refer to the technical specifications for more information.

Preset Descriptions

Description

The test set is capable of accepting several different preset commands.

At no time during a preset operation, will transmit power exceed the last user setting of the transmit power. The input power will not be set to any value lower than the last user setting of the input power. This is to avoid power spikes on the output and possible receiver damage on the input during transitions associated with preset operations.

Partial Preset

```
OUTPUT 714;"SYSTEM:PRESET3" !Command for a partial preset when user in
                            !remote operation.
```

SYSTEM:PRESET3 is the recommended command for a partial preset operation. The SYSTEM:PRESET[1] command is not recommended for use at this time.

Full Preset

A full preset requires you to setup new measurements and their parameters. If new setup parameters are not needed, use a partial preset to save time.

Example

```
OUTPUT 714;"*RST" !Recommended command for a full preset, sets trigger arm to single.

OUTPUT 714;"SYSTEM:PRESET2" !Command for a full preset, sets trigger arm to continuous.
```

The *RST common command is the recommended command for a full preset operation.

NOTE Transmit power is not set to OFF during a full preset, transmit power will be set to the default value.

*RST gives the same results as partial preset with the exception of Trigger Arm and the measurement parameters.

Table 5. Full Preset Behavior

Function	Result
Trigger Arm	Continuous (manual operation full preset or SYSTEM:PRESET2 command)
Trigger Arm	Single (remote operation full preset, *RST command)

Table 5. Full Preset Behavior

Function	Result
Measurement Parameters	all set to defaults
Maskable Message Display State	On (manual operation full preset)
Maskable Message Display State	Off (remote operation full preset)

Status Preset

The STATUS:PRESET command will set the status system as defined in “SCPI 1995 Volume 2: Command Reference” section 20.7. All of the enable registers will be set to 0, all PTR registers will be set to 1, and all NTR registers will be set to 0.

Example

```
OUTPUT 714;”STATUS:PRESET” !Presets the STATus subsystem.
```

Related Topics

****

“SYSTem:PRESet”

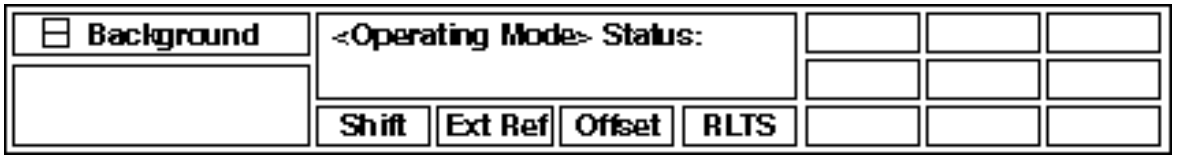
****

Instrument Status Area

Description

The Instrument status area is found on the bottom center of the test set's display.

Figure 4. Status Area of the Test Set Display



Background

Users are able to initiate more than one measurement at a time with the test set. The test set's display will show a maximum of 2 measurements. When 3 or more measurements are initiated, or the MEASUREMENT screen is not displayed, the Background annunciator reminds the user that measurements are active but not displayed.

<Operating Mode> Status

The call processing status and the operating modes are displayed in this area. This area may change (depending on the TA that is active) in order to provide TA specific information.

Shift

This annunciator indicates that the blue SHIFT key has been pressed, and that the next key you press will perform the shifted function indicated, also in blue.

Ext Ref

When a suitable external time base is connected to the rear panel 10MHz REF IN connector, this annunciator will turn on.

Int Ref

When a suitable external time base is not connected to the rear panel 10MHz REF IN connector, this annunciator will turn on.

Offset

Indicates that the Amplitude Offset state is set to On.

R L T S

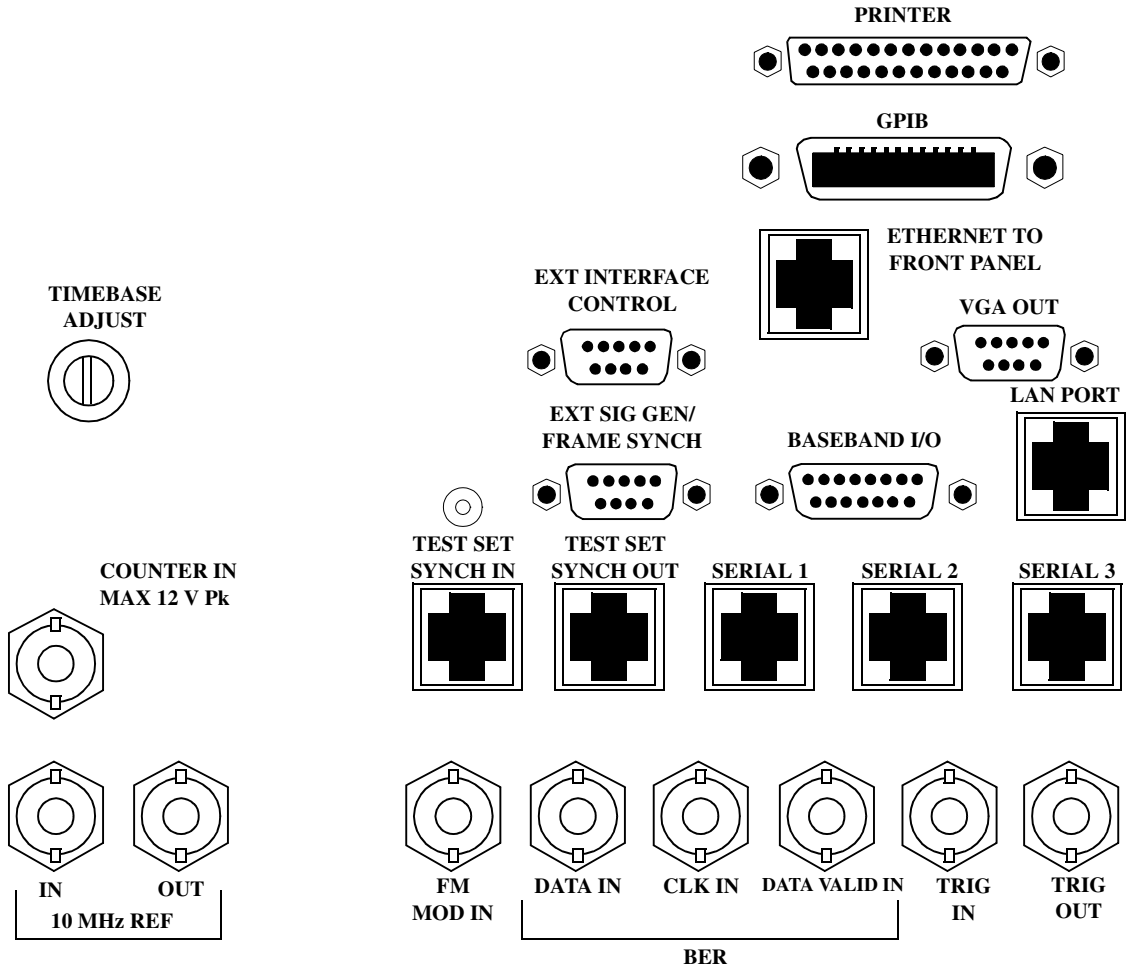
This annunciator indicates the state of four different conditions of the test set:

- Remote annunciator. 'R' turns on when the test set is operated remotely.

- Listen annunciator. ‘L’ turns on when the test set is listening to a command.
- Talk annunciator. ‘T’ turns on when the test set is providing information over GPIB.
- SRQ annunciator. ‘S’ turns on when an SRQ is active.

Rear Panel Connectors

Description



BASEBAND I/O

Not functional for this release.

CLK IN

Not functional for this release.

COUNTER IN

Not functional for this release.

DATA IN

Not functional for this release.

DATA VALID IN

Not functional for this release.

ETHERNET TO FRONT PANEL

This RJ-45 connector is used with a separate LAN jumper cable to connect the front panel DATA connector to the rear panel LAN PORT.

The the DATA connector on the front panel is connected internally to the ETHERNET TO FRONT PANEL connector on the rear panel. In order to use the front panel DATA connector the user must connect the rear panel LAN PORT, to the rear panel ETHERNET TO FRONT PANEL connector with the LAN jumper cable.

The LAN jumper cable, part number E5515-61160, is supplied with the test set.

EXT INTERFACE CONTROL

Not functional for this release.

EXT SIG GEN/FRAME SYNCH

Not functional for this release.

FM MOD IN

This BNC connector let's you use an external signal to frequency modulate the test set's RF generator. It has a fixed sensitivity of 20 KHz/volt, and a frequency range of 100Hz to 20 KHz.

GPIB

The GPIB connector allows test set control with compatible devices.

