ARIEL 4

HIGH & LOW SPEED MERGED DATA

71-109A-01A, 02A, 03A & 04A

4
1 of 4 bks.
~~# tapes~~

ARIEL 4

LANGMUIR PROBE DATA

MHZ RADIO NOISE DATA

VLF/ELF PROPAG. DATA

LOW ENERGY CHARGE PART.DATA

71-109A-01A,02A,03A,04A

THESE DATA SETS HAVE BEEN RESTORED. ORIGINALLY THERE WERE 475 TAPES, 50 OF THESE TAPES ARE LOW SPEED AND 425 ARE HIGH SPEED MERGED DATA. FIVE OF THESE TAPES WERE COMPLETELY BAD, MANY OF THE OTHERS HAD MANY READ ERRORS, REFER TO THE SUMMARY SHEET FOR THE ERRORS AND WHERE THEY OCCURRED. THERE ARE 25 RESTORED TAPES. THE ORIGINAL TAPES WERE 7-TRACK, 556 BPI WRITTEN IN BINARY WITH BCD HEADER INFORMATION. WHEN THESE TAPES WERE CONVERTED TO 9-TRACK THE DATA WAS PADDED. THE BCD DATA WERE NOT CONVERTED TO ASCII. THE NUMERICAL VALUE OF EACH CHARACTER IS THE SAME AS IT WAS ON THE 7-TRACK TAPE. A LISTING OF THE CODES TO TRANSLATE THE CODES TO ASCII FOLLOWS. FOR THE MOST PART THESE TAPES WERE STACKED IN TIME ORDER, BUT THERE ARE SOME TAPES THAT WERE NOT. THE DR TAPES ARE 3480 CARTRIDGES AND THE DS TAPES ARE 9-TRACK, 6250 BPI. THE ORIGINAL TAPES WERE CREATED ON AN ICL 1900 COMPUTER AND THEY WERE RESTORED ON THE MRS SYSTEM. THE DR AND DS NUMBERS ALONG WITH THE CORRESPONDING D NUMBERS AND TIME SPANS ARE AS FOLLOWS:

DR#	DS#	D#	FILES	TIME SPAN
DR004712	DS004712	D014421	1-72	12/21/71 - 12/26/71
		D014423	73-139	01/05/72 - 01/10/72 *
		D014187	140-210	12/12/71 - 12/16/71
		D016754	211-256	12/12/71 - 12/28/71 *
		D016757	257-296	12/12/71 - 12/19/71
		D016759	297-340	12/12/71 - 12/24/71
		D016756	341-373	12/12/71 - 12/19/71
		D016749	374-420	12/12/71 - 12/26/71
		D016735	421-462	12/12/71 - 12/17/71 *
		D016758	463-504	12/12/71 - 12/24/71
		D017129	505-550	12/13/71 - 04/19/72 *

71-109A-01A, 02A, 03A, 04A

DR#	DS#	D#	FILES	TIME SPAN
DR004713	DS004713	D016755	1-39	12/15/71 - 12/18/71
		D014186	40-113	12/16/71 - 12/21/71
		D016734	114-161	12/17/71 - 12/22/71
		D016747	162-187	12/18/71 - 12/22/71
		D017130	188-220	12/19/71 - 01/02/72
		D017131	221-255	12/19/71 - 01/03/72
		D016088	256-305	12/12/71 - 01/04/72
		D016748	306-339	12/22/71 - 12/26/71
		D016733	340-388	12/23/71 - 12/28/71
		D016087	389-435	12/24/71 - 01/01/72
		D016750	436-485	12/24/71 - 12/31/71 *
		D016742	486-519	12/26/71 - 12/30/71
		D016766	520-564	12/27/71 - 01/08/72
		D017132	565-611	12/29/71 - 01/04/72 *
		D017133	612-656	12/29/71 - 01/25/72
DR004714	DS004714	D017134	1-33	12/30/71 - 01/03/72 *
		D016107	34-99	12/31/71 - 01/05/72
		D016764	100-140	12/31/71 - 01/07/72
		D016738	141-180	01/02/72 - 01/11/72
		D016740	181-212	01/02/72 - 01/14/72
		D016732	213-246	01/03/72 - 01/12/72 *
		D017135	247-278	01/03/72 - 01/06/72
		D017136	279-327	01/04/72 - 01/09/72 *
		D014422	328-396	12/26/71 - 12/31/71
		D017137	397-445	01/05/72 - 02/01/72
		D017099	446-483	01/07/72 - 01/15/72
		D017138	484-518	01/07/72 - 01/10/72 *
		D016767	519-556	01/08/72 - 01/21/72
		D014181	557-627	01/10/72 - 01/15/72
		D017101	628-654	01/10/72 - 01/14/72
		D017100	655-703	01/10/72 - 01/16/72 *
		D017102	704-744	01/12/72 - 01/18/72 *
		D016765	745-785	01/11/72 - 01/23/72
		D016090	786-818	01/14/72 - 01/18/72
		D017103	819-843	01/14/72 - 01/23/72
DR004715	DS004715	D014420	1-72	01/15/72 - 01/20/72
		D017104	73-110	01/16/72 - 01/22/72 *
		D017105	111-146	01/16/72 - 01/25/72 *
		D017106	147-175	01/19/72 - 01/22/72 *
		D014185	176-246	01/20/72 - 01/24/72
		D017107	247-284	01/20/72 - 01/26/72 *
		D017108	285-329	01/21/72 - 02/01/72 *
		D016099	330-378	01/22/72 - 01/29/72
		D017162	379-412	01/31/72 - 02/05/72
		D014180	413-482	01/25/72 - 01/29/72
		D016761	483-532	01/26/72 - 02/19/72
		D016743	533-565	02/05/72 - 02/09/72
		D016763	566-610	01/23/72 - 02/01/72
		D016744	611-648	01/23/72 - 01/27/72
		D017159	649-673	01/23/72 - 02/01/72

DR#	DS#	D#	FILES	TIME SPAN
DR004715 CON'T.	DS004715	D016746	674-704	01/27/72 - 01/31/72
		D014418	705-775	01/29/72 - 02/03/72
		D016762	776-819	01/25/72 - 02/01/72 *
		D016745	820-871	02/01/72 - 02/23/72
		D017160	872-906	01/26/72 - 02/05/72
		D016752	907-949	02/01/72 - 02/09/72 *
DR004716	DS004716	D017163	1-46	02/02/72 - 02/20/72
		D014182	47-117	02/03/72 - 02/09/72 *
		D017161	118-179	01/29/72 - 02/06/72 *
		D016760	180-217	02/06/72 - 02/15/72
		D016089	218-265	02/07/72 - 02/14/72
		D017164	266-312	02/08/72 - 02/16/72 *
		D014183	313-383	02/09/72 - 02/14/72
		D017166	384-419	02/09/72 - 02/19/72 *
		D017165	420-448	02/09/72 - 02/12/72
		D016751	449-479	02/01/72 - 02/13/72 *
		D016768	480-529	02/01/72 - 02/08/72
		D017167	530-555	02/13/72 - 02/15/72 *
		D017168	556-591	02/13/72 - 02/23/72
		D017119	592-642	02/14/72 - 02/21/72 *
		D016108	643-715	02/14/72 - 02/19/72
		D017120	716-747	02/15/72 - 02/19/72
		D017121	748-790	02/15/72 - 02/21/72 *
		D017122	791-834	02/16/72 - 02/28/72
		D014179	835-906	02/19/72 - 02/24/72 *
DR004717	DS004717	D017124	1-42	02/19/72 - 02/29/72
		D017123	43-82	02/19/72 - 02/23/72
		D017125	83-130	02/20/72 - 03/14/72
		D017126	131-176	02/21/72 - 02/26/72
		D017127	177-217	02/21/72 - 02/29/72
		D017128	218-262	02/21/72 - 03/10/72 *
		D017118	263-293	02/23/72 - 02/26/72
		D017116	294-327	02/24/72 - 03/04/72
		D017117	328-379	02/24/72 - 03/11/72 *
		D014417	380-448	02/24/72 - 02/29/72
		D017115	449-478	02/27/72 - 03/01/72 *
		D017114	479-531	02/27/72 - 03/04/72
		D014184	532-603	02/29/72 - 03/05/72
		D017113	604-634	02/29/72 - 03/09/72
		D017111	635-665	03/01/72 - 03/05/72
		D017112	666-706	02/29/72 - 03/07/72 *
		D017109	707-731	03/05/72 - 03/14/72 *
		D017110	732-781	03/04/72 - 03/10/72 *
		D016093	782-810	03/05/72 - 03/09/72
		D016109	811-882	03/05/72 - 03/10/72

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DR#	DS#	D#	FILES	TIME SPAN	
DR004718	DS004718	D017149	1-40	03/07/72 - 03/16/72	
		D017150	41-82	03/07/72 - 03/16/72	*
		D017158	83-121	03/09/72 - 03/16/72	
		D017156	122-165	03/10/72 - 04/01/72	
		D017157	166-216	03/10/72 - 03/16/72	
		D016092	217-251	03/12/72 - 03/15/72	
		D017154	252-304	03/14/72 - 03/31/72	
		D017155	305-356	03/12/72 - 03/26/72	
		D017146	357-390	03/15/72 - 04/14/72	*
		D017153	391-426	03/15/72 - 03/19/72	
		D017148	427-461	03/16/72 - 03/26/72	
		D017152	462-510	03/16/72 - 03/21/72	*
		D017151	511-543	03/16/72 - 03/20/72	
		D014178	544-613	03/19/72 - 03/23/72	
		D017147	614-648	03/17/72 - 03/26/72	
		D017144	649-679	03/19/72 - 03/23/72	
		D017145	680-718	03/20/72 - 03/26/72	
		D014416	719-789	03/28/72 - 04/02/72	
		D017143	790-839	03/21/72 - 03/27/72	
		D014419	840-910	03/23/72 - 03/28/72	*
		D017142	911-941	03/23/72 - 03/27/72	
DR004719	DS004719	D017141	1-37	03/26/72 - 04/01/72	
		D017675	38-91	03/27/72 - 04/17/72	
		D017499	92-122	03/27/72 - 03/30/72	
		D017511	123-153	03/26/72 - 03/31/72	
		D017491	154-203	03/27/72 - 04/01/72	*
		D017515	204-239	03/27/72 - 04/05/72	
		D014412	240-311	04/02/72 - 04/06/72	
		D017490	312-360	04/01/72 - 04/06/72	
		D017502	361-394	04/01/72 - 04/08/72	
		D017504	395-444	04/01/72 - 04/20/72	
		D017507	445-490	04/01/72 - 04/10/72	
		D017512	491-531	02/29/72 - 03/07/72	
		D017497	532-564	04/02/72 - 04/05/72	*
		D017509	565-620	04/02/72 - 04/19/72	
		D017514	621-661	04/05/72 - 04/15/72	
		D017496	662-692	04/06/72 - 04/09/72	
		D017519	693-736	04/07/72 - 04/12/72	*
		D016111	737-807	04/20/72 - 04/26/72	
		D017501	808-845	04/09/72 - 04/21/72	
		D017495	846-879	04/09/72 - 04/12/72	
		D014415	880-950	03/14/72 - 03/19/72	
DR004720	DS004720	D017506	1-31	04/11/72 - 04/19/72	*
		D017494	32-64	04/12/72 - 04/16/72	*
		D017518	65-111	04/13/72 - 04/18/72	
		D016091	112-145	03/09/72 - 03/12/72	
		D016110	146-217	04/15/72 - 04/20/72	
		D017510	218-257	04/15/72 - 04/28/72	
		D017493	258-289	04/16/72 - 04/20/72	

DR#	DS#	D#	FILES	TIME SPAN
DR004720 CON'T.	DS004720	D017513	290-325	04/16/72 - 04/26/72
		D017676	326-382	04/17/72 - 04/30/72 *
		D017505	383-422	04/19/72 - 04/28/72
		D017517	423-470	04/19/72 - 04/24/72
		D017492	471-500	04/20/72 - 04/24/72
		D017508	501-557	04/20/72 - 05/08/72 *
		D017500	558-595	04/21/72 - 04/29/72 *
		D017503	596-644	04/21/72 - 05/05/72
		D017679	645-678	04/24/72 - 04/29/72 *
		D014411	679-751	04/06/72 - 04/11/72
		D017516	752-800	04/25/72 - 04/30/72
		D013947	801-831	03/23/72 - 03/27/72
		D017680	832-867	04/27/72 - 05/03/72 *
DR004721	DS004721	D014409	1-71	04/30/72 - 05/05/72 *
		D017682	72-109	04/28/72 - 05/08/72 *
		D017681	110-143	04/28/72 - 05/08/72 *
		D017683	144-176	04/29/72 - 05/03/72 *
		D017684	177-221	04/29/72 - 05/10/72 *
		D014407	222-293	05/25/72 - 05/30/72
		D017686	294-348	05/01/72 - 05/14/72 *
		D017685	349-396	05/01/72 - 05/07/72 *
		D014408	397-466	05/05/72 - 05/10/72 *
		D017688	467-506	05/03/72 - 05/12/72 *
		D017687	507-541	05/03/72 - 05/07/72 *
		D017669	542-584	05/06/72 - 05/19/72
		D017670	585-613	05/07/72 - 05/11/72
		D017671	614-660	05/07/72 - 05/13/72
		D017672	661-694	05/08/72 - 05/20/72
		D017673	695-754	05/09/72 - 06/01/72 *
		D019321	755-825	05/10/72 - 05/15/72
		D017674	826-862	05/09/72 - 05/19/72
		D014410	863-931	04/26/72 - 04/30/72 *
		D017677	932-965	05/11/72 - 05/16/72 *
DR004722	DS004722	D017678	1-45	05/11/72 - 05/20/72
		D014414	46-116	03/10/72 - 03/14/72 *
		D018139	117-164	05/13/72 - 05/20/72
		D018137	165-200	05/13/72 - 05/20/72
		D018133	201-251	05/15/72 - 05/30/72 *
		D018141	252-281	05/16/72 - 05/20/72
		D014413	282-351	04/11/72 - 04/15/72 *
		D019334	352-407	05/19/72 - 06/02/72 *
		D018134	408-452	05/20/72 - 06/01/72 *
		D018135	453-494	05/20/72 - 05/31/72 *
		D018136	495-526	05/20/72 - 06/02/72 *
		D018138	527-573	05/20/72 - 05/26/72 *
		D018140	574-609	05/21/72 - 05/24/72 *
		D020404	610-644	05/21/72 - 05/28/72 *
		D019332	645-676	05/24/72 - 05/28/72 *
		D018143	677-724	05/26/72 - 06/01/72
		D018147	725-760	05/28/72 - 06/01/72
		D018149	761-797	05/29/72 - 06/07/72 *
		D018150	798-850	05/30/72 - 06/15/72 *
		D016113	851-923	05/30/72 - 06/04/72

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DR#	DS#	D#	FILES	TIME SPAN
DR004723	DS004723	D018132	1-34	06/01/72 - 06/08/72 *
		D018144	35-85	06/01/72 - 06/08/72
		D018146	86-127	06/01/72 - 06/09/72 *
		D018142	128-186	06/02/72 - 06/16/72 *
		D018151	187-222	06/02/72 - 06/19/72 *
		D018148	223-258	06/02/72 - 06/05/72 *
		D018145	259-300	06/02/72 - 06/17/72 *
		D016112	301-372	06/04/72 - 06/09/72
		D018181	373-414	06/06/72 - 06/10/72 *
		D018179	415-455	06/08/72 - 06/15/72 *
		D018180	456-500	06/08/72 - 06/13/72 *
		D018178	501-546	06/09/72 - 06/19/72 *
		D016114	547-616	06/09/72 - 06/13/72
		D018176	617-652	06/10/72 - 06/14/72
		D018177	653-682	06/10/72 - 06/17/72
		D016115	683-753	06/13/72 - 06/18/72
		D018174	754-791	06/14/72 - 06/18/72
		D018175	792-843	06/14/72 - 06/20/72 *
		D018172	844-900	06/16/72 - 07/02/72
		D018173	901-936	06/16/72 - 06/26/72 *
		D019333	937-972	06/17/72 - 07/01/72
DR004724	DS004724	D018158	1-34	06/19/72 - 06/30/72 *
		D018156	35-84	06/20/72 - 06/26/72 *
		D018159	85-121	06/18/72 - 06/22/72 *
		D018161	122-163	06/18/72 - 07/01/72
		D018157	164-211	06/20/72 - 07/01/72
		D016116	212-281	06/18/72 - 06/23/72
		D018160	282-339	06/17/72 - 06/30/72
		D018155	340-373	06/22/72 - 06/26/72 *
		D016105	374-445	06/23/72 - 06/28/72
		D018153	446-479	06/26/72 - 07/01/72 *
		D018154	480-522	06/26/72 - 07/01/72
		D020405	523-560	06/26/72 - 07/03/72
		D016106	561-629	06/28/72 - 07/03/72
		D018122	630-682	07/01/72 - 07/07/72
		D018128	683-719	07/01/72 - 07/14/72 *
		D018130	720-754	07/01/72 - 07/05/72
		D018131	755-796	07/01/72 - 07/10/72 *
		D018123	797-841	07/02/72 - 07/17/72 *
		D020409	842-891	07/02/72 - 07/26/72 *
		D020407	892-934	07/01/72 - 07/15/72 *
DR004725	DS004725	D018171	1-54	07/03/72 - 07/19/72 *
		D016103	55-126	07/03/72 - 07/09/72
		D020406	127-153	07/04/72 - 07/11/72 *
		D020410	154-186	07/05/72 - 07/09/72 *
		D018124	187-237	07/08/72 - 07/13/72 *
		D018125	238-275	07/09/72 - 07/12/72 *
		D016104	276-344	07/09/72 - 07/13/72
		D018170	345-389	07/11/72 - 07/18/72 *
		D018126	390-428	07/12/72 - 07/16/72

