

Production Receivers

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Revision History:

1998-11-18: New chapter.

1998-11-24: Section 5.2.1 on mobile laboratory added

Summary

The design of the MMA Production Receivers will evolve during the D&D phase and will be influenced heavily by the Evaluation Receiver development. The schedule for the construction of the receivers is governed by the delivery of the first receivers to the site in 2004. The following milestones will likely be modified in the next few months.

Table 5.2.1 Tentative Milestones for Production Receiver Construction

| Task | | Date |
|------|---------------------------------------|------------|
| 1) | Optics design complete | 1999-06-01 |
| 2) | Dewar design complete | 2000-01-01 |
| 3) | Design of dewar interior | 2000-06-01 |
| 4) | All receiver components delivered | 2002-06-01 |
| 5) | First receiver complete | 2003-01-01 |
| 6) | Testing of first production receivers | 2003-01-01 |
| 7) | Delivery of first receivers to site | 2004-01-01 |

5.2 Production Receiver

The production receivers will be designed to accommodate all the bands specified for the MMA. The receivers will be initially equipped with bands 3, 6, and 9 only and retrofitted as the additional components become available.

The frequency bands for the final receiver are given in the table below.

Table 5.2.2 Frequency bands for the MMA.

| Receiver | Low Frequency (GHz) | Center Frequency (GHz) | High frequency (GHz) |
|----------|------------------------|---------------------------|-------------------------|
| 1 | 30 | 35 | 40 |
| 2 | 67 | 79 | 90 |
| 3 | 89 | 103 | 116 |
| 4 | 125 | 144 | 163 |
| 5 | 163 | 187 | 211 |
| 6 | 211 | 243 | 275 |
| 7 | 275 | 323 | 370 |
| 8 | 385 | 442 | 500 |
| 9 | 602 | 660 | 720 |
| 10 | 787 | 869 | 950 |

5.2.1 Mechanical Considerations: A Mobile Electronics Laboratory

A very important aspect of the Production Receiver design is the ease of installation of the receiver dewar in the receiver cabin, and removal for maintenance. At the Chajnantor site the conditions are relatively harsh, partly because of the high altitude and partly because the antennas may be spread over several km.

A special receiver installation vehicle is envisioned, which consists of a mobile lab, with its own power and cryogenics equipment, its atmosphere oxygenated, and outfitted with necessary electronic test equipment - spectrum analysers and so on. The lab container may be attached to the vehicle chassis in a way that enables it to mate easily with the receiver cabin. This may require raising the entire cabin, in a fashion similar to loading vehicles commonly used to replenish food supplies on commercial aircraft. Some system of rails on the floor of the laboratory may connect with similar rails in the receiver cabin, enabling an entire cryogenics and receiver package to be move smoothly, quickly and easily between the mobile receiver laboratory and the receiver cabin.

5.2.2 Future Work

The plan for the construction of the production receivers is incomplete at present. The plan will be updated in future project book updates.