LAN PORT

This RJ-45 connector provides connection for down loading firmware upgrades, or new test applications into

the test set. No other types of communication are possible with the LAN port.

PRINTER

Not functional for this release.

SERIAL 1

Not functional for this release.

SERIAL 2

Not functional for this release.

SERIAL 3

Not functional for this release.

TEST SET SYNCH IN

Not functional for this release.

TEST SET SYNCH OUT

Not functional for this release.

TIMEBASE ADJUST

This is the timebase adjust cover, removing this screw allows access for timebase adjustment.

TRIG IN

Not functional for this release.

TRIG OUT

This BNC connector allows for synchronization of the test set to other equipment and is configured by setting Frame Trigger Parameters.

VGA OUT

This DB-15 connector allows the user to simultaneously route the test set's display to another monitor.

10 MHZ REF IN

This BNC connector accepts an external 10 MHz timebase signal. The nominal input impedance is 50 ohm. This version of test set can only accept a 10 MHz timebase signal.

10 MHZ REF OUT

This BNC connector provides a 10 MHz timebase signal to external test equipment. The accuracy of this signal is determined by the timebase used. The nominal output impedance is 50 ohm with a typical level of 0.5 V rms.

Remote/Local Mode

Description

Remote Mode

When the test set is operated remotely, all of the keys on the front panel of the test set are disabled (except the LOCAL key and the power switch). During remote operation the test set is controlled by the Remote User Interface, (RUI).

Any open menus are be closed, and any manual entries are be aborted when the test set transitions from local mode to remote mode.

The remote annunciator (R) will appear in the Instrument Status Area of the test set's display indicating that the test set is in remote mode.

When the test set is in remote mode press the LOCAL key on the front panel in order to gain manual control.

Local Mode

During local mode all front panel keys and the knob are enabled. During local operation the test set is controlled by the Manual User Interface, (MUI).

The remote annunciator (R) is turned off when the test set is operated in local mode.

6 Installation/Configuration

Timebase Description/Configuration

Description

The time base source is selected by the test set, either an internal time base or an external source (if a suitable signal is detected) is used as the reference oscillator. If a 10 MHz +/- 100 ppm signal, that has an input level from 0 to +13 dBm is connected to the 10 MHz REF IN connector on the rear panel, the test set will automatically select the external timebase.

The user can read the status window at the bottom of the test set display for the EXT REF indicator, or query the test set to verify if it is using an external time base or an internal time base. The user may also query the test set to verify if the time base is locked. The reference oscillator functionality is controlled through the SYSTEM subsystem.

Example:

```
OUTPUT 714;"SYSTEM:ROSCILLATOR[:TIMEBASE]?" !returns INT or EXT
                                            !(internal or external) timebase.
OUTPUT 714;"SYSTEM:ROSCILLATOR:LOCKED?" !returns 1 or 0 (locked or unlocked)
                                        !condition for timebase
```

Display Brightness

Description

This parameter allows the user to adjust the brightness of the test set's display. The test set's display screen has two brightness settings:

- medium brightness
- high brightness

Example

```
OUTPUT 714;"DISPLAY:BRIGHTNESS MEDIUM" ! sets screen brightness to medium.
```

Related Topics

****

"DISPlay" on page 247

****

Display Mode

Description

There are two display modes to select from when operating the test set remotely.

- Display mode fast
- Display mode track

Fast Mode

When operating remotely, there is often no need for the display to be updated as measurements are made. Using the fast display mode will increase the speed of the test set when it is operated remotely.

Fast mode is designed for remote use only. The test set returns to track mode if the user changes to manual operation.

- No screen or menu items are visible (except error messages).
- Error messages will be displayed in their normal location.
- “This instrument is being operated remotely” will be displayed at the bottom of the screen.

Example

```
OUTPUT 714;”DISPLAY:MODE FAST” !Selects fast mode
```

Track Mode

The track display mode is used to allow users to see what the test set is doing while it is being controlled remotely. Track mode is the default mode of the test set.

- Any changes made remotely will be updated on the screen if that screen is displayed.
- The error message window will be displayed as required when an error occurs.

Example

```
OUTPUT 714;”DISPLAY:MODE TRACK”!Selects track mode
```

Writing Messages to the Display

The capability to write up to four 30-character lines of text to the front panel display for operator messages is available when the display is in "Fast Mode" . This feature can be used to control the flow of software running on an external controller by pressing softkeys on the test set's front panel.

For example, by displaying a message that prompts the operator to press a front panel softkey and then monitoring that softkey through status register bits, the programmer can design code that starts measurements, stops measurements, or branches to a selected routine or function without the need for access to the external computer's keyboard.

The GPIB commands for writing messages to the display are found in the "DISPlay:OPERator:MESSage" table.

The status bit register GPIB commands and bit definitions for monitoring the test set's sofkeys are found in the "STATus:OPERation:KEYPressed Register Bit Assignments" table.

Related Topics

****

"DISPlay" on page 247

"STATus:OPERation:KEYPressed Register Bit Assignments" on page 315

****

Configuring the Test Set's GPIB

Description

The GPIB address is an integer between 0 and 30. The test set comes with a default address of 14 and may be set/queried using the SYSTem subsystem or manually through the system configuration screen by selecting the parameter and changing the number with the knob or the keypad.

The GPIB address is a non-volatile parameter. The GPIB address is not affected by any reset operation and can only be changed by direct access to the parameter itself.

Related Topics

****

"SYSTem:COMMunicate" on page 359

****

Hardware Configuration Report

Description

You can generate a list of the test set's hardware configuration over the LAN or GPIB.

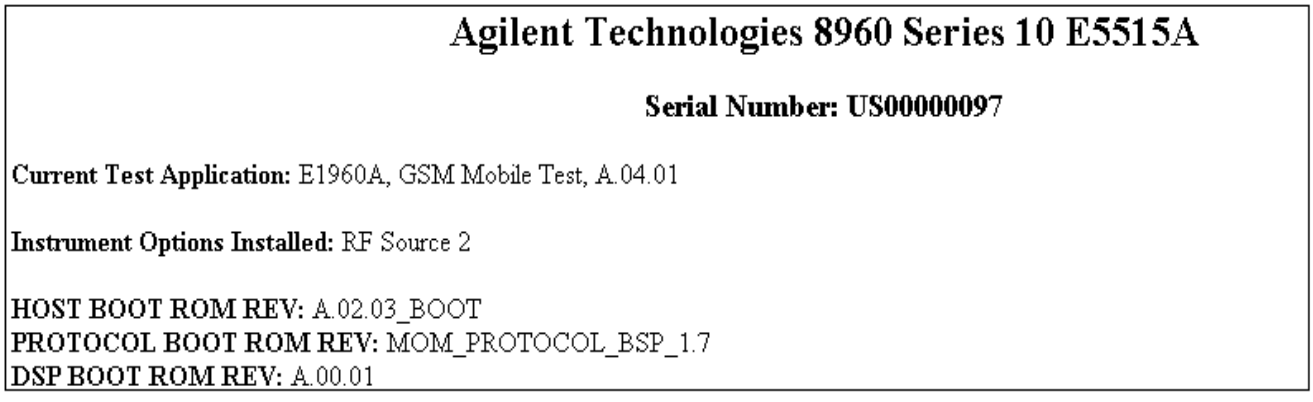
The LAN query is the easiest and most direct way to query the test set's hardware configuration. This method uses your web browser to display a formatted report.

The GPIB query returns an unformatted character string that must be buffered and saved to an HTML file to provide formatted text.

LAN Query

1. Refer to the SYSTEM CONFIG screen to determine the LAN address.
2. Open a web browser and enter <LAN address>/iconfig. For example, if your LAN address is 130.2.2.147, you would enter:

   130.2.2.147/iconfig
3. The web browser will then display formatted text. A partial list of the hardware configuration information is shown below:



Agilent Technologies 8960 Series 10 E5515A

Serial Number: US00000097

Current Test Application: E1960A, GSM Mobile Test, A.04.01

Instrument Options Installed: RF Source 2

HOST BOOT ROM REV: A.02.03_BOOT
PROTOCOL BOOT ROM REV: MOM_PROTOCOL_BSP_1.7
DSP BOOT ROM REV: A.00.01

GPIB Query

Use the following Basic example as a model to store the test set's configuration as an HTML file.

GPIB Example:

```
10    DIM Buf1$[20000],Buf2$[20000] ! This is the minimum space for the arrays
20    OUTPUT 714;"SYSTEM:CONFIGURE:INFORMATION:HARDWARE:VERBOSE?"
30    ENTER 714;Buf1$,Buf2$
40    CREATE "HW.htm",1             ! Create an HTML file
50    ASSIGN @File TO "HW.htm"
60    OUTPUT @File;Buf1$,Buf2$
70    END
```

In the future, the hardware configuration report may increase in length. More space would then need to be allocated for the arrays.