DR#	DS#	D#	FILES	TIME SPAN
DR004725 CON'T.	DS004725	D016100	429-500	07/13/72 - 07/18/72
		D018129	501-552	07/14/72 - 07/20/72
		D018127	553-594	07/15/72 - 07/24/72
		D018169	595-632	07/17/72 - 07/21/72 *
		D020408	633-675	07/16/72 - 07/29/72 *
		D018162	676-714	07/18/72 - 07/29/72 *
		D018168	715-750	07/18/72 - 07/28/72
		D016101	751-823	07/18/72 - 07/23/72
		D018164	824-852	07/21/72 - 07/25/72
		D018163	853-904	07/20/72 - 08/02/72
		D018167	905-955	07/21/72 - 07/27/72 *
DR004726	DS004726	D018165	1-49	07/22/72 - 08/01/72
		D016102	50-121	07/23/72 - 07/28/72
		D018166	122-166	07/24/72 - 08/06/72
		D014405	167-236	05/15/72 - 05/20/72 *
		D016097	237-308	07/28/72 - 08/02/72
		D014406	309-378	05/20/72 - 05/25/72 *
		D016098	379-417	08/02/72 - 08/04/72
		D019322	418-460	08/03/72 - 08/17/72 *
		D016094	461-502	08/03/72 - 08/04/72
		D016095	503-542	08/04/72 - 08/05/72
		D016096	543-581	08/05/72 - 08/06/72
		D019323	582-609	08/17/72 - 08/24/72 *
		D020412	610-638	08/16/72 - 08/25/72 *
		D018152	639-667	08/30/72 - 09/09/72 *
		D019293	668-695	09/09/72 - 09/16/72
		D019294	696-721	09/10/72 - 09/20/72 *
		D019295	722-753	09/10/72 - 09/24/72 *
		D019292	754-798	09/07/72 - 09/14/72 *
		D019324	799-828	09/08/72 - 09/12/72 *
		D020414	829-854	09/10/72 - 09/20/72
		D019297	855-881	09/12/72 - 09/16/72
DR004727	DS004727	D019296	1-29	09/13/72 - 09/21/72 *
		D019298	30-57	09/14/72 - 09/23/72 *
		D019299	58-98	09/14/72 - 09/21/72
		D019361	99-124	09/15/72 - 09/27/72 *
		D019300	125-155	09/16/72 - 09/20/72 *
		D019301	156-182	09/17/72 - 09/26/72 *
		D013946	183-251	07/09/72 - 07/13/72 *
		D019359	252-279	09/19/72 - 10/05/72 *
		D019360	280-307	09/20/72 - 09/24/72 *
		D019320	308-337	09/21/72 - 09/27/72 *
		D019357	338-364	09/21/72 - 10/02/72 *
		D019353	365-393	09/22/72 - 10/01/72 *
		D019352	394-421	09/24/72 - 10/08/72 *
		D019355	422-449	09/24/72 - 10/04/72 *
		D019354	450-480	09/24/72 - 09/28/72 *
		D019356	481-508	09/26/72 - 10/06/72
		D019358	509-538	09/27/72 - 10/03/72 *
		D019350	539-566	09/28/72 - 10/10/72 *
		D019351	567-594	09/28/72 - 10/01/72 *

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DR#	DS#	D#	FILES	TIME SPAN	
DR004728	DS004728	D019349	1-29	10/01/72 - 10/05/72	
		D019347	30-56	10/02/72 - 10/14/72	*
		D019346	57-84	10/04/72 - 10/09/72	
		D019344	85-112	10/05/72 - 10/30/72	
		D019345	113-139	10/05/72 - 10/13/72	
		D019342	140-167	10/06/72 - 10/15/72	*
		D019343	168-197	10/06/72 - 10/09/72	
		D017139	198-218	10/07/72 - 11/09/72	
		D019325	219-246	10/08/72 - 10/22/72	*
		D019326	247-271	10/09/72 - 10/12/72	*
		D019327	272-298	10/09/72 - 10/15/72	*
		D019328	299-326	10/10/72 - 10/23/72	
		D019329	327-355	10/11/72 - 10/20/72	*
		D019305	356-384	10/20/72 - 10/28/72	
		D019331	385-414	10/13/72 - 10/17/72	*
		D019319	415-443	10/13/72 - 10/23/72	*
		D019306	444-471	10/21/72 - 10/24/72	*
		D019307	472-499	10/21/72 - 10/27/72	*
		D019302	500-528	10/15/72 - 10/30/72	
DR004729	DS004729	D019303	1-28	10/15/72 - 10/24/72	
		D019330	29-62	10/15/72 - 10/21/72	
		D019304	63-90	10/17/72 - 10/21/72	
		D019312	91-119	10/28/72 - 11/02/72	*
		D019313	120-148	10/28/72 - 11/07/72	*
		D019308	149-179	10/22/72 - 11/04/72	*
		D019309	180-207	10/23/72 - 11/04/72	*
		D019310	208-234	10/23/72 - 11/03/73	*
		D019311	235-264	10/24/72 - 10/28/72	*
		D020416	265-292	10/24/72 - 11/02/72	
		D020415	293-319	10/28/72 - 11/02/72	*
		D019316	320-346	11/02/72 - 11/05/72	*
		D019314	347-373	11/03/72 - 11/11/72	*
		D019318	374-402	11/03/72 - 11/09/72	*
		D019282	403-432	11/05/72 - 11/09/72	
		D019284	433-462	11/05/72 - 11/18/72	
		D019283	463-492	11/05/72 - 11/18/72	*
		D019289	493-520	11/14/72 - 11/18/72	
		D019290	521-549	11/14/72 - 12/02/72	*
		D019285	550-578	11/07/72 - 11/15/72	
DR004730	DS004730	D020417	1-27	11/04/72 - 11/15/72	*
		D019315	28-55	10/31/72 - 11/13/72	*
		D019317	56-81	10/31/72 - 11/15/72	
		D019286	82-112	11/09/72 - 11/16/72	*
		D019287	113-142	11/10/72 - 11/14/72	
		D019288	143-169	11/11/72 - 11/18/72	*
		D019291	170-199	11/15/72 - 11/27/72	*
		D019341	200-228	11/15/72 - 11/28/72	
		D019339	229-253	11/16/72 - 11/22/72	
		D019340	254-280	11/16/72 - 11/22/72	*
		D019338	281-308	11/18/72 - 11/30/72	
		D019335	309-335	11/19/72 - 11/27/72	
		D019336	336-364	11/19/72 - 12/03/72	

DR#	DS#	D#	FILES	TIME SPAN
DR004730 CON'T.	DS004730	D020421	365-392	11/22/72 - 12/03/72
		D020420	393-422	11/22/72 - 11/29/72
		D020418	423-452	11/23/72 - 11/28/72 *
		D020422	453-482	11/27/72 - 12/07/72 *
		D020434	483-509	11/28/72 - 12/06/72 *
		D020427	510-536	11/30/72 - 12/06/72 *
		D019337	537-565	11/19/72 - 11/23/72
DR004731	DS004731	D020430	1-24	12/02/72 - 04/20/73 *
		D020423	25-51	12/02/72 - 12/06/72 *
		D020431	52-82	12/03/72 - 05/06/73
		D020432	83-108	12/04/72 - 03/09/73 *
		D016753	109-137	12/06/72 - 12/13/72
		D020433	138-163	12/01/72 - 12/11/72 *
		D016737	164-193	12/06/72 - 12/11/72 *
		D020435	194-222	12/07/72 - 05/01/73
		D020436	223-243	12/08/72 - 05/03/73 *
		D017140	244-257	12/11/72 - 12/11/72
		D020413	258-287	12/11/72 - 12/15/72 *
		D016739	288-317	12/13/72 - 12/20/72
		D016741	318-345	12/15/72 - 12/20/72 *
		D020426	346-372	12/28/72 - 01/01/73
		D020424	373-399	12/20/72 - 12/24/72 *
		D020428	400-429	12/20/72 - 12/27/72 *
		D020425	430-459	12/24/72 - 12/28/72
		D020437	460-491	12/28/72 - 01/04/73 *
		D020441	492-522	01/01/73 - 01/05/73 *
		D020438	523-550	01/04/73 - 01/10/73 *
		D020442	551-580	01/05/73 - 01/09/73 *
DR004732	DS004732	D020439	1-29	01/10/73 - 01/16/73 *
		D020446	30-58	01/20/73 - 01/24/73
		D020440	59-89	01/23/73 - 01/29/73 *
		D020456	90-118	02/09/73 - 02/13/73
		D020466	119-149	03/02/73 - 03/07/73 *
		D020476	150-172	10/03/73 - 12/05/73 *
		D020480	173-204	12/03/73 - 12/09/73 *
		D017498	205-238	03/30/72 - 04/02/72
		D018383	239-272	07/25/72 - 07/30/72 *
		D018384	273-321	07/27/72 - 08/02/72 *
		D018385	322-362	07/29/72 - 08/05/72 *
		D018386	363-403	07/29/72 - 08/12/72 *
		D018387	404-440	08/03/72 - 08/08/72
		D018388	441-471	08/06/72 - 08/16/72 *
		D018389	472-499	08/07/72 - 08/19/72
		D018390	500-532	08/08/72 - 08/12/72
		D018391	533-564	08/10/72 - 08/17/72
		D018392	565-592	08/12/72 - 08/22/72
		D018393	593-621	08/12/72 - 08/24/72 *
		D018394	622-651	08/12/72 - 08/17/72 *

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DR#	DS#	D#	FILES	TIME SPAN	
DR004733	DS004733	D018395	1-28	08/22/72 - 08/30/72	
		D018396	29-56	08/22/72 - 09/04/72	*
		D018397	57-84	08/22/72 - 08/26/72	*
		D018398	85-111	08/25/72 - 09/02/72	*
		D018399	112-140	08/24/72 - 08/31/72	*
		D018400	141-169	09/05/72 - 09/14/72	*
		D018401	170-198	09/03/72 - 09/13/72	*
		D018402	199-227	08/30/72 - 09/09/72	*
		D018403	228-256	08/27/72 - 09/10/72	*
		D018404	257-302	07/27/72 - 08/12/72	
		D018405	303-334	07/30/72 - 08/03/72	*
		D018406	335-377	08/02/72 - 08/12/72	*
		D018407	378-421	07/30/72 - 08/09/72	*
		D018408	422-477	08/03/72 - 08/10/72	
		D018409	478-518	08/06/72 - 08/06/72	*
		D018410	519-547	08/09/72 - 08/22/72	
		D018411	548-579	08/13/72 - 08/27/72	*
		D018412	580-608	08/17/72 - 08/21/72	*
		D018413	609-635	08/17/72 - 09/04/72	
		D018414	636-664	08/19/72 - 08/31/72	*
		D018415	665-692	08/25/72 - 09/02/72	
DR004734	DS004734	D018416	1-30	08/26/72 - 08/30/72	*
		D018417	31-57	09/05/72 - 09/18/72	*
		D018418	58-86	09/03/72 - 09/07/72	*
		D018419	87-115	09/03/72 - 09/14/72	
		D018420	116-148	08/31/72 - 09/07/72	*
		D018421	149-176	08/31/72 - 09/10/72	
		D018422	177-203	08/30/72 - 09/03/72	
		D020419	204-230	11/28/72 - 12/02/72	*
		D020429	231-267	11/28/72 - 12/15/72	
		D020444	268-295	01/13/73 - 01/16/73	
		D020445	296-323	01/16/73 - 01/20/73	
		D020447	324-351	01/24/73 - 01/28/73	*
		D020449	352-381	02/05/73 - 02/12/73	*
		D020450	382-412	02/12/73 - 02/18/73	*
		D020451	413-442	02/19/73 - 02/26/73	*
		D020452	443-472	01/28/73 - 02/01/73	*
		D020453	473-502	01/28/73 - 02/01/73	*
		D020454	503-517	03/09/73 - 05/06/73	*
		D020455	518-544	02/05/73 - 02/08/73	*
		D020457	545-573	02/13/73 - 02/17/73	*
DR004735	DS004735	D020458	1-30	02/17/73 - 02/21/73	*
		D020459	31-58	02/22/73 - 02/26/73	*
		D020460	59-87	02/27/73 - 03/02/73	*
		D020461	88-116	02/26/73 - 03/05/73	*
		D020462	117-147	03/05/73 - 03/12/73	
		D020463	148-176	03/12/73 - 03/19/73	*
		D020464	177-203	03/19/73 - 03/26/73	*
		D020465	204-232	03/26/73 - 04/04/73	
		D020467	233-261	03/07/73 - 03/11/73	
		D020468	262-292	03/02/73 - 03/07/73	*
		D020469	293-322	03/16/73 - 03/21/73	*

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DR#	DS#	D#	FILES	TIME SPAN	
DR004735	DS004735	D020470	323-353	03/21/73 - 03/25/73	*
CON'T.		D020471	354-382	03/25/73 - 03/29/73	
		D020472	383-409	03/30/73 - 04/08/73	
		D020473	410-439	04/05/73 - 04/29/73	*
		D020474	440-465	04/30/73 - 07/27/73	*
		D020475	466-478	05/01/73 - 05/06/73	
		D020477	479-517	10/01/73 - 10/28/73	
DR005228	DS005228	D020478	1-35	10/29/73 - 11/20/73	*
		D020479	36-65	11/20/73 - 12/02/73	*

Please NOTE: The tapes marked with an * had read errors. There were excessive errors for this data set, so please refer to the summary sheet located in the DRP folder for the errors and where they occurred.

ICL 1900 BCD CHARACTER CODES

CHAR	CODE (OCTAL)	CHAR	CODE (OCTAL)
$	00	4	70
]	01	5	71
~	02	6	72
~	03	7	73
X	04	0	74
Y	05	1	75
Z	06	2	76
[	07	3	77
T	10		
U	11		
V	12		
W	13		
P	14		
Q	15		
R	16		
S	17		
L	20		
M	21		
N	22		
O	23		
H	24		
I	25		
J	26		
K	27		
D	30		
E	31		
F	32		
G	33		
@	34		
A	35		
B	36		
C	37		
.	40		
-	41		
.	42		
/	43		
(	44		
)	45		
*	46		
+	47		
~	50		
%	51		
&	52		
'	53		
SPACE	54		
!	55		
"	56		
#	57		
<	60		
=	61		
>	62		
?	63		
8	64		
9	65		
:	66		
;	67		

REQ. AGENT	RAND NO.	ACQ. AGENT
PAR	RB4562	LLD
MAW	RC0159	
CMT	RC0452	

ARIEL 4

HIGH AND LOW SPEED MERGED DATA

71-109A-01A, 02A, 03A, 04A

This data set consists of 50 Low Speed and 425 High Speed Merged data tapes. They are 556 BPI, binary, 7-track, multi-filed. These tapes were created on the ICL 1900 series magnetic tape system, and contain 24-bit words.

The first 2 files of each tape contain BCD header information. The format of these files can be found on page 39 of the documentation. The number of files on each tape can be found in word 11 of the header file containing one record of 96 characters. This number does not include the two header files.

A smaple (10%) of the Ariel 4 tapes were duplicated and given 'C' numbers. A list of the tapes processed can be found on sheets 1A and 1B. The 'D' tapes were then sent to FRC (Federal Records Center).

D#	C#	#FILES	TIME SPAN
D-16742	C-16251	34	12/26/71 - 12/30/71
D-16751	C-16252	31	2/09/72 - 2/13/72
D-16761	C-16253	50	1/26/72 - 2/19/72
D-17101	C-16254	27	1/10/72 - 1/16/72
D-17111	C-16255	31	3/03/72 - 3/07/72
D-17121	C-16256	43	2/15/72 - 2/21/72
D-17131	C-16257	35	12/19/71 - 1/03/72
D-17141	C-16258	37	3/28/72 - 4/13/72
D-17151	C-16259	33	3/18/72 - 3/22/72
D-17161	C-16260	62	2/04/72 - 2/06/72
D-17492	C-16261	30	4/22/72 - 4/26/72
D-17502	C-16262	34	4/03/72 - 4/10/72
D-17512	C-16263	41	3/01/72 - 4/13/72
D-17671	C-16264	47	5/09/72 - 5/14/72
D-17681	C-16265	34	4/30/72 - 5/10/72
D-18124	C-16266	51	7/09/72 - 7/14/72
D-18134	C-16267	45	5/21/72 - 6/02/72
D-18144	C-16268	51	6/02/72 - 6/09/72
D-18154	C-16269	43	6/27/72 - 7/02/72
D-18164	C-16270	29	7/20/72 - 7/26/72
D-16732	C-16402	34	1/03/72 - 1/12/72
D-18174	C-16403	38	6/15/72 - 6/19/72
D-19284	C-16404	29	11/06/72 - 11/18/72
D-19294	C-16405	26	9/04/72 - 9/21/72
D-19304	C-16406	28	10/18/72 - 10/22/72
D-19314	C-16407	27	11/04/72 - 11/12/72
D-19320	C-16408	30	9/22/72 - 9/28/72

D#	C#	#FILES	TIME SPAN
D-19324	C-16409	30	9/09/72 - 9/13/72
D-19334	C-16410	56	5/20/72 - 6/03/72
D-19344	C-16411	28	10/06/72 - 10/31/72
D-19354	C-16412	31	9/25/72 - 9/29/72
D-20406	C-16413	27	7/06/72 - 7/13/72
D-20416	C-16414	28	10/26/72 - 11/04/72
D-20426	C-16415	27	12/18/72 - 1/01/73
D-20436	C-16416	21	12/10/72 - 5/03/73
D-20446	C-16417	29	1/20/73 - 1/24/73
D-20456	C-16418	29	2/09/73 - 2/13/73
D-20466	C-16419	31	3/02/73 - 3/07/73
D-20476	C-16420	23	10/04/73 - 12/05/73
D-20480	C-16421	32	11/29/73 - 12/09/73

D#	C#	NO. OF FILES	TIME SPAN
13946	10433	15 (Low speed)	09/19/72 - 09/19/72
13947	10434	31 (High speed)	04/28/72 - 04/28/72
14178	11361	70 L	03/19/72 - 03/23/72
14179	11362	72 L	02/19/72 - 02/24/72
14180	11363	70 L	01/25/72 - 01/29/72
14181	11364	71 L	01/10/72 - 01/15/72
14182	11365	71 L	02/03/72 - 02/09/72
14183	11366	71 L	02/09/72 - 02/14/72
14184	11367	72 L	02/29/72 - 03/05/72
14185	11368	71 L	01/20/72 - 01/24/72
14186	11369	73 L	12/16/71 - 12/21/71
14187	11370	71 L	12/12/71 - 12/16/71
19321	13154	71 L	05/10/72 - 05/15/72
14405	13155	70 L	05/15/72 - 05/20/72
14406	13156	70 L	08/02/72 - 08/07/72
14407	13157	72 L	05/25/72 - 05/30/72
14408	13158	70 L	05/05/72 - 05/10/72
14409	13159	71 L	04/30/72 - 05/05/72
14410	13160	73 L	04/06/72 - 04/30/72
14411	13161	69 L	04/26/72 - 05/11/72
14412	13162	72 L	04/02/72 - 04/06/72
14413	13163	70 L	05/20/72 - 05/25/72
14414	13164	70 L	05/15/72 - 05/20/72
14415	13165	71 L	04/20/72 - 04/26/72
14416	13166	71 L	03/23/72 - 03/28/72
14417	13167	69 L	02/24/72 - 02/29/72
14418	13168	71 L	01/29/72 - 02/03/72

