

# MG002 Correlation Report

## General

- Session info: <http://www3.mpifr-bonn.mpg.de/div/vlbi/globalmm/>
- Station feedback: [http://www3.mpifr-bonn.mpg.de/div/vlbi/globalmm/sessions/apr17/feedback\\_apr17.asc](http://www3.mpifr-bonn.mpg.de/div/vlbi/globalmm/sessions/apr17/feedback_apr17.asc)
- ALMA QA2: 2016.1.01116.V was used for polarization conversion
- This experiment has ALMA with 32x62.5MHz, VLBA with 2x128MHz channels, and most of the EVN with a 1x512MHz channel
- Two EVN stations (Yebees, Pico Veleta) observed in an incorrect backend mode, with a 32 MHz polyphase filterbank. Yebees had the correct backend mode in scans No0064 to No0067 but not in later scans.
- Due to the issue at Yebees and Pico, three correlations were performed:
  - a) standard ALMA correlation setup (58 MHz bands)
  - b) narrower band correlation setup (32 MHz bands)
  - c) emulated standard ALMA correlation setup (58 MHz bands), accomplished via a mixed-bandwidth correlation with additional postprocessing of all baselines to Yebees and Pico Veleta to reconstruct 58 MHz bands
- The details of correlation run (c) are: the experiment was correlated with 58 MHz bands and several narrower bands that fitted the Pico/Yebees recorded bands (e.g., 32 MHz, 24 MHz, 2 MHz and similar). After correlation the visibility data were ran through a post-processing script in order to form 58 MHz bands from the narrow bands (i.e., combining visibilities in frequency domain from e.g. 32 + 24 + 2 MHz bands). This step included spectrally averaging inside the 58 MHz bands from a total of 3712 channels per band down to the final 116 channels per band that matched the originally intended correlation mode. Correlation (c) was run twice, first for scans No0064 to No0067 where only Pico had the incorrect backend mode, then for other scans where both Pico and Yebees had the incorrect backend mode. Scans without Pico and Yebees were not re-correlated but were taken from standard correlation (a).
- The FITS files are delivered in two variants due to the problems with Pico and Yebees that were outlined above.
  - **mg002.fits**: Standard correlation (a) with Pico and Yebees excluded during correlation
  - **mg002\_merged\_set1.fits, mg002\_merged\_set2.fits**: Special correlation with post-processing (c). Note1: scan No0078 contained corrupted DiFX output data, and unfortunately a re-correlation of that scan is not possible, since raw recordings of this and other experiments have been lost due to a computing cluster file storage issue. Note2: Yebees (but not Pico) briefly had the correct backend mode during scans No0064 to No0067  
The output is unfortunately provided as two sets, that need to be merged in AIPS, as DiFX difx2fits is failing to combine into one FITS file the data from certain scans that have a differing number of antennas than other scans.

## Status

What	Date
Correlation 2nd round finished	21.8.2017
Conversion to HOPS	5.9.2017
Fourfit fringe fitting	5.9.2017
Conversion to FITS with -u (union) option	5.9.2017
PCList check	5.9.2017
aedit plots, alist v6 residual rate and delay plots	5.9.2017
re-run with updated polconvert	18.12.2017
Material sent to PI	(pending final ALMA QA2 solutions)

## Fringes

Station	Fringes	Comment
Ef	yes	Effelsberg DBBC2
Eb	yes	Effelsberg RDBE
On	yes	
Aa	yes	
Mh	no	faulty backend configuration
Pv	yes	LCP bad (2bit sample dist. 78%:0:0:22%), is OK in ma008 and mb007
Ys	yes	
Fd	yes	
La	yes	
Pt	yes	weak or no fringes
NI	yes	
La	yes	
Kp	yes	
Ov	yes	
Mk	no	wide fringe search but no fringes found
Br	yes	

Fringes plotted on all baselines to Effelsberg ([No0134 Effelsberg PDF](#)), and ALMA ([No0140 ALMA PDF](#)), and VLBA only ([No0200 VLBA FD PDF](#)).