Display the HTML file using a web browser or HTML text editor.

Obtaining Identification Information (*IDN)

Description

Test set information is returned from a *IDN? query. The *IDN? query provides information about the Manufacturer, Model Number, Serial Number, and Firmware Revision. *IDN? is defined in IEEE Std. 488.2-1992, 10.14.

Test Set Information

*IDN? query returns identification information as a comma separated string.

```
DIM A$[100]
OUTPUT 714;"*IDN?" !returns manufacturer,model number, serial number and "0"
                   !separated by commas
ENTER 714;A$
PRINT A$           !prints, for example "Agilent Technologies, 8960 Series 10 E5515B,
                    !US38020105,0
```

- Agilent Technologies is the manufacturer.
- Printable ASCII characters excluding comma and semicolon up to a 25-character string.

  Model number example: 8960 Series 10 E5515B
- Printable ASCII characters excluding comma and semicolon up to a 10-character string.

  Serial number example: US00000123
- Printable ASCII characters excluding comma and semicolon up to a 20-character string.

  Firmware revision example: 0

NOTE The *IDN? query will always indicate that the firmware revision is zero. SYSTem:APPLication[:CURRent]:REVision? is the recommended way to query the firmware revision.

Configuring the Test Set's LAN

Description

LAN IP Address

The LAN address is a character string with a maximum of 15 characters and a format of A, B, C, D, where A is between 0 and 223, and B, C, and D are between 0 and 255. No embedded spaces are allowed. The address may be manually set/viewed in the system configuration screen. The LAN address can be set/queried using the SYSTem subsystem.

The LAN address is a non-volatile parameter. The LAN address is not affected by any reset operation and can only be changed by direct access to the parameter itself.

NOTE If the LAN address is set to a different network class, the subnet mask will change to the default net mask for the new network class.

For convenience the DATA port on the front panel may be configured as a LAN port. When a RJ45 jumper cable, (part number E5515-61160) is connected from the LAN PORT on the rear panel, to the ETHERNET TO FRONT PANEL port also on the rear panel, the user has LAN access from the front panel of the test set. Without the RJ45 jumper cable, the test set connection to a LAN is the rear-panel, LAN PORT connector.

LAN Default Gateway

The LAN router, (default gateway), is a character string with a maximum of 15 characters and a format of A, B, C, D, where A is between 0 and 223 , and B, C, and D are between 0 and 255, no embedded spaces are allowed. If the default gateway is set to a format not allowed with the LAN address or the subnet mask that have been selected, the default gateway will be set to a null string, indicated by a blank field on the test set display. The address may be manually set/viewed in the system configuration screen. The LAN default gateway can be set/queried using the SYSTem subsystem.

The LAN default gateway is the address of a router that routes messages between networks and or subnets. If this value is not specified, LAN communications will be limited to the network and subnet specified by the LAN IP address and the subnet mask. Your network administrator will know if a default gateway is needed and if so, the address of the router. If the default gateway address is not needed by your network, it may be disabled by entering any of the following values: “0” (zero), ““ (null string), “0.0.0.0”

The LAN default gateway is a non-volatile parameter. The LAN default gateway is not affected by any reset operation and can only be changed by direct access to the parameter itself.

LAN Subnet Mask

The LAN subnet mask address is a character string with a maximum of 15 characters and a format of A, B, C, D, where A , B, C, and D are between 0 and 255. No embedded spaces are allowed. The address may be manually set/viewed in the system configuration screen. The LAN subnet mask address can be set/queried using the SYSTem subsystem.

The subnet mask number combined with the IP address identifies which network and subnet your computer is on. Contact your system administrator for the correct subnet mask for your network.

The subnet mask determines the boundaries between the subnet ID and the host ID.

The LAN subnet mask is a non-volatile parameter. The LAN subnet mask is not affected by any reset operation and can only be changed by direct access to the parameter itself.

NOTE If the LAN address is set to a different network class, the subnet mask will change to the default net mask for the new network class.

The subnet mask number is obtained from your network administrator.

Measurement Related Configuration

Description

Amplitude offset is provided in order to compensate for loss or gain of the external network between the test set and the DUT, (device under test).

The test set allows the user to select up to 20 different offsets at 20 different frequencies.

There are 5 non-volatile amplitude offset parameters that require your attention:

- RF IN/OUT Amplitude Offset State
- Frequency state 1 - 20
- Frequency 1 - 20
- Offset state 1-20
- Offset 1 - 20

NOTE Frequency and offset values must be set independently.

It is not necessary to use all 20 offsets or frequencies.

RF IN/OUT Amplitude Offset State

The RF IN/OUT Amplitude Offset State can be changed to On by setting any of the 20 offsets or frequencies to the On state. The RF IN/OUT Amplitude Offset State can also be turned On or Off independently of the frequency or offset state. When the RF IN/OUT Amplitude Offset State is On, the Offset indicator will appear in the Instrument Status Area of the test set display.

If the RF IN/OUT Amplitude Offset State is Off none of the amplitude offsets are active even if the states of the individual offsets are set to On.

Remote User To set the RF IN/OUT Amplitude Offset State to On:

```
OUTPUT 714;"SYSTEM:CORRECTION:STATE ON" !Sets the RF IN/OUT
                                        !Amplitude Offset State to On
```

Manual User In order to manually set the RF IN/OUT Amplitude Offset State, go to the SYSTEM CONFIG screen, and press the RF IN/OUT Amptd Offset key, F5. Amplitude offset loss, gain and state settings are found by pressing the RF IN/OUT Amptd Offset Setup key, F2. RF IN/OUT Amplitude Offset State is the first parameter in the RF IN/OUT Amplitude Offset Setup menu.

When any of the 20 frequencies or offsets are manually set to On, the RF IN/OUT Amplitude Offset State is also set to On.

Frequency 1 - 20

Up to 20 different RF offset frequencies can be defined by the user to correct network loss or gain.

When operating at frequencies not specified in the RF IN/OUT Amplitude Offset frequency list, but between

the lowest and highest frequencies in the list, the test set will use linear interpolation to define offset values.

When operating at frequencies above the highest frequency specified, or below the lowest frequency specified in the RF IN/OUT Amplitude Offset frequency list, the test set will use the offset of the closet associated frequency.

If the user repeats a frequency entry, only the first entry along with its offset will be used by the test set, even though both of the repeated frequencies may be shown. If a frequency is repeated a warning will appear:

NOTE Duplicate RF IN/OUT Amplitude Offset Frequency. The first occurrence of duplicate is used.

Remote User If less than 20 frequencies are sent, the first positions of the RF IN/OUT Amplitude Offset Setup menu will fill in according to the number of frequencies sent. This means that if 6 frequencies are sent, Frequency 1 through Frequency 6 will reflect the values sent by the user, and Frequency 7 through Frequency 20 will remain off.

Sending any new frequency values in subsequent commands will write over the original values and set the state to Off for any frequencies not set with the new command.

Sending a null list (no values) with the frequency command results in setting the state for Frequency 1 - 20 to Off .

There are two different commands that can be used to set the RF offset frequency.

- Frequency is set, and the frequency state is set to On with this complex command:

```
OUTPUT 714;"SYSTEM:CORRECTION:SFREQUENCY 1710.2 MHZ,1805.2 MHZ,1784.8 MHZ,1879.8 MHZ"
!A complex command that sets the up to 20 comma separated frequencies and sets the state to On
!for the frequencies, offsets, and RF IN/OUT Amplitude Offset State
```

- Frequencies are set with this command:

```
OUTPUT 714;"SYSTEM:CORRECTION:FREQUENCY 1784.8 MHZ,1879.8 MHZ" !Sets up to 20 comma
                                                               !separated frequencies
```

Manual User Manual users may set the state or the value for any of the 20 frequencies from the RF IN/OUT Amplitude Offset Setup menu. Frequency values may be set in any order, i.e. set Frequency 1 and then skip to Frequency 20. The frequency state and value is individually controlled for manual users.

In order to manually set the RF offset frequencies go to the SYSTEM CONFIG screen, and press the RF IN/OUT Amptd Offset key, F5. Amplitude offset loss, gain and state settings are found by pressing the RF IN/OUT Amptd Offset Setup key, F2. RF offset frequencies 1 through 20 are listed in the RF IN/OUT Amplitude Offset Setup menu.

When any of the 20 frequencies are manually set to On, the RF IN/OUT Amplitude Offset State and the associated offset state are also set to On.

Offset 1 - 20

Up to 20 different offset values can be defined by the user to correct network loss or gain.

