UR1973.65

Computer programmes for metric conversion.

E.L. Martin

A comprehensive programme (9A1; V = 5917) enables rapid conversion of data and the production of various types of conversion tables.

Abbreviations and definitions

> CF = conversion factor
> Input number = number to be converted
> Output number = converted numbers
> SF = special function key
> SReg = storage register

DATA CONVERSION

Provides simple numerical conversion with print-out of input and output number. Both input and output numbers are automatically totalled. The totals can be recalled at any time (SReg 08 and 09 respectively) and may also be printed. The print-out format may be adjusted (refer to Table 1).

Operation

> (1) Key CF, SReg 00
> (2) PRIME, GO
> (3) Key input number, GO

To continue, repeat (3).

To print totals, key SEARCH +. If you wish to leave a line space above and, or below the total, then key SF 15 before and, or after SEARCH +.

If the input number is not an integer programme steps 015 and 032 must be altered to give the required number of decimal places.

The programme may be altered to accept an input number consisting of two units (*e.g.* feet and inches):

Step	Existing Code	Alter to
011	0514	0301
014	0411	0514 (GO)
015	0900	0514 (GO)
016	0604	0514 (GO)
031	0411	0300
032	0900	0514 (GO)

The mode of operation will then be:

> (1) Key CF, SReg 00
> (2) Key number of smaller input units equal to larger input unit, SReg 15
> (3) PRIME, GO
> (4) Key larger unit input number, GO
> (5) Key smaller unit input number, GO

To continue, repeat (4) and (5).
To print totals, key SEARCH +.

Table 1. FORMAT CONTROL: PROGRAMME STEP NUMBERS, CODES AND VALUES FOR PROGRAMME 9A1.

Programme	Input Number			Output Number			Column Spacing			
	1 unit	2-unit		1 unit	2-unit		Initial	1/2	2/3	3/4
Step										
9A1 (1)	015	584	590	263†	627	637	—	—	—	—
Totals	032	603	613	036	627	637	—	—	—	—
9A1 (2) *	268	—	—	263†	627	637	199	051	058	065
9A1 (3) *	421	—	—	263†	627	637	199	098	110	122
9A1 (4) *	—	303	307	263†	627	637	199	156	164	172
		333	337							
		363	367							
		393	397							
Code										
	0900	0600	0200	0902	0600	0200	1509	1505	1505	1505
*Value**										
	10	7	3	13	7	3	9	5	5	5

*The sum of the values of the input and output numbers must not exceed 24, otherwise the column spacing must be reduced to keep the table within the width of the paper.

†Programme step 244 must also be altered if step 263 is changed. The numerical value represented by the code for step 244 should equal the last digit of the code for step 263.

The programme may also be altered to provide a two-unit output:

Step	Existing Code	Alter to
021	0200	0302
035	0411	0302
036	0902	0514 (GO)

The type of input determines the mode of operation. The number of smaller output units which equal the larger output unit is placed in SReg 25.

PRODUCTION OF CONVERSION TABLES

The format of these tables consists of four columns, and normally fifty rows (*i.e.* 200 increments). This standard will fit lengthwise on A4 paper.

For single unit input number proceed as follows:

Operation

(1) Key CF, SReg 00
(2) Key SEARCH, STORE DIRECT
(3) Key SEARCH 2 (or SEARCH 3 if you wish the output number to be printed *before* the input number.)
(4) The programme stops to enable you to type in a title for the table.
(5) Key GO. Print-out commences and will be complete in about 5 minutes.

To continue key SF 05 and repeat operations (3) to (5).

The above operations give an increment of one. You may alter the increment by multiplication or division (or both).

To multiply: key factor required, SF 02
To divide: key factor required, SF 03

The starting number may be altered as desired. Key starting number required, less one increment, SF 01.

The above alterations must be performed immediately following operation (2).

If you do not require 50-row columns then operation (2) should be modified as follows.

(2) Key number of rows required, SF 04

For 2-unit input number proceed as follows:

Operation

(1) Key CF (for smaller unit), SReg 00
(2) Key number of rows per column (this number must be exactly divisible by the number of smaller units which equal the larger unit), SF 04
(3) Key SF 06, key number of rows per column, GO, key number of smaller units equal to the larger unit, GO
(4) Key SEARCH 4

    (5)   The programme stops to enable you to type in a title for the table

    (6)   Key GO. Print-out commences and will be completed in about 5 minutes (for a column length of about 50).