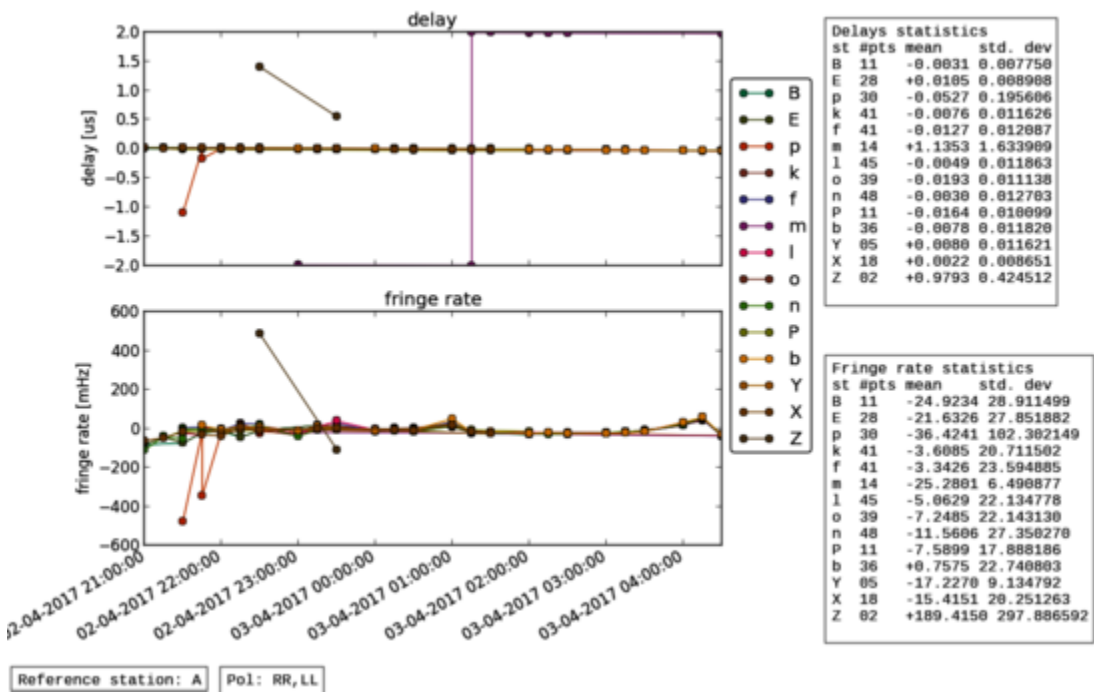
## Notes

1. In case (c) the additional processing consisted of, first, correlation with 58 MHz bands and several narrower bands that fitted the Pico/Yebes recorded bands (e.g., 32 MHz, 24 MHz, 2 MHz and similar), secondly, after correlation passing the visibility data through a post-processing script to form 58 MHz bands on the affected baselines using the narrow bands (i.e., combining visibilities in frequency domain from 32 + 24 + 2 MHz bands), thirdly, spectrally averaging inside the 58 MHz bands from 3712 channels per band to the final goal of 116 channels per band that matches the originally intended correlation mode.
2. Yebes began recording 20 seconds late in every scan; lost scans No0061 to No0063; recorded scans No0064 to No0067 in wideband mode as intended; recorded scans No0068 until the end in 32 MHz polyphase filter bank mode
3. Pico restarted backend for scan 092-2100, bad sampler statistics in earlier scans