Duplicate offsets are allowed as long as they are associated with different frequencies.

Remote User Sending any new offset values in subsequent commands will write over the original values and set the state to Off for any offsets not set with the new command.

There are two different commands to set offsets.

- Offsets are set, and the offset state is set to On with this complex command:

```
OUTPUT 714;"SYSTEM:CORRECTION:SGAIN -2.55,-3.12,-3.68,-4.23,-4.74,-5.3"
!A complex command that sets up to 20 comma separated offsets and sets the state to On for
!the frequencies, offsets and RFIN/OUT Amplitude Offset State
```

- Offsets are set with this command:

```
OUTPUT 714;"SYSTEM:CORRECTION:GAIN -3.12,-3.68,-4.23" !Sets up to 20 separated offset values
```

Manual User Manual users may set the state or the value for any of the 20 offsets from the RF IN/OUT Amplitude Offset Setup menu. Offset values may be set in any order, i.e. set Offset 1 and then skip to Offset 20. The offset state and value is individually controlled for manual users.

In order to manually set the RF offsets go to the SYSTEM CONFIG screen, and press the RF IN/OUT Amptd Offset key, F5. Amplitude offset gain, loss and state settings are found by pressing the RF IN/OUT Amptd Offset Setup key, F2. RF offsets 1 through 20 are listed in the RF IN/OUT Amplitude Offset Setup menu.

When any of the 20 offsets are manually set to On, the RF IN/OUT Amplitude Offset State and the associated frequency state are also set to On.

Points

Remote users can query the test set to determine the number of offsets that are in the On state.

```
OUTPUT 714;"SYSTEM:CORRECTION:POINTS?" !Query returns the number of
                                       !frequencies that have their
                                       !offset states set to On
```

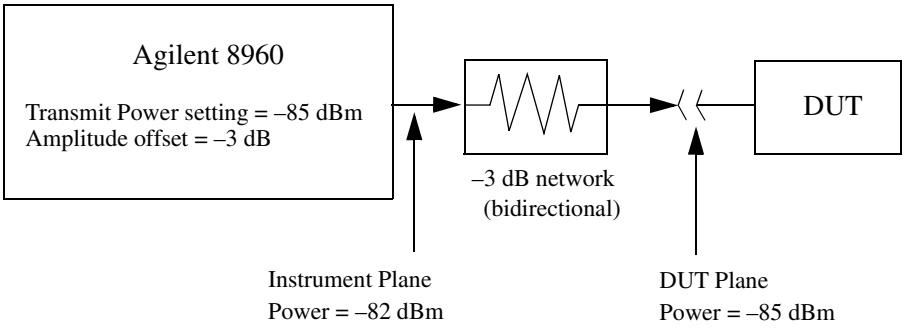
RF IN/OUT Amplitude Offset

The offset values allow the test set to represent the RF level at the DUT.

Transmitter Example When you set transmit power level, the test set uses the amplitude offset value to adjust the power so that the power at the DUT will match the transmit power setting.

With the test set's transmit power set to –85 dBm, the RFIN/OUT Amplitude Offset State set to On, and a –3 dB offset at some frequency. The power transmitted from the test set will be –82 dBm, the 3dB loss in the network means that the DUT will be see –85 dBm.

Figure 5. Amplitude Offset Transmitter Example

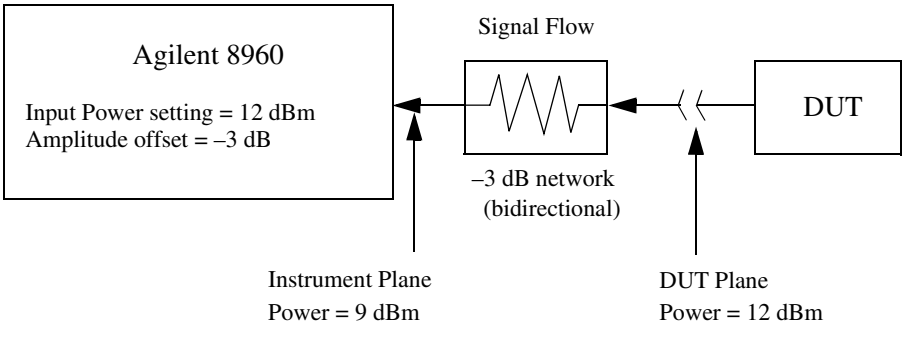


The transmit power setting reflects the power at the DUT plane.

Receiver Example The received power setting reflects the power at the DUT. This means the value displayed for received power does not change; however, the test set's hardware changes internally to expect a level that includes the offset.

With the test set's received power set to 12 dBm, the RF IN/OUT Amplitude Offset State set to On, and a –3 dB offset at some frequency. The received power remains unchanged at 12 dBm to reflect the level at the DUT. The test set's internal hardware changes to receive 9 dBm, the power received at the test set's RF IN/OUT connector.

Figure 6. Amplitude Offset Receiver Example



The input power setting reflects the power at the DUT plane.

Related Topics

****

"SYSTem:CORRection"

****

Obtaining Test Application Information

Description

Test application information may be viewed from the SYSTEM CONFIG screen or using SYSTem:APPLication GPIB query. Queries for information about the current test application, selected test application, or any of the test applications loaded on your test set are available.

Each test application has a name, model number, at least one revision, and a license status.

These are examples of the data returned from four different queries:

Example 13. Test Application Name Query

GSM Mobile Test

Example 14. Model Number Query

E1960A

Example 15. Revision Query

A.01.04

Example 16. License Status Query

LIC: indicates the status is licensed for use.

Related Topics

****

"Selecting a Radio Personality" on page 423

"SYSTem:APPLication" on page 351

****

Selecting a Radio Personality

Description

Different radio personalities or radio standards, (such as GSM, AMPS or TIA/EIA 136) can be tested when the optional test applications are purchased from Agilent Technologies. Some test applications will have the ability to test more than one radio standard.

When the operations described in this section are queried, several seconds may pass before the information is ready to be displayed.

You can query the current revision, the selected revision, all the revisions, and the total count of revisions for a selected test application. These queries are helpful when changing revisions or loading new revisions. They are not usually necessary when switching test applications.

The Test Application Setup menu will display all of the test applications available along with the selected revision. The selected revision is the revision that would run if the test set was switched to that test application. There is no need to select a revision every time you want to switch test applications.

NOTE Selecting the correct name and the desired revision of a test application is important. This information should be reviewed before proceeding.

Test Applications Switching

Selecting of a different test application is accomplished manually using the front panel keys, or remotely over GPIB. The test set must be rebooted in order for the test application to become functional. The reboot will happen automatically when the you tell the test set to switch test applications. Rebooting to another test application takes about one minute.

Remote User In order to switch to another test application use this GPIB command:

```
OUTPUT 714;"SYSTEM:APPLICATION:SELECT:NAME 'GSM MOBILE TEST'"
```

Sending this command will cause the test set to reboot.

Manual User Test application switching is found on the SYSTEM CONFIG screen.

To switch to the test application you have selected.

1. Press the Test Application key.
2. Use the knob or arrows to scroll to the test application you want.
3. Press the knob or enter key.
4. A menu will appear asking “Switch Now?” If you answer “No” nothing will change, if you answer “Yes” the test set will reboot in the new test application.

Revision Selection

Different revisions of the test applications in your test set will provide different functionality. Switching

revisions does not reboot the test set in a new test application. It merely selects a revision for the next switch. A revision will remain the selected revision until a different revision is selected by you.

NOTE If you switch test applications to an older version that does not support test application switching you will not have a path to get back. Using the firmware upgrade process to load firmware with the correct version will fix this problem.

Test application switching is available on revisions greater than A.04.00 of GSM Mobile Test, and all other test applications that are developed thereafter.

Remote User These are commands to query revision information or select a revision. Selecting a new revision does not switch test applications.

- In order to query a **selected** test application revision (running or not) use this GPIB command:

```
OUTPUT 714;"SYSTEM:APPLICATION:SELECT:REVISION? 'AMPS/136 MOBILE TEST'"
```

- In order to query the revision of the test application **currently running** use this GPIB command:

```
OUTPUT 714;"SYSTEM:APPLICATION:CURRENT:REVISION?"
```

- In order to query **all** of the revisions available for a test application use this GPIB command:

```
OUTPUT 714;"SYSTEM:APPLICATION:CATALOG:REVISION? 'AMPS/136 MOBILE TEST'"
```

- In order to **select** a revision of a test application use this GPIB command:

```
OUTPUT 714;"SYSTEM:APPLICATION:SELECT:REVISION 'GSM mobile test','A.04.01'"
```

- Query that returns the number of revisions for a specified test application:

```
OUTPUT 714;"SYSTEM:APPLICATION:CATALOG:REVISION:COUNT? 'GSM MOBILE TEST'"
```

License Status of Test Applications The test application license status can be queried for a particular test application and revision using the following GPIB command:

```
OUTPUT 714;"SYSTEM:APPLICATION:CATALOG:LICENSE? 'GSM mobile test','A.04.01'"
```

This query returns one of the following:

- "LIC" The test application license status is, licensed
- "NLIC" The test application license status is, not licensed
- "UNKN" The test application license status is, unknown

CAUTION If you switch to an unlicensed state the test set will reboot to SYSTEM CONFIG screen, unable to switch to any other screen or make any measurements. View the Test Application Setup menu to determine the licensed versions of test applications available. Use the Test Application key to switch to a licensed version of the test application.

