

```

*      17.2.1985
* *****
*      FAST FOURRIER SUBROUTINE
* *****
FFT1 PSHS X,Y
LDX START
LDB #B0
LDY #STACKA
VESAT LDA ,X+
STA ,Y+
DECB
BNE VESAT
JSR INPAT
JSR TEILO
JSR BERRY
PULS X,Y
RTS

* *****
* PAGE1 WELLEN BERECHNUNG
* ***** Z6C9B W.BIN

```

```

BERRY LDA HARMN
PSHS A
LDX #B0000 E010 BIS E090 AUF NULL PEGEL
LDA #B0
LDB #B0

```

```

BAR1 STA ,X+

```

```

DECB
BNE BAR1
LDA #B1
STA HARMN
STA MERK1

```

```

LDY #ZE110

```

```

STY WELEND

```

```

Z6CB3 LDX #ZE110

```

```

LDY #ZE090

```

```

LDU #ZE190

```

```

DECA

```

```

LDB A,U

```

```

BEQ Z6CDE

```

```

ASLB

```

```

STB PEGEL

```

```

JSR Z7284

```

```

LDX #ZE010

```

```

LDY #ZE090

```

```

Z6CDO LDA ,Y+

```

```

ADDA ,X

```

```

ADDA #B0

```

```

STA ,X+

```

```

CMPY WELEND

```

```

BNE Z6CDO

```

```

Z6CDE LDA MERK1

```

```

INCA

```

```

STA MERK1

```

```

STA HARMN

```

```

CMPA #B21

```

```

BNE Z6CB3

```

```

LDA #B1

```

```

STA HARMN

```

```

LDA PEGEL

```

E070) 80
90) 80

E090) 80
E110) 80

E110) 80
E190) 80

E420) 80
E4A0) 80

Original
Weller
speicher
zur Analyse

E500 Analys. Data

```

PSHS A
LDA ZE180
ASLA
STA PEGEL
LDX #ZE010
LEAY #80,X
STY WELEND
TFR X,Y
JSR Z7284
PULS A
STA PEGEL
PULS A
STA HARMN
RTS
* *****
* *****
* PEGEL COMPUTE
* ***** Z7284
Z7284 LEAX #80,X
STX WELANF
LEAX -#80,X
LDA HARMN
Z7291 PSHS A
LDA PEGEL
ASLA
LDB ,X
MUL
ADCA ##80
SUBA PEGEL
STA ,Y+
PULS A.
CMPY WELEND
BEQ Z7285
LEAX A,X
CMPX WELANF
BMI Z7291
LEAX -#80,X
BRA Z7291
Z7285 RTS
* *****

```

```

* *****
* PAGE 3 ZU PAGE 1
* ***** Z623F R.CMD
TEILD LDX #PUFFA E500
LDY #PUFFU E190
LDB ##20
CLR RALM
Z625E LDA ,X+
CMPA RALM
BLS Z6266
STA RALM
Z6266 LEAX #01,X
STA ,Y+
DECB
BNE Z625E
LDA RALM
CMPA ##3F
BLS Z6280
LDX #PUFFU
LDB ##20
Z6278 LDA ,X
ASRA
STA ,X+
DECB

```

E190

Vorher: 80 Byte Welle in Puffer,
dann FFT

BNE Z6278
Z6280 LDA ##3F
STA PUFA E1B0
LDA #1
STA FUNDAM
STA PUFB E1B1
RTS

* *****

* *****

* ANALYSE

* ***** Z72E2

INPAT LDY #PUFFA E500 Analyse Teilton - Data

LDA #01
NEXTW PSHS A
STA FAKTOR
CLR PHI
BSR MAINL
STD #50,Y
PSHS A
LDA #32
STA PHI
BSR MAINL
STD #0090,Y
TSTA
BPL NONE1
NEGA
NONE1 TFR A,B
TSTA
MUL
PSHS B,A
LDA #02,S
BPL NONE2
NEGA
NONE2 TFR A,B
TSTA
MUL
ADDD ,S++
JSR SUBLOP
STA ,Y+
CLR ,Y+
LEAS #01,S
PULS A
INCA
CMPA ##21
BNE NEXTW
CLR FAKTOR
BSR MAINL
STA ,Y+
RTS

