



12 Meter Diameter; f/8
 Observing season: October – June
 Carbon fiber construction
 Altitude over Azimuth
 Absolute pointing accuracy: 2.5" rms
 Tracking precision: 0.2" rms
 Efficiency: 85% +/- 5%
 Azimuth range: +/-270°
 Elevation range: 3° to 110°
 Observational range: ~18°– 84°
 Slew speed: 360° min⁻¹
 Observational value: 60° min⁻¹
 (Dome tracking limited)
 Supports position-switching, beam-switching, on-the-fly mapping, and continuum observing

Front Ends

Multi-Band Receiver (4mm, 3mm, 2mm, 1mm, Dual polarization, SBS)

3mm (ALMA Band 3; 84 – 116 GHz; Available)

Image Rejection: 15 dB minimum ≥ 20 dB typical

Typical $T_{\text{sys}@90\text{GHz}} = 120\text{--}160\text{ K}$, $T_{\text{sys}@115\text{GHz}} = 250\text{--}375\text{ K}$

Best $T_{\text{sys}@90\text{GHz}} = 85\text{--}110\text{ K}$, $T_{\text{sys}@115\text{GHz}} = 150\text{--}200\text{ K}$

4mm (66 – 90 GHz; Available, shared-risk)

1mm (211 – 275 GHz; Available, shared-risk)

2mm (In development)

Back Ends

ARO Wideband Spectrometer (AROWS)

Interim: two 4 GHz wide IFs (Available)

Final: four 4 GHz wide IFs (Unavailable)

Mode	Total Bandwidth (MHz)	Channel Spacing (kHz)	Velocity Resolution at 86 GHz (km s ⁻¹)	Velocity Resolution at 115 GHz (km s ⁻¹)
0	4000	625	4.4	3.2
1	2000	312.5	2.2	1.6
2	1000	156.25	1.1	0.8
3	500	78.125	0.54	0.40
4	250	39.0625	0.28	0.20
5	125	19.53	0.14	0.10

12 Meter MAC (2 IF Mode; Available)

Center frequency fixed at 6.3 GHz in receiver IF.

Bandwidth (MHz)	Channels	Usable (MHz)	Usable Channels	Δv^* (kHz)	Resolution (kHz)
800	2048	600	1536	390.6	781.2
800	4096	600	3072	195.3	390.6
400	4096	300	3072	97.6	195.3
400	8192	300	6144	48.8	97.6
200	8192	150	6144	24.4	48.8
200	16384	150	12288	12.2	24.4
100	16384	75	12288	6.1	12.2
100	32768	75	24576	3	6.1

*This is the frequency sampling interval, not the FWHM channel width.

Observing Restrictions

Sun Avoidance: The 12m requires a 10° Sun avoidance zone.

Observing: On-the-fly mapping is currently unavailable with the MAC back end.

For more information, please contact:

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10 Meter Diameter, bent Cassegrain;
f/13.8
Observing season: October – June
Carbon fiber and invar steel
construction
Altitude over Azimuth
Absolute pointing accuracy: 2" rms
Tracking precision: 0.2" rms
Efficiency: 71% +/- 5%
at 216 GHz and 228 GHz
Azimuth range: +/-270°
Elevation range: -2° to 91°
Observational range: ~20° – 84°
Slew speed: 60° min⁻¹
Supports position-switching, beam-switching, on-the-fly mapping, and continuum observing

Front Ends

1.3mm Receiver (Available)

ALMA Band 6 (205 – 280 GHz)
Dual polarization, SBS
Typical $T_{\text{sys@230GHz}} = 200\text{--}275\text{ K}$
Best $T_{\text{sys@230GHz}} = 130\text{--}160\text{ K}$

0.4mm Receiver (Unavailable)

602 – 720 GHz
Dual polarization, DSB
80 K T_{Rx}

0.7mm Receiver (Unavailable)

385 – 500 GHz
Dual polarization, SBS
150 K T_{Rx}

0.8mm Receiver (Available)

325 – 370 GHz
Dual polarization, DSB
Typical $T_{\text{sys@345GHz}} = 600\text{--}900\text{ K}$
Best $T_{\text{sys@345GHz}} = 350\text{--}500\text{ K}$

New 0.8mm Band 7 Receiver (In development)

ALMA Band 7 (275 – 373 GHz)
Dual polarization, SBS

Back Ends

SMT Filter banks (Available)

The SMT IF range is 4–8 GHz for all receivers except the 0.8mm receiver, which has an IF range of 4–6 GHz. The IF center frequency is tunable from 4.5–7.5 GHz.

Mode	Bandwidth (MHz)	Resolution (kHz)
1 IF	2000	1000
2 IF	1000	1000
2 IF	256	250
4 IF	512	1000
4 IF	128	250

Observing Restrictions

Sun Avoidance: The SMT requires a 45° Sun avoidance zone.

Observing: None.

For more information, please contact:

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12M Telescope (EIE ALMA Prototype Antenna) – Kitt Peak

MAC: Unusable for on-the-fly mapping due to hardware limitations.

Submillimeter Telescope (SMT) – Mt. Graham

Filters 1.0MHz: There are periods of instability in the IF down conversion stages that manifests itself in platforming. Problems appear worse in position-switching and on-the-fly observing modes.

Filters 250kHz: The instability noted in the 1.0 MHz filters also appears in these filters. This platforming step is located at the IF center frequency and can be avoided by offsetting the IF.

Position-switching mode: There is a standing wave present when using observing in position-switching mode, especially at the upper end of 1.3mm receiver observing band. This standing wave is not atmospherically induced but instead is related to the receiver/hardware.

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