

# 27000B-?-TEST

Test System for the 27000 Signal Conditioning System

## OVERVIEW

The Precision 27000B-?-TEST System provides signal sources, signal measuring devices and software modules for performing a variety of tests, ranging from a Factory Acceptance Test (complete parametric test) through Go/No-Go with diagnostics on the 27000 system.

The Test System hardware comprises an external voltmeter and signal generator coupled with a test module that performs signal buffering and muxing on the Bus Interface Module in each 27000 Mainframe. (See Figure 2 on the following page.) Multiple mainframe systems share a single set of external instruments.

27000B-?-TEST Software Modules support various tests and allow the user to test the system at the installation site in a manner identical to factory tests—with no hardware or software development and with instrumentation that can be traceable to NIST standards.

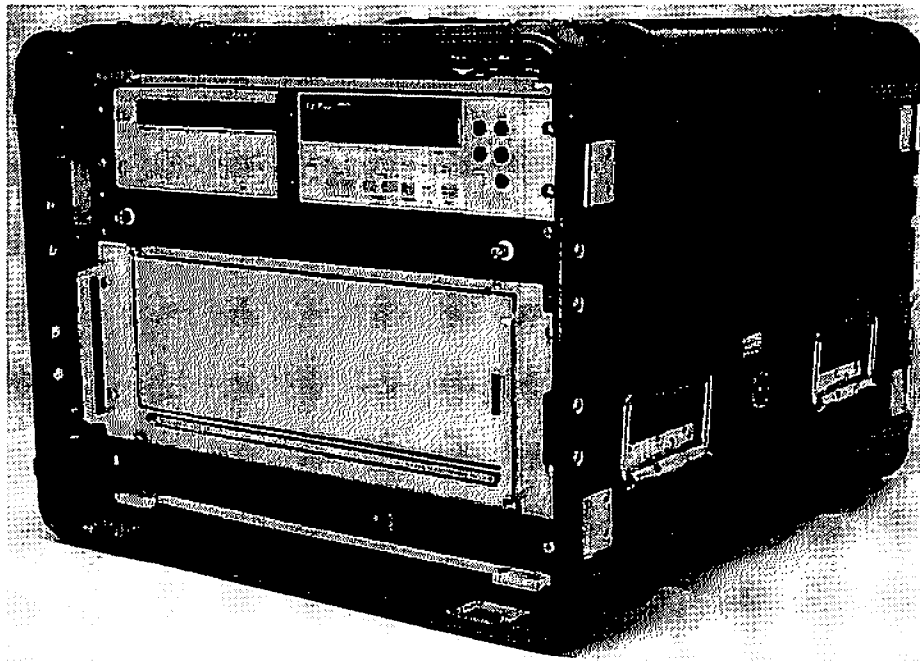
Software support packages provide easy graphical interfaces for test operation and reporting.

## SYSTEM FEATURES

- Built-in factory acceptance (parametric) tests
- Go/No-Go Tests with diagnostics
- System end-to-end calibration
- Programmable calibrated signal sources and meters
- Graphical User Interface (GUI)
- Local or Remote operation

## SYSTEM BENEFITS

- System Self-Test and Verification assures good data
- Perform Factory Acceptance Test (full parametrics) anytime with the click of a button
- Turn-key— No user development of hardware or software is required