To continue table key SF 05, SF 07 and repeat operations (4) to (6).

For 2-unit output number proceed as follows:

The programme must be altered as follows:

		Step	*Existing Code*	*Alter to*
(a)	Single unit input	274	0200	0302
(b)	Single unit input, reversed print-out	285	0200	0302
(c)	Two-unit input	294	0200	0302

In all cases the number of smaller output units which equal the larger output unit must be stored: Key this number, SReg 25.

FORMAT CONTROL

The programme allows for an input number (integer) of nine digits and an output number of nine digits before the decimal point and two digits following the decimal point.

Where the programme is changed to allow for 2-unit numbers, these are formatted as follows:

Larger unit number : Six digit integer
Smaller unit number : Two digit integer

The programme can be modified to accommodate most input/output requirements. To modify the programme see Table 1, which lists the format control steps in the programme. Read the footnotes carefully to avoid a format which will exceed the width of the paper. If the format is within the width of the paper, but the right-hand margin of the table is too close to the right-hand edge of the paper the line feed mechanism may be rendered inoperative. The left hand margin setting of the typewriter is normally set at 10 but may be moved if required.

ROUNDING CONTROL

Two types of rounding control are used in the programme.

The first type is used for single unit output numbers. It must be adjusted if the programme step 263 is changed. The number entered as programme step 244 represents the number of decimal places. To round to the nearest integer this should be 0. It is also possible to round to the nearest 10, 100, 1000 etc.; in this case alter programme step 243 to CHANGE SIGN and enter in step 244 the number of digits, before the decimal place, plus 1, at which the rounding is to be applied.

The second type of rounding control does not normally need to be altered. It rounds the smaller unit of a 2-unit number to the nearest integer.

If decimal places of the smaller unit of the output number are required or if it is to be rounded to the nearest 10 or 100 the programme must be altered as follows:

Number of decimal places	Step	Alter to
1	637	0712
	638	0700
2	636	0712
	638	0700
3	635	0712
	638	0700

To the nearest

	Step	Alter to
10	638	0700
100	638	0705
	639	0700

[revised 3 December 1973]

PROGRAMME 9A1 (v = 5917)