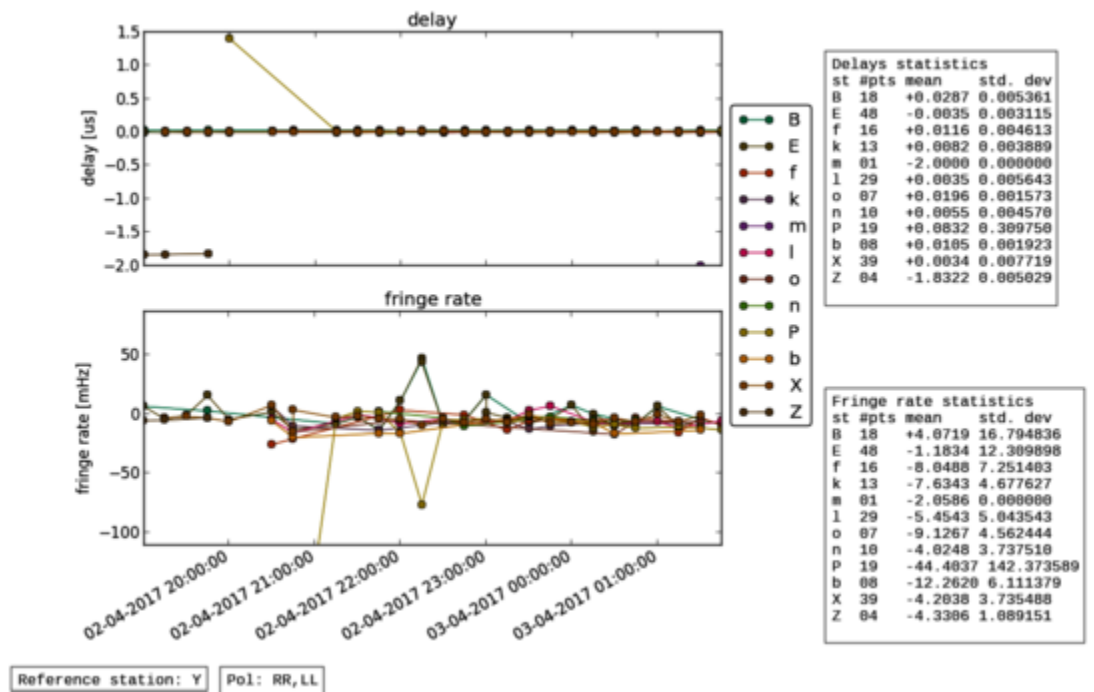
## Post-Correlation checks

### Residuals

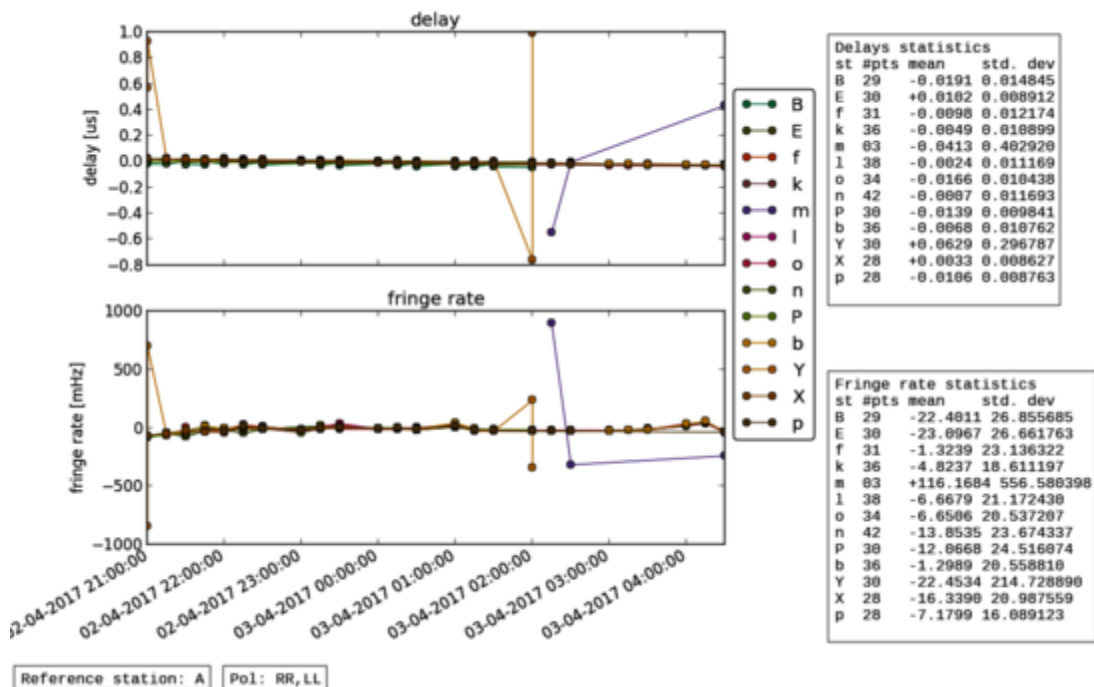
reference A (ALMA), pols LL and RR, residuals in 32 MHz correlation run (a)



