**Feed Status**

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| --- | --- |
| Document last update | 2021-06-28 |
| Feed ser.num. (rev) | 5C4-016-A |
| Last worked on | 2018-12-11 |
| Antenna (previous/current) | 3C, 5B |
| Original build date | 2016-03-01 |
| Number of cooldown cycles | 9 (2017-06-14) |
|  |  |

**Critical Component Summary**

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| --- | --- |
| ATA Feed  Control Board | S.N. 13a |
| Sunpower CryoTel GT  Cryocooler | S.N. GT15-76 |
| Sunpower GT Gen II  Cryo Controller | S.N. 50031064058 |
| Pfeiffer Hi Pace 80  Turbo Pump | S.N. ~~15862921~~  15818768 |
| Pfeiffer TC 110  Electronic Drive Unit | S.N. 74481699 |
| Pfeiffer MVP 006-4  Diaphragm Pump | S.N. 28409618 |
| H.S. Martin  Borosilicate Glass Radome | S.N. 020 |
| Pyramid | S.N. 016 |

**Retrofits**

|  |  |
| --- | --- |
| Temp S. Isolation | X |
| New Wire Harness | X |
| Bellow Removed | X |
| Cryo Tuned | X |
| Firmware 5.4 | X |

**Vibration Measurements**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Before Tuning | Tuned | Re-tune #1 | Re-tune #2 | Re-tune #3 |
| X | 0.70 | 0.05 |  |  |  |
| Y | 0.04 | 0.04 |  |  |  |
| Z | 0.13 | 0.14 |  |  |  |

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| --- | --- |
| **Chassis Up-Dates** | **Vac & Cryo Up-Dates** |
| 15 pin Hermetic Feedthur Filter | RTD Wire Routing |
| 48v Through Control Board | Buna-n O-Rings |
| Vibration System (Bellows Tech) | Turbo Centering Ring w/Screen |
| Control Board 12v Jumper |  |
| Control Board Firmware 3.12 |  |
| Foreline/Valve Layout Change |  |
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|  |  |
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**HISTORY**

2016-03-01 Started Chassis & sub-assembly build-up

2016-04-13 Enclosure assembled with SS base plate, honeycomb vents, ducts & fan.

Wiring, board tray, diaphragm pump & foreline assemblies ready

2016-04-(18-22) Installed Turbo/Diaphragm pumps, Cryo pump with suspension system, Metal Flex.

2016-04-28 Installed temp sensors, wiring harnesses & foreline valve assy.

2016-06-24 Enclosure & PAX case 99% completed.

2016-09-01 Started working on LNA‘s & Group Assy.

2016-10-14 Systems test & firmware & jumper on to Control board, did Control Board reset & set board to auto mode, Turbo running too high a watts(42+) & shutting down, replaced diaphragm pump, no change, must have leak, removed vac & cryo systems. Removed SS base plate & leak tested, no leaks found, inspected all parts during reassembly. 3rd attempt turbo made it to full speed (2hrs). (vac 90K rpms/12 watts &*cryo 268K/85 watts*)

2016-11-17 Installed Pyramid assembly on SS Base Plate, wiring & coax hooked-up.

Glass Dome installed & Feed ready for pumpdown/cooldown. Started pumpdown

auto mode, Turbo reaches 90k/17watts at 65min mark, *Cryo* started at 75min mark, 120min in Turbo power started floating around 18-22watts.

2016-11-18 Turbo power has come down to 90k/17watts &Cryo at 65/68K 177watts,

powered up Test PAX box, LNA bias turned on, both LNA’s working & biasing

normally, Feed ready for testing.

2016-11-21 Feed Vac & Cryo good, 90k/15watts, 65/68K/193watts.

2016-11-23 Feed Vac & Cryo good, 90k/17watts, 65/69K/210watts.

2016-11-28 Feed Vac & Cryo good, 90k/16watts, 65/68K/197watts.