000	04 08	050	04 11	100	00 02	150	04 05	200	05 15
001	07 01	051	15 05	101	01 03	151	00 01	201	04 12
002	00 00	052	04 05	102	04 05	152	01 04	202	01 02
003	07 00	053	00 02	103	00 02	153	04 00	203	01 08
004	04 04	054	01 02	104	03 03	154	00 01	204	01 08
005	00 08	055	04 00	105	04 05	155	04 11	205	04 13
006	04 04	056	00 02	106	01 00	156	15 05	206	05 11
007	00 09	057	04 11	107	04 00	157	02 02	207	04 08
008	04 08	058	15 05	108	00 02	158	04 05	208	01 00
009	07 00	059	04 05	109	04 11	159	00 02	209	06 04
010	05 15	060	00 03	110	15 05	160	01 04	210	07 10
011	05 14	061	01 02	111	04 05	161	04 00	211	06 03
012	04 00	062	04 00	112	00 03	162	00 02	212	04 04
013	00 08	063	00 03	113	01 03	163	04 11	213	01 09
014	04 11	064	04 11	114	04 05	164	15 05	214	15 14
015	09 00	065	15 05	115	00 03	165	02 03	215	07 00
016	06 04	066	04 05	116	03 03	166	04 05	216	06 13
017	04 05	067	00 04	117	04 05	167	00 03	217	06 02
018	00 00	068	01 02	118	01 00	168	01 04	218	06 06
019	06 02	069	01 05	119	04 00	169	04 00	219	04 02
020	06 05	070	05 09	120	00 03	170	00 03	220	01 09
021	02 00	071	04 07	121	04 11	171	04 11	221	07 12
022	04 12	072	07 06	122	15 05	172	15 05	222	07 05
023	01 08	073	05 15	123	04 05	173	02 04	223	04 00
024	04 13	074	04 08	124	00 04	174	04 05	224	01 09
025	04 07	075	07 06	125	01 03	175	00 04	225	04 05
026	07 00	076	04 12	126	04 05	176	01 04	226	01 09
027	04 08	077	01 08	127	00 04	177	01 05	227	06 08
028	06 00	078	04 13	128	03 03	178	05 09	228	06 06
029	04 05	079	04 07	129	04 05	179	04 07	229	06 03
030	00 08	080	07 05	130	01 00	180	07 12	230	06 05
031	04 11	081	04 08	131	01 05	181	05 15	231	04 00
032	09 00	082	07 03	132	05 09	182	04 08	232	00 09
033	04 05	083	00 00	133	04 07	183	07 12	233	04 11
034	00 09	084	01 01	134	07 08	184	04 12	234	09 00
035	04 11	085	04 08	135	05 15	185	01 08	235	05 11
036	09 02	086	07 07	136	04 08	186	04 13	236	04 08
037	04 07	087	04 05	137	07 08	187	04 07	237	02 00
038	07 01	088	00 01	138	04 12	188	07 09	238	06 04
039	04 08	089	01 03	139	01 08	189	04 08	239	07 10
040	07 02	090	04 05	140	04 13	190	00 00	240	06 03
041	00 00	091	00 01	141	04 07	191	04 12	241	04 04
042	01 01	092	03 03	142	07 07	192	01 02	242	01 09
043	04 08	093	04 05	143	04 08	193	01 08	243	05 14
044	07 05	094	01 00	144	07 04	194	04 13	244	07 02
045	04 05	095	04 00	145	00 00	195	05 11	245	06 13
046	00 01	096	00 01	146	01 01	196	04 08	246	06 02
047	01 02	097	04 11	147	04 08	197	01 01	247	06 06
048	04 00	098	15 05	148	07 09	198	04 11	248	04 02
049	00 01	099	04 05	149	02 01	199	15 09	249	01 09

250	07	12	300	04	05	350	04	00	400	01	04	450	04	04
251	07	05	301	02	01	351	02	02	401	04	05	451	01	07
252	04	00	302	04	11	352	07	00	402	01	04	452	07	01
253	01	09	303	06	00	353	04	04	403	06	04	453	04	04
254	04	05	304	04	05	354	01	02	404	04	05	454	00	01
255	01	09	305	01	01	355	04	08	405	00	07	455	04	04
256	06	08	306	04	11	356	06	12	406	05	09	456	01	00
257	06	06	307	02	00	357	05	11	407	04	07	457	04	00
258	06	03	308	07	01	358	04	08	408	06	14	458	00	02
259	06	05	309	04	00	359	02	03	409	07	01	459	04	00
260	04	00	310	01	01	360	04	05	410	04	00	460	00	03
261	00	09	311	04	05	361	02	03	411	02	04	461	04	00
262	04	11	312	01	01	362	04	11	412	07	00	462	00	04
263	09	02	313	06	04	363	06	00	413	04	04	463	04	00
264	05	11	314	04	05	364	04	05	414	01	04	464	00	05
265	04	08	315	00	07	365	01	03	415	04	08	465	05	15
266	01	02	316	05	09	366	04	11	416	06	14	466	04	08
267	04	11	317	04	07	367	02	00	417	05	11	467	00	05
268	09	00	318	06	11	368	07	01	418	04	08	468	04	05
269	06	04	319	07	01	369	04	00	419	03	03	469	01	07
270	04	05	320	04	00	370	01	03	420	04	11	470	04	00
271	00	00	321	02	01	371	04	05	421	09	00	471	00	01
272	06	02	322	07	00	372	01	03	422	05	11	472	04	00
273	06	05	323	04	04	373	06	04	423	04	08	473	00	02
274	02	00	324	01	01	374	04	05	424	04	04	474	04	00
275	04	05	325	04	08	375	00	07	425	07	05	475	00	03
276	01	00	326	06	11	376	05	09	426	07	00	476	04	00
277	05	11	327	05	11	377	04	07	427	04	08	477	00	04
278	04	08	328	04	08	378	06	13	428	00	04	478	04	05
279	01	03	329	02	02	379	07	01	429	04	04	479	01	08
280	06	04	330	04	05	380	04	00	430	00	02	480	04	00
281	04	05	331	02	02	381	02	03	431	04	04	481	00	05
282	00	00	332	04	11	382	07	00	432	00	04	482	05	15
283	06	02	333	06	00	383	04	04	433	06	04	483	04	08
284	06	05	334	04	05	384	01	03	434	07	02	484	00	01
285	02	00	335	01	02	385	04	08	435	06	02	485	04	00
286	05	11	336	04	11	386	06	13	436	04	14	486	00	01
287	04	08	337	02	00	387	05	11	437	00	03	487	04	00
288	01	04	338	07	01	388	04	08	438	06	02	488	00	02
289	06	04	339	04	00	389	02	04	439	06	05	489	04	00
290	04	05	340	01	02	390	04	05	440	04	04	490	00	03
291	00	00	341	04	05	391	02	04	441	00	05	491	04	00
292	06	02	342	01	02	392	04	11	442	04	04	492	00	04
293	06	05	343	06	04	393	06	00	443	01	08	493	04	00
294	02	00	344	04	05	394	04	05	444	04	05	494	00	05
295	04	05	345	00	07	395	01	04	445	00	03	495	05	15
296	01	00	346	05	09	396	04	11	446	04	00	496	05	14
297	05	11	347	04	07	397	02	00	447	00	04	497	04	08
298	04	08	348	06	12	398	07	01	448	04	05	498	00	02
299	02	01	349	07	01	399	04	00	449	00	04	499	04	02