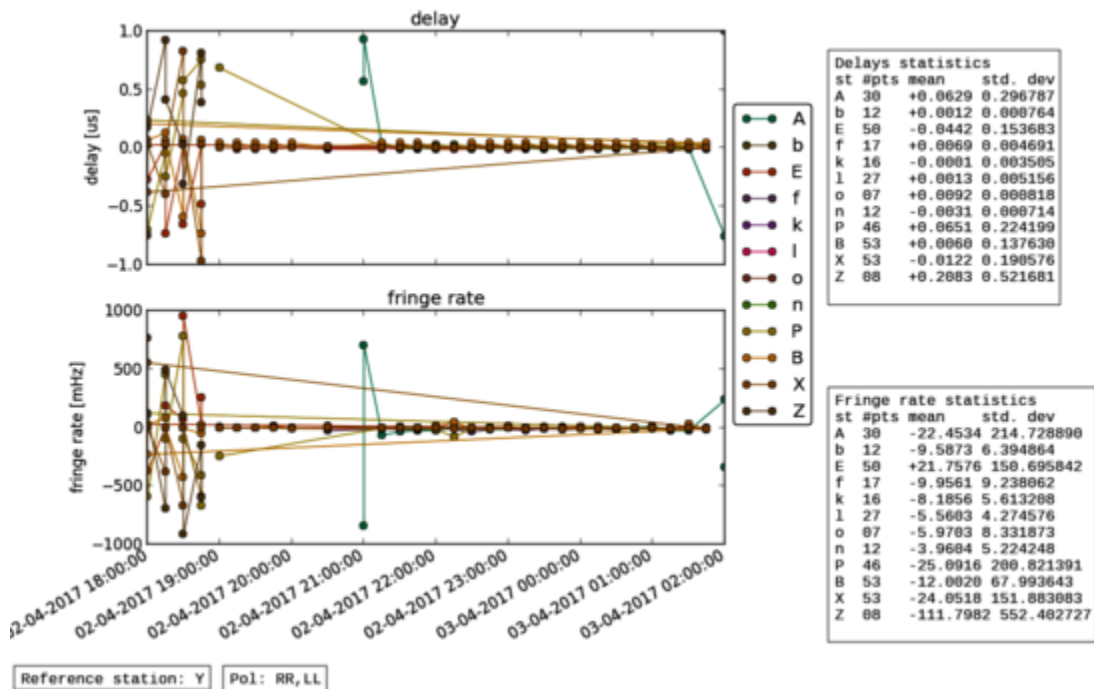
reference Y (Yebe), pols LL and RR, residuals in 32 MHz correlation run (a)



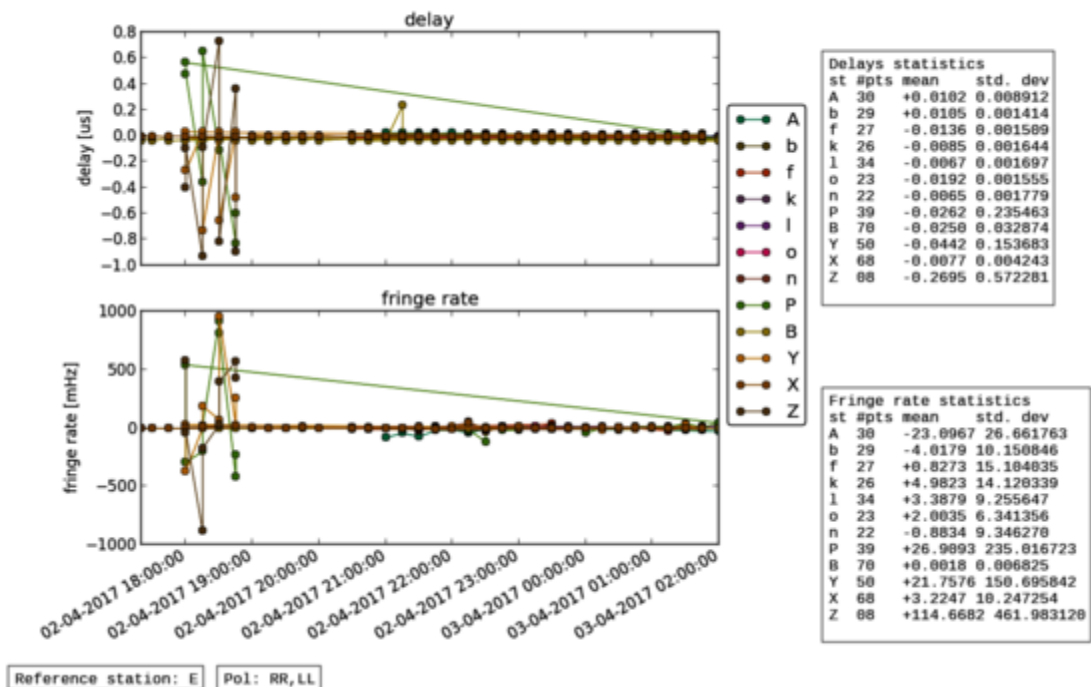
reference A (ALMA), pols LL and RR, residuals in 58 MHz correlation run (c)



reference Y (Yebe), pols LL and RR, residuals in 58 MHz correlation run (c)



reference E (Effelsberg), pols LL and RR, residuals in 58 MHz correlation run (c)



### FITS completeness (plist)

Legend:

- o: station is included in the FITS-file (data is complete)
- x: expected station is missing in the FITS-file
- number: percentage of job time in the FITS-file compared to expected time.