D#	C#	NO. OF FILES	TIME SPAN
14419	13169	71 L	03/23/72 - 03/28/72
14420	13170	72 L	01/15/72 - 01/20/72
14421	13171	72 L	12/01/71 - 12/06/71
14422	13172	67 L	01/05/72 - 01/10/72
14423	13173	69 L	12/26/71 - 12/31/71
16087	13294	47 (High speed)	12/24/71 - 01/01/72
16088	13295	50 H	12/24/71 - 01/05/72
16089	13296	48 H	02/07/72 - 02/14/72
16090	13297	33 H	01/14/72 - 01/18/72
16091	13298	34 H	04/16/72 - 04/19/72
16092	13299	35 H	03/14/72 - 03/17/72
16093	13300	29 H	03/07/72 - 03/11/72
16094	13301	42 H	08/05/72 - 08/06/72
16095	13302	40 H	08/06/72 - 08/07/72
16096	13303	39 H	08/07/72 - 08/08/72
16097	13304	72 L	07/28/72 - 08/02/72
16098	13305	39 L	08/02/72 - 08/04/72
16099	13306	49 H	01/22/72 - 01/29/72
16100	13307	72 L	07/13/72 - 07/18/72
16101	13308	73 L	07/18/72 - 07/23/72
16102	13309	72 L	07/23/72 - 07/28/72
16103	13310	72 L	07/03/72 - 07/09/72
16104	13311	69 L	07/09/72 - 07/13/72
16105	13312	72 L	06/23/72 - 06/28/72
16106	13313	69 L	06/28/72 - 07/03/72

D#	C#	NO. OF FILES	TIME SPAN
16107	13314	66 L	12/31/71 - 01/05/72
16108	13315	73 L	02/14/72 - 02/19/72
16109	13316	72 L	03/05/72 - 03/10/72
16110	13317	72 L	04/15/72 - 04/20/72
16111	13318	70 L	04/11/72 - 04/15/72
16112	13319	72 L	06/04/72 - 06/09/72
16113	13320	73 L	05/30/72 - 06/04/72
16114	13321	70 L	06/09/72 - 06/13/72
16115	13322	71 L	06/13/72 - 06/18/72
16116	13323	70 L	06/18/72 - 06/23/72
16732		34 H	01/03/72 - 01/12/72
16733		49 H	12/32/71 - 12/28/71
16734		48 H	12/17/71 - 12/31/71
16735		42 H	12/12/71 - 12/27/71
16736		1	----------
16737		30 H	12/08/71 - 12/13/71
16738		40 H	01/02/72 - 01/27/72
16739		30 H	12/14/71 - 12/21/71
16740		32 H	01/02/72 - 01/16/72
16741		28 H	12/16/71 - 12/21/71
16742		34 H	12/26/71 - 12/30/71
16743		33 H	02/05/72 - 02/09/72
16744		38 H	01/27/72 - 02/02/72
16745		52 H	02/01/72 - 02/23/72
16746		31 H	01/27/72 - 01/31/72

D#	C#	NO. OF FILES	TIME SPAN
16747		26	12/18/71 - 12/22/71
16748		34	12/22/71 - 12/26/71
16749		47	12/12/71 - 12/26/71
16750		50	12/24/71 - 12/31/71
16751		31	02/09/72 - 02/13/72
16752		43	02/01/72 - 02/09/72
16753		29	12/07/72 - 12/15/72
16754		46	12/12/71 - 12/28/71
16755		39	12/15/71 - 12/18/71
16756		33	12/12/71 - 12/19/71
16757		40	12/12/71 - 12/19/71
16758		42	12/12/71 - 12/24/71
16759		44	12/12/71 - 12/24/71
16760		38	02/06/72 - 02/15/72
16761		50	01/26/72 - 02/19/72
16762		44	01/31/72 - 02/01/72
16763		45	01/27/72 - 02/01/72
16764		41	12/31/71 - 01/07/72
16765		41	01/13/72 - 01/23/72
16766		45	12/27/71 - 01/08/72
16767		38	01/08/72 - 01/25/72
16768		50	02/09/72 - 02/16/72
17099		38	01/07/72 - 01/17/72
17100		49	01/10/72 - 01/20/72
17101		27	01/10/72 - 01/16/72

D#	C#	NO. OF FILES	TIME SPAN
17102		41	01/12/72 - 01/22/72
17103		25	01/14/72 - 01/27/72
17104		38	01/16/72 - 01/18/72
17105		36	01/16/72 - 01/31/72
17106		29	01/19/72 - 01/22/72
17107		38	01/20/72 - 01/22/72
17108		45	01/21/72 - 02/01/72
17109		21	03/06/72 - 03/14/72
17110		50	03/06/72 - 03/12/72
17111		31	03/03/72 - 03/07/72
17112		41	03/03/72 - 03/09/72
17113		31	03/02/72 - 03/11/72
17114		53	02/28/72 - 03/06/72
17115		30	02/27/72 - 03/13/72
17116		34	02/24/72 - 03/16/72
17117		52	02/24/72 - 03/13/72
17118		31	02/23/72 - 02/26/72
17119		51	02/14/72 - 02/21/72
17120		32	02/15/72 - 02/19/72
17121		43	02/15/72 - 02/21/72
17122		44	02/16/72 - 02/28/72
17123		40	02/19/72 - 02/24/72
17124		42	02/19/72 - 02/29/72
17125		48	02/20/72 - 03/16/72
17126		46	02/21/72 - 02/26/72

D#	C#	NO. OF FILES	TIME SPAN
17127		41	02/21/72 - 03/16/72
17128		45	02/21/72 - 03/12/72
17129		46	12/13/71 - 04/21/72
17130		33	12/19/71 - 01/02/72
17131		35	12/19/71 - 01/03/72
17132		47	12/29/71 - 01/04/72
17133		45	12/29/71 - 01/31/72
17134		33	12/30/71 - 01/03/72
17135		32	01/03/72 - 01/06/72
17136		49	01/04/72 - 01/09/72
17137		49	01/05/72 - 02/01/72
17138		35	01/07/72 - 01/10/72
17139		21	10/09/72 - 11/11/72
17140		14	12/13/72 - 12/29/72
17141		37	03/28/72 - 04/13/72
17142		31	03/25/72 - 03/29/72
17143		50	03/23/72 - 03/29/72
17144		31	03/21/72 - 03/25/72
17145		39	03/22/72 - 03/28/72
17146		34	03/17/72 - 04/16/72
17147		27	03/19/72 - 03/26/72
17148		35	03/18/72 - 03/28/72
17149		40	03/09/72 - 03/17/72
17150		42	03/09/72 - 03/18/72

D#	C#	NO. OF FILES	TIME SPAN
17151		33	03/18/72 - 03/22/72
17152		49	03/18/72 - 03/23/72
17153		36	03/17/72 - 03/21/72
17154		53	03/16/72 - 04/02/72
17155		52	03/16/72 - 04/01/72
17156		44	03/12/72 - 04/02/72
17157		51	03/12/72 - 03/17/72
17158		39	03/11/72 - 03/18/72
17159		25	01/27/72 - 02/01/72
17160		35	02/01/72 - 02/05/72
17161		62	02/04/72 - 02/06/72
17162		34	01/23/72 - 02/05/72
17163		46	02/02/72 - 02/18/72
17164		47	02/08/72 - 02/16/72
17165		29	02/09/72 - 02/12/72
17166		36	02/09/72 - 02/19/72
17167		26	02/13/72 - 02/15/72
17168		36	02/13/72 - 02/23/72
17490		49	04/03/72 - 04/08/72
17491		50	03/29/72 - 04/03/72
17492		30	04/22/72 - 04/26/72
17493		32	04/18/72 - 04/22/72
17494		33	04/14/72 - 04/18/72

D#	C#	NO. OF FILES	TIME SPAN
17495		34	04/11/72 - 04/14/72
17496		31	04/08/72 - 04/11/72
17497		33	04/04/72 - 04/07/72
17498		34	04/01/72 - 04/04/72
17499		31	03/28/72 - 04/01/72
17500		38	04/23/72 - 04/30/72
17501		38	04/11/72 - 04/23/72
17502		34	04/03/72 - 04/10/72
17503		49	04/23/72 - 05/07/72
17504		50	04/03/72 - 04/23/72
17505		40	04/21/72 - 04/30/72
17506		31	04/13/72 - 04/21/72
17507		46	04/03/72 - 04/12/72
17508		57	04/22/72 - 05/09/72
17509		56	04/04/72 - 04/21/72
17510		40	04/17/72 - 04/26/72
17511		31	03/28/72 - 04/01/72
17512		41	03/01/72 - 04/13/72
17513		36	04/18/72 - 04/28/72
17514		41	04/07/72 - 04/17/72
17515		36	03/29/72 - 04/07/72
17516		49	04/27/72 - 05/02/72
17517		48	04/21/72 - 04/26/72
17518		47	04/15/72 - 04/20/72
17519		44	04/09/72 - 04/14/72

D#	C#	NO. OF FILES	TIME SPAN
17669		43	05/08/72 - 05/20/72
17670		29	05/09/72 - 05/12/72
17671		47	05/09/72 - 05/14/72
17672		34	05/10/72 - 05/21/72
17673		60	05/11/72 - 06/02/72
17674		37	05/11/72 - 05/16/72
17675		54	03/28/72 - 04/19/72
17676		57	04/19/72 - 05/02/72
17677		34	05/13/72 - 05/18/72
17678		45	05/13/72 - 05/21/72
17679		34	04/26/72 - 05/01/72
17680		36	04/29/72 - 05/05/72
17681		34	04/30/72 - 05/10/72
17682		38	04/30/72 - 05/10/72
17683		33	05/01/72 - 05/05/72
17684		45	05/01/72 - 05/12/72
17685		48	05/02/72 - 05/09/72
17686		55	05/02/72 - 05/16/72
17687		35	05/05/72 - 05/09/72
17688		40	05/05/72 - 05/14/72
18122		53	07/02/72 - 07/08/72
18123		45	07/03/72 - 07/18/72
18124		51	07/09/72 - 07/14/72
18125		38	07/10/72 - 07/13/72

D#	C#	NO. OF FILES	TIME SPAN
18126		39	07/13/72 - 07/17/72
18127		42	07/16/72 - 07/25/72
18128		37	07/02/72 - 07/15/72
18129		52	07/15/72 - 07/21/72
18130		35	07/02/72 - 07/06/72
18131		42	07/02/72 - 07/11/72
18132		34	06/02/72 - 06/10/72
18133		51	05/16/72 - 05/31/72
18134		45	05/21/72 - 06/02/72
18135		42	05/21/72 - 06/01/72
18136		32	05/21/72 - 06/03/72
18137		36	05/14/72 - 05/21/72
18138		47	05/21/72 - 05/27/72
18139		48	05/14/72 - 05/21/72
18140		36	05/22/72 - 5/25/72
18141		30	05/17/72 - 05/21/72
18142		59	06/03/72 - 06/17/72
18143		48	05/27/72 - 06/06/72
18144		51	06/02/72 - 06/09/72
18145		42	06/03/72 - 06/18/72
18146		42	06/02/72 - 06/10/72
18147		36	05/29/72 - 06/02/72
18148		36	06/03/72 - 06/06/72
18149		37	05/30/72 - 06/08/72

D#	C#	NO. OF FILES	TIME SPAN
18150		53	05/31/72 - 06/16/72
18151		36	06/03/72 - 06/20/72
18152		29	08/31/72 - 09/10/72
18153		34	06/27/72 - 07/02/72
18154		43	06/27/72 - 07/02/72
18155		34	06/23/72 - 06/27/72
18156		50	06/21/72 - 06/27/72
18157		48	06/21/72 - 07/02/72
18158		34	06/20/72 - 07/02/72
18159		37	06/21/72 - 06/23/72
18160		58	06/22/72 - 07/01/72
18161		42	06/21/72 - 07/02/72
18162		39	07/19/72 - 07/30/72
18163		52	07/21/72 - 08/03/72
18164		29	07/20/72 - 07/26/72
18165		49	07/23/72 - 08/02/72
18166		45	07/25/72 - 08/07/72
18167		51	07/22/72 - 07/28/72
18168		36	07/19/72 - 07/29/72
18169		38	07/18/72 - 07/22/72
18170		45	07/12/72 - 07/19/72
18171		54	07/04/72 - 07/20/72
18172		57	06/17/72 - 07/03/72
18173		36	06/17/72 - 06/27/72

D#	C#	NO. OF FILES	TIME SPAN
18174		38	06/15/72 - 06/19/72
18175		52	06/15/72 - 06/21/72
18176		36	06/11/72 - 06/27/72
18177		30	06/11/72 - 06/18/72
18178		46	06/10/72 - 06/20/72
18179		41	06/09/72 - 06/16/72
18180		45	06/09/72 - 06/14/72
18181		42	06/07/72 - 06/11/72
19282		29	11/06/72 - 11/10/72
19283		29	11/06/72 - 11/19/72
19284		29	11/06/72 - 11/18/72
19285		29	11/08/72 - 11/16/72
19286		31	11/10/72 - 11/17/72
19287		29	11/11/72 - 11/15/72
19288		27	11/12/72 - 11/19/72
19289		28	11/07/72 - 11/19/72
19290		29	11/07/72 - 12/03/72
19291		29	11/16/72 - 11/28/72
19292		45	09/08/72 - 09/15/72
19293		28	09/03/72 - 09/17/72
19294		26	09/04/72 - 09/21/72
19295		32	09/04/72 - 09/25/72
19296		29	09/14/72 - 09/22/72
19297		27	09/13/72 - 09/17/72

D#	C#	NO. OF FILES	TIME SPAN
18383		34	07/25/72 - 07/30/72
18384		49	07/27/72 - 08/02/72
18385		41	07/29/72 - 08/05/72
18386		41	07/29/72 - 08/12/72
18387		38	08/03/72 - 08/08/72
18388		31	08/06/72 - 08/16/72
18389		28	08/06/72 - 08/19/72
18390		33	08/08/72 - 08/12/72
18391		32	08/10/72 - 08/17/72
18392		28	08/12/72 - 08/22/72
18393		29	08/12/72 - 08/24/72
18394		30	08/12/72 - 08/17/72
18395		28	08/22/72 - 09/17/72
18396		28	08/22/72 - 09/04/72
18397		28	08/22/72 - 08/26/72
18398		27	08/25/72 - 09/02/72
18399		29	08/24/72 - 08/29/72
18400		29	09/05/72 - 09/14/72
18401		29	08/29/72 - 09/14/72
18402		29	08/30/72 - 09/06/72
18403		29	08/27/72 - 09/10/72
18404		46	07/27/72 - 08/12/72
18405		32	07/30/72 - 08/03/72
18406		43	08/02/72 - 08/12/72
18407		44	07/30/72 - 08/09/72

D#	C#	NO. OF FILES	TIME SPAN
18408		48	08/03/72 - 08/09/72
18409		41	08/06/72 - 08/06/72
18410		29	08/09/72 - 08/22/72
18411		32	08/13/72 - 08/27/72
18412		29	08/17/72 - 08/21/72
18413		27	08/17/72 - 09/04/72
18414		29	08/19/72 - 08/29/72
18415		28	08/25/72 - 09/04/72
18416		30	08/26/72 - 08/30/72
18417		27	09/05/72 - 09/18/72
18418		29	08/29/72 - 09/07/72
18419		29	09/05/72 - 09/14/72
18420		33	08/29/72 - 09/07/72
18421		28	08/29/72 - 09/10/72
18422		27	08/30/72 - 09/05/72

D#	C#	NO. OF FILES	TIME SPAN
19298		28	09/15/72 - 09/24/72
19299		41	09/15/72 - 09/22/72
19300		31	09/17/72 - 09/21/72
19301		27	09/18/72 - 09/27/72
19302		29	10/16/72 - 10/31/72
19303		28	10/16/72 - 10/25/72
19304		28	10/18/72 - 10/22/72
19305		29	10/14/72 - 10/29/72
19306		28	10/15/72 - 10/25/72
19307		28	10/15/72 - 10/28/72
19308		31	10/23/72 - 11/05/72
19309		28	10/24/72 - 11/05/72
19310		27	10/24/72 - 11/04/72
19311		30	10/25/72 - 10/29/72
19312		29	10/21/72 - 11/03/72
19313		29	10/21/72 - 11/08/72
19314		27	11/04/72 - 11/12/72
19315		28	11/09/72 - 11/14/72
19316		27	11/03/72 - 11/6/72
19317		26	11/09/72 - 11/16/72
19318		29	11/4/72 - 11/10/72
19319		29	10/14/72 - 10/24/72
19320		30	09/22/72 - 09/28/72

D#	C#	NO. OF FILES	TIME SPAN
19322		43	08/04/72 - 08/18/72
19323		28	08/18/72 - 08/25/72
19324		30	09/09/72 - 09/13/72
19325		28	10/09/72 - 10/23/72
19326		25	10/10/72 - 10/14/72
19327		27	10/10/72 - 10/16/72
19328		28	10/11/72 - 10/24/72
19329		29	10/12/72 - 10/21/72
19330		34	10/16/72 - 10/22/72
19331		30	10/14/72 - 10/18/72
19332		32	05/25/72 - 05/29/72
19333		36	06/18/72 - 07/02/72
19334		56	05/20/72 - 06/03/72
19335		27	11/20/72 - 11/28/72
19336		29	11/20/72 - 12/04/72
19337		29	12/04/72 - 12/09/72
19338		28	11/19/72 - 12/01/72
19339		25	11/17/72 - 11/23/72
19340		27	11/17/72 - 11/23/72
19341		29	11/16/72 - 11/26/72
19342		28	10/07/72 - 10/16/72
19343		30	10/07/72 - 10/19/72
19344		28	10/06/72 - 10/31/72
19345		27	10/06/72 - 10/14/72

D#	C#	NO. OF FILES	TIME SPAN
19346		28	10/05/72 - 10/10/72
19347		27	10/03/72 - 10/15/72
19348		28	10/02/72 - 10/12/72
19349		29	10/02/72 - 10/06/72
19350		28	09/29/72 - 10/11/72
19351		28	09/29/72 - 10/02/72
19352		28	09/25/72 - 10/09/72
19353		29	09/23/72 - 10/02/72
19354		31	09/25/72 - 09/29/72
19355		28	09/25/72 - 10/05/72
19356		28	09/27/72 - 10/07/72
19357		27	09/22/72 - 10/03/72
19358		30	09/28/72 - 10/04/72
19359		28	09/20/72 - 10/06/72
19360		28	09/21/72 - 09/25/72
19361		26	09/16/72 - 09/28/72
20404		35	05/23/72 - 05/30/72
20405		38	06/28/72 - 07/05/72
20406		27	07/06/72 - 07/13/72
20407		43	07/03/72 - 07/17/72
20408		43	07/18/72 - 07/31/72
20409		50	07/03/72 - 07/28/72
20410		33	07/07/72 - 07/11/72
20411		47	07/12/72 - 07/24/72
20412		29	08/18/72 - 08/27/72