* *****

* MAINLOOP

* *****

MAINL LDD #32

STD REMA1
STA INTEG
LDX #STACKA
LDU #TABLE
SUBLU TFR X,D

SUBD ##E8B0 STACK ADRESSE

LDA FAKTOR
MUL
ADDB PHI
ANDB ##7F
LDA B,U

originale Kette Aufhang

LDB ,X
SUBB ##80
LEAS -#01,S
FSHS B,A
EORA #01,S
STA #02,S
PULS B,A
TSTA
BPL NONE3
NEGA
NONE3 TSTB
BPL NONE4
NEGB
NONE4 MUL
CMPD ##0000
BEQ FASTF
TST ,S+
BMI NEGAR
ADDD REMA1
STD REMA1
LDB ##00
ADCB INTEG
STB INTEG
BRA GOONF

POSITIV BERECH

NEGAR FSHS B,A NEGATIV BERECH

LDD REMA1

SUBD ,S++

STD REMA1

LDB INTEG

SBCB ##00

STB INTEG

GOONF CMPX #STACKE

original Wellenspieler Ende

BEQ WEITER

LEAX #01,X

BRA SUBLU

FASTF LEAS #01,S

BRA GOONF

WEITER LDD INTEG

ASL REMA2

ROLB

ROLA

ASL REMA2

ROLB

ROLA

ASL INTEG

ROLB

ROLA

FSHS A

LDA INTEG

BITA ##80

PULS A

BEQ FERTG

COMA

COMB

ADDD ##0001

FERTG RTS

* *****
* SUBLOP
* *****

SUBLOP CMPD ##0000

BEQ FERTG

FSHS B,A

LDA #40

PSHS A
LDA #B0
NOCHMA PSHS A
TFR A,B
TSTA
MUL
CMPD #02,S
BEQ WEITR3
BCS WEITR1
PULS A
SUBA ,S
BRA WEITR2

WEITR1 PULS A
ADDA ,S
WEITR2 LSR ,S
BNE NOCHMA
PSHS A
WEITR3 LDA ,S
LDB ,S
MUL
CMPD #02,S
BLS ZURUE
PULS A
DECA
PSHS A
ZURUE PULS A
LEAS #03,S
RTS

* *****
ORG \$E800
* *****

TABLE FCB #03,#09,#10,#16,#1C,#22,#28,#2E
FCB #33,#39,#3F,#44,#49,#4E,#53,#58
FCB #5C,#60,#64,#68,#6B,#6F,#71,#74
FCB #76,#79,#7A,#7C,#7D,#7E,#7F,#7F
FCB #7F,#7F,#7E,#7D,#7C,#7A,#79,#76
FCB #74,#71,#6F,#6B,#68,#64,#60,#5C
FCB #58,#53,#4E,#49,#44,#3F,#39,#33
FCB #2E,#28,#22,#1C,#16,#10,#09,#03
FCB #FD,#F7,#F0,#EA,#E4,#DE,#D8,#D2
FCB #CD,#C7,#C1,#BC,#B7,#B2,#AD,#AB
FCB #A4,#A0,#9C,#98,#95,#91,#8F,#8C
FCB #8A,#87,#86,#84,#83,#82,#81,#81
FCB #81,#81,#82,#83,#84,#86,#87,#8A
FCB #8C,#8F,#91,#95,#98,#9C,#A0,#A4
FCB #AB,#AD,#B2,#B7,#BC,#C1,#C7,#CD
FCB #D2,#D8,#DE,#E4,#EA,#F0,#F7,#FD