			EF	EB	ON	YS	PV	MH	NL	FD	PT	LA	KP	OV	BR	AA	MK
mg002_01	No0061	OJ287 3mm_ddc	o	o	o	x	x	93	.	.	.	.	.	.	.	.	.
mg002_02	No0062	OJ287 3mm_ddc	o	o	o	x	x	95	.	.	.	.	.	.	.	.	.
mg002_03	No0063	OJ287 3mm_ddc	o	o	o	x	x	95	.	.	.	.	.	.	.	.	.
mg002_04	No0064	OJ287 3mm_ddc	o	o	o	x	x	95	.	.	.	.	.	.	.	.	.
mg002_05	No0065	OJ287 3mm_ddc	o	o	o	x	x	95	.	.	.	.	.	.	.	.	.
mg002_06	No0066	OJ287 3mm_ddc	o	o	o	x	x	95	.	.	.	.	.	.	.	.	.
mg002_07	No0067	OJ287 3mm_ddc	o	o	o	x	x	95	.	.	.	.	.	.	.	.	.
mg002_08	No0068	OJ287 3mm_ddc	o	o	o	x	x	95	.	.	.	.	.	.	.	.	.
mg002_09	No0069	OJ287 3mm_ddc	o	o	o	x	x	95	.	.	.	.	.	.	.	.	.
mg002_10	No0070	OJ287 3mm_ddc	o	o	o	x	x	95	.	.	.	.	.	.	.	.	.
mg002_11	No0071	OJ287 3mm_ddc	o	o	o	x	x	95	.	.	.	.	.	.	.	.	.
mg002_12	No0072	OJ287 3mm_ddc	o	o	o	x	x	95	.	.	.	.	.	.	.	.	.
mg002_13	No0075	J0510+18 3mm_ddc	o	o	o	x	x	x	o	o	o	o	o	o	o	.	.
mg002_14	No0078	J0510+18 3mm_ddc	o	o	o	x	x	x	o	o	o	o	o	o	o	.	.
mg002_15	No0081	OJ287 3mm_ddc	o	o	o	x	x	x	o	.	.	.	.	.	.	o	.
mg002_16	No0084	J0510+18 3mm_ddc	.	.	.	.	.	.	o	o	o	o	o	o	o	.	.
mg002_17	No0087	OJ287 3mm_ddc	o	o	o	x	x	50	o	.	.	.	.	.	.	o	.
mg002_18	No0090	J0510+18 3mm_ddc	.	.	.	.	.	.	o	o	o	o	o	o	o	.	.
mg002_19	No0093	OJ287 3mm_ddc	o	o	o	x	x	95	o	o	o	o	.	.	.	o	.
mg002_20	No0096	OJ287 3mm_ddc	o	o	o	x	x	95	o	o	o	o	.	.	o	o	.
mg002_21	No0099	J0510+18 3mm_ddc	o	o	o	x	x	.	o	o	o	o	o	o	o	o	.