D#	C#	NO. OF FILES	TIME SPAN
20413		30	12/13/72 -12/17/72
20414		26	09/12/72 - 09/22/72
20415		27	10/27/72 - 11/04/72
20416		28	10/26/72 - 11/04/72
20417		27	11/08/72 - 11/17/72
20418		30	11/25/72 - 11/30/72
20419		27	11/30/72 - 12/04/72
20420		30	11/24/72 - 12/01/72
20421		28	11/20/72 - 12/05/72
20422		30	11/29/72 - 12/09/72
20423		27	12/04/72 - 12/08/72
20424		27	12/22/72 - 12/26/72
20425		30	12/26/72 - 12/30/72
20426		27	12/18/72 - 01/01/73
20427		27	12/02/72 - 12/08/72
20428		30	12/22/72 - 12/29/72
20429		37	11/29/72 - 12/17/72
20430		24	12/04/72 - 04/30/73
20431		31	12/05/72 - 05/06/73
20432		26	12/06/72 - 03/09/72
20433		26	12/07/72 - 12/13/72
20434		27	11/30/72 - 12/08/72
20435		29	12/09/72 - 05/01/73
20436		21	12/10/72 - 05/03/73
20437		32	12/30/72 - 01/04/73
20438		28	01/04/73 - 01/10/73

D#	C#	NO. OF FILES	TIME SPAN
20439		29	01/10/73 - 01/16/73
20440		31	01/23/73 - 01/29/73
20441		31	01/01/73 - 01/05/73
20442		30	01/05/73 - 01/09/73
20443		30	01/09/73 - 01/13/73
20444		28	01/13/73 - 01/16/73
20445		28	01/16/73 - 01/20/73
20446		29	01/20/73 - 01/24/73
20447		28	01/24/73 - 01/28/73
20448		29	01/29/73 - 02/05/73
20449		30	02/05/73 - 02/12/73
20450		31	02/12/73 - 02/18/73
20451		30	02/19/73 - 02/26/73
20452		30	01/28/73 - 02/01/73
20453		29	02/01/73 - 02/05/73
20454		15	03/09/73 - 05/06/73
20455		27	02/05/73 - 02/08/73
20456		29	02/09/73 - 02/13/73
20457		29	02/13/73 - 02/17/73
20458		30	02/17/73 - 02/21/73
20459		28	02/22/73 - 02/26/73
20460		29	02/27/73 - 03/02/73
20461		29	02/27/73 - 03/05/73
20462		31	03/05/73 - 03/12/73
20463		29	03/12/73 - 03/19/73
20464		27	03/19/73 - 03/26/73
20465		29	03/21/73 - 04/04/73
20466		31	03/02/73 - 03/07/73

D#	C#	NO. OF FILES	TIME SPAN
20467		29	03/07/73 - 03/11/73
20468		30	03/12/73 - 04/01/73
20469		30	03/16/73 - 03/21/73
20470		31	03/21/73 - 03/25/73
20471		29	04/04/73 - 03/29/73 ?
20472		27	03/30/73 - 04/08/73
20473		30	04/05/73 - 04/29/73
20474		26	04/30/73 - 07/27/73
20475		13	05/01/73 - 05/06/73
20476		23	10/04/73 - 12/05/73
20477		39	10/01/73 - 10/29/73
20478		35	10/29/73 - 11/20/73
20479		30	11/20/73 - 12/02/73
20480		32	11/29/73 - 12/09/73

ARIEL 4

Tape code tracks 7654321	Internal machine code 012345	Character	Tape code tracks 7654321	Internal machine code 012345	
P0111003	100000	@	P1111007	000000	0
P0111013	100001	A	P1111017	000001	1
P0111023	100010	B	P1111027	000010	2
P0111137	100011	C	P1111137	000011	3
P0110030	100100	D	P1110040	000100	4
P0110131	100101	E	P1110151	000101	5
P0110232	100110	F	P1110262	000110	6
P0110133	100111	G	P1110173	000111	7
P0101024	101000	H	P1101004	001000	8
P0101125	101001	I	P1101015	001001	9
P0101026	101010	J	P1101066	001010	: (colon)
P0101127	101011	K	P1101167	001011	; (semi-colon)
P0100020	101100	L	P1100060	001100	<
P0100121	101101	M	P1100161	001101	=
P0100022	101110	N	P1100062	001110	>
P0100123	101111	O	P1100163	001111	?
P0011004	110000	P	P1011005	010000	spaces
P0011015	110001	Q	P1011055	010001	! (exclamation)
P0011106	110010	R	P1011056	010010	" (quotes)
P0011117	110011	S	P1011157	010011	#
P0010010	110100	T	P1010050	010100	£
P0010011	110101	U	P1010151	010101	%
P0010102	110110	V	P1010052	010110	&
P0010113	110111	W	P1010153	010111	' (apostrophe)
P0001004	111000	X	P1001044	011000	(
P0001015	111001	Y	P1001045	011001	)
P0001106	111010	Z	P1001146	011010	* (asterisk)
P0001117	111011	[	P1001147	011011	+
P0000000	111100	$	P1000040	011100	, (comma)
P0000101	111101	]	P1000141	011101	- (hyphen/minus)
P0000102	111110	↑	P1000042	011110	. (stop)
P0000103	111111	←	P1000143	011111	/ (solidus)

Notes

1 The parity can be odd or even.

2 All zeros on tape are illegal in even parity.

This is the character code sheet for 71-109A-01A, 2A, 3A & 4A

Table 18 I.C.T. 1900 Series seven-track tape code

Chapter 16 Data interchange with industry compatible magnetic tape

The magnetic tape used on the 1900 Series magnetic tape systems is industry compatible magnetic tape. This means that data may be interchanged with the computer systems of other manufacturers through the medium of magnetic tape as long as the tape used by the other manufacturers is to the same industry compatible standards.

TAPE STANDARDS

Magnetic tape standards have been defined both by the European Computer Manufacturers Association and by the British Standards Institute.

The relevant standards for seven-track tape are E.C.M.A. 5 and B.S.S. 3968 and for nine-track NRZI tape E.C.M.A. 12. The proposed industry compatible standard for nine-track phase encoded tape has not yet been ratified.

The standards laid down define the physical properties of tape such as spool dimensions, tape width and thickness, recording mode and density, and the positioning of reflective strips. They do not define tape codes or label and block formats. E.C.M.A. 13 provides for tape labelling and codes.

TAPE CODES

Most computer manufacturers use IBM BCD code in even parity for data interchange on seven-track tapes, and IBM EBCDIC or USACII on nine-track tapes. These codes are shown in Tables 19, 20 and 21.

These codes are different from the 1900 Series tape codes and the 1900 Series internal machine code, therefore, the first step in any user program must be a translation routine. An example of such a routine is shown on page 141. Table 18 shows the 1900 Series seven-track tape code. As can be seen this code is based on the I.C.T. internal machine code with the four most significant bits inverted. With nine-track tape systems the 1900 Series word is recorded in three rows on tape as shown in Table 14 below.

	Tape track								
	1	2	3	4	5	6	7	8	9
Row 1	B5	B7	B3	P	B2	B1	B0	B6	B4
Row 2	B13	B15	B11	P	B10	B9	B8	B14	B12
Row 3	B21	B23	B19	P	B18	B17	B16	B22	B20

Table 14 1900 Series word format on nine-track tape

The system shown in Table 14 is used by other manufacturers. On reading an IBM nine-track tape, for example, three bytes (bits numbered 0 to 7) are represented in a 1900 Series word as shown in Table 15 below.

1900 Series word																			
B0							B7	B8							B15	B16			B23
First byte								Second byte								Third byte			
0	1	2	3	4	5	6	7	0	1	2	3	4	5	6	7	0	1	2	3	4	5	6	7

Table 15 Representation of three bytes in a 1900 Series word

TAPE MARKS

The tape mark defined in the E.C.M.A. standard for seven-track tape differs from that currently used in industry compatible tape. The tape mark given in the E.C.M.A. 5 and B.S.S. 3968 standards is 0011111, i.e. odd parity. The IBM seven-track tape mark is 0001111, i.e. even parity.

The 1900 S-series seven track magnetic tape systems will write the tape mark X001111 [illegible] depending on whether the tape is in odd or even parity mode. On reading, the 1900 Series will treat any one row block of form X0X1111 as a tape mark, i.e. the parity bit and the bit in track 5 will be ignored. This means that both IBM and E.C.M.A. tape marks can be read on the 1900 Series seven-track tape systems.

With the nine-track NRZI tape systems a single tape mark is recorded; this mark is represented in store as 00010011, i.e. odd parity. Information on the tape marks used by the nine-track phase encoded tape systems is given in Chapter 1, page 5.

DATA INTERCHANGE METHODS

The 1900 Series normally operates in odd parity mode. The procedures outlined below must be followed to read a tape in even parity mode.

The tape deck on which the tape is loaded must be allocated to the program by the console allocation scheme, i.e. by the GIVE directive (see Chapter 7, page 39).

The console input directive

GIVE *#name x y* MODE 16

will cause Executive to allocate the tape deck *x* to the program *name* as its tape file *y*. Specifying MODE 16 means that the tape will be read and written in even parity at 556 characters per inch. It is important to note that since Executive cannot recognise the Header Label the change mode GIVE console directive (see Chapter 5, page 40) cannot be used and the console allocate GIVE directive as described above must be used instead.

After the tape has been allocated it can be read with a PERI instruction using mode #0.

Once the data has been read into store it must be converted into the 1900 Series internal machine code. It is not necessary to convert tape marks.

If the data input is not contained in an integral number of words, the remaining characters of the last word input will be filled with $ (dollar) characters in the case of seven-track tape and zeros in the case of nine-track tape. The dollar character will also effectively end a transfer when writing to seven-track tape. It is possible, therefore, to read or write variable length blocks with even parity on seven-track tape. Since nine-track tape only operates in odd parity the 1900 Series can only write an integral number of words. Any number of characters may be read.

The user program must examine the data that is read. The first block read will probably be a Header Label whose format must be known to the user. It is possible that other blocks may also be label blocks of various types.

It is important to note that the Magnetic Tape Housekeeping package cannot be used since the label and block formats will not be to Housekeeping standards.

Writing to tape is the reverse of the procedure described above. The data must first be assembled in the required format, converted to non-I.C.T. code and written to tape by a PERI instruction using mode #1.

CONVERSION ROUTINES

Seven-track tape

If conversion routines are used, it is a relatively simple matter to convert one tape code to another. Two conversion tables are given below, followed by a routine which makes use of the first table to convert I.C.T. internal machine code to IBM BCD seven-track code.

#66757677	#70717273	#64656122	#02416206
#54436267	#46401442	#01212003	#47340755
#60151617	#10111213	#04053536	#37303132
#33242556	#57505152	#53444563	#74004223

Table 16 I.C.T. to IBM conversion table (seven-track tape)

#75301433	#50511736	#44454647	#26414243
#32311377	#61622174	#55565760	#35525354
#25152721	#71722434	#65666770	#20376364
#40122273	#10110023	#04050607	#74010203

Table 17 IBM to I.C.T. conversion table (seven-track tape)

Note: These two tables take into account the bit inversion of tracks 6,5,4 and 3.

In the two tables given above the following equivalent characters are used:

	I.C.T.	IBM
	!	≠
	"	>
	£	≠
	'	\
	(	[
	)	]
	+	≠
	[	⌟
	]	¤
*	↑	\
	←	Δ

* The I.C.T. character ↑ is converted into the IBM character \ but not vice versa. The IBM character \ is converted into the I.C.T. character '(apostrophe) and vice versa.

I.C.T. TO IBM CONVERSION ROUTINE

A routine which makes use of the I.C.T. to IBM conversion table is given below.

It is required to write a block of 25 words to an IBM tape. These 25 words are held in store in the area starting at OUTPT. The 16 word conversion table is held in the area starting at TABLE.

Before the program is run the output tape must be allocated to it. If the tape is mounted on deck number 13, and it is sequired to write at 556 rows per inch in even parity, the console allocation message takes the form

GIVE 13 AS 0 MODE 24

or more simply

GI 13 0 24

In a multiprogram environment it is necessary to name the program, i.e.

GIVE *#name* AS 0 24

where *#name* is the program name.

The coding is as follows:

Label	Operation	Acc.	Operand	
#LOWER				
MTCON			5/#1,0,25,0/OUTPT	
#PROGRAM				
	LDCT	2	100	[NO. OF CHARS.
	LDCH	3	OUTPT(2)	[PICK UP NEXT CHAR.
	SRC	3	2	[CONVERT TO CHAR. MODIFIER
	LDCH	4	TABLE(3)	[PICK UP EQUIVALENT CHAR.
	DCH	4	OUTPT(2)	
	BCHX	2	*-4	
	PERI	0	MTCON	

It should be noted that if character #74 (dollar sign) occurs on output, special provision will have to be made as this is the terminate transfer character.

Nine-track tape

Provisions similar to those described above for seven-track tape must also be made for nine-track tape if non-I.C.T. tapes are to be read or written. It must be borne in mind, however, that the internal instruction repertoire of the 1900 Series is not really suitable for seven or eight level information.

As can be seen from Table 20, if data is alphanumeric only, i.e. numbers and alphabetic capitals, bits 0 and 1 can be ignored by the conversion routine. Alternatively, a shift character can be generated and the data converted into the 1900 Series internal shift code (see the reference manual *Basic Peripherals*, page 362, Table 53).

If the data is, for example, IBM packed decimal, i.e. each byte contains two four-bit decimal characters, no conversion is needed and a routine such as the one shown below will store the six packed decimal characters in X3 into six character locations starting at INPUT.

Label	Operation	Acc.	Operand
	LDCH	1	6
	STOZ		2
	SLL	23	4
	DCH	2	INPUT(1)
	BCHX	1	*-3

CONSTRUCTION OF CONVERSION TABLES

The method used to construct the I.C.T. to IBM table shown on page 140, together with the way in which the conversion routine utilizes this table is explained below.

The I.C.T. machine code characters are arranged in ascending order from the lowest to highest, i.e. from #00 to #77. The corresponding IBM tape characters are then paired with the I.C.T. characters, e.g. the I.C.T. character zero (#00) is paired with the IBM character zero (#12). The IBM character is then placed in character position 0 of Word 0 of the conversion table after the four most significant bits have been inverted. These four bits must be inverted as the 1900 Series hardware always inverts the four most significant bits of a character during a transfer. The IBM zero character (#12) is, therefore, placed in the conversion table as #66. The IBM character corresponding to the I.C.T. character #01 is then placed in character position 1 of Word 0 of the conversion table. This procedure is repeated until all the characters have been matched.

The routine makes use of the conversion table in the following manner. The I.C.T. character to be output to the IBM tape is loaded into a modifier. This character is converted into a character modifier by shifting it to the right two places with a SRC instruction. This character modifier is then used to modify the LDCH instruction which loads the corresponding IBM character from the conversion table. If, for example, the I.C.T. character to be converted is the letter A (#41), when used to modify TABLE (if TABLE is Word 0 of the conversion table) then the LDCH instruction will load TABLE+8.1 into the specified accumulator. This character will be the IBM letter A.

Tape code tracks 7654321	Character	Tape code tracks 7654321	Character
P110000	&	P010000	Space
P110001	A	P010001	/
P110010	B	P010010	S
P110011	C	P010011	T
P110100	D	P010100	U
P110101	E	P010101	V
P110110	F	P010110	W
P110111	G	P010111	X
P111000	H	P011000	Y
P111001	I	P011001	Z
P111010	?	P011010	‡ (Record Mark)
P111011	. (full stop)	P011011	, (comma)
P111100	¤ (lozenge)	P011100	%
P111101	[(left bracket)	P011101	= (word separator)
P111110	< (less than)	P011110	\
P111111	ǂ (Group Mark)	P011111	⁜ (segment mark)
P100000	–	P000000	Illegal
P100001	J	P000001	1
P100010	K	P000010	2
P100011	L	P000011	3
P100100	M	P000100	4
P100101	N	P000101	5
P100110	O	P000110	6
P100111	P	P000111	7
P101000	Q	P001000	8
P101001	R	P001001	9
P101010	!	P001010	0
P101011	$	P001011	#
P101100	*	P001100	@
P101101	] (right bracket)	P001101	: (colon)
P101110	; (semi-colon)	P001110	> (greater than)
P101111	Δ (delta)	P001111	✓ (tapemark)

Note: IBM tapes are usually in even parity. If an attempt is made to write 000000 in even parity IBM tape decks will record 010000 (space character). IBM decks can write in odd parity and this mode is usually used for binary information in which case 000000 is a valid character.

Table 19 IBM BCD seven-track tape code

Bit position	1	0	0	0	0	1	1	1	1	0	0	0	0	1	1	1	1
	2	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1
	3	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1
4 5 6 7																	
0 0 0 0		NUL		DS		Blank	&	–									0
0 0 0 1				SOS				/		a	j			A	J		1
0 0 1 0				FS						b	k	s		B	K	S	2
0 0 1 1			TM							c	l	t		C	L	T	3
0 1 0 0		PF	RES	BYP	PN					d	m	u		D	M	U	4
0 1 0 1		HT	NL	LF	RS					e	n	v		E	N	V	5
0 1 1 0		LC	BS	EOB	UC					f	o	w		F	O	W	6
0 1 1 1		DEL	IDL	PRE	EOT					g	p	x		G	P	X	7
1 0 0 0										h	q	y		H	Q	Y	8
1 0 0 1										i	r	z		I	R	Z	9
1 0 1 0			CC	SM		]	[		:								
1 0 1 1						.	$	,	#								
1 1 0 0						<	*	%	@								
1 1 0 1						(	)	_	'								
1 1 1 0						+	;	>	=								
1 1 1 1						!	^	?	"								

Notes

1 The parity is odd.

2 The bit relationship between tape and bit position is as follows:

Track	1	2	3	4	5	6	7	8	9
Bit position	5	7	3	P	2	1	0	6	4

3 The control characters are as follows:

NUL	Null	BS	Backspace	EOB	End of block
PF	Punch off	IL	Idle	PRE	Prefix
HT	Horizontal tab	CC	Cursor control	PN	Punch on
LC	Lower case	DS	Digit select	RS	Reader stop
DL	Delete	SOS	Start of Significance	UC	Upper case
TM	Tape mark	FS	Field separator	EOT	End of transmission
RES	Restore	BYP	Bypass	SM	Set mode
NL	New line	LF	Line feed	SP	Space

4 The special graphic characters are as follows:

.	Period	^	Circumflex	:	Colon
!	Exclamation	–	Minus sign, hyphen	'	Apostrophe
&	Ampersand	/	Slash	=	Equal sign
	Asterisk	,	Comma	"	Quotation mark
	Semicolon	_	Underscore		

Table 20 EBDIC nine-track t... code

Position 6 / 4 3 2 1 5	0 0	0 1	1 0	1 1	0 0	0 1	1 0	1 1
0 0 0 0	NUL	DLE	SP	0	'	P	@	p
0 0 0 1	SOH	DC1	!	1	A	Q	a	q
0 0 1 0	STX	DC2	"	2	B	R	b	r
0 0 1 1	ETX	DC3	#	3	C	S	c	s
0 1 0 0	EOT	DC4	$	4	D	T	d	t
0 1 0 1	ENQ	NAK	%	5	E	U	e	u
0 1 1 0	ACK	SYN	&	6	F	V	f	v
0 1 1 1	BEL	ETB	'	7	G	W	g	w
1 0 0 0	BS	CAN	(	8	H	X	h	x
1 0 0 1	HT	EM	)	9	I	Y	i	y
1 0 1 0	LF	SS	*	:	J	Z	j	z
1 0 1 1	VT	ESC	+	;	K	[	k	{
1 1 0 0	FF	FC	,	<	L	~	l	¬
1 1 0 1	CR	GS	–	=	M	]	m	}
1 1 1 0	SO	RS	.	>	N	^	n	|
1 1 1 1	SI	US	/	?	O	___	o	DEL

Notes

1 The parity is odd.

2 The bit relationship between tape and bit position is as follows:

Track	1	2	3	4	5	6	7	8	9
Bit position	3	1	5	P	6	7	0	2	4

Table 21 USACII nine-track tape code

Bit 7 Position 6 4 3 2 1 5	0 0 0	0 0 1	0 1 0	0 1 1	1 0 0	1 0 1	1 1 0	1 1 1
0 0 0 0	NUL	DLE	SP	0	‘	P	@	p
0 0 0 1	SOH	DC1	!	1	A	Q	a	q
0 0 1 0	STX	DC2	"	2	B	R	b	r
0 0 1 1	ETX	DC3	#	3	C	S	c	s
0 1 0 0	EOT	DC4	$	4	D	T	d	t
0 1 0 1	ENQ	NAK	%	5	E	U	e	u
0 1 1 0	ACK	SYN	&	6	F	V	f	v
0 1 1 1	BEL	ETB	’	7	G	W	g	w
1 0 0 0	BS	CAN	(	8	H	X	h	x
1 0 0 1	HT	EM	).	9	I	Y	i	y
1 0 1 0	LF	SS	*	:	J	Z	j	z
1 0 1 1	VT	ESC	+	;	K	[	k	{
1 1 0 0	FF	FC	,	<	L	~	l	¬
1 1 0 1	CR	GS	–	=	M	]	m	}
1 1 1 0	SO	RS	.	>	N	^	n	|
1 1 1 1	SI	US	/	?	O	__	o	DEL

Notes

1 The parity is odd.

2 The bit relationship between tape and bit position is as follows:

Track	1	2	3	4	5	6	7	8	9
Bit position	3	1	5	P	6	7	0	2	4

Table 21 USACII nine-track tape code

315139

Ariel-4 Data Processing

The Master Tape Format and Data Index

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Introduction

The Form of the Master Tapes

This document defines in detail the formats of the Ariel 4 Experimenters' Master Tapes. It is an updated version of a previous document which, because it was written in stages, had its chapters written in an illogical order. However, in an attempt not to introduce any new errors the old chapter numbering has been adhered to. The following remarks are of general application and hold for all the data.