Manual User Revision selection is found in the SYSTEM CONFIG screen, Test Application Setup menu. Revisions are shown with their license status. This is where you select the revision and test application that you want, it does not switch test applications. After the revision number is a letter, this letter indicates the

revision license status; Licensed “L”, Not Licensed “N”, or Unknown “U”.

- “L” This revision of test application appears to have a license. The test application may have been developed before licensing and therefore needs no license.
- “N” This test application does not appear to have a license. Selecting a not licensed revision will result in an error +130.
- “U” This test application has unknown license status.

1. Press the Test Application Setup key.
2. Use the knob or arrows and scroll to the test application you want.
3. Press the knob or enter key to display the revision menu.
4. Use the knob or enter key to scroll to the revision you want.
5. Press the knob or enter key to select the revision.

Test Application Names

Each test application has a name associated with it.

- “AMPS/136 Mobile Test” for the E1961A test application.
- “CDMA 2000 Test Mode” for the E1962A test application.
- “GSM Mobile Test” for the E1960A test application.
- “GPRS Mobile Test” for the E1964A test application.

Remote User

In order to query or switch test applications remotely you must use the test application name exactly as it appears (without regard to case) in the Test Application Setup menu of the test set display.

- Query the name of the all test applications installed in the test set.

  ```
  OUTPUT 714;"SYSTEM:APPLICATION:CATALOG:NAME?"
  ```

- Query the name of the selected test application (running or not):

  ```
  OUTPUT 714;"SYSTEM:APPLICATION:SELECT:NAME?"
  ```

- Query the name of the currently running test application:

  ```
  OUTPUT 714;"SYSTEM:APPLICATION:CURRENT:NAME?"
  ```

- In order to know the number of test applications installed in the test set, use the following GPIB command:

  ```
  OUTPUT 714;"SYSTEM:APPLICATION:CATALOG:NAME:COUNT?"
  ```

Manual User The names of test applications installed in the test set can be viewed from the Test Application Setup menu found in the SYSTEM CONFIG screen. This menu shows you how each test application is spelled and should be used as a reference for GPIB commands.

Test Application Model Number

Each test application has a model number associated with it.

Remote User This query will return E1960A, if that test application is currently running.

```
OUTPUT 714;"SYSTem:CURRent:TA:MODel?"
```

Manual User The test application model number is found in the SYSTEM COFIG screen in the Instrument Information window.

Programming Example

This program example assumes that the you want to switch to the GSM test application.

1. Query the list of test application names to get exact spelling of the GSM test application. This is not necessary if you already know the exact name.
2. Query the test set to get a list of all revisions for “GSM Mobile Test.” This is not necessary if you are not changing revisions.
3. Select a revision of “GSM Mobile Test.” This is not necessary if you are not changing revisions.
4. Select the GSM test application. This will switch test applications and cause the test set to reboot.

```
10    OUTPUT 714;”SYSTEM:APPLICATION:CATALOG:NAME?”
20    !Queries all of the test application names
30    ENTER 714;N$
40    PRINT “The CATALOG names that are loaded are “;N$
50    OUTPUT 714;”SYSTEM:APPLICATION:CATALOG:REVISION? ‘GSM MOBILE TEST’”
60    !Queries all revisions of GSM MOBILE TEST
70    ENTER 714;Cat_rev$
80    PRINT “The revisions for the GSM Mobile Test Application are “;Cat_rev$
90    OUTPUT 714;”SYSTEM:APPLICATION:SELECT:REVISION ‘GSM MOBILE TEST’,’A.04.01’”
100   !Selects a revision
110   OUTPUT 714;”SYSTEM:APPLICATION:SELECT:NAME ‘GSM MOBILE TEST’”
120   !Switches the test application to GSM MOBILE TEST
130   END
```

Related Topics

****

“Obtaining Test Application Information” on page 421

“SYSTem:APPLication” on page 351

****

Test Set Beeper

Description

This parameter allows the user to change the beeper state to on or off. A beep will indicate error conditions caused during manual or remote operation of the test set.

A 100 ms, 1.24 kHz audible tone (beep) is generated when an error message is logged and the beeper state is set to on. If two errors are generated in quick succession, two beeps are generated to indicate that more than one error has been logged.

The beeper state can be manually set in the Instrument Setup window found in the SYSTEM CONFIG screen.

Example

```
OUTPUT 714;"SYSTEM:BEEPER:STATE OFF"
```

Related Topics

****

"SYSTem:BEEPer" on page 357

****

7 Error Messages

Error Message List and Summary

Description

Reading Error Messages

Each error message that is generated is recorded in either the error/event queue or the message log or both. Error messages are shown in a message window at the center of the test set's display.

When an error message is displayed an audio beep occurs, the beeper state of the test set can be set to on or off.

The error/event queue is read remotely using the SYSTem:ERRor? query. The error/event queue is able to hold 100 messages. To read the entire error/event queue use the following program.

```
10 DIM Err_msg$[255]
20 REPEAT
30 OUTPUT 714;"SYSTEM:ERROR?"
40 ENTER 714; Err_num,Err_msg$
50 PRINT Err_num,Err_msg$
60 UNTIL Err_num = 0
```

The message log may be viewed on the test set's display by pressing the SYSTEM CONFIG screen's Message Log key. The message log can display up to 24 entries over two pages.

Error messages can be cleared from the test set's display using the DISPlay:WINDow:ERRor:CLEar command. Pressing any functional front panel key, i.e. the LOCAL key, will clear an error message for the test set's display.

Classes of Errors

Error messages are divided into classes, each class of error is handled differently by the test set. The message log is cleared when the test set is power cycled.

Measurement Integrity Indicators These messages occur as a result of a measurement, they indicate the validity of the measurement. Measurement integrity indicators are read with the FETCh command.

Non-Persistent Errors These messages are generated when a condition occurs that is incorrect, but has no serious or long lasting effect on the test set's operation. Examples could include an out of range value to a parameter, or an invalid GPIB mnemonic. The message window is cleared when any front panel key is pressed.

Persistent Errors These errors are generated when a non-transitory error condition exists. Persistent errors occur when a hardware failure is found, or when damage or injury to a person or the test set may occur.

The test set displays these errors in the error message window and as a prompt at the bottom of the display screen where it remains until the error condition no longer exists.

Fatal Errors When these errors occur no further operation of the test set is possible without cycling the power switch. Fatal errors are not saved in the error message log. The test set display will provide the user with information about what to do next and some details about what the test set was doing when the fatal

error occurred.

Maskable Messages These messages are intended to inform the user of a condition within the test set. They are generally meant to provide information to the user. The user will need to decide if this condition is undesirable and if they want the message to appear.

Maskable Message Display State The Maskable Messages Display State found in the Instrument Setup menu gives users a way to block these messages and the associated beep from ever happening. When the state is Off these messages and their associated beep will be blocked. The Maskable Message Display State can be set manually or with the following GPIB command:

```
OUTPUT 714;"DISPLAY:MESSAGE:MASKABLE:STATE OFF" !Prevents certain messages from appearing on the
display.
```

Instrument Maskable Messages

- Instrument warning: Audio Generator instrument has been closed.
- Instrument warning: Audio Analyzer instrument has been closed.
- Instrument warning: Analog Audio instrument has been closed.

Related Topics

****

"SYSTem:ERRor?"

****

Error Message Log

Description

When an error message is displayed, it is also logged in the error message log. This log is only accessible manually; it is not available through GPIB. The error message log can have two pages it can be displayed by pressing the F7 menu key from the SYSTEM CONFIG screen, Next Page and Previous Page controls are provided.

All errors and events that are generated are displayed in the error message log. When the log is full a new message is sent to the log and the oldest message is removed from the log. The log is cleared when the test set powers up or when the user presses F10 (Clear Error Message Log).

Manual User Error Messages

Description

These messages are intended to be displayed on the manual user interface only, and are not entered into the Error/Event Queue.