* *****
ORG \$E880
* *****

STACKA RMB #7F
STACKE EQU \$E8FF RMB #1

* *****
ORG \$E900
* *****

PUFFA FCB #00,#00,#00,#00,#00,#00,#00,#00
FCB #00,#00,#00,#00,#00,#00,#00,#00
FCB #00,#00,#00,#00,#00,#00,#00,#00
FCB #00,#00,#00,#00,#00,#00,#00,#00
FCB #00,#00,#00,#00,#00,#00,#00,#00
FCB #00,#00,#00,#00,#00,#00,#00,#00

Pinus Table

Original Welten Zweiche Speicher

T e i l t o n

[illegible]

```

*  * * * * *
ORG $EAOO
*  * * * * *

```

E500 PUFFA

E900

E420 STACKA

E880

E49F STACKE

E8FF

4040 TABLE

E900

E110 PAFFU

E190 PUFFU



Clear his

E1B0 PUFA 3F

E1B1 PUF3 1

(E010 PAFA

E090 PAFE

) wird Cleared
(auf SP0)

(EA5) REMA1
EA5E REMA2)

D Byte

4040 →

X write
+SP0
nach
E190

80 Byte

0000 0000 0000 0000

SYMBOL TABLE:

2				
3	E000		ORG	#E000
4				
5	E000	FAKTOR	RMB	1
6	E001	PHI	RMB	1
7	E002	INTEG	RMB	1
8	E003	ZEASD	RMB	1
9		ZEAS5E	"	7

Double Byte

← 512 (2 Byte)

REMA 7
REMA 2

10				
11	E420		ORG	#E420
12				
13				

14	E420	ZE420	RMB	80	
15					
16					
17	E440		ORG	#E440	
18					
19					
20	E440	ZE440	RMB	80	
21					
22					
23		E49F	ZE49F	EQU	#E49F

Orig. Wallen Puffer

Enke Orig Wallen Speaker

24				
25	E500		ORG	#E500
26				
27				

28	E500	ZE500	RMB	#100
29				
30				
31				
32				
33				
34				
35	E100		ORG	#E100
36				
37				
38				
39				
40				

Analyse Data Tailtone

Table Sirius

INTRO

41	E100	10BE	E500	Z72E2	LDY	#ZE500
42	E104	B6	01		LDA	#01
43	E106	34	02	Z72E8	PSHS	A
44	E108	B7	E000		STA	>FAKTOR
45	E10B	7F	E001		CLR	>PHI
46						
47	E10E	8D	3D		BSR	Z732F
48						
49	E110	ED	AB 50		STD	#50,Y
50	E113	34	02		PSHS	A
51	E115	B6	20		LDA	#020
52	E117	B7	E001		STA	>PHI
53						
54	E11A	8D	31		BSR	Z732F
55						
56	E11C	ED	A9 0090		STD	#0090,Y
57	E120	4D			TSTA	
58						
59	E121	2A	01		BPL	Z7306
60						
61	E123	40			NEGA	
62	E124	1F	B9		TFR	A,B
63	E126	4D			TSTA	
64	E127	3D			MUL	
65	E128	34	06		PSHS	B,A
66	E12A	A6	62		LDA	#02,S
67						
68	E12C	2A	01		BPL	Z7311
69						
70	E12E	40			NEGA	
71	E12F	1F	B9		TFR	A,B