The tapes for the UK Experimenters are standard ICL 1900 tapes, recognisable by the ICL George operating system. They are 9-track ~~1600~~ 6250 bpi odd parity binary tapes. Tapes intended for use in the U.S. however have even parity file marks and are ~~7~~ 9-track, ~~556~~ 6250 bpi odd parity tapes.

All data values are expressed as binary integers 24 bits in length. For non-ICL users it should be noted that the 1906A is a two's complement machine.

The number of words in each record is divisible by 3 to aid Iowa's use of the tapes on their 18-bit-word computer. The Stages Tapes from which the Master Tapes are derived hold several files of High Speed or Low Speed data, when a file corresponds to a pass of the telemetry station in the case of High Speed data and to a play-back of the tape recorder in the case of Low Speed data. The files are broken down into one or more sub-files during the data reduction each of which consists of data containing no large time gaps. The High Speed tapes also contain processed Low Speed back-up data.

Thus each Master Tape commences with a Tape Header record followed by a series of Sub-files. The tape is then terminated with two Tape Marks.

Each Sub-file commences with a Tape Mark and a Sub-file Header Record. These are followed by Time Units which are four or two records long depending on whether the tape contains High or Low Speed data. In the case of High Speed tapes the Time Unit in the Sub-file is followed by two Crib Data Records (see Fig. 1).

For High Speed Tapes the data are divided into Time Units 16 sequences in length; the time of commencement of the Unit being chosen to coincide with the beginning of a Birmingham "sequence of measurements". Each time unit will commence with an Auxiliary Data Record containing data such as the position and attitude of the spacecraft at the time of the following experimental data. The next two records are referred to as the Birmingham and Iowa Record and the Birmingham or Iowa Record. The first contains data common to both satellite data modes; the second contains data arising from channels 1, 3, 5, 9, 11 and 13 (all frames) and are either Birmingham or Iowa data according to the satellite telemetry mode. The fourth data record contains Jodrell/RSRS data.

For Low Speed Tapes the Time Units are also 16 sequences in length. Each consists of two records (see Fig.2) the first being an Auxiliary Data Record and the second contains data from the Sheffield, Iowa and Birmingham experiments.

The tape records are all described separately in the following 8 chapters. The last chapter describes the data index of processed tapes held at Chilton.

Error Flags and Dummy Values

Contained within the records are flagwords indicating various malfunctions of the spacecraft. One word is allocated for each type of flag; the least significant 16 bits being used to indicate a fault in each of the 16 sequences in one Time Unit. Thus the bit pattern

0000000001000011000010 10

(the binary representation of the number 19,162) would indicate the fault occurs in sequences 2, 7, 8, 13 and 15.

Where a data value is missing for any reason or if it is outside the permitted range it will be replaced by a dummy value, which has been chosen to be -1234.7.

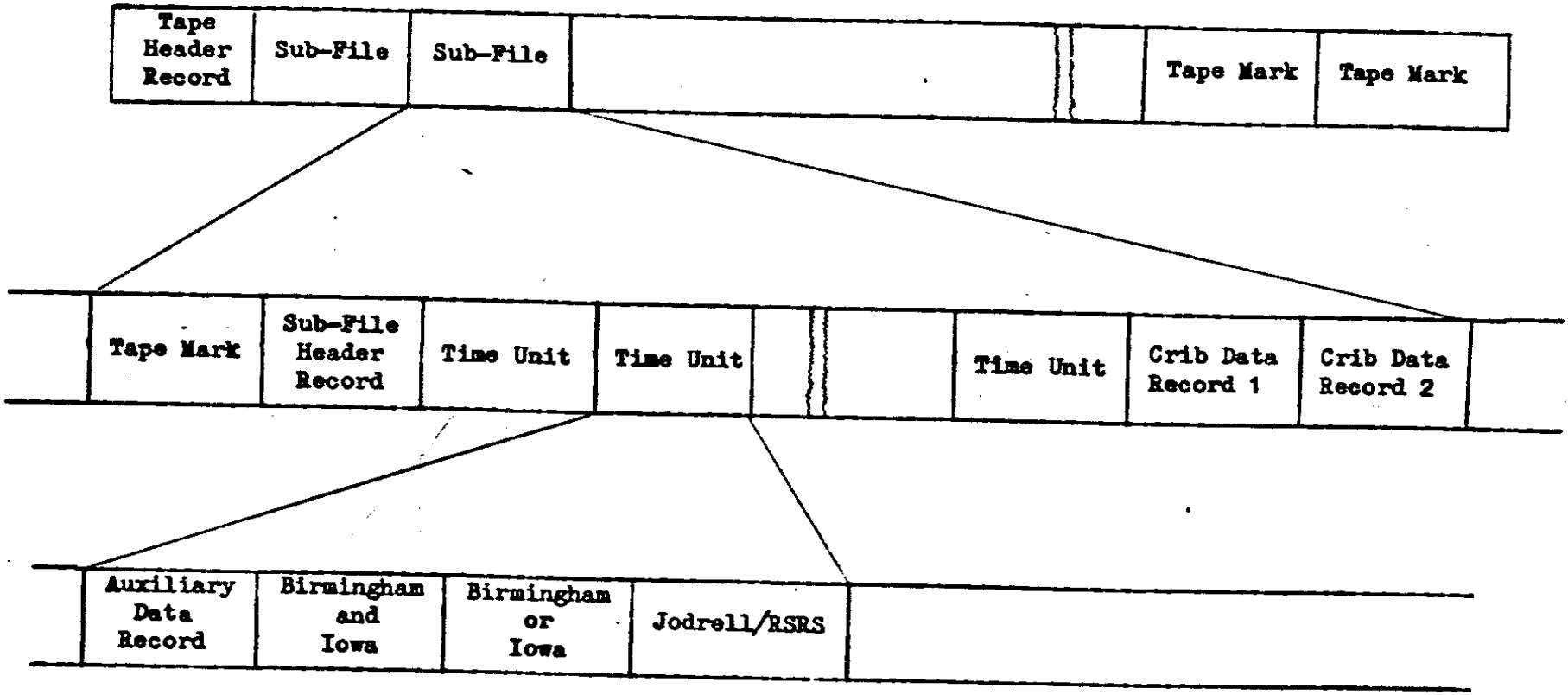


FIGURE 1: HIGH SPEED TAPE FORMAT

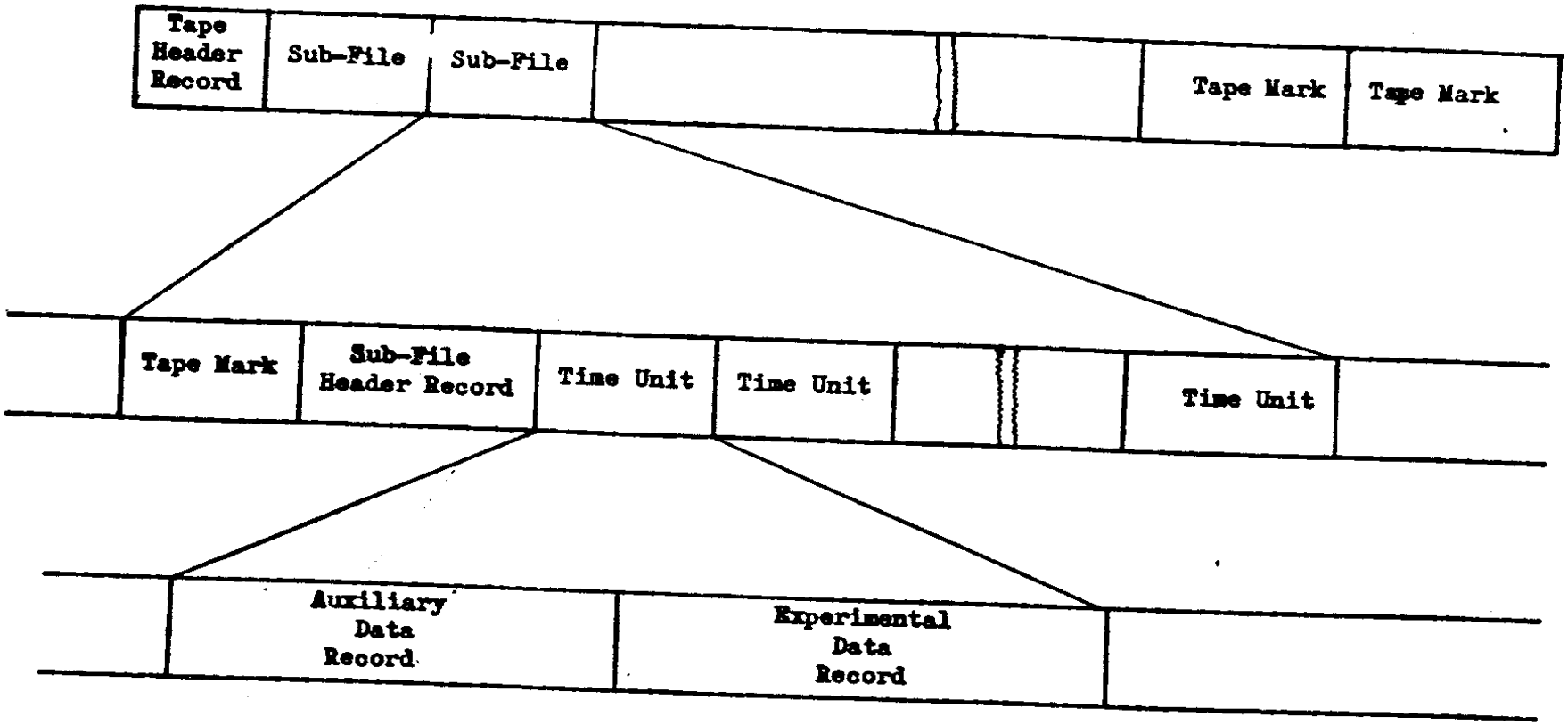


FIGURE 2: LOW SPEED TAPE FORMAT

Chapter 1. Birmingham High Speed

1. Introduction

It will be recalled that both Iowa and Birmingham data will be written in two records. The first, which we refer to as Birmingham and Iowa (or B and I) will contain data common to both satellite modes; the second, Birmingham or Iowa (B or I) will contain data arising from channels 1, 3, 5, 9, 11 and 13 (all frames) and will be either Birmingham or Iowa data according to the satellite mode.

To understand the output format it is necessary to give a short description of the mode of operation of the Birmingham experiment. During each time unit of 16 sequences the experiment goes through 8 sawtooth sweeps. In the first 4 sweeps both temperature and density measurements are output although the temperature data may be contaminated by the density experiment. In the latter 4 sweeps there are no density data output.

2. Definitions of output parameters

Symbols	Origin in Data Format		Description
	Channel	Frame	
(a) Modes 1 and 2			
D_1 - D_4	4	0 or 2	4 Electron Density measurements in units of 10^4 x log (electrons/m^3)
$B10_1$ - $B10_{16}$	"	4	16 Raw Voltages in mV
$P16_1$ - $P16_{16}$	15	1	16 Values of PP16 in mV
S_1 - S_{32}	10	0 and 3	32 Sweep Monitor Voltages in mV
(b) Mode 1 only			
DE_1 - DE_4	1,3,9,11	All	4 Densities estimated from the characteristic curves in units of 10^4 x $\log_{10}$ (el./m^3)
DV_1 - DV_{96}	"	"	96 Raw voltages from B1 or B2
$B3_1$ - $B3_{192}$	5, 13	"	Raw voltages in mV

(a) Modes 1 and 2

FD1 Both the B9's in a sweep dummy.

FD2 The two values of B9 in a sweep not equal.

FD3 This flag indicates a possible inconsistency between the two logarithmic amplifiers. Specifically, the flag will fly if B9 > 4.8V and B8 < 1.2V, or if B8 < 1.2V when both B9 values are dummy.

FD4 Dummy B8

FT1 Temperature experiment (B10) inoperative.

FT2 This flag indicates that the electron density (B8, B9) and spacecraft temperature are outside an envelope containing all the points where data correction is not necessary.

FT3 There may be an inconsistency between the two logarithmic amplifiers. The test used is B9 < 4.8V and B8 > 1.4V.

FM1 All sequences before synchronization.

FM2 Experiment off.

FM3 At least one of the two voltage sweep monitor values (B4) in a sequence dummy.

FM4 At least one of the two voltage sweep monitor values (B4) is a sequence outside permitted range.

FM5 PP16 value dummy.

FM6 PP16 value outside permitted range.

FS1 FS2 Spare Flags.

(b) Mode 1 only

The output waveform has 24 data points. This flag flies if the maximum value is not in the 5th or 6th points, or if both 5th and 6th data points are dummy. The first alternative indicates a severe wake and the second alternative suggests that the electron density value recorded will be too low by a significant amount.

FDE2 B1 or B2 is not consistent with B8 or B9.

FDE3 The test pulse maximum is outside the permitted voltage range.

FTE1 Temperature experiment (B3) inoperative.

FTE2 The electron density (B1, B2) and the spacecraft temperature are outside an envelope containing all the points where temperature compensation is not necessary.

FSE1 to
FSE7 Spare Flags

4. The Tape Format

Record B and I

Word Number	1 → 152	153 → 154	155 → 158	159 → 174
Parameter	Iowa Data	Spares	$D_1 \rightarrow D_4$	$B10_1 \rightarrow B10_{16}$

175 → 190	191 → 222	223 → 226	227 → 229	230 → 235	236	237
$P16_1 \rightarrow P16_{16}$	$S_1 \rightarrow S_{32}$	FD1 → FD4	FT1 → FT3	FM1 → FM6	FS1	FS2

Record B or I

Word Number	1 → 4	5 → 100	101 → 292	293 → 300	301 → 303	304 → 305	306 → 312
Parameter	$DE_1 \rightarrow DE_4$	$DV_1 \rightarrow DV_{96}$	$B3_1 \rightarrow B3_{192}$	Spares	FDE1 → FDE3	FTE1 → FTE2	FSE1 → FSE7

5. Notes

1. The flags FT1 and FTE1 will always be set because the temperature experiment is inoperative.

2. When the experiment is first turned on the various parts of the experiment are not in synchronisation with one another until the first occurence of Frame 1, Channel 7 in the low speed data. Until this occurs the flag FM1 will be set. In addition the sweep itself is not in synchronisation with the telemetry until the first occurence of a HS Synch. (Frame 0, Channel 0). Data in the part sequence before this should be ignored.

3. A Birmingham Monitor/Flag will be set in the sub-file header to indicate the modes of the experiment during the sub-file. This is described in Chapter 6.

Chapter 2. Iowa High Speed Data

1. Introduction

This document follows the lines of the previous one on Birmingham High Speed data. As a reminder, we restate that there will be two records for Iowa and Birmingham data. The first, B and I, contains data common to both satellite modes: the second, B or I, contains data from channels 1, 3, 5, 9, 11 and 13 (all frames).

2. Definitions of Output parameters

The following symbols are used for the different parameters:

Ga : Integral particle intensity measured by the Geiger-Mueller Tube in LEPEDEA A. Units are $10^3 \times \log_{10}$ (particles/cm-s-sr)

Gb : Integral particle intensity measured by the Geiger-Mueller Tube in LEPEDEA B. Units are $10^3 \times \log_{10}$ (particles/cm-s-sr)

C1 to C36 : Differential particle intensity in $10^3 \times \log_{10}$ (particles/cm-s-sr-eV) The numbering refers to successive outputs from channels 1, 3, 5, 9, 11, 13, being 36 in all in one sequence.

