S E R V I C E N O T E

SUPERSEDES: None

8922F/S/H/M GSM Test Set

A23 Input Section

Serial Numbers: 0000 A0000 0 / 9999 Z9999 9

No-Cost Mechanical Input Section Replacement Policy

To Be Performed By: Agilent-Qualified Personnel

Parts Required:

08922-61897 NEW MOD AY INPUT KIT

Situation:

Background Information

In 1996, Agilent introduced the Electronic Input Section as standard in the 8922M/S. This new design replaced the Mechanical Input Section previously used in all 8922 variants. There were two key problems with the Mechanical Input Section that led directly to its replacement.

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DATE:August 1998

ADMINISTRATIVE INFORMATION

SERVICE NOTE CLASSIFICATION: **MODIFICATION AVAILABLE**		
ACTION CATEGORY:	AGREEABLE TIME	☐ PERFORMANCE ENHANCEMENT ■ SERVICE/RELIABILITY ENHANCEMENT
LOCATION CATEGORY:	☐ CUSTOMER INSTALLABLE ■ ON-SITE ■ SERVICE CENTER	AVAILABLE UNTIL: May 13, 1999
AUTHOR: PK	ENTITY: E600	ADDITIONAL INFORMATION: None

Agilent Technologies

1. Wear-out of the "mechanical" relays in this module due to switching operations beyond their design limit.

The mechanical relays used in the module were designed to have a lifetime of around 1 million switching operations. In a typical manufacturing test environment this figure is easily exceeded. The fact that some Mechanical Input Sections are still working is a testimony to their design. It should be noted therefore that any perception of poor Agilent quality is not really valid. These things were not designed to last forever!

2. Intermittent behavior of the mechanical relays due to periods of inactivity.

Preamble

Relay manufacturers and design engineers have acknowledged that relays, which rely on mechanical switching for their operation, can be prone to intermittent behavior. This is especially so when the relay is subjected to long periods of inactivity. This is also true when the relay is being used in applications that involve switching through low-level signals. Both situations exist for the relays of the Mechanical Input Section. In an inactive relay the intermittent behavior can reveal itself as a variable, additional attenuation in the path which the relay is part of.

Non-Critical Intermittent Behavior

Intermittent behavior in a relay, only occurring after a period of inactivity, is deemed, by Agilent, to be "non-critical intermittent behavior". An obvious example of this would be an instrument returning from a CSC or being removed from storage after a period of time. It is non-critical because the problem can be removed by a period of multi-switching. This can be conducted after the fault has been identified, or by a preventative maintenance action such as the multi-switching of all relays say, once per month. For the relays in the Mechanical Input Section, the switching activity for each relay is dependent on the specific "output level switching pattern" used by each customer. This is explained further:

There are 7 relays in the generator path of the Input Section used in the 8922. Different customers will use very different switching patterns in their production final test environments. The specific output levels that the customer selects during the final test program determine which relays are kept most active. The customer may claim that the output levels in the switching pattern go up and down many times and that they believe that the relays are being kept active as a result of this. However, a switching pattern with many changes will not necessarily keep all the relays active. Some relays may be kept active whereas others may be idle, much to the surprise of the customer. For example if the 8922 is programmed to output levels -50dBm down to -100dBm, the customer might reasonably expect to be switching all 7 relays. In fact, of the 7 generator path relays, 2 are switched between 5 and 10 times, whilst another 2 are switched only once. The remaining 3 relays are not switched at all!

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Critical Intermittent Behavior

If the fault condition remains after lengthy periods of multi-switching then it will belong in the "critical intermittent behavior" category. Typically this intermittent behavior happens after many switches. Then after further switching the intermittent behavior may disappear either temporarily or permanently.

Whether the effect is temporary or permanent is irrelevant. The point to note is that the relay has shown intermittent behavior after a period of switching. Therefore it cannot be as a result of inactivity. It should be interpreted as a sign that the relay could cause problems in the future. The associated Mechanical Input Section should be replaced as a matter of caution.

Solution / Action:

Customer Actions and Responsibilities

- The customer must agree to carry out routine switching of the Mechanical Input Section relays. This periodic maintenance task will lessen the likelihood of intermittent failure. Agilent will provide special software for this purpose. This software will not capture data. It's sole purpose is to switch all relays 100 times, to "clean up" suspect ones. There are three software routines:

SWITCHG:	switches the generator path relays.
SWITCHA:	switches all other relays in the input section.
SWCHALL:	switches ALL the relays.

The software routines will be made available on RAM cards, supplied by the local CSC. QMD, PL13 Product Support will provide supplies of these cards to CSCs on request.

- Should a Mechanical Input Section be suspected as being faulty, the customer will assist local ISSD staff to provide hard copy data of the failure.

ISSD/SSV Actions and Responsibilities

- ISSD/SSV locally will familiarize themselves with the software supplied to customers for preventative maintenance. ISSD staff will endeavor to make sure that the maintenance software is used regularly (monthly) by the customer.
- ISSD/SSV staff will familiarize themselves with the CHECK10 software routine. This will be made available, on request, by QMD, PL13 Product Support Team. The software will conduct a reference set of measurements on the 8922 before switching any relays. This allows capture of the current state of the 8922 in terms of relay behavior. The software will then go on and switch all relays a total of 10,000 times each, checking the relays every 500 switches for correct performance to the specification for the component.

Any relay identified as a failure by the CHECK10 program will warrant further analysis

- Failures occurring switches into the CHECK10 program:

As a rule of thumb, if the failure occurs within the first 1000 switches and does not reappear then it's most probable cause is a recent period of inactivity.

The Mechanical Input Section should not be replaced. This period of switching activity will overcome this intermittent behavior.

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- Failures occurring 5000 switches into the CHECK10 program:

These failures are less likely to have occurred due to periods of inactivity. It does not matter that a failure after this number of cycles may disappear. This type of failure is likely to be a sign of impending demise. The Mechanical Input Section should be replaced.

The primary objective of this software tool is to help customers confirm their suspicion that a relay is showing abnormal behavior, either intermittently or otherwise. The customer will be able to use this tool on-line in the production area, in a time efficient manner and without external measuring equipment. The customer can then use the data generated to seek advice from Agilent personnel on whether or not to replace the Mechanical Input Section. For the record a hard copy of the data should be captured by using the software utility PRINTDAT described below. These routines will be available on memory card as an IBasic program.

"PRINTDAT" and "GETDATA"

All the data output to the 8922 display during CHECK10 is also captured onto a data file and stored on the memory card. The data can then be displayed on the 8922 screen after the tests have been completed by running the GETDATA utility. To obtain a hard copy of the data then the utility PRINTDAT will print the contents of the data file onto an external GP-IB printer. Certain fields in the 8922 CONFIGURE screen will need to be set up before printout can operate correctly. The program will advise the user what fields to set.