mg002_22	No0102	OJ287	3mm_ddc	o	o	o	x	x	95	o	o	o	o	o	o	o	o	.
mg002_23	No0105	OJ287	3mm_ddc	o	o	o	x	x	95	o	o	o	o	o	o	o	o	.
mg002_24	No0108	OJ287	3mm_ddc	o	o	o	x	x	95	o	o	o	o	o	o	o	x	.
mg002_25	No0111	J0510+18	3mm_ddc	.	.	.	.	.	.	o	o	o	o	o	o	o	o	.
mg002_26	No0112	1055+018	3mm_ddc	o	o	o	x	x	o	.	.	.	.	.	.	.	.	.
mg002_27	No0115	OJ287	3mm_ddc	o	o	o	x	x	95	o	o	o	o	o	o	o	o	.
mg002_28	No0118	OJ287	3mm_ddc	o	o	o	x	x	95	o	o	o	o	o	o	o	o	.
mg002_29	No0121	OJ287	3mm_ddc	o	o	o	x	x	95	o	o	o	o	o	o	o	x	.
mg002_30	No0124	J0510+18	3mm_ddc	.	.	.	.	.	.	o	o	o	o	o	o	o	o	.
mg002_31	No0125	1055+018	3mm_ddc	o	o	o	x	x	16	.	.	.	.	.	.	.	.	.
mg002_32	No0128	OJ287	3mm_ddc	o	o	o	x	x	95	o	o	o	o	o	o	o	o	.
mg002_33	No0131	OJ287	3mm_ddc	o	o	o	x	x	95	o	o	o	o	o	o	o	o	.
mg002_34	No0134	OJ287	3mm_ddc	o	o	o	x	x	95	o	o	o	o	o	o	o	x	o
mg002_35	No0137	1055+018	3mm_ddc	o	o	o	x	x	95	o	o	o	o	o	o	o	o	.
mg002_36	No0140	OJ287	3mm_ddc	o	o	o	x	x	.	o	o	o	o	o	o	o	o	o
mg002_37	No0143	OJ287	3mm_ddc	o	o	o	x	x	.	o	o	o	o	o	o	o	o	o
mg002_38	No0146	1055+018	3mm_ddc	o	o	o	x	x	.	o	o	o	o	o	o	o	x	.
mg002_39	No0149	OJ287	3mm_ddc	o	o	.	x	x	.	o	o	o	o	o	o	o	o	o
mg002_40	No0152	OJ287	3mm_ddc	.	.	.	.	.	.	o	o	o	o	o	o	o	o	o
mg002_41	No0155	OJ287	3mm_ddc	.	.	.	.	.	.	o	o	o	o	o	o	o	o	o
mg002_42	No0158	1055+018	3mm_ddc	.	.	.	.	.	.	o	o	o	o	o	o	o	x	.
mg002_43	No0161	OJ287	3mm_ddc	.	.	.	.	.	.	o	o	x	o	o	o	o	o	x
mg002_44	No0164	OJ287	3mm_ddc	.	.	.	.	.	.	o	o	x	o	o	o	o	o	x
mg002_45	No0167	OJ287	3mm_ddc	.	.	.	.	.	.	o	o	x	o	o	o	o	o	x
mg002_46	No0170	1055+018	3mm_ddc	.	.	.	.	.	.	o	o	x	o	o	o	o	x	x
mg002_47	No0173	OJ287	3mm_ddc	.	.	.	.	.	.	o	o	x	o	o	o	o	o	x
mg002_48	No0176	OJ287	3mm_ddc	.	.	.	.	.	.	o	o	x	o	o	o	o	o	x
mg002_49	No0179	1055+018	3mm_ddc	.	.	.	.	.	.	o	o	73	o	o	o	o	o	73
mg002_50	No0182	OJ287	3mm_ddc	.	.	.	.	.	.	o	o	o	o	o	o	o	.	o
mg002_51	No0185	OJ287	3mm_ddc	.	.	.	.	.	.	o	o	o	o	o	o	o	.	o
mg002_52	No0188	OJ287	3mm_ddc	.	.	.	.	.	.	o	o	o	o	o	o	o	.	o
mg002_53	No0191	1055+018	3mm_ddc	.	.	.	.	.	.	o	o	o	o	o	o	o	.	o
mg002_54	No0194	OJ287	3mm_ddc	.	.	.	.	.	.	o	o	o	o	o	o	o	.	o
mg002_55	No0197	OJ287	3mm_ddc	.	.	.	.	.	.	o	o	o	o	o	o	o	.	o
mg002_56	No0200	OJ287	3mm_ddc	.	.	.	.	.	.	o	o	o	o	o	o	o	.	o
mg002_57	No0203	1055+018	3mm_ddc	.	.	.	.	.	.	o	o	o	o	o	o	o	.	o
mg002_58	No0206	OJ287	3mm_ddc	.	.	.	.	.	.	o	o	o	o	o	o	o	.	o
mg002_59	No0209	OJ287	3mm_ddc	.	.	.	.	.	.	o	o	o	o	o	o	o	.	o
mg002_60	No0210	OJ287	3mm_ddc	.	.	.	.	.	.	x	x	x	x	x	x	x	.	o