

Page 1 of 1

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**HP 41C PROGRAM SUBMITTAL FORM**  
**PROGRAMMFORMBLATT/DOCUMENTATION DU PROGRAMME/GENERALITÀ SUL PROGRAMMA**

<b>Program Title</b> Programmtitel Titre du programme Titolo del programma		<u>CONVERSION</u>
<b>Category No.</b> Kategorie Nr. Catégorie N° Categoria N°	<b>Name</b> Rubrik Rubrique Nome della categoria	

<b>No. of program lines</b> Anzahl Programmzeilen Nombre de lignes de programme N° di linee di programma	<u>182</u>	<b>No. of data registers</b> Anzahl des benötigten Datenspeicher Nombre de registres de données N° di registri utilizzati	<u>63</u>
<b>Recommended HP 41C System configuration</b> Empfohlene System-Konfiguration Configuration recommandée Configurazione raccomandata			
Port # 1		Port # 2	
Port # 3		Port # 4	
<b>This program requires the following programs as subroutines:</b> Dieses Programm benutzt folgende Programme als Unterprogramme: Ce programme utilise les programmes suivants comme sous-programmes: Questo programma usa i seguenti programmi come subroutines:			
<b>HP Applications ROM</b> HP Applikations ROM ROM d'application HP ROM di applicazione HP		<b>Program Name:</b> Programm: Nom du programme: Programma:	

<b>Program Abstract</b> Kurzbeschreibung Résumé Breve descrizione del programma	<u>With this program numbers of a system with a base from 2 up to and including 16 can be converted to a number of an other system with a base with the same range.</u> <u>The input number (the one that must be converted) may consist of 12 digits and may also have a fraction.</u> <u>The conversion take place via the decimal system.</u>
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**ACKNOWLEDGMENT AND AGREEMENT**  
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<b>Date</b> Datum Date Data	<u>4-december-79</u>	<b>Signature</b> Unterschrift Signature Firma	
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# PROGRAM DESCRIPTION I

## PROGRAMMBESCHREIBUNG I DESCRIPTION DU PROGRAMME I DESCRIZIONE DEL PROGRAMMA I

**Application, Equations, Variables** Suppose the conversion as follow:  $X_{B1} \rightarrow Y_{10} \rightarrow Z_{B2}$

Anwendung, Gleichungen, Veränderliche  
Application, Equations, Variables  
Applicazione, Equazioni, Variabili

$X_{B1}$  = number with base B1 that must be converted.

$Y_{10}$  = converted number in the decimal system.

$Z_{B2}$  = converted number in a system with base B2.

$x$  = digit of X;  $z$  = digit of Z.

$$Y_{10} = B1^n \cdot x_n + B1^{n-1} \cdot x_{n-1} + \dots + B1 \cdot x_1 + x_0 + B1^{-1} \cdot x_{-1} + B1^{-2} \cdot x_{-2} + \dots + B1^{-m} \cdot x_{-m}$$

$$\text{INT}(Y):B2 = \text{INT}(Y_0) \text{ rest } z_0 \qquad \text{FRC}(Y).B2 = \text{FRC}(Y_{-1}) + z_{-1}$$

$$\text{INT}(Y_0):B2 = \text{INT}(Y_1) \text{ rest } z_1 \qquad \text{FRC}(Y_{-1}).B2 = \text{FRC}(Y_{-2}) + z_{-2}$$

$$\text{INT}(Y_{n-1}):B2 = 0 \text{ rest } z_n \qquad \text{FRC}(Y_{-m}).B2 = \text{FRC}(Y_{1-m}) + z_{-m}$$

$$Z_{B2} = z_n \dots z_1 z_0 z_{-1} z_{-2} \dots z_{-m}$$

**Operating limits and Warnings**  $2 \leq B1 \leq 16$        $2 \leq B2 \leq 16$

Grenzen und Einschränkungen  
Limites et restrictions  
Limiti operativi e avvertenze

X: maximum 12 digits, must contain a comma.

The execution time from the conversion  $X_{B1} \rightarrow Y_{10}$  lasts  $\frac{1}{2}$  minute up to  $3\frac{1}{2}$  minute.

It is possible that Z does not fit in the display, so it starts scrolling.

This program has been verified only with respect to the numerical example given in Program Description II. User accepts and uses this program material AT HIS OWN RISK, in reliance solely upon his own inspection of the program material and without reliance upon any representation or description concerning the program material.