P18A : Performance parameter 18A measured in mV

P18B : Performance parameter 18B measured in degrees

S1 to S4 : Step Monitor in mV, 4 per sequence

N : Assumed Step Number - an integer between 5 and 13

M : Assumed experiment mode expressed as an integer according to the following table:

M	Explanation
0	Mode not identifiable
1	Calibration Mode
2	Experiment OFF
3	Mode 1 (α Sequence)
4	Mode 1 (β Sequence)
5	Mode 2
6	Mode 3
7	Mode 4
8	Mode 5

3. Error Flags

Flag number	Fault
F1	There is at least one dummy data point in the data sequence
F2	PP18A or B are suspect or dummy
F3	One of the 4 step monitors in the sequence is not consistent with the assumed Mode
F4	More than one of the 4 step monitors in the sequence is not consistent with the assumed Mode
F5	At least one of the step monitor values is dummy
F6 -F8	Spares

4. The Tape Format

Record B and I

Word Number	1	2	3	4	31	32	33 → 40	41 → 48
Parameter	Ga_1	Gb_1	Ga_2	Gb_2	Ga_{16}	Gb_{16}	$P18A_1 \rightarrow P18A_8$	$P18B_1 \rightarrow P18B_8$

	49	50	51	52	112	113 → 120	121 → 136	137 → 152	153 → 237
	$S1_1$	$S2_1$	$S3_1$	$S4_1$	$S4_{16}$	F1 → F8	N1 → N16	M1 → M16	Birmingham Data

Record B or I

Word Number	1	2	36	37	576	577-579
Parameter	$C1_1$	$C2_1$	$C36_1$	$C1_2$	$C36_{16}$	Spare

5. Notes

1. The subscripts denote the sequence numbers (except for the PP's, where they denote pairs of sequences).

2. This numbering system for each parameter is not uniform with that used for the Birmingham Data because of the essentially different nature of the two experiments.

3. If the Mode cannot be established (i.e. M = 0) or the experiment is in Calibration mode (M = 1) the particle measurements will be left as particle counts, without the final multiplication by the geometric factor.

4. In modes 3, 4 and 5 (M = 6, 7 and 8) the Step Number N will indicate the energy step level for each sequence. In the other modes this parameter should be ignored as the energy steps will be following a set pattern in each sequence.

5. The flags will be written in exactly the same way as for Birmingham so that the position of the bit set in the 16 least significant bits of the word corresponds to the number of the sequence in which the error occurs.

6. Certain conditions appertaining to the entire sub-file are indicated in the sub-file header. These indicate:-

1. the experiment mode(s) during the sub-file
2. if the calibration is wrong
3. the state of the Birmingham/Iowa data switch.
4. the percentage of inconsistent step-monitors occurring.

Further details of these are given in Chapter 6.

7. Details of the Iowa experiment may be obtained from the "Experiment Requirements Document" University of Iowa, May 1970.

Chapter 3. Jodrell/R.S.R.S.

1. Introduction

This chapter describes the format of the record on the High Speed Master Tapes containing data from the Jodrell/R.S.R.S. experiment.

2. Definitions of Output Parameters

Symbols	Origin in Data Format		Description
	Channel	Frame	
SS1→ SS2	-	-	Indicator of start of frequency sweeps (See note 5)
GF1→ GF3	-	-	Gyro-frequency used for frequency normalisation in each sweep. (See note 6)
N1→ N18	2,7,12	All	HF noise measurements in dB. The numbering refers to successive outputs in one sequence.
FR1→ FR18			10^6X Normalised frequencies corresponding to the noise outputs.
AG1, AG2	8	0,3	Receiver A.G.C. in dB
AF	10	2	Approximate frequency in kHz from C2.
P13	4	1	Temperature from PP13, in degrees.

3. Error Flags

Flag number	Fault
F1	All noise data in sequence dummy
F2	Some noise data in sequence dummy
F3	The calculated frequency does not agree with the frequency given by C2
F4	Marker occurs in position incompatible with assumed frequency sweep

4. The Tape Format

Jodrell: Modes 1 and 2

Word Number	1	2	3	4	5	6	7	8	9	41	581
Parameter	SS1	SS2	GF1	GF2	GF3	$N1_1$	$FR1_1$	$N2_1$	$FR2_1$	$FR18_1$	$FR18_{16}$

582	583	613	614	629	630	645	646 → 649	650 → 651
$AG1_1$	$AG2_1$	$AG2_{16}$	AF_1	AF_{16}	$P13_1$	$P13_{16}$	F1 → F4	Spares

Jodrell: Mode 3

Word Number	1	2	18	19	288	289	290	320	321	336	337	352	353	354	355 → 357
Parameter	$N1_1$	$N2_1$	$N18_1$	$N1_2$	$N18_{16}$	$AG1_1$	$AG2_1$	$AG2_{16}$	AF_1	AF_{16}	$P13_1$	$P13_{16}$	F1	F2	Spares

5. Notes

1. The subscripts denote the sequence numbers.

2. The Jodrell Modes are taken to be as indicated.

Mode	Operation
1	Alternate swept frequency and fixed frequency
2	Swept frequency only
3	Fixed frequency only

3. If the experiment is in Mode 3 there is no need for the calculated frequencies on the Master Tapes. The alternative record format for this mode is indicated in Section 4.

4. The flags will be written in exactly the same way as for Birmingham, so that the position of the bit set in the 16 least significant bits of the word corresponds to the number of the sequence in which the error occurs.

5. The start of each frequency sweep (SS) is indicated by the number of the output channel. The start of 2 sweeps can occur in one record, since the record length is 28 secs. and the sweep time 16 secs. The numbers 12, 506 in words 1 and 2 would thus indicate that the 12th and 506th words of the record are the first noise values in the two sweeps. These words will in fact contain zeros because the noise is suppressed for the first 6 or 7 outputs at the start of a sweep.

6. The frequency FR is normalised to the local gyrofrequency which is calculated from the local magnetic field derived from the IGRF. Up to 3 sweeps or portions of sweeps can occur; if there are only 2 then GF3 (Word 5) will be zero and SS2 is undefined.

7. Certain errors appertaining to the entire sub-file are indicated in the sub-file header. These indicate:-

1. The experiment mode (including On/Off)
2. There is at least one marker in the sub-file incompatible with the assembled frequency sweep.
3. The duration of the sweep and the position of the markers has been estimated by using information from adjacent files.
4. The position of the markers has been estimated by using information from adjacent files.

Further details are given in chapter 6.

8. In the interval between launch and the deployment of the Jodrell/RSRS aerials the values output in P13 are not really temperatures and should be ignored.

Chapter 4. Auxiliary Data

1. Introduction

This chapter describes the format of the record giving data relating to the position and attitude of the satellite. The forms of the records for Low and High Speed data are as far as possible the same, but differences occur because of the lack of the roll phase sensor data on Low Speed and also because the time units to which the records correspond are of different length in the two cases.

2. Definitions of Output Parameters

(a) High and Low Speed

			See Note
UT	Universal Time	(Hours (Minutes (Seconds (Milliseconds	15
LT	Local Solar Time	(Hours (Minutes (Seconds (Milliseconds	15
GLA	Geographic Latitude	(Degrees (Millidegrees	15
GLO	Geographic Longitude	(Degrees (Millidegrees	15
HT	Height above sub-satellite point	km	
R	Radius from earth's centre	km	

			See Note
GMLO	Geomagnetic Longitude	(Degrees ((Millidegrees	2,15
GMLA	Geomagnetic Latitude	(Degrees ((Millidegrees	2,15
GMLT	Geomagnetic Local Time	(Hours ((Minutes	2,15,16
L	L-value	(Earth-radii ((Milliearth-radii	3,4
ILAT	Invariant Latitude	(Degrees ((Millidegrees	3
B	Magnetic Field Strength	Milli Gauss	3
DEC	Magnetic Declination	(Degrees ((Milli Degrees	3,15
DIP	Magnetic Dip	(Degrees ((Milli Degrees	3,15
DIPLA	Dip Latitude	(Degrees ((Milli Degrees	3,15
BX) BY) BZ)	Magnetic Field Components	Milli Gauss	3,5
V	Satellite Speed	m/sec.	
VX) VY) VZ)	Satellite Velocity Components	m/sec.	5
SZA	Solar Zenith Angle	Degrees	
FD	Flag indicating that all experimental data in a sequence are dummy.		
FTP	Flag Indicating Data occurs during torquing phase		10,11
FW	Flag indicating that the angle between the spin axis and the velocity vector is such that the Birmingham sensors may be in the satellite wake		10,14

			See Note
(b) High Speed Only			
XL) XM) XN)	Direction cosines of the satellite X axis	Units x 10^{-6}	5,6
YL) YM) YN)	Direction cosines of the satellite Y-axis	Units x 10^{-6}	5,6
SPT	Sheffield Calibration Phase and Temperature	Degrees	
RP	Roll Phase	Degrees	6,7
IEF	Integrated electron flux	particle $(cm\text{-}s\text{-}sr)^{-1}$	13
FT	Flag indicating that torquing is occurring		12
FP	Roll Phase Flag indicating nearest sun pulse is far removed in time		9,10
FE	Eclipse Flag (high speed only)		10
(c) Low Speed Only			
FEL	Eclipse Flag (low speed only)		10

3. The tape format

(See pages 7 and 8).

4. Notes

1. All the physical quantities in the high speed record are given three times. The first corresponds to conditions for Frame 0, Channel 0 of the first sequence in the time unit, the second to Frame 0, Channel 0 of sequence 9 and the third to the sequence immediately following the last one in the record. Thus the last set in each record will be repeated as the first set in the following record. Linear or quadratic interpolation is thus possible using data from the current record alone.

In the low speed record the quantities are given 17 times, corresponding to Frame 0, Channel 0 of each sequence in the record, plus the following sequence. The chosen repetition rate means that the quantities are given every 14 seconds in High Speed and 28 seconds for Low Speed Data.

2. The Geomagnetic quantities are all derived from an eccentric dipole whose direction and displacement are as given in "Physics of Geomagnetic Phenomena" Vol. 2 Appendix 1, ed. Matsushita and Campbell.

3. All other magnetic quantities and coordinates are derived using the International Geomagnetic Reference Field 1965, updated to 1972.

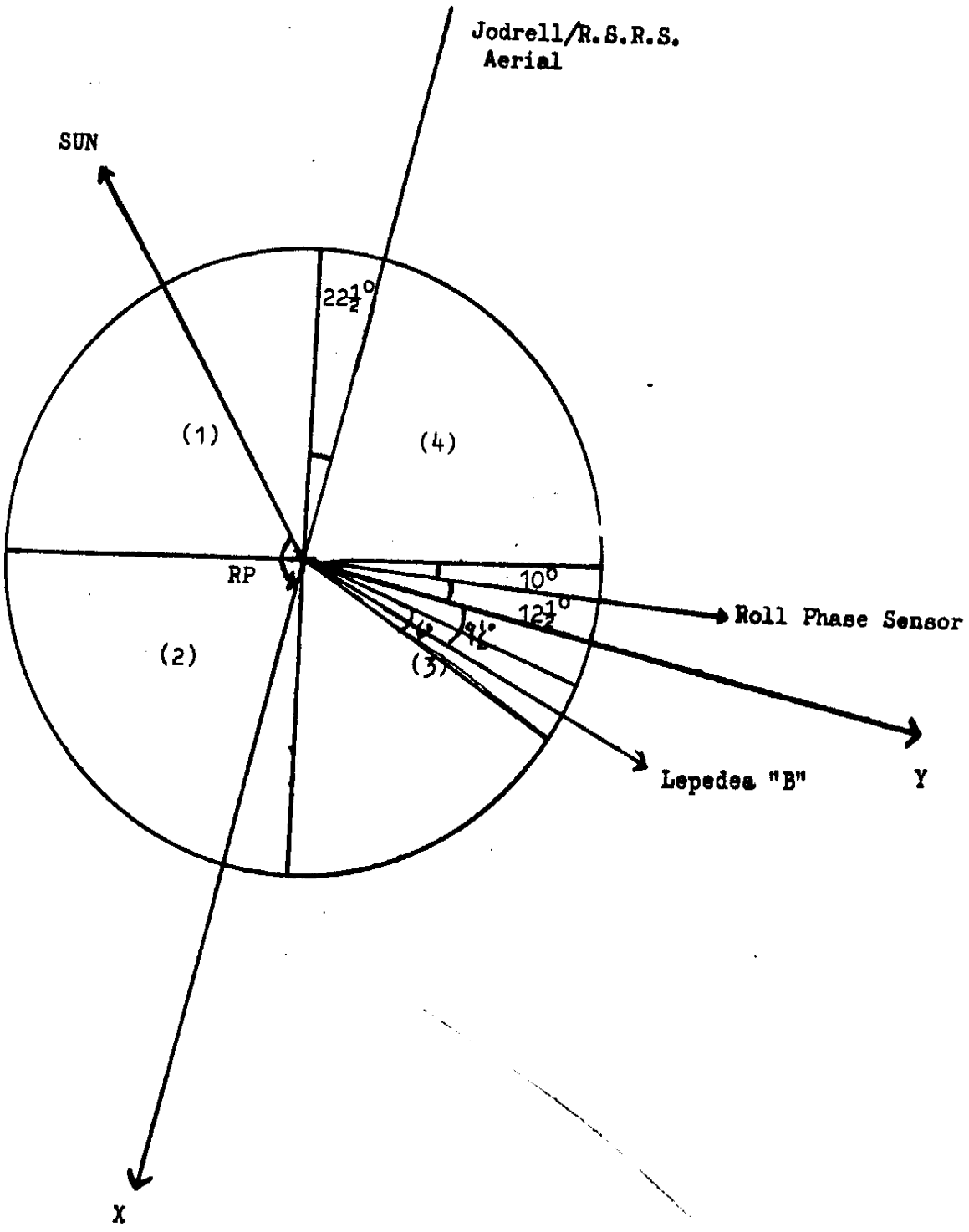
4. The L value will be given for all possible positions of the satellite. However to avoid overflow, when its value is greater than 10,000 the number 10,000 will be given on the Master Tape.

5. The axes used for expressing the components of magnetic field, satellite velocity and attitude are an inertial geocentric cartesian system such that X is in the direction of the first point of Aries, Z is in the direction of the North Pole and Y completes a right-handed set.

6. The satellite axes used for giving the satellite attitude and roll phase are shown in the diagram.

The numbers refer to the satellite quadrants and these and the angles shown are taken from a B.A.C. diagram dated 1/3/70 "Position and coding of equipment in centre tube and on top cone of spacecraft". The Z axis is in the direction of the spin axis and forms a right handed set.

Direction cosines of X and Y relative to the inertial coordinates will be given for high speed data only. The direction cosines of the Z axis, which is assumed to be constant for the duration of a pass, is given in the sub-file header record, which is described in Chapter 6.



The Satellite Coordinate Axes X and Y

7. The roll phase, RP, is the angle the plane containing the X and Z axes makes with the plane containing the sun direction and the Z axis. This is also shown on the diagram for the sun lying in an arbitrary direction.

8. In the event of no roll phase sensor data being available for the pass, the direction cosines of the X and Y axes and the roll phase will all be set to zero.

9. If the nearest sun pulse observed by the roll phase sensor occurred so far away in time that the accuracy of the attitude calculations cannot be guaranteed the roll phase flag FP will be set to unity (otherwise zero). The attitude quantities will still be calculated and the flag indicates that caution is needed.

10. Calculations are performed using the positions of the sun and satellite relative to the earth to determine if the satellite is in shadow. If the satellite is in eclipse the flag FE is set to unity. Since approximations for the effects of the earth's atmosphere are included, and may not prove accurate, this flag may not coincide exactly with the absence of sun pulses in the roll phase sensor.

Please note that this flag, FE and FP are special flags in that the word as a whole is set to unity; so also are the flags FTP and FW in the HS data only if any of the 3 calculations in the time unit gives a positive indication. All the others (both high and low speed, including the low speed eclipse flag, FEL) have individual bits set as described in the Introduction.

11. The flag FTP is set on information received from R.A.E. and indicates that the sequence is within a torquing "phase". For this purpose a torquing phase is deemed to exist from the beginning of a series of torquing operations until the end. During this period torquing will not be taking place continuously, but the spin axis direction as calculated may be seriously in error.

12. The flag FT is set if torquing is actually taking place and is derived from PP19A. Thus only alternate bits are set if torquing is occurring.

13. The integrated electron flux IEF has not been implemented to date.

14. The flag FW is set if the angle, θ, between the spin axis and the velocity vector is such that $\pm 46^{\circ} < \theta < \pm 94^{\circ}$

15. Where a real parameter is divided up into its integer and fractional parts the number can be reconstituted by adding together the parts (multiplied by the appropriate power of ten) regardless of sign. For example Geographic Latitude - 61.856 is written on the tape as the two numbers - 62 and 144. Thus - 62 + 144×10^{-3} = - 61.856.

16. As the parameter GMLT passes through 24 hours increasing or 0 hours decreasing, no attempt is made to subtract or add 24 hours. The limits on the GMLT observed during a pass and output in the sub-file header thus represent a true range of values since no artificial discontinuities are introduced.

The Tape Format

High Speed Auxiliary Record

Word Number	1 → 4	5 → 8	9 → 10	11 →12	13	14	15 →16	17 →18	19 →20	21 →22	23 →24
Parameter	UT1	LT1	GLO1	GLA1	HT1	R1	GMLO1	GMLA1	GMLT1	L1	ILA1

25	26→27	28→29	30→31	32	33	34	35	36	37	38	39	40	41	42	43	44
B1	DEC1	DIP1	DIPLA1	BX1	BY1	BZ1	V1	VX1	VY1	VZ1	SZA1	XL1	XM1	XN1	YL1	YM1

45	46	47	48	49→52	96	97 →100	144	145	146	147	148	149 →156	157→172	173→174
YN1	RP1	FP1	FE1	UT2	FE2	UT3	FE3	FD	FW	FT	FTP	SPT1 →SPT8	IEF1→IEF16	Spares

The Tape Format

Low Speed Auxiliary Record

Word Number	1→4	5→8	9→10	11→12	13	14	15→16	17→18	19→20	21→22	23→24	25
Parameter	UT1	LT1	GLO1	GLA1	HT1	R1	GMLO1	GMLA1	GMLT1	L1	ILA1	B1

	26→27	28→29	30→31	32	33	34	35	36	37	38	39	
	DEC1	DIP1	DIPLA1	BX1	BY1	BZ1	V1	VX1	VY1	VZ1	SZA1	

	40→43	78	79→82	663	664	665	666	667	668→669	
	UT2	SZA2	UT3	SZA17	FD	FTP	FW	FEL	Spares	

UK-4 Data Processing

The Master Tape Format

Chapter 5: Low Speed Experimental Data

1. Introduction

To keep the amount of tape wasted on inter-record gaps to a minimum the data from all the experiments are combined into one record. With 16 low speed sequences to a time unit this gives a record length for the experimental data of 510 words and for the auxiliary data 669 words (see Chapter 4). These two records will alternate on the tape.