2016-12-09 Feed Vac lost, 38k/36watts, 292/282K/0watts, can hear hissing noise from bellows area, hooked up leak tester to Feed at foreline KF flange, gross leak tester could not pumpdown.

Disassembled Feed & leak tested Base plate Bellow assy, large leak, removed Bellows from Base plate, inspected Bellows under microscope, found crack.

2017-01-(11+13) New Bellows adapter (Metal Flex 2016 PO) welded in, passed leak test, reassembled Feed.

2017-01-17 Finished Feed assembly, started pumpdown&*cooldown*, Turbo at

90K/14watts at 64min mark, cryo started at 75min mark, Turbo climbed to 17watts,

switched roughing pump to high speed for overnight.

2017-01-18 Feed running fine, 90k/12watts, 65/68.4K/157watts, ready for noise testing.

2017-01-20 Started noise testing, Turbo at 90k/18watts, Cryo at 65/68.4K/175watts, while adjusting biasing Vacuum failure, Turbo 60k/76watts, ran noise test on both poles quickly, X+Y noise good (data recorded), bellows failed, disassemble Feed.

2017-01-(26-27) Disassembled Feed, new bellows assy (Metal Flex AM350 SS mat’l) installed in SS Base plate& leak tested, reassembles Feed & started pumpdown/cooldown, Turbo 90k/16watts at 64min mark, Cryo started at 74min mark. Turbo went to 10k/76watts as *Cryo* was getting to 80/90K, 6hrs in to pumpdown/cooldown.

2017-01-30 ran all weekend at 10k/76watts, 212/234K/130watts, shutdown everything, Pyramid will be removed & swapped with -015’s Pyramid (Y pole problem) so it can go to HCRO.

2017-02-07 Disassembled Feed to remove SS Base plate for replacement bellows assy, new bellows assy (Metal Flex AM350 SS mat’l) installed & passed leak test, reassembles enclosure/base plate assembly, ready for Pyramid.

2017-03-01 Installed dumpy pyramid (heat load) on Flex/Base plate assembly, started vac pumpdown &*Cryo cooling* for bellows run-in test (90k/7w, 65K/123w), new RTD sensor wire length & routing.

2017-03-14 Found Y pole Tip Arm Links with soldering failures, Y pole had poor performance, will not remove as planned, resoldered & checked all solder joints, ultrasonic cleaned Tip area, Pyramid ready to install in Feed. Bellows run-in test completed (2wks), Vac 90k/8w & Cryo 65K/131w working fine.

2017-03-15 Installed Pyramid assembly on SS Base Plate, wiring & coax hooked-up, Glass Dome installed, powered up Test PAX box, LNA bias turned on, both LNA’s working & biasing normally, started Pumpdown & Cooldown.

2017-03-16 Vac &*Cryo* good (90k/10w, 65/68+K/187w), checked LNA’s at 68K, X pole biasing fine, Y pole needs higher Vg & Vd to get to 25.0ma, may work fine?

2017-03-17 Hot load test in screen room reviled that both poles have structure & little gain, shutdown vac & cryo, will inspect Tip when at room temp.

2017-03-(22-24) Removed LNA module from Pyramid, inspected input & output coax & LNA components, wiring & connectors, no problems. Reinstalled LNA module in Pyramid.

2017-03-27 Finished Tip Links & Arms, reinstalled Pyramid on SS Base plate, wiring & coax hooked-up, Glass Dome installed, powered up Test PAX box with Feed in screen room, in hot load, LNA biased, post amp turned on, both LNA’s working & biasing normally at 296K (data saved), startedPumpdown &*Cooldown*.

2017-03-28 Feed cooled down, Cryo 65/68K/190w, Vac 90k/11w, powered up Test PAX box with Feed in screen room, in hot load, LNA biased, post amp turned on, both LNA’s have structure & poor gain, adjusted all bias settings until structure was gone, but gain was very low & a hot/cold test would have had low dB results (data & screen images saved). Watched X poles structured trace on monitor while Feed warmed-up, structure disappeared at 125K. Sent everything to Niklas for his input, will decide LNA’s fate after Niklas’s input.