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Dieses Programm wurde lediglich anhand des in der Programmbeschreibung II enthaltenen Zahlenbeispiels überprüft. Der Benutzer erhält und benutzt das Programmmaterial auf eigenes Risiko hin; er hat es deshalb - gleichgültig, ob es bereits anderweitig präsentiert oder beschrieben wurde - selbst zu untersuchen.

WEDER HP NOCH DER EINSENDER DES PROGRAMMS ÜBERNEHMEN FÜR DAS PROGRAMMATERIAL EINE IRGENDWIE GEARTETE GEWÄHRLEISTUNG ODER HAFTUNG, INSBESONDERE NICHT FÜR SEINE VERKÄUFLICHKEIT ODER SEINE VERWENDBARKEIT FÜR EINEN BESTIMMTEN ZWECK. HP UND DER EINSENDER HAFTEN AUCH NICHT FÜR INDIREKTE ODER FOLGESCHÄDEN.

Le présent programme n'a été vérifié qu'en ce qui concerne l'exemple numérique indiqué dans la description du programme II. L'utilisateur accepte et utilise le présent programme À SES PROPRES RISQUES et doit se fier uniquement à sa propre inspection dudit programme sans se référer à toute autre déclaration et description.

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Questo programma è stato verificato soltanto per quanto concerne l'esempio numerico indicato nella Descrizione del Programma II. L'utilizzatore accetta e utilizzerà il presente programma A SUO INTERO RISCHIO, fidandosi unicamente della propria verifica del programma e non basandosi su altre dichiarazioni o descrizioni.

NÈ LA SOCIETÀ NÈ L'AUTORE DANNO ALCUNA GARANZIA IMPLICITA O ESPLICITA CONCERNENTE IL PRESENTE PROGRAMMA, IN SPECIAL MODO RIGUARDO ALLA SUA COMMERCIALIZZAZIONE O ADATTABILITÀ AD UN USO PARTICOLARE. NÈ LA SOCIETÀ HP NÈ L'AUTORE ASSUMONO ALCUNA RESPONSABILITÀ PER DANNI IMMEDIATI O MEDIATI CAUSATI DALLA FORNITURA, UTILIZZAZIONE O FUNZIONAMENTO DEL PRESENTE PROGRAMMA.

# PROGRAM DESCRIPTION II

PROGRAMMBESCHREIBUNG II  
DESCRIPTION DU PROGRAMME II  
DESCRIZIONE DEL PROGRAMMA II

**Example**

Beispiel  
Exemple  
Esempio

On the next page are some examples given for different conversions.  
In the last example is the possibility given for calculating more digits behind the comma. For systems with a high base there is no point for calculating more digits behind the comma, because of the machine accuracy.

**Sketch**

Skizze  
Croquis  
Schizzo

**PROGRAM DESCRIPTION III**

(Example continued)  
 (Beispiel Fortsetzung)  
 (Exemple, suite)  
 (Esempio)

**PROGRAMMBESCHREIBUNG III  
 DESCRIPTION DU PROGRAMME III  
 DESCRIZIONE DEL PROGRAMMA III**

Data Input Dateneingabe Données Dati	Keystrokes Tasten Touches Tasti	Result Resultat Résultat Risultato	Comments Kommentare Commentaires Commenti
	USER, AON		USER-made, and ALPHA on.
"B1F,"	AOFF, C	B1?	Input X.
16	R/S	B2?	Input base 16(hexadecimal system).
	RCL 03	2.847,0000	Output Y <sub>10</sub> .
2	R/S	101100011111,0	Output Z <sub>2</sub> .
	AOFF, c	B2?	Second conversion.
4	R/S	230133,0	Output Z <sub>4</sub> .
	AOFF, c	B2?	New conversion from same X.
8	R/S	5437,0	Output Z <sub>8</sub> .
"121,021"	AOFF, C	B1?	New conversion.
3	R/S	B2?	Input base 1.
9	R/S	17,2300000002	Output Z <sub>3</sub> , with small error (Y <sub>10</sub> is rounded)!
	AOFF, c	B2?	
10	R/S	16,25925926	Base 10: always 10 digits, if not greater than 10 <sup>9</sup> , caused by machine accuracy.
	AOFF		
65.000	STO 03, c	B2?	Input Y <sub>10</sub> .
2	R/S	OUT OF RANGE	Too big.
	c	B2?	
4	R/S	33313220,0	Output Z <sub>4</sub> .
"6,E23BF"	AOFF, C	B1?	New conversion.
16	R/S	B2?	
2	R/S	110,111000100	Output Z <sub>2</sub> rounded.
	AOFF, SF 00,c	B2?	Adjust more digits.
2	R/S	110,1110001000111011111	Output Z <sub>2</sub> .