Error Message	Description
The function you requested is not yet available.	The test set does not have this capability.
IQ Calibration completed successfully for modulator <N>. Cycle power to continue.	<N> is the IQ modulator number that the user is attempting to calibrate, <N> is 1 or 2.
IQ Calibration failed for modulator <N>. Cycle power to continue.	<N> is the IQ modulator number that the user is attempting to calibrate, <N> is 1 or 2.
The function you requested is not available in this TA.	This function is used in another Test Application.
IQ Calibration for modulator <N> in progress. Call processing disabled	<N> is the IQ modulator number that the user is attempting to calibrate, <N> is 1 or 2.
Instrument warning: Audio generator instrument has been closed.	The audio generator instrument was closed automatically by the test set.
Instrument warning: Audio Analyzer instrument has been closed.	The audio analyzer instrument was closed automatically by the test set.
Measurement warning: Analog audio measurement has been closed.	Analog audio measurements have been closed by the test set.

–100 through –199 Error Message Descriptions

Description

A command error indicates that the test set's GPIB parser has detected an IEEE 488.2 syntax error.

When one of these errors is generated, the command error bit in the event status register is set.

Error Message	Description
-100 Command error	This event bit (Bit 5) indicates a syntax error, or a semantic error, or a GET command was entered, see IEEE 488.2, 11.5.1.1.4.
-101 Invalid character	Indicates a syntactic elements contains a character which is invalid for that type.
-102 Syntax error	Indicates that an unrecognized command or data type was encountered. For example, a string was received when the device does not accept strings.
-103 Invalid separator	The parser was expecting a separator and encountered an illegal character. For example, the semicolon was omitted after a program message unit.
-104 Data type error	The parser recognized a data element different than one allowed. For example, numeric or string data was expected but block data was encountered.
-105 Get not allowed	Indicates a Group Execute Trigger was received within a program message. Correct the program so that the GET does not occur within the program code.
-108 Parameter not allowed	Indicates that more parameters were received than expected for the header. For example, *ESE common command only accepts one parameter, so *ESE 0,1 is not allowed.
-109 Missing parameter	Indicates that less parameters were received than required for the header. For example, *ESE requires one parameter, *ESE is not allowed.
-110 Command header error	Indicates an error was detected in the header. This error is used when the device cannot detect the more specific errors -111 through -119.
-111 Header separator error	Indicates that a character that is not a legal header separator was encountered while parsing the header.
-112 Program mnemonic too long	Indicates that the header contains more that twelve characters, see IEEE 488.2, 7.6.1.4.1.

Error Message	Description
-113 Undefined header	Indicates the header is syntactically correct, but it is undefined for this specific device. For example, *XYZ is not defined for any device.
-114 Header suffix out of range	Indicates the value of a header suffix attached to a program mnemonic makes the header invalid.
-120 Numeric data error	This error, as well as errors -121 through -129, are generated when parsing a data element which appears to be numeric, including non-decimal numeric types. This particular error is used if the device cannot detect a more specific error.
-121 Invalid character in number	Indicates an invalid character for the data type being parsed was encountered. For example, an alpha in a decimal numeric or a “9” in octal data.
-123 Exponent too large	Indicates the magnitude of an exponent was greater than 32000, see IEEE 488.2, 7.7.2.4.1.
-124 Too many digits	Indicates the mantissa of a decimal numeric data element contained more than 255 digits excluding leading zeros, see IEEE 488.2, 7.7.2.4.1.
-128 Numeric data not allowed	Indicates that a legal numeric data element was received, but the device does not accept one in this position for the header.
-130 Suffix error	This error, as well as errors -131 through -139, are generated when parsing a suffix. This particular error message is used if the device cannot detect a more specific error.
-131 Invalid suffix	Indicates the suffix does not follow the syntax described in IEEE 488.2, 7.7.3.2, or the suffix is inappropriate for this device.
-134 Suffix too long	Indicates the suffix contain more than 12 characters, see IEEE 488.2, 7.7.3.4.
-138 Suffix not allowed	Indicates that a suffix was encountered after a numeric element that does not allow suffixes.
-140 Character data error	This error, as well as errors -141 through -149, are generated when parsing a character data element. This particular error message is used if the device cannot detect a more specific error.
-141 Invalid character data	Indicates that the character data element contains an invalid character or the particular element received is not valid for the header.
-144 Character data too long	Indicates the character data element contains more than twelve characters, see IEEE 488.2, 7.7.1.4.

Error Message	Description
-148 Character not allowed	Indicates a legal character data element was encountered where prohibited by the device.
-150 String data error	This error, as well as errors -151 through -159, are generated when parsing a string data element. This particular error message is used if the device cannot detect a more specific error.
-151 Invalid string data	Indicates that a string data element was expected, but was invalid, see IEEE 488.2, 7.7.5.2. For example, an END message was received before the terminal quote character.
-158 String data not allowed	Indicates that a string data element was encountered but was not allowed by the device at this point in parsing.
-160 Block data error	This error, as well as errors -161 through -169, are generated when parsing a block data element. This particular error message is used if the device cannot detect a more specific error.
-161 Invalid block data	Indicates a block data element was expected, but was invalid, see IEEE 488.2, 7.7.6.2. For example, and END message was received before the end length was satisfied.
-168 Block data not allowed	Indicates a legal block data element was encountered, but not allowed by the device at this point in parsing.
-170 Expression error	This error, as well as errors -171 through -179, are generated when parsing an expression data element. This particular error message is used if the device cannot detect a more specific error.
-171 Invalid expression	Indicates the expression data element was invalid, see IEEE 488.2, 7.7.7.2. For example, unmatched parentheses or an illegal character.
-178 Expression data not allowed	Indicates a legal expression data was encountered, but was not allowed by the device at this point in parsing.
-180 Macro error	This error, as well as error -181 through -189, are generated when defining a macro or execution a macro. This particular error message is used if the device cannot detect a more specific error.
-181 Invalid output macro definition	Indicates that a macro parameter place holder was encountered outside of a macro definition.
-183 Invalid inside macro definition	Indicates that the program message unit sequence, sent with a *DDT or a *DMC command, is syntactically invalid, see IEEE 488.2, 10.7.6.3.

Error Message	Description
-184 Macro parameter error	Indicates that a command inside the macro definition had the wrong number or type of parameters.

–200 through –299 Error Message Descriptions

Description

These errors are generated when something occurs that is incorrect in the current state of the instrument. These errors may be generated by a user action from either the remote or the manual user interface.

Error Message	Description
-200 Execution error	This event bit (Bit 4) indicates a PROGRAM DATA element following a header was outside the legal input range or otherwise inconsistent with the device's capabilities, see IEEE 488.2, 11.5.1.1.5.
-203 Command protected	Indicates that a legal password-protected program command or query could not be executed because the command was disabled.
-220 Parameter error	Indicates that a program data element related error occurred.
-221 Setting conflict	Indicates that a legal program data element was parsed but could not be executed due to the current device state.
-222 Data out of range	Indicates that a legal program data element was parsed but could not be executed because the interpreted value was outside the legal range defined by the devices
-223 Too much data	Indicates that a legal program data element of block, expression, or string type was received that contained more data than the device could handle due to memory or related device-specific requirements.
-224 Illegal parameter value	Indicates that the value selected was not part of the list of values given.
-225 Out of memory	The device has insufficient memory to perform the requested operation.
-226 Lists not the same length	Attempted to use LIST structure having individual LIST's of unequal lengths.
-230 Data corrupt or stale	Indicates invalid data, a new reading started but not completed since the last access.
-231 Data questionable	Indicates that measurement accuracy is suspect.

Error Message	Description
-233 Invalid version	Indicates that a legal program data element was parsed but could not be executed because the version of the data is incorrect to the device. For example, a not supported file version, a not supported instrument version.
-240 Hardware error	Indicates that a legal program command or query could not be executed because of a hardware problem in the device.
-241 Hardware missing	Indicates that a legal program command or query could not be executed because of missing device hardware. For example, an option was not installed.
-250 Mass storage error	Indicates that a mass storage error occurred. The device cannot detect the more specific errors described for errors -251 through -259.
-251 Missing mass storage	Indicates that a legal program command or query could not be executed because of missing mass storage.
-252 Missing media	Indicates that a legal program command or query could not be executed because of missing media. For example, no disk.
-253 Corrupt media	Indicates that a legal program command or query could not be executed because of corrupt media. For example, bad disk or wrong format.
-254 Media full	Indicates that a legal program command or query could not be executed because the media is full. For example, there is no room left on the disk.
-255 Directory full	Indicates that a legal program command or query could not be executed because the media directory was full.
-256 File name not found	Indicates that a legal program command or query could not be executed because the file name was not found on the media.
-257 File name error	Indicates that a legal program command or query could not be executed because the file name on the device media was in error. For example, an attempt was made to read or copy a nonexistent file.
-258 Media protected	Indicates that a legal program command or query could not be executed because the media was protected. For example, the write-protect switch on a memory card was set.
-270 Macro error	Indicates that a macro related execution error occurred.