72	E131 4D	87	TSTA	H, S
73	E132 3D		MUL	
74	E133 E3	E1	ADDD	, S++
75			*****	
76	E135 BD	E1DF	JSR	>Z73CD
77			*****	
78	E138 A7	A0	STA	, Y+
79	E13A 6F	A0	CLR	, Y+
80	E13C 32	61	LEAS	\$01, S
81	E13E 35	02	PULS	A
82	E140 4C		INCA	
83	E141 81	21	CMFA	##21
84			*****	
85	E143 26	C1	BNE	Z72EB
86			*****	
87	E145 7F	E000	CLR	>FAKTOR
88			*****	
89	E148 BD	03	BSR	Z732F
90			*****	
91	E14A A7	A0	STA	, Y+
92	E14C 39		RTS	
93				
94	E14D CC	0020	Z732F LDD	##0020 32 dec
95	E150 FD	E003	STD	>ZEASD
96	E153 B7	E002	STA	>INTEG (cer)
97	E156 8E	E420	LDX	##ZE420
98	E159 CE	4040	LDU	##Z4040
99				
100	E15C 1F	10	Z733E TFR	X, D
101	E15E 83	E420	SUBD	##E420
102	E161 B6	E000	LDA	>FAKTOR
103	E164 3D		MUL	
104	E165 FB	E001	ADDB	>PHI
105	E168 C4	7F	ANDB	##7F
106	E16A A6	C5	LDA	B, U
107	E16C E6	84	LDB	, X
108	E16E C0	80	SUBB	##80
109	E170 32	7F	LEAS	-\$01, S
110	E172 34	06	PSHS	B, A
111	E174 A8	61	EDRA	\$01, S
112	E176 A7	62	STA	\$02, S
113	E178 35	06	PULS	B, A
114	E17A 4D		TSTA	
115			*****	
116	E17B 2A	01	BPL	Z7360
117			*****	
118	E17D 40		NEGA	
119				
120	E17E 5D		Z7360 TSTB	
121			*****	
122	E17F 2A	01	BPL	Z7364
123			*****	
124	E181 50		NEGB	
125				
126	E182 3D		Z7364 MUL	
127	E183 1083	0000	CMFD	##0000
128			*****	
129	E187 27	2F	BEQ	Z739A
130			*****	
131	E189 6D	E0	TST	, S+
132			*****	
133	E18B 2B	10	BMI	Z737F
134			*****	
135	E18D F3	E003	ADDD	>ZEASD
136	E190 FD	E003	STD	>ZEASD
137	E193 C6	00	LDB	##00
138	E195 F9	E002	ADCB	>INTEG
139	E198 F7	E002	STB	>INTEG
140	E19B 20	12	BRA	Z7391

140	E19B 20	12		BRA	Z7391
141					
142	E19D 34	06	→ Z737E	PSHS	B,A
143	E19F FC	E003		LDD	>ZEASD
144	E1A2 A3	E1		SUBD	,S++
145	E1A4 FD	E003		STD	>ZEASD
146	E1A7 F6	E002		LDB	>INTEB
147	E1AA C2	00		SBCB	##00
148	E1AC F7	E002		STB	>INTEB
149					
150	E1AF 8C	E49F	→ Z7391	CMPX	#ZE49F
151			*****		
152	E1B2 27	08		BEQ	Z739E
153			*****		
154	E1B4 30	01		LEAX	#01,X
155	E1B6 20	A4		BRA	Z733E
156					
157	E1B8 32	61	→ Z739A	LEAS	#01,S
158	E1BA 20	F3		BRA	Z7391

159					
160	E1BC FC	E002	→ Z739E	LDD	>INTEB
161	E1BF 78	EASE		ASL	>ZEASE
162	E1C2 59			ROLB	
163	E1C3 49			ROLA	
164	E1C4 78	EA5E		ASL	>ZEASE
165	E1C7 59			ROLB	
166	E1C8 49			ROLA	
167	E1C9 78	E002		ASL	>INTEB
168	E1CC 59			ROLB	
169	E1CD 49			ROLA	
170	E1CE 34	02		PSHS	A
171	E1D0 B6	E002		LDA	>INTEB
172	E1D3 85	80		BITA	##80
173	E1D5 35	02		PULS	A
174			*****		
175	E1D7 27	05		BEQ	Z73C0
176			*****		
177	E1D9 43			COMA	
178	E1DA 53			COMB	
179	E1DB C3	0001		ADD	##0001
180	E1DE 39		→ Z73C0	RTS	
181					