2. Definitions of Output Parameters

Symbols	Origin in Data Format		Description
	Channel	Frame	
N1 → N17	1→5,9,13	0	Sheffield VLF noise in dB above $10^{-15}\ \gamma^2\ Hz^{-1}$ x 10 (see Note 8)
	2,4,9 →15	1	
I1, I2	6,7	0	Impulse counts at 3.2 and 9.6 kHz
D	6 or 7	1	Birmingham electron density expressed as 10^4 x $\log_{10}$ (electrons /m^3)
T	8	1	Birmingham electron temperature channel in mV
C1 →C5	10,12,14	0	Iowa differential particle intensity as 10^3 x $\log_{10}$ (particles/(cm-s-sr-eV)).
	1,3	1	
G	5	1	Iowa integral particle intensity as 10^3 x $\log_{10}$ (particles/(cm-s-sr)).
M	8	0	Iowa Mode in mV
S	15	0	Iowa step monitor in mV
AS			Iowa assumed step number - an integer between 5 and 13 (see Note 6)
AM			Iowa assumed mode (see Note 4)

3. Error Flags

Flag	Experiment	Interpretation
FS1	Sheffield	At least one of the data values is dummy
FS2	"	A calibration is in progress
FI1	Impulse Counter	At least one of the two counts is dummy
FI2	"	" " " " " " " " outside the 0 to 5 V range
FB1	Birmingham	Possible inconsistency between B5 and B6; both density channels dummy or B5 dummy when B6>4.8V
FB2	"	There is an inconsistency between the two logarithmic amplifiers. That is B6>4.8V and B5<1.2V, or B6<4.8V and B5>1.4V.
FB3	"	Temperature channel (B7) dummy (See Note 1)
FB4	"	Densities may be in error (See Note 2)
FU1	U. of Iowa	At least one data value dummy
FU2	"	Mode ident dummy or inconsistent
FU3	"	Step monitor is inconsistent with the mode ident or is dummy

4. The Tape Format

See page 32.

5. Notes

1. This flag will always be set because the Birmingham temperature experiment is inoperative.
2. This flag is set if the electron density and the spacecraft temperature are outside an envelope containing all the points where data correction is not necessary.
3. The subscripts denote the sequence numbers.
4. The assumed mode of the Iowa experiment, AM, will be expressed as an integer according to the following table:

AM	Explanation
0	Mode not identifiable
1	Calibration mode
2	Experiment Off
3	Mode 1 (LEPEDEA 'A')
4	Mode 1 (LEPEDEA 'B')
5	Mode 2 (LEPEDEA 'A')
6	Mode 2 (LEPEDEA 'B')
7	Mode 3
8	Mode 4
9	Mode 5

5. If the Mode of the Iowa experiment cannot be established (i.e. M = 0) or the experiment is in Calibration mode (M = 1) the particle measurements will be left as particle counts, without the final multiplication by the geometric factor.

6. For Iowa modes 3, 4 and 5 (M = 7, 8 and 9) the Step Number N will indicate the energy step level for each sequence. In the other modes this parameter should be ignored as the energy steps will be following a set pattern in each sequence.

7. The following conditions for the entire subfile are indicated in the sub-file header.

    1. Iowa modes.
    2. Birmingham modes.
    3. Iowa calibration wrong.
    4. Iowa quality flag

Further details of these are given in Chapter 6.

8. The Sheffield parameters are output in the following order, thus grouping together the Peak, Min and Mean values for increasing frequency.

Word Number	Origin in Telemetry Format		Designation in Telemetry Format	Function	Frequency
	Channel	Frame			
1	1	0	K 7	Peak	0.75 kHz
2	2	0	K 8	"	1.25 "
3	3	0	K 9	"	3.2 "
4	4	0	K10	"	9.6 "
5	5	0	K11	"	16.0 "
6	9	1	K17	Mean	0.75 "
7	10	1	K 1	"	1.25 "
8	11	1	K 2	"	3.2 "
9	4	1	K16	"	9.6 "
10	2	1	K15	"	16.0 "
11	12	1	K 3	Min.	0.75 "
12	13	1	K 4	"	1.25 "
13	14	1	K 5	"	3.2 "
14	15	1	K 6	"	9.6 "
15	9	0	K12	"	16.0 "
16	11	0	K13	Min. Narrow Band	16.0 "
17	13	0	K14	" " "	17.8 "

The Tape Format

Low Speed Experimental Data Record

Word Number	1	2	17	18	272	273	274	275	276	306	307	308	309	324	325	340
Parameter	$N1_1$	$N2_1$	$N17_1$	$N1_2$	$N17_{16}$	FS1	FS2	$I1_1$	$I2_1$	$I2_{16}$	FI1	FI2	D_1	D_{16}	T_1	T_{16}

341	342	343	344	348	349	423	424
FB1	FB2	FB3	$C1_1$	$C5_1$	$C1_2$	$C5_{16}$	G_1

439	440	455	456	471	472	487	488	503	504	505	506	507	508 - 510
G_{16}	M_1	M_{16}	S_1	S_{16}	AS_1	AS_{16}	AM_1	AM_{16}	FU1	FU2	FU3	FB4	Spares

Word Range	Experiment
1 → 274	Sheffield
275 → 308	Impulse Counter
309 → 343	Birmingham
344 → 506	U. of Iowa

Chapter 6. The Sub-file Header

1. Introduction

The concept of the Sub-file was introduced in the document "UK-4 Experimenter Tapes" ACL, 15/2/71. A file (i.e. pass or play-back) will be divided into two or more sub-files if there is a large time gap in the data. The sub-file header will be located before the data in each sub-file. There will be a tape-mark before each sub-file header record.

2. Definitions of output parameters

(a) High and Low Speed

		See Note
NRECS	number of time units in the sub-file	
NSUB	sub-file number on the Master Tape	12
NOSF	total number of subfiles in the file	
SFNO	sub-file number in the file	
YR	year	
DAY	day	
HR	hour	5
STA	station number	
BTN	buffer/stage tape number	
NSTAGE	file number on the Stage Tape	
STAT	start time (Hours, Minutes, Seconds)	1
STOT	stop time (Hours, Minutes, Seconds)	1
TEC	time of equatorial crossing in degrees	2
MINL	minimum invariant latitude in degrees	
MAXL	maximum invariant latitude in degrees	
MINGT	minimum geomagnetic time in degrees	2
MAXGT	maximum geomagnetic time in degrees	2

		See Note
SL) SM) SN)	solar direction cosines Units x 10^{-6}	6
ZL) ZM) ZN)	spin axis direction cosines Units x 10^{-6}	6
THETA	angle between the sun and the spin (or Z) axis in degrees	
TEMP	assumed temperature for the VCO conversion in degrees	7
ITEMP	assumed Iowa temperature in degrees	7
IU	University of Iowa calibration wrong	3
MU	University of Iowa Mode indicator	8
MB	Birmingham Monitor and Flag	9
IQ	University of Iowa Quality Flag	13

(b) <u>High Speed Only</u>

MJ	Jodrell/R.S.R.S. Mode	10
MS	Satellite Mode	11
PER	period of rotation in milliseconds	14
SUBCOM	indicator that an "A" or "B" sequence is first in the sub-file	4
FJ1	Jodrell/R.S.R.S. At least one marker in the sub-file is incompatible with the assumed frequency sweep.	3
FJ2	Jodrell/R.S.R.S. The duration of the sweep and the position of the markers throughout the sub-file has been estimated by using information from adjacent files	3
FJ3	Jodrell/R.S.R.S. The position of the markers throughout the sub-file has been estimated by using information from adjacent files	

3. Notes

1. The start time and stop time for both low and high speed data will be the times of the first and last sequences in the sub-file (calculated from the replay times in the case of the low speed date).

2. The time of equatorial crossing and the maximum and minimum geomagnetic time will be given in degrees to correspond with the times given in the Index. In order to make these limits meaningful, if the time crosses a 360° or 0° boundary no adjustment is made. Thus it is possible for negative values and values greater than 360° to occur. If no equatorial crossing occurs during the sub-file TEC is given the value 999.

3. The flags for Iowa (FU) and Jodrell/R.S.R.S. (FJ1 to FJ3) will be set to unity in the case of an error and will otherwise be zero.

4. The value of SUBCOM will be set to 1 if the first sequence in the sub-file is an "A" sequence and 2 if it is a "B" sequence.

5. The hour (HR) given will be that copied from the Buffer Tape Ident. It may not correspond exactly with the hour given for the start time (STAT).

6. The direction cosines for the solar direction (SL, SM, SN) and the spin axis direction (ZL, ZM, ZN) will be relative to the inertial geocentric cartesian coordinate system described in Chapter 4.

7. The assumed temperature, TEMP, is the Sheffield temperature from PP 19B, selected for each day from the housekeeping quick look data and used for correcting the VCO conversion tables. Similarly ITEMP is the Iowa (after failure on 29.4.72., Jodrell) temperature used for correcting the Iowa conversion tables.

8. The University of Iowa Mode indicator (MU) will have values corresponding to the table given in Chapter 2 for High Speed Data and Chapter 5 for Low Speed Data. However since the Iowa ON/OFF command is a primary command the experiment could be in several modes during a sub-file. The states will be indicated by the digits of the decimal representation of the word. For example in a high speed tape if the value of MU is 52, this indicates the

experiment was in Mode 2 at the start of the sub-file but was switched off before the end of that subfile.

9. The Birmingham Monitor/Flag (MB) will be set according to the following table

MB = 1 Birmingham experiment ON

2 Birmingham experiment OFF

3 Birmingham is ON but it is impossible to find out where the time units of 16 sequences start.

The Birmingham OFF command is also a primary command and this experiment could be in three different modes during a sub-file. For High Speed data, therefore, the flag may consist of up to three digits, each indicating the experiment mode. In the case of Low Speed Data, however, the flag will be one digit. If the experiment is OFF for the entire sub-file the flag will be set to 2, otherwise its value will be 1.

10. The Jodrell/R.S.R.S. Mode (MJ) will be as follows

MJ = 0 Experiment OFF

1 Alternate swept frequency and fixed frequency

2 Swept frequency only

3 Fixed frequency only

Since the Jodrell mode switch is a secondary command only one mode can occur in a sub-file. MJ can thus only take the values 0, 1, 2 or 3.

11. The satellite mode, MS indicates the state of the Birmingham/Iowa data switch

MS = 1 indicates Birmingham data in Channels 1, 3, 5, 9, 11, 13

2 indicates Iowa data in Channels 1, 3, 5, 9, 11, 13.

12. NSUB indicates the position of the sub-file on the Master Tape. It may thus be used for skipping tape-marks in order to bypass unwanted sub-files.

13. The University of Iowa quality flag IQ is a summary of flags F3 and F4 in the Iowa data. It gives the percentage of step monitors occurring in the sub-file which are inconsistent with the expected value.

14. If no sun pulses occur during the sub-file, the period cannot be calculated. In this case the period, PER, is set to zero.

4. The Tape Format

High Speed Sub-file Header Record

Word Number	1	2	3	4	5	6	7	8	9	10	11 → 13	14 → 16	17	18	19
Parameter	NRECS	NSUB	NOSF	SFNO	YR	DAY	HR	STA	BTN	NSTAGE	STAT	STOT	TEC	MINL	MAXL

	20	21	22	23	24	25	26	27	28	29	30	31
	MINGT	MAXGT	SL	SM	SN	ZL	ZM	ZN	THETA	TEMP	IU	MU

	32	33	34	35	36	37	38	39	40	41	42 → 45
	MB	MJ	MS	PER	SUBCOM	FJ1	FJ2	FJ3	IQ	ITEMP	Spares

Low Speed Sub-File Header Record

The first 32 words of the above record plus 4 spare words.

Word Number	1 → 32	33	34	35 → 36
Parameter	As above	IQ	ITEMP	Spares

Chapter 7. The Tape Header Record

1. Introduction

The Master Tape header record will commence with the standard I.C.L. tape header which is 9 words long. For the British experimenters this means that the Master Tapes will be recognised by the I.C.L. George operating system. The I.C.L. tape header is described in the 1900 Magnetic Tape Manual, Chapter 6. The exact meaning of these 9 words may however be changed and experimenters are recommended not to use these words. If this is unavoidable please contact Mr. A. Walter at Chilton.

2. Definitions of output parameters

(a) Standard I.C.L. Tape Header

		See Note
HDDR		1
TSN	Tape Serial Number	2
FN	File Name	3
RSN	Reel Sequence Number	4
FGN	File Generation Number	4
RP	Retention Period	4
DW	Date Written	5

(b) Other parameters in the record

		See Note
TS	Tape Speed-High or Low	6
NSF	Total number of sub-files on tape	
FYR, FDAY, FHR	Year, Day, Hour of the first sub-file	
LYR, LDAY, LHR	Year, Day, Hour of the last sub-file	
FNO	Type number of the format	7
BTN	Buffer/Stage Tape Number or Numbers	8

3. Notes

1. The first word consists of the characters HDDR.
2. TSN will be the Tape Serial Number of the Master Tape and FGN is the Master Tape number.
3. The File name (FN) is three words long and consists of the twelve characters MASTER TAPE1
4. The two words RSN and RP are zero.
5. The Date Written, DW, is measured in days from 1 January 1900.
6. The tape speed, TS is set to 1 if the tape contains High Speed Data and is set to 2 if the tape contains Low Speed (Recorded) Data.
7. The Type number of the format, FNO, was initially set to unity and will be set to two for the production Master Tapes.
8. The Stage/Buffer Tape Number (or numbers), BTN,indicate from which Buffer/Stage Tapes the files on the Master Tape have been derived Up to 5 different tapes have been allowed for.

The Tape Format

The Tape Header Record

Word Number	1	2	3 → 5	6	7	8	9	10	11	12	13	14	15	16	17	18	19 → 23	24
Parameter	HDDR	TSN	FN	RSN	FGN	RP	DW	TS	NSF	FYR	FDAY	FHR	LYR	LDAY	LHR	FNO	BTN	Spare

CHAPTER 8. THE CRIB DATA RECORD

1. Introduction

The Crib data present in a High Speed data sub-file will be extracted during the processing of that sub-file. After reformatting it will be processed by the Low Speed Programs. The data will then be output on the High Speed Master Tape immediately following the end of the High Speed data for that sub-file. The maximum number of reconstituted Low Speed sequences in a sub-file is less than 30. The Crib Data can thus be written within two records each 16 sequences long (two records will always be output completed with dummy values where necessary). These records will have the same format as the Low Speed Experimental Data Record (described in Chapter 5) with the addition of 16 universal times corresponding to Frame 0 Channel 0 of each sequence. Each time will consist of four words

1. Hours HR
2. Minutes M
3. Seconds S
4. Milliseconds MS

2. Crib Data Record Format

Word Number	1 → 507	508	509	510	511	512	571	572 → 573
Parameter	Low Speed Data	HR_1	M_1	S_1	MS_1	HR_2	MS_{16}	Spares

N.B. There will not be a tape mark between the last of the high speed data records and the first of the two crib data records. There will of course be one before the next sub-file header record.

Chapter 9. The Data Index

The index has been changed in several ways from the SATREF index produced for Ariel 3. This note is to draw attention to the changes and to describe briefly the different entries.

The index will be produced in different versions. For experimenters there will be two versions, high speed and low speed. For internal use there will be further high and low speed versions. A second change is that the basic unit listed will be sub-file rather than a file (a file is divided into two or more sub-files if there is a large time gap in the data). A further change is that the index will be listed in a complete form, rather than just printing out days which have changed since the last version. As a result considerable paper will be generated each time the index is produced and one would envisage less frequent listing than for Ariel 3. These listings will be produced at the experimenter's request and will not be generated automatically. It is hoped eventually to provide a facility for experimenters to make selected listings for say, specific stations or on any other of the listed parameters.

Two items have been omitted from the experimenters' indices which were given in the SATREF index. The first is the orbit number and the second the SATAN diagnostics. Several new parameters have been added and the full lists are given on the following pages.

A. Experimenters High Speed Index

1. The Master Tape number.
2. The number of the file on the Master Tape.
3. The number of the sub-file in the file.
4. The number of the sub-file on the Master Tape.
5. Year number.
6. Day number.
7. Hour number.
8. Station number.
9. Stage/Buffer Tape number.
10. Start time of sub-file in hours, minutes and seconds.
11. Stop time of sub-file in hours, minutes and seconds.
12. Satellite Mode - 1 or 2.
13. Birmingham ON/Off - 0 for off, 1 for on, with the possibility of two switches occurring during the sub-file, thus requiring three digits.
14. Iowa Mode - the indicator will have the same values as on the Master Tape. Again three digits will be required.
15. Jodrell Mode - as on Master Tape, one digit.
16. The date of the Master Tape generation as day, month, year.
17. Bad sub-file indicator. This will be set to 1 if a more recent (and better) version of the sub-file is available. It will have the value 2 if the sub-file is bad, but no other version exists. In either case the data should not be used.
18. Time of equatorial crossing measured in degrees (15° to 1 hour) for compactness in writing. This indicates the first northbound crossing. If no equatorial crossing occurred during the sub-file, the value 999 will be output.

19. The range of invariant latitude, expressed as minimum and maximum.

20. The range of local geognetic times, again measured in degrees. These values may sometimes be outside the range 0° to 360°.

21. Sun Pulse Indicator - this is set to * if sufficient sun pulses have been observed by the roll phase sensor.

B. Internal High Speed Index

1. The Master Tape number.
2. The number of the file on the Master Tape
3. The number of the sub-file in the file.
4. The number of the sub-file on the Master Tape.
5. Year number.
6. Day number.
7. Hour number.
8. Station number.
9. Stage/Buffer Tape number.
10. Start time of sub-file in hours, minutes and seconds.
11. Stop time of sub-file in hours, minutes and seconds.
12. Satellite Mode - 1 or 2.
13. Birmingham ON/OFF - 0 for off, 1 for on, with the possibility of two switches occurring during the sub-file, thus requiring three digits.
14. Iowa Mode - the indicator will have the same values as on the Master Tape. Again three digits will be required.
15. Jodrell Mode - as on Master Tape, one digit.
16. The date of the Master Tape generation as day, month, year.
17. Bad sub-file indicator. This will be set to 1 if a more recent (and better) version of the sub-file is available. It will have the value 2 if the sub-file is bad, but no other version exists. In either case the data should not be used.

18 - 24 Diagnostics produced by the SATAN program.

18. Number of parity errors.
19. Number of length errors.
20. Synch Errors.
21. Number of timing errors.
22. Percentage of 888's.
23. Percentage of values out of range.
24. [illegible]

C. Experimenters' Low Speed Index

1. The Master Tape number.
2. The number of the file on the Master Tape.
3. The number of the sub-file in the file.
4. The number of the sub-file on the Master Tape.
5. Year number.
6. Day number.
7. Hour number.
8. Station number.
9. Stage/Buffer Tape number.
10. Start time of sub-file in hours, minutes and seconds.
11. Stop time of sub-file in hours, minutes and seconds.
12. Birmingham ON/OFF.
13. Iowa Mode.
14. The date of the Master Tape generation as day, month, year.
15. Bad sub-file indicator. This will be set to 1 if a more recent (and better) version of the sub-file is available. It will have the value 2 if the sub-file is bad but no other version exists. In either case the data should not be used.
16. Time of equatorial crossing in degrees (15° to 1 hour), for compactness in writing. This indicates the first northbound crossing. If no equatorial crossing occurred during the sub-file the value 999 will be output.