**USER INSTRUCTIONS I**  
**PROGRAMMABLAUF I**  
**INSTRUCTIONS D'EMPLOI I**  
**NORME OPERATIVE I**

Step Schritt Pas Passo	Instructions Operation Instructions Istruzioni	Variables Dateneingabe Données Dati	Function(s) Taste(n) Touche(s) Tasti	Result Resultat Résultat Risultato
1	Key in program and set status.			
2 a	Conversion $X_{B1} - Y_{10}$		AON	
b		code X	AOFF, C	B1?
c		base B1	R/S	B2?
d			RCL 03	number $Y_{10}$
3 a	Conversion $Y_{10} - Z_{B2}$	number $Y_{10}$	STO 03, c	B2?
b		base B2	R/S	code Z
4	Conversion $X_{B1} - Z_{B2}$ : do instructions 2 and 3, but miss 2 d and 3 a.			
5 a	More digits behind the comma: •)		SF 00	
b	Return to less digits behind the comma:		CF 00	
•)	When 23 digits as maximum is more than wished, change program line 116 in a lower number. The same can be done with line 114 for Flag 00 is clear. number = number of digits + 3 If the integer part is bigger than the selected number of digits, and less than 16, more digits will be shown, but only one behind the comma.			

# PROGRAM LISTING

## PROGRAMMAUFLISTUNG LISTAGE DU PROGRAMME LISTATO DI PROGRAMMA

Line Zeile Ligne Linea	Keystrokes Tastenfolge Touches Tasti	Comments Kommentar Commentaires Commenti	Line Zeile Ligne Linea	Key pressed Tastenfolge Touches Tasti	Comments Kommentar Commentaires Commenti
01	• LBL C	Input X.	51	1	
	5	Set register		-	
	STO 00	pointer.		1 E3	
	GTO 24			/	
05	• LBL 21		55	5	
	RCL 00	Set power		+	
	INT	register.		STO 00	
	CHS			"B1?"	
	5			TONE 5	
10	+		60	PROMPT	Input base 1.
	STO 02			STO 01	
	GTO 23			• LBL 26	
	• LBL 22			RCL 01	Calculate
	RCL 01			RCL 02	Y <sub>10</sub> .
15	INT		65	Y/X	
	STO IND 00	Store digit.		RCL IND 00	
	ISG 00			*	
	• LBL 23	Right shift		ST+ 03	
	" "	number		1	
20	ARCL 03	1 position.	70	ST+ 02	
	ARCL 04			ISG 00	
	• LBL 24			GTO 26	
	ASTO 03	Store number		• LBL c	
	ASHF	R03-R04.		4,018	Adjust reg.
25	ASTO 04		75	STO 00	pointer.
	ASHF	Least (digit)		"B2?"	
	ASTO Y	in Y reg.		PROMPT	Input base 2.
	CLA			STO 02	
	ASTO X			CLA	
30	X=Y?	Digit?	80	RCL 03	Decode
	GTO 23	:yes.		INT	integer
	","	:no.		• LBL 27	part of
	ASTO X			RCL 02	number.
	X=Y?	Comma?		/	
35	GTO 21	:yes.	85	ENTER ↗	
	,015	:no. Set sub-		FRC	
	STO 01	routine count.		RCL 02	
	RDN	Repair stack.		*	
	• LBL 25			STO IND 00	
40	CLA	COmpair with	90	RDN	
	XEQ IND 01	0 - F.		INT	
	ASTO X			X=0?	Ready?
	X=Y?	Found?		GTO 28	:yes.
	GTO 22	:yes.		ISG 00	:no.
45	ISG 01	:no.	95	GTO 27	New digit.
	GTO 25	Next.		70	Too large.
	0	Clear R03 for		FACT	
	STO 03	sum.		• LBL 28	
	RCL 00	Adjust reg.		RCL 00	
50	INT	pointer.	00	INT	