2017-04-05 No problems found after inspecting Pyramid & Tip assy, moved Pyramid assembly to Feed -013, e-mailed back & forth with Niklas (e-mails saved).

2017-04-(26-27) Installed Pyramid/LNA assembly from Feed -013 on SS Base plate, wiring & coax hooked-up, Glass Dome installed, powered up Test PAX box with Feed in screen room hot load, both LNA’s working & biasing normally at 282K (data saved), started Pumpdown &*Cooldown*. Feed cooled down, Cryo 65/68K/178w, Vac 90k/15w, with Feed in screen room hot load, both LNA’s working & biasing normally, Feed ready for Noise tests.

2017-05-01 Rotated Feed to vertical position.

2017-05-10 Feed lost power last night, restarted Pumpdown &*Cooldown*.

2017-05-15 Cryo power & RTD sensor jumping all over the place, RTD wire vibrating &rubbing on copper baseplate near support clamp, shutdown Cryo to watched RTD temp sensors, still not accurately recording temps, shutdown Vacuum, with no vibration sensor readings improved(data recorded), warm-up & adjust RTD wires routing.

2017-05-(17-18) Opened-up Feed, adjusted RTD wires routing& closed-up Feed, started pumpdown &*cooldown*, cooldown completed & RTD sensor working fine, both LNA’s look fine in hot load, Feed ready for Noise tests.

2017-06-10 Vac & Cryo good, X & Y poles working fine, 4dB+ (data recorded), Feed ready to deliver to HCRO.

2017-06-14 Delivered to HC (3of3), installed on antenna 3C, 24 + 48v power supply up-dates added to Rim Box. Turbo, *Cryo*& LNAs working properly, Noise tests performed for X & Y(data saved)

2017-06-19 Feed Test Report sent to HCRO (Elin).

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2018-07-31 HC Trip Rob S. Feeds has been off for 6 months, Vac system only getting to 45k rpms / 77watts. Feed has a vacuum leak, most likely at the Bellows. Remove Feed from Antenna 3C & return it to Minex for repairs.

*Feed appears to have been run for a long period with no vacuum, quite a bit of ice must have formed and lots of hard vibration occurred causing significant tip & bellows damage. There is evidence of cooler damper shaft hammering alum bar.*

2018-08-06 Tried to pumpdown system, Turbo stalled out at 4k rpms, rpms fluctuated between 2500 & 4500?, started to do leak test on Turbo/Dewar system but found oil in the foreline fittings at the Turbo pump. Replaced the Turbo pump & started pumpdown, Turbo stalled out at 8k rpm’s. Tried leak test on Turbo/Dewar system, gross leak, could not pull a vacuum, leak test failed, most likely a leak at the bellows.

2018-08-08 Checked LNA’s in Screen room, 300K, no vacuum, structure on both poles, screen image saved.

2018-08-13 Start disassembling Dewar to remove the SS Base plate for leak test, removed glass to do visual inspection of Tip, all 4 leads broken, circuit board also damaged, lots of Rexolite dust.

2018-08-(14-15) removed Turbo pump, Pyramid, Cryo pump & Base plate, no need to leak test Base plate, one whole bellows convolution has cracked (photo taken).We know the Cryo ran while vacuum was lost, Feed was iced up inside & out. Dewar shows evidence of large amounts of water. Installed new Base plate (BellowsTech 316/347 SS), cleaned all components, re-assembled Dewar less the pyramid, started pumpdown, Turbo reached 90k rpms/14watts in 60min, leaving Turbo running for Bellows run-in test, vac only. Pyramid waiting for tip repairs.

2018-09-04 Bellows run-in test, vac only, 90k/9w.

2018-10-11 Started LNA Module build-up.

2018-10-18 LNA module assy completed,

2018-10-23 LNA Module & Arms installed in Pyramid, LNA Temp Sensor working, Matt needs to completes Tip final assembly.

2018-12-(03-12) Tested Sunpower AVC dampening system.

2019-01-02