D. Internal Low Speed Index

1. The Master Tape number.
2. The number of the file on the Master Tape.
3. The number of the sub-file in the file.
4. The number of the sub-file on the Master Tape.
5. Year number.
6. Day number.
7. Hour number.
8. Station number.
9. Stage/Buffer Tape number.
10. Command Time in hours, minutes and seconds.
11. Replayed Command Time in hours, minutes and seconds.
12. Birmingham ON/OFF.
13. Iowa Mode.
14. The date of the Master Tape generation as day, month, year.
15. Bad sub-file indicator. This will be set to 1 if a more recent (and better) version of the sub-file is available. It will have the value 2 if the sub-file is bad but no other version exists. In either case the data should not be used.

16 - 25 Diagnostics produced by the SATAN program.

16. Number of Parity Errors.
17. Number of length errors.
18. Synch errors.
19. Number of timing errors.
20. Percentage of 888's.
21. Percentage of values out of range.
22. Number of frames lost.
23. Command time.
24. End of replayed command time.
25. Average frequency.

FILE 0001 REC 0001 CH 0080 HEADER FILE

0001	243030167376	751221351710	311654103514	317074747474	747475727474	747474723766	167474747474	747474747474
0049	747474747474	747474747474	747474747474	747474747474	747474747474	7474		

FILE 0002 REC 0001 CH 0096 HEADER FILE

0001	243030167475	751221351710	311654103514	315074747474	747474747474	747474723663	747474767474	757774747476
0049	747477603747474	747774747476	747477777474	745774747476	747475127474	747474747474	747474747474	747474747474

FILE 0003 REC 0001 CH 0144 SUB FILE HEADER

0001	747474627474	747574747475	747474757474	747674747603	747474777474	747174747512	747474757474	747574747476
0049	747474127474	742774747437	747474137474	744274747474	747475537474	715474746600	020410367752	543474606711
0097	031610427522	037577457732	747474250303	030274747474	747474657474	747574747474	747474607474	747774747477

FILE 0003 REC 0002 CH 2676 AUXILIARY RECORD

0001	747474757474	740674747412	747474347474	745274747455	747474077474	717674747013	747460760303	032374746643
0049	747464377640	206074747640	747470660303	030774747070	747474527474	744574747475	747476307474	745274747427
0097	747477720303	031374747673	030303047474	620403030300	747473630303	035203030204	747476107475	124574746513
0145	030341707475	142074747646	747474757474	740774747451	747463737474	745274747456	747474127474	771674747014
0193	747461100303	031574746636	747464307475	206174747640	747472020303	030074746274	747474527474	744674747475
0241	747476357474	745174746130	747477640303	031274746075	030303077474	637603030301	747463560303	035303030373
0289	747476077475	124474746644	030334367475	152574747645	747474757474	740774747415	747461537474	745274747457
0337	747474147474	775674747014	747463350303	031774747235	747464317475	205274747640	747465150303	030274746456
0385	747474527474	744074747475	747476347474	745174746034	747477670303	031274747226	030303037474	747003030303
0433	747473120303	034403030352	747477767475	125374746605	030330757475	164374747645	747474767474	747474747455
0481	747460527474	745274747450	747474257474	646374747015	747475370303	031174747630	747464327475	206374747640
0529	747460377474	747474747631	747474527474	744174747475	747476357474	745174746173	747477620303	031274747532
0577	747474767474	756574747475	747474310303	034503030332	747477647475	125174746745	030333367475	176274747644
0625	747474767474	747474747421	747466327474	745274747451	747474367474	750074747015	747477660303	031274746267
0673	747464337475	205574747640	747463517474	747574746042	747474527474	744274747475	747476377474	745174746344
0721	747477550303	031174746046	747474717474	766374747476	747465750303	034603030313	747477617475	125074746704
0769	030327707475	171274747644	747474767474	747574747461	747465317474	745274747452	747474467474	704274747015
0817	747470230303	030474746661	747464247475	205674747641	747476437474	747774747215	747474527474	744374747475
0865	747476337474	745274747725	747477510303	031174747317	747474647474	776374747470	747475010303	034674747465
0913	747477567475	125774746053	030322247475	105374747653	747474767474	747574747425	747473117474	745274747453
0961	747474557474	622674747015	747472560303	030674747267	747464257475	205774747641	747471577474	747174747575
1009	747474527474	743474747475	747476217474	745274746572	747477450303	031174747752	747474677474	771474747471
1057	747466370303	034774747447	747477517475	125674746011	030316607475	101574747652	747474767474	747674747465
1105	747472107474	745274747444	747474657474	713074747015	747473100303	030074747661	747464267475	205074747641
1153	747464647474	747274746600	747474527474	743574747475	747476107474	745374747472	747477420303	031074746224
1201	747474627474	772374747473	747477330303	034074747421	747477537475	125474746156	030311167475	117074747651
1249	747474767474	747674747431	747471107474	745274747445	747474747474	643174747015	747465510303	030174746111
1297	747464277475	205174747641	747466037474	746474747163	747474527474	743674747475	747476017474	745374747304
1345	747477370303	031074746653	747474557474	760774747464	747460530303	034174747574	747477537475	126374746123
1393	030305447475	115474747650	747474767474	747774747471	747470177474	745274747445	747474177474	653774747015
1441	747466110303	030374746512	747464207475	205374747641	747461047474	746574746365	747474527474	743074747475
1489	747477647474	744474747552	747477250303	031074747266	747474507474	756474747466	747471350303	034174747357
1537	747477537475	126274746266	030300027475	115174747657	747474767474	747774747435	747477777474	745274747446
1585	747474267474	643374747015	747460517474	747574747116	747464217475	204474747642	747475617474	746774746545
1633	747474527474	743174747475	747477507474	744474746726	747477230303	031074747501	747474527474	611574747667
1681	747462570303	034274747532	747477517475	126174746231	747474307475	115774747656	747474767474	747074747475
1729	747476767474	745274747447	747474357474	650074747015	747461117474	747774747516	747464237475	204574747642
1777	747470617474	746174747727	747474527474	743274747475	747477377474	744574747337	747477110303	031774746144
1825	747474457474	652674747461	747473360303	034374747506	747477567475	126074746202	747470667475	116674747655
1873	747474767474	747074747441	747475757474	745274747440	747474447474	612674747015	747463537474	747074746144
1921	747464147475	204674747642	747473567474	746274746131	747474527474	743374747475	747477107474	744674747030
1969	747477000303	031774746564	747474407474	705474747463	747474170303	034374747661	747477617475	126774746353
2017	747473147475	100674747654	747474767474	747074747404	747462087474	745274747441	747474547474	705474747016
2065	747475547474	747274746557	747464157475	204774747642	747466477474	745474747311	747474527474	742574747475
2113	747470737474	744774747633	747470760303	031774747011	747474427474	617074747454	747465200303	033474747635
2161	747477647475	126574746323	747467517475	103774747663	747474767474	747174747444	747461057474	745274747442
2209	747474647474	753374747016	747476107474	746474747154	747464167475	204774747642	747461267474	745674747673
2257	747474527474	742674747475	747470417474	744074747526	747470650303	031774747441	747474357474	700174747456
2305	747477750303	033474747617	747477757475	126474745472	747462057475	107174747661	747474767474	747174747410
2353	747460647474	745274747443	747474747474	703774747016	747470457474	746674747565	747464177475	204074747643
2401	747475647474	745774746703	747474527474	742774747475	747470127474	744174747532	747470540303	031674746724
2449	747474377474	677574747457	747467020303	033474747772	747476047475	127374745440	747456407475	173474747660

ARIEL 4

LOW SPEED DATA

D-13946

Pg 5 - outline of format

Pg 39 - tape header

Pg 33 - Sub file header

19 - Auxiliary Data

Pg 28 - Exp. data

the Exp data rec contains a the Birmingham & Iowa data combined

FILE 0003 REC 0002 CH 2676

2497	747474767474	747274747450	747467647474	745274747443	747474117474	751774747016	747472757474	746774746021
2545	747464107475	204174747643	747470107474	745174747255	747474527474	742074747475	747471557474	744274747644
2593	747470530303	031674747377	747474327474	746674747451	747471450303	033474747744	747476227475	127274745415
2641	747451027475	161074747667	747474747474	747474747474	746303037474	747474747474		

FILE 0003 REC 0003 CH 2040 Low Speed Experimental data

0001	747467777474	642574747343	747471547474	772074746450	747472347474	714574747751	747477567474	731474747253
0049	747471617474	774274747753	747477637474	704474746050	747466507474	735074747030	747477207474	643574747253
0097	747471557474	775174747766	747473147474	725674747163	747477427474	775374747763	747470447474	651574747346
0145	747472127474	706074747720	747464357474	723474747155	747477517474	775674747324	747472567474	716174747732
0193	747477537474	776374747044	747466267474	641474747331	747470157474	772074746450	747472347474	714574747751
0241	747477567474	731474747256	747471617474	774274747753	747477637474	704474746520	747464377474	647074747123
0289	747470477474	643574747253	747471457474	775174747766	747473057474	725674747163	747477427474	775374747763
0337	747470447474	675674746441	747473277474	712374747074	747464207474	723474747155	747477517474	775674747324
0385	747472567474	716174747732	747477537474	776374747044	747467367474	642574747331	747471377474	707374746435
0433	747472347474	715574747751	747477567474	730574747253	747471617474	774274747753	747477637474	704774746725
0481	747465757474	732774747152	747477127474	641374747217	747471437474	774474747766	747464777474	724374747161
0529	747477427474	775374747763	747470477474	606274746674	747466147474	735274747160	747465747474	736074747275
0577	747477157474	774574746456	747472337474	714574747713	747477637474	776374747017	747467177474	667474746656
0625	747473207474	725674746413	747473527474	727574747047	747477357474	647774747233	747471637474	770374747742
0673	747477347474	736474746962	747467557474	650074747307	747473317474	655474747334	747472757474	703274747721
0721	747464567474	723374747163	747477237474	774274747734	747473447474	605074746650	747466147474	731074747107
0769	747465447474	733474747267	747470057474	772174746456	747472437474	714574747713	747477427474	773474747341
0817	747460247474	666174746521	747473637474	726074746544	747473337474	725274747005	747477217474	647774747233
0865	747471457474	772374747742	747477247474	733674746135	747466367474	661474747210	747471117474	652274747313
0913	747472427474	700574747706	747464357474	720174747163	747477237474	775374747734	747473617474	624274746777
0961	747466137474	732074747366	747465127474	731374747204	747471747474	707174746435	747472337474	713674747703
1009	747477327474	770074747336	747461007474	670474746613	747473077474	736674746522	747473237474	723374747164
1057	747470547474	643574747201	747471457474	770374747732	747470657474	732274747474	747474747474	747474747474
1105	747474747474	747474747474	747474747474	747474747474	747474747474	747474747472	747474767474	747474747474
1153	747474747474	747474747574	747474147474	746374747454	747474747474	747474747674	747477147474	746374747454
1201	747474757474	747474747774	747472547474	753474747574	747474747474	747474464560	744641137446	363774463350
1249	744636377446	335074463350	744620747446	142774461427	744606657447	773474476467	744760137447	553774475537
1297	030303320303	033203030332	030303320303	033203030332	030303320303	033203030332	030303327474	744703036332
1345	030303320303	033203030332	030303327474	747474747474	746303037474	201274742062	747572627474	554674743610
1393	747413027474	403674755552	747440367474	210074745212	747452127475	672674745212	747430777474	012774740373
1441	747551757475	744674757402	747446377474	463774756363	747446377474	270174745130	747451307475	664474748130
1489	747436157474	425074744250	747557647474	425074742735	747445767474	457674756112	747445767474	264074745610
1537	747456107475	732474745610	747427127474	403674744036	747555527474	403674742523	747452127474	521274756726
1585	747452127474	307774745546	747455467475	726274745546	747442337474	403674744036	747555527474	403674742523
1633	747430777474	521274756726	747452127474	245474745546	747455467475	726274745546	747436107474	463774744637
1681	747563537474	463774743314	747422047474	104474741103	747404207474	747474747474	747474747474	747474747474
1729	747474747474	747474747474	747474747474	747474747474	747474747474	022774740227	747403427474	022774740827
1777	747403427474	022774740342	747402277474	022774740227	747402277474	034274740227	747402277474	034274741256
1825	747440417474	254174745105	747434367474	214374744567	747437177474	165774744156	747425417474	125674744156
1873	747425417474	125674743552	747474617474	747374747466	747474717474	746474747467	747474727474	746574747460
1921	747474737474	746674747461	747474737474	746674747461	747474647474	746574747465	747474657474	746574747465
1969	747474657474	746574747465	747474657474	746574747465	747474657474	746574747465	747474657474	746574747474
2017	747474747474	747474747474	747474767474	747074747404				

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0001	747474767474	747274747450	747467647474	745274747443	747474117474	751774747016	747472757474	746774746021
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0097	747470530303	031674747377	747474327474	746674747451	747471450303	033474747744	747476227475	127274745415
0145	747451027475	161074747667	747474767474	747274747414	747466737474	745274747434	747474227474	644674747016
0193	747473277474	746174746432	747464117475	204274747643	747464447474	745374747436	747474527474	742274747475
0241	747471147474	744374747701	747470430303	031674747653	747474247474	773774747452	747462410303	033474747725
0289	747476377475	127174745571	747445437475	167574747665	747474767474	747374747454	747464537474	745274747435
0337	747474247474	662174747016	747465457474	746374747041	747464127475	204374747643	747460717474	744474746646
0385	747474527474	742374747475	747472577474	743474747266	747470320303	031574746165	747474267474	713174747444
0433	747473070303	034374747706	747476537475	127074745544	747440027475	156474747664	747474767474	747374747420
0481	747473527474	745274747436	747474377474	602674747016	747467667474	745574747451	747464137475	203474747634
0529	747474507474	744674747020	747474527474	741574747475	747472057474	743574746403	747470210303	031574746465
0577	747474207474	724474747446	747475430303	034374747066	747476667475	1277747455526	747434477475	146474747673

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0625	747474767474	746474747460	747472527474	745274747437	747474437474	621674747016	747460037474	745674746711
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0721	747470110303	031574747601	747474227474	710174747447	747466220303	034274747045	747475077475	127674746507
0769	747437137475	237574747671	747474767474	746474747424	747470317474	745274747430	747474417474	767574747016
0817	747462057474	745074747324	747464067475	203574747634	747464377474	744174746412	747474527474	741074747475
0865	747464547474	743074747467	747470000303	031474746162	747474147474	705774747441	747470530303	034274747033
0913	747475207475	127574745667	747433637475	211074747670	747474767474	746574747464	747477317474	745274746431
0961	747474477474	660574747017	747475557474	745274747742	747464077475	203674747634	747460027474	744374747764
1009	747474527474	741174747475	747465767474	743174747701	747471770303	031474747324	747474167474	753074747442
1057	747461230303	034174747010	747475477475	127474745646	747426327475	203474747676	747474767474	746574747430
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1201	747474177474	614474747434	747473370303	034074747174	747475667475	127474745633	747421067475	277274747675
1249	747474767474	746674747470	747474107474	745274747433	747474417474	774274747017	747471377474	744574746626
1297	747464007475	203774747635	747472057474	743674747355	747474527474	740474747475	747466137474	743374746016
1345	747471560303	032374746750	747474117474	644374747436	747475490303	034774747167	747474047475	110374746510
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1537	747474317475	110274745603	747410467475	330274747502	747474767474	746674747407	747462467474	745274747425
1585	747474327474	743774747017	747466577474	744174747661	747464027475	203774747636	747475007474	743174746740
1633	747474537474	747474747475	747461737474	742674747336	747471430303	032274746111	747474047474	673074747431
1681	747470030303	034474747141	747474567475	110174745766	747413317475	325574747500	747474767474	746774747447
1729	747461467474	745274747426	747474217474	666574747017	747460047474	744274746130	747464037475	203074747636
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1825	747474067474	770074747432	747462200303	035374747137	030303027475	110174745757	747406217475	304274747507
1873	747474767474	746774747413	747467267474	745274747427	747474137474	655074747017	747463337474	743474746562
1921	747465747475	203074747636	747462747474	742474746336	747474537474	747074747476	747474547474	742174747735
1969	747471200303	032174746205	747474077474	677074747424	747464150303	035174747125	030303267475	110074746747
2017	747401157475	363174747505	747474767474	746074747453	747466287474	745274747421	747474647474	727574747010
2065	747476067474	743674747007	747465757475	203074747637	747471757474	742674746515	747474537474	747274747476
2113	747475047474	742274746527	747471160303	032174747202	747474017474	751774747426	747476060303	035774747121
2161	030303517475	110074745736	747574157475	343274747504	747474767474	746074747417	747465247474	745274747422
2209	747474447474	777274747010	747472767474	743074747431	747465767475	203174747637	747460657474	742074747703
2257	747474537474	746474747476	747477207474	741474747446	747471040303	032074746260	747474027474	734474747427
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2353	747473047474	745274747423	747474277474	772674747010	747465537474	743174746710	747465777475	203174747630
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2449	747474037474	606074747421	747472160303	036374747115	030302207475	110774745720	747572327475	404474747511
2497	747474767474	746174747423	747472137474	745274747415	747474727474	765474747010	747460007474	743374747347
2545	747465777475	203174747630	747460457474	742374747300	747474537474	746174747476	747464747474	741674746123
2593	747472770303	032774746753	747475757474	742074747423	747474130303	036174747115	030302537475	110674746723
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0001	747461677474	667374746624	747473207474	736674746543	747473237474	722374747005	747470547474	643574747201
0049	747471207474	771374747742	747477347474	731074746035	747465067474	664574747363	747472157474	652274747303
0097	747472047474	717474747054	747465767474	720174747113	747477137474	774274747724	747464667474	625474746777
0145	747467717474	647774747370	747466557474	644074747355	747471647474	703574746514	747473027474	725274747067
0193	747477157474	772474746545	747463667474	675574746771	747464667474	735374746666	747464407474	734774747144
0241	747471707474	655774747352	747471637474	770374747715	747477147474	654574746717	747465177474	662474746572
0289	747473427474	650074746461	747473677474	714474747012	747465767474	735274747145	747470677474	706474747714
0337	747466717474	600574746624	747466677474	645674747306	747465127474	647274747204	747471647474	717074746406
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0433	747464727474	736774747144	747471467474	656774747342	747471367474	708774747064	747477147474	667174746035
0481	747466507474	661374746403	747464437474	665574746440	747473477474	713474747146	747465257474	733374747113
0529	747470677474	717174747041	747466617474	617174746611	747467617474	640374746444	747466337474	642374747331
0577	747471237474	712274746650	747473027474	727574747020	747470317474	705774746661	747462177474	674474746752
0625	747465627474	641174746623	747464367474	735574747123	747471117474	664074746472	747471207474	704474747171
0673	747470577474	677474746100	747467347474	662474746414	747464447474	675474746577	747473317474	712474747107
0721	747467757474	642574747120	747470367474	717174747057	747467647474	612474746766	747467527474	657274746421
0769	747467327474	655474747347	747471237474	727674746731	747465667474	727574747012	747471227474	717374746702
0817	747461717474	662474746602	747464037474	643274746712	747465327474	734774747123	747472767474	671774746530