END

182					
183	E1DF 10B3	0000	Z73CD	CMPD	##0000
184			*****		
185	E1E3 27	38		BEQ	Z740B
186			*****		
187	E1E5 34	06		PSHS	B,A
188	E1E7 86	40		LDA	##40
189	E1E9 34	02		PSHS	A
190	E1EB 86	80		LDA	##80
191					
192	E1ED 34	02	→ Z73DB	PSHS	A
193	E1EF 1F	89		TFR	A,B
194	E1F1 4D			TSTA	
195	E1F2 3D			MUL	
196	E1F3 10A3	62		CMPD	#02,S
197			*****		
198	E1F6 27	12		BEQ	Z73FB
199	E1F8 25	06		BCS	Z73EE
200			*****		
201	E1FA 35	02		PULS	A
202	E1FC A0	E4		SUBA	,S
203	E1FE 20	04		BRA	Z73F2
204					
205	E200 35	02	→ Z73EE	PULS	A
206	E202 AB	E4		ADDA	,S
207	E204 64	E4	→ Z73F2	LSR	,S
208			*****		
209	E206 26	E5		BNE	Z73DB

RTS

```

209 E206 26 E5 ***** BNE Z73DB
210 *****
211 E208 34 02 PSHS A
212 E20A A6 E4 LDA ,S
213 E20C E6 E4 LDB ,S
214 E20E 3D MUL
215 E20F 10A3 62 CMFD #02,S
216 *****
217 E212 23 05 BLS Z7407
218 *****
219 E214 35 02 PULS A
220 E216 4A DECA
221 E217 34 02 PSHS A
222
223 E219 35 02 Z7407 PULS A
224 E21B 32 63 LEAS #03,S
225 E21D 39 Z740B RTS
226
227 END

```

0 ERROR(S) DETECTED

SYMBOL TABLE:

FAKTOR	E000	INTEG	E002	PHI	E001	Z4040	4040	Z72E2	E100
Z72E8	E106	Z7306	E124	Z7311	E12F	Z732F	E14D	Z733E	E15C
Z7360	E17E	Z7364	E182	Z737F	E19D	Z7391	E1AF	Z739A	E1B8
Z739E	E18C	Z73C0	E1DE	Z73CD	E1DF	Z73DB	E1ED	Z73EE	E200
Z73F2	E204	Z73FB	E20A	Z7407	E219	Z740B	E21D	ZE420	E420
ZE440	E440	ZE49F	E49F	ZE500	E500	ZE5D	E003	ZE5E	EA5E

TAB

2-17-85 TSC ASSEMBLER PAGE 1

34	E9CB 00 35 00 00	FCB	\$00,\$35,\$00,\$00,\$00,\$4B,\$00,\$27
	E9CC 00 4B 00 27		
35	E9D0 00 00 00 00	FCB	\$00,\$00,\$00,\$00,\$00,\$00,\$00,\$00
	E9D4 00 00 00 00		
36	E9D8 00 00 00 00	FCB	\$00,\$00,\$00,\$00,\$00,\$00,\$00,\$00
	E9DC 00 00 00 00		
37	E9E0 00 00 00 00	FCB	\$00,\$00,\$00,\$00,\$00,\$00,\$00,\$00
	E9E4 00 00 00 00		
38	E9E8 00 00 00 00	FCB	\$00,\$00,\$00,\$00,\$00,\$00,\$00,\$00
	E9EC 00 00 00 00		
39	E9F0 00 00 00 00	FCB	\$00,\$00,\$00,\$00,\$00,\$00,\$00,\$00
	E9F4 00 00 00 00		
40	E9F8 00 00 00 00	FCB	\$00,\$00,\$00,\$00,\$00,\$00,\$00,\$00
	E9FC 00 00 00 00		
41			
42		END	

O ERROR(S) DETECTED