27000 Test Subsystem with Precision 27000 (The Shock Mounted Case is Optional)

## SYSTEM DESCRIPTION

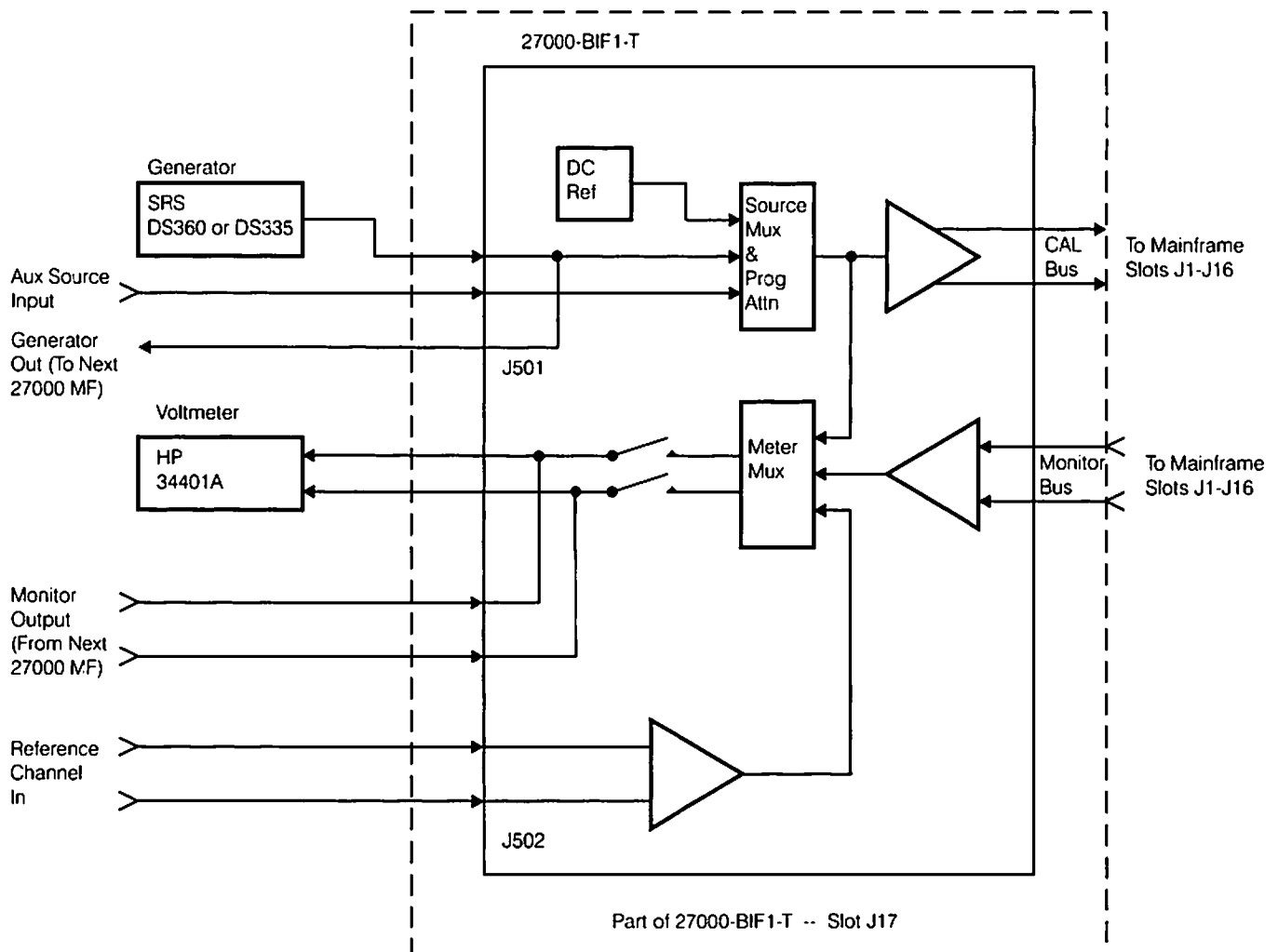
The Precision 27000 Test Subsystem consists of a digital multimeter, a function generator and a test module which is part of the 27000C-BIF1-T bus interface module located in slot J17 of each 27000 mainframe. This test module performs signal buffering and switching, allowing a single meter and generator to be used in multi-mainframe 27000 System configurations. This module also routes generator signals to the CAL Bus in the 27000 frame and buffers signals from the MONITOR Bus in the frame.

Two test subsystems are available. The **27000B-1-TEST** consists of a Hewlett Packard 34401A Digital Multimeter and a Stanford Research Systems DS360 Low-Distortion Function Generator. The **27000B-2-TEST** consists of a Hewlett Packard 34401A Digital Multimeter and a Stanford Research Systems DS335 Function Generator. The test subsystem includes cables to connect to the test and monitor busses of the 27000 chassis as well as rack mounting hardware. Either test subsystem is suitable to perform the Factory Acceptance and Go/No-Go tests on the 27000 system. The choice of test subsystem is dictated by the features and performance that the user desires for the function generator. Refer to the Stanford Research Systems specifications for the DS360 and DS335 for more details.

The meter and function generator each have RS-232 and IEEE-488 remote control and in a typical system configuration that are controlled from the same computer controlling the 27000 System. Software modules running on this computer then have access to all components necessary to run complete system tests: 27000 channels are set up to a desired test state, appropriate signal sources and levels are programmed and the multimeter is read by the computer.

## TEST DESCRIPTION

Two levels of test are provided. The Factory Acceptance Test (FAT) does a complete parametric performance checkout of the 27000 System. Parameters such as Common Mode Rejection Ratio (CMRR), noise, offset, gain frequency response and composite match are tested to original specifications. For a quick checkout of the equipment prior to a test run, the Go/No-Go test may be run to measure system performance of the current programmed setup.



