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An Audit of the VLA Checker Messages

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INTRODUCTION

The VLA on line system generates checker messages to notify the operator when certain events occur that could cause observing data to be corrupt, or cause damage to equipment. The purpose of this report is to identify possible areas where the present set of VLA checker messages could fail to notify the VLA operator that a failure has occurred. This report does not address those parts of the array that are monitored and controlled by the Wye Monitor System. In addition to this report, a document is being made available online, that describes each checker message and the appropriate action that should be taken.

POSSIBLE DEFICIENCIES

1. MASER

There are not any current checker messages associated with the maser. Following are some suggested maser checker messages. All values given below correspond to values on the maser overlay.

5.7 KHZ IF LEVEL OUT OF RANGE	(acceptable range 4V to 8V)
INTERNAL ION PUMP CURRENT OUT OF RANGE	(acceptable range -300 to -10)
EXTERNAL ION PUMP CURRENT OUT OF RANGE	(acceptable range -300 to -10)
+24 V POWER SUPPLY OUT OF RANGE	(acceptable range 23.5 V to 24.5 V)
+15 V POWER SUPPLY OUT OF RANGE (MUX 73)	(acceptable range 14.5 V to 15.5 V)
-15 V POWER SUPPLY OUT OF RANGE (MUX 74)	(acceptable range -14.5 V to -15.5 V)
+5 V POWER SUPPLY OUT OF RANGE	(acceptable range 4.8 V to 5.2 V)
+15 V POWER SUPPLY OUT OF RANGE (MUX 76)	(acceptable range 14.5 V to 15.5 V)
-15 V POWER SUPPLY OUT OF RANGE (MUX 77)	(acceptable range -14.5 V to -15.5 V)
BATTERY A VOLTAGE OUT OF RANGE	(acceptable range 20 V to 30 V)
BATTERY B VOLTAGE OUT OF RANGE	(acceptable range 20 V to 30 V)
BATTERY A CURRENT OUT OF RANGE	(acceptable range 1.0 to 3.0)
BATTERY B CURRENT OUT OF RANGE	(acceptable range 0.5 to 3.0)
CAVITY VARACTOR VOLTAGE	(acceptable range is 2 V to 9 V)
XTL VARACTOR VOLTAGE	(acceptable range is 2 V to 7 V)
RF VOLTAGE SOURCE	(acceptable range is 15 V to 30 V)
RF CURRENT SOURCE	(acceptable range is 0.2 to 1.0)

2. MASTER LO RACKS

There are no checker messages for the master LO racks. The off line rack is intended to be a "hot spare". If something goes wrong with this rack, it would not be noticed until someone checks the overlays. It would also be a good idea to have the checker messages for the on line rack, even though a major problem with this rack will cause many problems that would be noticed immediately. Checker messages in these racks could help to identify problems (such as power supplies out of range) before they become critical.

3. THE VLBI RACK

There is not a checker message for the comparison of the VLBA Station Timing Module 1PPS (kept in sync by the maser) and the GPS 1PPS. This could be very serious, because the operator will not be notified if the VLBI rack is not timed. VLBI data could be lost.

There is no checker message to indicate that the analog sum, or a single dish IF power level is out of range. During VLBI, this power level is monitored in the VLBA IF distributor. The VLBA operator might be notified of the power level out of range, depending on how the VLBA operator displays are set up. There is a VLBA screen that the VLA operator could check, which shows BBC power levels, and this also could indicate if the IF power level is out of range. A VLA checker message would help here, to notify the operator immediately if the IF power level is out of range.

4. DE-ICERS

There is a checker message to notify the operator that the de-icers should be turned on, based on the temperature and the dew point temperature. There is not, however, a checker message that is generated if the de-icers are not operating. There could be a checker message to notify the operator that the de-icers are turned on, but not drawing current.

5. PT LINK

Checker messages do appear for the D rack assigned to PT, just as they would for another VLA antenna. There are, however, two areas that are unique to the PT link. There are two power supplies in the D rack for the link. These are not monitored, and have no checker messages associated with them. Also, the fiber optic transmitter/receiver is not monitored, and therefore has no associated checker messages. Checker messages would be preferable, because they might help to identify a problem before it becomes critical.

6. D RACK TEMPERATURE

The D Rack temperature is monitored in only 3 D racks, (one for each arm of the array). There is no checker message associated with this monitor point. If the rack temperatures start rising, the operator is not notified. If a single rack has a failure that causes high temperature, chances are that the high temperature will not be noticed since the temperature is not monitored in most racks.

7. T1/T2 MODULES AT THE ANTENNAS

There are checker messages associated with the T1/T2 modules in the control building, but there are no messages associated with the T1/T2 modules at the antennas. Sometimes, errors for the T1/T2 modules at the antennas can be read on the overlay, even though a hard T1/T2 module failure at the antenna will prevent these error bits from being read.

8. T6 IN MANUAL

If the T6 is left in manual, the module will not accept commands from the on line system. There is no checker message to notify the operator of this situation, and it might not be noticed.