PROGRAMME 9A1 (continued)

500	00 01		550	06 00		600	06 05		650	00 05
501	04 02		551	04 14		601	06 08		651	06 04
502	01 00		552	02 04		602	04 11		652	04 05
503	04 02		553	04 14		603	06 00		653	00 04
504	00 02		554	02 00		604	06 01		654	05 11
505	04 02		555	07 00		605	04 05		655	04 08
506	00 03		556	04 04		606	01 05		656	00 14
507	04 02		557	02 01		607	06 02		657	04 12
508	00 04		558	07 01		608	07 00		658	01 11
509	04 02		559	04 04		609	07 00		659	04 13
510	00 05		560	01 01		610	07 00		660	05 11
511	04 02		561	04 04		611	07 12		661	04 08
512	01 07		562	01 02		612	07 05		662	00 15
513	04 02		563	04 04		613	06 00		663	04 12
514	01 08		564	01 03		614	06 05		664	01 10
515	05 15		565	04 04		615	04 11		665	04 13
516	05 14		566	01 04		616	02 00		666	05 11
517	04 08		567	05 15		617	05 11			
518	00 03		568	04 08		618	05 15			
519	04 03		569	00 07		619	04 08		v = 5917	
520	00 01		570	04 05		620	03 02			
521	04 03		571	02 00		621	04 00			
522	01 00		572	04 00		622	00 09			
523	04 03		573	02 01		623	06 04			
524	00 02		574	04 00		624	04 05			
525	04 03		575	02 02		625	02 05			
526	00 03		576	04 00		626	06 03			
527	04 03		577	02 03		627	06 05			
528	00 04		578	04 00		628	06 08			
529	04 03		579	02 04		629	04 11			
530	00 05		580	05 15		630	06 00			
531	04 03		581	04 08		631	06 01			
532	01 07		582	03 01		632	04 05			
533	04 03		583	04 11		633	02 05			
534	01 08		584	06 00		634	06 02			
535	05 15		585	04 15		635	07 00			
536	04 08		586	01 05		636	07 00			
537	00 06		587	06 02		637	07 00			
538	05 15		588	05 15		638	07 12			
539	06 04		589	04 11		639	07 05			
540	05 15		590	02 00		640	06 00			
541	04 04		591	06 00		641	06 05			
542	00 07		592	06 05		642	04 11			
543	06 03		593	05 11		643	02 00			
544	04 14		594	04 08		644	05 11			
545	02 02		595	03 00		645	04 08			
546	07 02		596	06 04		646	01 05			
547	06 02		597	04 05		647	04 00			
548	04 14		598	01 05		648	00 04			
549	02 03		599	06 03		649	04 05			