

Initiated by: Dave Emrich

Project Manager: Tom Booler

Proposed Priority: Fast Track Normal

Title: RF Amplifiers in the Beam-former

Affected item(s):

All tiles at the MRO

Technical description:

The manufacturer of two of the three types of amplifier chips used in the MWA Beam-former has declared them obsolete and while they offer “drop-in” replacement parts they do not operate identically in the MWA frequency range (although the chips perform adequately in “typical” applications, eg. Cell-phones).

The front-end chip (SGA4563Z) occurs 16 times on each beam-former, where as the mid-stage (SGA4263Z) and output (CGB1089Z) amplifiers occur once each. Most of our component failures are in the front-end or output amplifiers. It is the front-end and mid-stage (SGA) amplifiers that have been made obsolete. We do not hold appropriate electronic design files to enable us to modify the beam-former delay-line boards if a layout change is required in order to use new parts. There will be a significant cost and delay associated with such modifications if suitable “drop-in” replacements cannot be found.

Several candidate replacement chips have been identified, but all have one or more undesirable impacts, mostly in that the gain falls below that of the parts that are being replaced. Despite the output amplifier chip still being in production it is likely that a new part will have to be sourced in that location, to allow the total gain in each chain to be reasonably well matched, despite drops in the earlier stages.

Suitable parts have been ordered as samples to be tested in beam-former boards that are presently unable to be repaired due to too many failed amplifiers. If these parts test OK, it will require replacing all 18 amplifier chips on each delay-line board to complete repairs, even if not all the 16 input amplifiers have failed. This may mean recovering some front-end amplifier chips that are still working satisfactorily which may be used to repair existing beam-formers with a small number of faulty channels during the changeover period.

Assuming the selected chips are able to restore very nearly the original total gain, detailed analysis and testing will be required to confirm that all other operating parameters of the beam-former remain acceptable with these new chips before they can be procured in quantity and used to repair faulty beam-formers in the future.

Effective Date: (dd-mm-yyyy) 2018-?-?

Reason for given effective date: This issue is still unresolved.

Expected impact on cost (\$AUD): Minimal if only new chips and some passive component value changes required

	Significant if re-laying the beam-former delay-line board becomes necessary.		
Impact on schedule:	Becoming crucial since faulty beam-formers cannot presently be repaired in the lab.		
Other impacts:	Unknown.		
Attached Document(s):			
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