27000B-?-TEST System Block Diagram

## Factory Acceptance Test

The FAT is a full parametric test and is normally run at regular maintenance intervals. All programmable settings of the channel are measured and compared to original factory specifications. The system operator is able to specify which channels are to be tested and which individual tests will be performed. Tests that may be selected for FAT are:

- Filter cutoff frequency response (amplitude and match)
- Gain accuracy
- Offset voltage
- AC/DC coupling
- Maximum level
- Noise (1000 kHz BW, RTO+RTI)
- Common Mode Rejection Ratio (CMRR)
- Overload
- Amplifier frequency response
- Auto balance
- Excitation
- Shunt calibration

The screenshot shows the FAT test execution interface. At the top, it displays 'Test Name: Filter' and 'Return' button. Below, 'Test Conditions' are listed: Input Signal 3.500 V, Input Freq 312.2 Hz, Cutoff Freq 530.0 Hz, Expected Output -33.000 dB, Measured Output -74.258 dB. A 'Pass/Fail' indicator is present. The 'Channel Under Test' is 00.00.00 and the 'Filter Model' is 27500-FB200-TD4-6-6C3. Below this, a table shows the current status of the test sequence.

Fr	Cd	Ch	In Freq	Match(dB)	Spec(dB)	Status
00	00	00	2550.0	-73.072	-33.000	P

Below the table, it shows 'FILTER TEST:fc = 530Hz,Type:A; Gain = G\_bypOFF G\_bypON DC\_err'. Another table shows the results for the filter test:

Fr	Cd	Ch	In Freq	G_bypOFF	G_bypON	DC_err	Gain dB	Spec	Tol	Status
00	00	00	312.200	-3.061	-0.030	0.008	-3.039	-3.04%	0.100	P

Another table shows 'FILTER MATCH TEST:fc = 530Hz,Type:A, Ref Chan: 00.00.00':

Fr	Cd	Ch	In Freq	Match(dB)	Spec(dB)	Status
00	00	00	312.200	-74.259	-33.000	P

At the bottom, it states 'All Tests Finished. Click RETURN.'

The FAT test screen reports the test conditions and provides a tabular listing of the test results during the execution of the test sequence.

## Go/No-Go Test

The Go/No-Go Test checks the system at current channel settings only. It is intended as a quick check of the system prior to taking data. Failed channels/cards are quickly identified so spares can be plugged in, minimizing system down-time. The Go/No-Go tests performed include:

- Cutoff accuracy
- Gain accuracy
- Offset voltage
- Coupling
- Maximum level

The screenshot shows the 'FAT Test Selection' panel. It includes a 'Test Version: 7.2C' and a 'Return' button. The 'Select Test' list includes: Offset, Filter, Gain, Coupling, Max Level, Noise, CMRR, OVLD, Amp Freq, Excite, Auto Bal, T Inset, and ICP Gain. The 'Select Channels' list includes 12 channels with their respective IDs and names. Below the lists are 'ALL', 'NONE', and 'RANGE' buttons. There are also 'Reference Channel A' and 'Reference Channel B' dropdowns, both currently set to 'NONE'. A 'RUN FAT' button is present. At the bottom, there are buttons for 'File Save', 'Display Test File', 'Print Test File', 'Save Setup', and 'Restore Setup'. A 'Test Delay (Min)' field is set to 0. There are also 'Diagnosics', 'Hardware', and 'Edit Template' buttons. A 'Run Pre-Test Verify & Diagnostics' checkbox is checked.

The FAT test selection panel allows the user to select any tests to run on any set of channels. The test results can be saved to a file for later retrieval. A test summary is listed for quick diagnosis.

## SYSTEM CONTROL

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A Precision 27000 system is controlled from a local controller (PC) via an RS-232 serial interface per 27000 chassis. The PC, running a 27000-GUI-WIN graphical user interface (GUI) serves as the local control interface to the 27000 system. Software modules installed in the GUI provide access to the Factory Acceptance tests and Go/No-Go tests. To control the voltage meter and the signal generator, two additional RS-232 interfaces are required or alternatively, a single GPIB interface may be utilized.

## ORDERING OPTIONS

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**Note:** The backplane interface module in slot 17 of the 27000 chassis must have option T (as indicated by the model 27000?-BIF1-T) to support the test subsystem. The local controller must have either two additional RS-232 interfaces or a GPIB interface as described above.

### 27000B-1-TEST

Test System instrumentation and cables. Includes HP 34401A Meter, SRS DS360 Generator, Cables and Rack Mounting Hardware.

### 27000B-2-TEST

Test System instrumentation and cables. Includes HP 34401A Meter, SRS DS335 Generator, Cables and Rack Mounting Hardware.

### 27XXX-FAT-WIN and 27XXX-FAT-WIN-SL

Factory Acceptance Test software module and site license for performing/reporting full parametric test. XXX = Signal Conditioner Card Model Number. For example, the 27104B-FAT-WIN provides factory acceptance test capability for the 27104B card.

### 27XXX-GNG-WIN and 27XXX-GNG-WIN-SL

Go/No-Go Test software module and site license for performing/reporting quick diagnostic test prior to experiment. XXX = Signal Conditioner Card Model Number. For example, the 27104B-GNG-WIN provides go/no-go test capability for the 27104B card.