Error Message	Description
-271 Macro syntax error	Indicates that a syntactically legal macro program data sequence, according to IEEE 488.2, 10.7.2, could not be executed due to a syntax error within the macro definition.
-272 Macro execution error	Indicates that a syntactically legal macro program data sequence could not be executed due to some error in the macro definition, see IEEE 488.2, 10.7.6.3.
-273 Illegal macro label	Indicates that the macro label was not accepted, it did not agree with the definition in IEEE 488.2, 10.7.3
-274 Macro parameter error	Indicates that the macro definition improperly used a macro parameter placeholder, see IEEE 4882, 10.7.3.
-275 Macro definition too long	Indicates that a syntactically legal macro program data sequence could not be executed because the string of block contents were too long for the device to handle, IEEE 488.2, 10.7.6.1.
-276 Macro recursion error	Indicates that a syntactically legal macro program data sequence count not be executed because it would be recursive, see IEEE 488.2, 10.7.6.6.
-277 Macro redefinition not allowed	Indicates that redefining an existing macro label, see IEEE 488.2, 10.7.6.4.
-278 Macro header not found	Indicates that a legal macro label in the *GMS?, see IEEE 488.2, 10.13, could not be executed because the header was not previously defined.

–300 through –399 Error Message Descriptions

Description

A device-specific error indicates that the instrument has detected an error that occurred because some operations did not properly complete, possibly due to an abnormal hardware or firmware condition. For example, an attempt by the user to set an out of range value will generate a device specific error. When one of these errors is generated, the device specific error bit in the event status register is set.

Error Message	Description
-300 Device specific error	This event bit (Bit 3) indicates that a device operation did not properly complete due to some condition, such as overrange see IEEE 488.2, 11.5.1.1.6.
-311 Memory error	Indicates some physical fault in the devices memory, such as a parity error.
-312 PUD memory lost	Indicates protected user data saved by the *PUD command has been lost, see IEEE 488.2, 10.27.
-313 Calibration memory lost	Indicates that nonvolatile calibration data used by the *CAL? command has been lost, see IEEE 488.2, 10.2.
-314 Save/recall memory lost	Indicates that the nonvolatile data saved by the *SAV command has been lost, see IEEE 488.2, 10.33.
-315 Configuration memory lost	Indicates that nonvolatile configuration data saved by the device has been lost.
-320 Storage fault	Indicates that the firmware detected a fault when using data storage. This is not an indication of physical damage or failure of any mass storage element.
-321 Out of memory	An internal operation needed more memory than was available
-330 Self test failed	Indicates a problem with the device that is not covered by a specific error message. The device may require service.
-340 Calibration failed	Indicates a problem during calibration of the device that is not covered by a specific error.
-350 Queue overflow	Indicates that there is no room in the queue and an error occurred but was not recorded. This code is entered into the queue in lieu of the code that caused the error.
-360 Communication error	This is the generic communication error for devices that cannot detect the more specific errors described for error -361 through -363.

Error Message	Description
-361 Parity error in program message	Parity bit not correct when data received for example, on a serial port.
-362 Framing error in program message	A stop bit was not detected when data was received for example, on a serial port (for example, a baud rate mismatch).
-363 Input buffer overrun	Software or hardware input buffer on serial port overflows with data caused by improper or nonexistent pacing.

–400 through –499 Error Message Descriptions

Description

A Query error is generated either when data in the instrument's GPIB output queue has been lost, or when an attempt is being made to read data from the output queue when no output is present or pending.

Error Message	Description
-400 Query error	This event bit (Bit 2) indicates that an attempt to read data from the Output Queues when no output is present or pending, to data in the Output Queue has been lost see IEEE488.2, 11.5.1.1.7.
-410 Query INTERRUPTED	Indicates the test set has been interrupted by a new program message before it finishes sending a RESPONSE MESSAGE see IEEE 488.2, 6.3.2.3.
-420 Query UNTERMINATED	Indicates an incomplete Query in the program see IEEE 488.2, 6.3.2.2.
-430 Query DEADLOCKED	Indicates that the Input Buffer and Output Queue are full see IEEE 488.2, 6.3.1.7.
-440 Query UNTERMINATED after indefinite response	Indicates that a query was received in the same program message after a query requesting an indefinite response was executed see IEEE 488.2, 6.5.7.5.

+100 through +199 Error Message Descriptions

Description

A device-specific error indicates that the instrument has detected an error that occurred because some operations did not properly complete, possibly due to an abnormal hardware or firmware condition. For example, an attempt by the user to set an out of range value will generate a device specific error.

These are general errors generated by the core instrument. When one of these errors is generated, the '+100 errors' bit in the questionable error status register is set.

Error Message	Description
+101 Assert; Cycle power. Assert message<message1>	<message1> will appear as: If the DSP generated the assert: ;P:DSP T:<task ID> E:<error code> C:<error classif.> F1:<flag 1> F2:<flag 2> If the Protocol processor generated the assert: ;P:Protocol T:<task ID> L:<line number> F:<file name> If the Host processor generated the assert: ;P:Host T:<task ID> L:<line number> F:<file name>
+102 Exception; Cycle power. Exception message<message2>	<message2> will appear as: T:<task ID> or V:<vector number> or PC:<program counter> or DA:<data adrs reg value>. Vector number, program counter and data address register values are hexadecimal format.
+103 Failure; No measurements or settings can be made	Indicates none of the VI's are operational because a serious problem exists.
+104 Failure; No settling operations will take place	Indicates none of the VI's are operational because a serious problem exists.
+105 Failure; No measurements or setting can be made for the function selected	Indicates none of the VI's are operational because a serious problem exists.
+110 Input pacing; Internal communication queue overflow likely	Indicates that GPIB commands are too fast for the device input queue and should be slowed.
+111 Input pacing; Internal communication queue overflow imminent. Pacing increased	Indicates that GPIB commands were too fast and the device input queue has not kept pace.
+112 Internal error; Protocol error <message3>	<message3> is an eight digit hexadecimal number that is the error code reported by protocol.

Error Message	Description
+113 Internal error; <VI NAME> forced inactive	Indicates that a VI is inactivated when not executed. <VI NAME> includes : “IntVmVI”, “GSMFixedVI”, “FixedVI”, “MiscVI”, “GSMSacchMriVI”.
+114 Internal error; <VI NAME> not responding	Indicates that a VI has not been instantiated or the state is not available. <VI NAME> includes : “IntVmVI”, “GSMFixedVI”, “FixedVI”, “MiscVI”, “GSMSacchMriVI”.
+120 Warning; Receiver over range due to requested settings	Indicates the total received power (a combination of received power and amplitude offset) is above the range of the test set.
+121 Warning; Receiver under range due to requested settings	Indicates the total received power (a combination of received power and amplitude offset) is below the range of the test set.
+122 Warning; Reference out of lock	Indicates the test set’s internal reference is out of lock.
+123 Warning; Duplicate RF IN/OUT Amplitude Offset Frequency entry. First frequency entry in RF IN/OUT Amplitude Offset table will be used.	Indicates that an amplitude offset value for that frequency has already been entered. The test set will use the amplitude offset value entered first.
+124 Warning; Source over range due to requested settings	The setting selected for total transmit power (a combination of cell power, awgn power, amplitude offset) is above the test set’s range.
+125 Warning; Source under range due to requested settings	The setting selected for total transmit power (a combination of cell power, awgn power, amplitude offset) is below the test set’s range.
+130 Configuration error; Unable to switch to indicated Test Application	The test application selected is not available for this test set.
+131 Configuration error; Current Test Application is not licensed (License = N). Select another Test Application	The test application selected is not licensed. Select another version or test application that is licensed (License = L).

+400 through +499 Error Message Descriptions

Description

These errors are generated when a problem occurs in one of the test set's hardware modules that is part of the test set's core instrument.

When one of these errors is generated, the '+400 errors' bit in the questionable error status register is set.