# PROGRAM LISTING

## PROGRAMMAUFLISTUNG LISTAGE DU PROGRAMME LISTATO DI PROGRAMMA

Line Zeile Ligne Linea	Keystrokes Tastenfolge Touches Tasti	Comments Kommentar Commentaires Commenti	Line Zeile Ligne Linea	Key pressed Tastenfolge Touches Tasti	Comments Kommentar Commentaires Commenti
1 <sup>01</sup>	CHS	Prepaire frac-	1 <sup>51</sup>	"F5"	
	STO 01	tion counter		RTN	
	CHS	and register		• LBL 06	
	,003	pointer for		"F6"	
1 <sup>05</sup>	+	down counting.	1 <sup>55</sup>	RTN	
	STO 00			• LBL 07	
	• LBL 29			"F7"	
	RCL IND 00	Store integer		RTN	
	RND	in ALPHA-reg.		• LBL 08	
1 <sup>10</sup>	XEQ IND X		1 <sup>60</sup>	"F8"	
	DSE 00			RTN	
	GTO 29			• LBL 09	
	"F,"			"F9"	
	15	Set fraction		RTN	
1 <sup>15</sup>	FS? 00	counter.	1 <sup>65</sup>	• LBL 10	
	26	•)		"FA"	
	ST+ 01			RTN	
	RCL 03	Decode		• LBL 11	
	FRC	fraction		"FB"	
1 <sup>20</sup>	• LBL 30	of number.	1 <sup>70</sup>	RTN	
	RCL 02			• LBL 12	
	*			"FC"	
	ENTER/			RTN	
	INT			• LBL 13	
1 <sup>25</sup>	XEQ IND X	Store digit	1 <sup>75</sup>	"FD"	
	RDN	in ALPHA-reg.		RTN	
	FRC			• LBL 14	
	X=0?	REAdy?		"FE"	
	GTO 31	:yes.		RTN	
1 <sup>30</sup>	DSE 01	:no.	1 <sup>80</sup>	• LBL 15	
	GTO 30	New digit.		"FF"	
	• LBL 31			RTN	
	AON	Output Z.			
	RTN				
1 <sup>35</sup>	• LBL 00	Digits to	85		
	"F0"	compair or			
	RTN	to place			
	• LBL 01	in number Z.			
	"F1"				
1 <sup>40</sup>	RTN		90		
	• LBL 02				
	"F2"				
	RTN				
	• LBL 03				
1 <sup>45</sup>	"F3"		95		
	RTN				
	• LBL 04				
	"F4"				
	RTN				
1 <sup>50</sup>	• LBL 05		00		

# REGISTERS, STATUS, FLAGS

## REGISTERBELEGUNG, FLAGS, BETRIEBSARTEN

### REGISTRES, INDICATEURS, MODES OPÉRATOIRES

#### REGISTRI, MODI OPERATIVI, FLAGS

Registers Datenspeicher Registres de données Registri				Status Betriebsart Modes opératoires Modi operativi			
00	register pointer			Size <u>019</u>	Total Reg. <u>63</u>	User Mode	
	subr. counter, base 1, fraction c.			Eng <input type="checkbox"/>	Fix <input checked="" type="checkbox"/> 4	Sci <input type="checkbox"/>	On <input checked="" type="checkbox"/>
	power, base 2			Deg <input type="checkbox"/>	Rad <input type="checkbox"/>	Grad <input type="checkbox"/>	Off <input type="checkbox"/>
	X part 1, sum Y10			<b>Purpose</b> Bedeutung Signification Scopo			
	X part 2, z0						
05	x -m , z1			00	No. of digits 23	<input checked="" type="checkbox"/>	12 (nominal)
	x -m+1 , z2			01			
	x , z3			02			
	x , z4			03			
10	x , z5			04			
	x , z6			05			
	x , z7			06			
	x , z8			07			
	x , z9			08			
15	x n-1 , z11			09			
	x n , z12			10			
	z13			11	Audio execute		
	z14			12			
20				13			
				14			
				15			
				16			
				17			
25		75		18			
				19			
				20			
				21	Printer Enable		
				22	Number Input		
30		80		23	Alpha Input		
				24	Range Ignore		
				25	Error Ignore		
				26	Audio Enable		
				27	User Mode		
35		85		28	Decimal Point	<input checked="" type="checkbox"/>	
				29	Digit Grouping		
				<b>Assignments</b> Tastenbelegung / Assignations / Assegnamenti			
				<b>Function</b> Funktion Fonction Funzione	<b>Key</b> Taste Touche Tasto	<b>Function</b> Funktion Fonction Funzione	<b>Key</b> Taste Touche Tasto
40		90					
45		95					
		99					