Error Message
+400 Hardware failure; Hardware is not available
+401 Hardware failure; Protocol processor hardware is not responding
+402 Hardware failure; Demod receiver hardware is not responding
+403 Hardware failure; Measurement receiver hardware is not responding
+404 Hardware failure; RF source 1 hardware is not responding
+405 Hardware failure; RF source 1 digital modulation hardware is not responding
+406 Hardware failure; RF source 1 level hardware is not responding
+407 Hardware failure; DSP demod control hardware is not responding
+408 Hardware failure; 2nd demod receiver hardware is not responding
+409 Hardware failure; Base station emulator trigger hardware is not responding
+410 Hardware failure; Audio source hardware is not responding
+411 Hardware failure; RF source 2 hardware is not responding
+412 Hardware failure; Internal voltmeter hardware is not responding
+413 Hardware failure; Fixed timebase input is not responding
+414 Hardware failure; Fixed external reference output is not responding
+415 Hardware failure; Instrument reference is not responding
+416 Hardware failure; Bit clock A is not responding
+417 Hardware failure; RF source 2 frequency hardware is not responding
+418 Hardware failure; RF source 2 digital modulation hardware is not responding
+419 Hardware failure; RF source 2 level hardware is not responding
+420 Hardware failure; RF source hopping hardware is not responding
+421 Hardware failure; Digital demod hopping hardware is not responding
+422 Hardware failure; Misc VI hardware is not responding

Error Message
+423 Hardware failure; Unable to access networking information
+425 Hardware failure; Invalid EEPROM checksum <EEPROM board ID>
+426 Hardware failure; Unable to write to EEPROM <EEPROM board ID>
+427 Hardware failure; Unable to read from EEPROM <EEPROM board ID>
+428 Hardware failure; Board not identified <board ID>
+429 Hardware failure; Could not create board identification <board ID>
+430 Hardware failure; Control version not compatible with FW <board ID>
+431 Hardware failure; RF IO DAC cannot be calibrated due to present temperature

<board ID> names

;3 GHZ ATTENUATOR 1| ;3GHZ ATTENUATOR 2| ;AUDIO BD| ;ROM BASEBAND GENERATOR 1| ;ROM BASEBAND GENERATOR 2| ;DEMOD DOWNCONVERTER| ;VECTOR OUTPUT BOARD 1| ;VECTOR OUTPUT BOARD 2| ;IVF MEASUREMENT| ;MEASUREMENT DOWCONVERTER| ;RF POWER DETECTORS| ;REFERENCE MODULE| ;SYNTH DOUBLER 1| ;SYNTH DOUBLER 2| ;TIMING REF| ;MOMENTUM INSTRUMENT| ;RF MOTHER BOARD| ;JUMPER BOARD| ;DIGITAL MOTHER BOARD| ;FLAT PANEL ADAPTER| ;REAR PANEL BOARD

<EEPROM board ID> names

;Instrument Eeprom ID State| ;Atten 1 Eeprom ID State| ;Atten 2 Eeprom ID State| ;Audio Eeprom ID State| ;BaseBandGen 1 Eeprom ID State| ;BaseBandGen 2 Eeprom ID State| ;Demod DC Eeprom ID State| ;Digital Mother Board Eeprom ID State| ;IQ Output 1 Eeprom ID State| ;IQ Output 2 Eeprom ID State| ;IVF Meas Eeprom ID State| ; Jumper Board Eeprom ID State| ; Meas DC Eeprom ID State| ;RF Mother Board Eeprom ID State| ;RF Interface Eeprom ID State| ; Ref Mod Eeprom ID State| ;Sig Gen 1 Eeprom ID State| ; Sig Gen 2 Eeprom ID State| ;Time Ref Eeprom ID State| ;Display Interface Eeprom ID State| ;Rear Panel Eeprom ID State

+600 through +699 Error Message Descriptions

Description

These errors are generated when a problem occurs that is specific to one of the test set's instruments. These errors are part of the test set's core. Note that these measurements may not be present in every test application and therefore, these errors may not be present in every test application. There is no plan at present to support test application specific instruments.

An instrument in this context refers to the measurement-like functionality such as the audio generator and not to the test set as a whole.

When one of these errors is generated, the '+600 errors' bit in the questionable error status register is set.

Error Message	Description
+601 Instrument failure; Audio generator hardware is not responding	Indicates a problem occurs when attempting to control the test set's audio generator.

+800 through +899 Error Message Descriptions

Description

These errors are generated when a problem occurs that is specific to one of the test set's core measurements (such as analog audio).

When one of these errors is generated, the '+800 errors' bit in the questionable error status register is set.

Error Message	Description
+801 Measurement failure; Analog audio hardware is not responding	Indicates that a problem occurs when attempting to control the measurement's hardware.
+802 Measurement failure; Audio analyzer hardware is not responding	Indicates that a problem occurs when attempting to control the measurement's hardware.

Fixed Timer Messages

Description

This is the list of fixed timers with a brief explanation and their values. A timer expiry message appears in its own window, on the test set display. The user has no access to these values and can not change them. None of the fixed timers are active when operating mode is Test Mode.

Timer Name	Description	Value
T100 RADIO-LINK-TIMEOUT	Detects the presence of the radio link by detecting SACCH frames every 480 ms.	4 SACCH multiframes. That is 1.92 seconds if the SACCH is completely absent.
T200 Data link timer	Used for re-transmission on the data link. The value varies depending on the message type.	155 ms for FACCH
T301 Alerting (ringing) timer	Timer used to limit the amount of time a user has to answer a call.	20 seconds
T303 Mobility Management connection timer	Time the network waits after sending a CM SERVICE REQUEST until receiving a response. This occurs before initiating call clearing procedures towards the MS.	10 seconds
T305 Release timer	Time the network waits after transmitting a DISCONNECT message until receiving a RELEASE message.	10 seconds
T306 In-band tones release timer	Time the network waits after transmitting a DISCONNECT message while in-band tones/announcements are provided, until receiving a RELEASE message.	10 seconds
T308 Release timer	Time the network waits after sending a RELEASE message until receiving a RELEASE COMPLETE message. This occurs before re-transmitting the RELEASE or releasing the Mobility Management connection.	10 seconds
T310 Call proceeding timer	Time the network waits after receiving a CALL CONFIRMED message until receiving a ALERTING, CONNECT, or DISCONNECT message before initiating clearing procedures towards the MS.	10 seconds

Timer Name	Description	Value
T313 Connect acknowledge timer	Time the network waits after transmitting a CONNECT message until receiving the CONNECT ACKNOWLEDGE message before performing clearing procedures with the MS.	10 seconds
T323 Modify complete timer	Time the network waits after sending a MODIFY message during call mode changes, until receiving a MODIFY COMPLETE or MODIFY REJECT message before initiating call clearing procedures.	10 seconds
T3101 Immediate assignment timer	Time the network waits after sending the IMMEDIATE ASSIGNMENT or IMMEDIATE ASSIGNMENT EXTENDED message until the main signalling link is established before releasing the newly allocated channels.	1 second
T3103 Handover timer	Time the network waits after transmitting a HANDOVER COMMAND message until receiving HANDOVER COMPLETE or HANDOVER FAILURE or the MS re-establishes the call before the old channels are released. If the timer expires and the network has not received a correctly decoded L2 (format A or B) or TCH frame, then the newly allocated channels are released.	2 seconds
T3105 Physical information repetition timer	Time the network waits after sending the PHYSICAL INFORMATION message until receiving a correctly decoded L2 (format A or B) or TCH frame. This occur before re-transmitting the PHYSICAL INFORMATION message or releasing the newly allocated channels.	50 ms
T3107 Channel assignment timer	Time the network waits after transmitting an ASSIGNMENT COMMAND message until receiving the ASSESSMENT FAILURE message or the MS re-establishes the call before releasing the old and the new channels.	3 seconds
T3109 Signalling disconnection timer	Time the network waits after sending the CHANNEL RELEASE message before disconnecting the signalling link.	5 seconds
T3111 Channel deactivation after disconnection timer	Time the network waits after disconnecting the signalling link before deactivating the channel.	500 ms

Timer Name	Description	Value
T3113 Paging timer	Time the network waits after transmitting the PAGING REQUEST message until receiving the PAGING RESPONSE message. This occurs before re-transmitting the PAGING REQUEST (if the maximum number of re-transmissions have not been exceeded).	5 seconds
T3212 Location update timer	The location update timer is set to zero, periodic location update by the MS are disabled. If the MS camps to the BCH and decodes a new MCC or MNC from the one it last camped on, it should perform a location update.	zero = infinite time
T3250 TMSI reallocation timer	Time the network waits after sending the TMSI REALLOCATION COMMAND until receiving TMSI REALLOCATION COMPLETE. This occurs before aborting the procedure and releasing the Radio Resource connection.	5 seconds
T3260 Authentication response timer	Time the network waits after an AUTHENTICATION REQUEST until receiving AUTHENTICATION RESPONSE. This occurs before aborting the procedure and releasing the Radio Resource connection.	5 seconds

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