

FRONTEND 4046 FM5

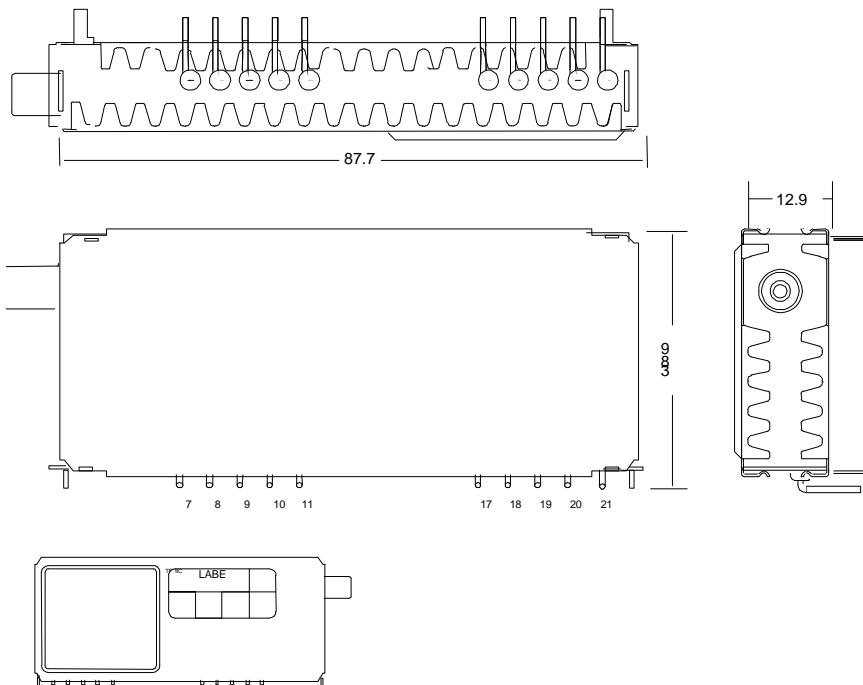
3X 7805; 3X 7804; 3X7806
3X 8103; 3X8104

TARGET - SPECIFICATION ELECTRICAL DATA

1. Description:

The frontend 4046 FM5 is specially designed for multimedia applications. Reception standards are B/G, I, D/K and L, L`resp.. The frontend includes a hyperband tuner which covers the frequency range from 45 to 856 MHz and an IF-part with SAW-filter, IF-amplifier, video and sound demodulator. The CVBS signal is via a video buffer available at the video output terminal (suitable for 75 Ω load), the audio signal (mono) at the audio output terminal. Also a 2nd IF output is provided, which allows external sound demodulation for stereo and NICAM reception. The reception frequency range is divided in VHF low, VHF high and UHF. Bandselection and tuning is done via I²C-bus, completely. Also a digital AFC-function can be realized, because the AFC-voltage, generated by the IF-demodulator is fed to an analog/digital converter which is included in the PLL-IC and readable via I²C-bus. A DC/DC converter is built in. Therefore supply voltage is 5 V only.

2. Mechanical Characteristics:



PIN	
4	
5	
6	
7	NOT USED
8	SUPPLY VOLTAGE VS1 FOR TUNER 5V
9	IIC BUS SIGNAL SCL
10	IIC BUS SIGNAL SDA
11	ADDRESS SELECTION FOR IIC BUS
12	
13	
14	
15	
16	
17	NOT USED
18	2nd IF
19	VIDEO OUTPUT CVBS
20	SUPPLY VOLTAGE VS1 FOR IF PART 5V
21	AF1 SOUND OUTPUT

2.1. Dimensions:

horizontal:

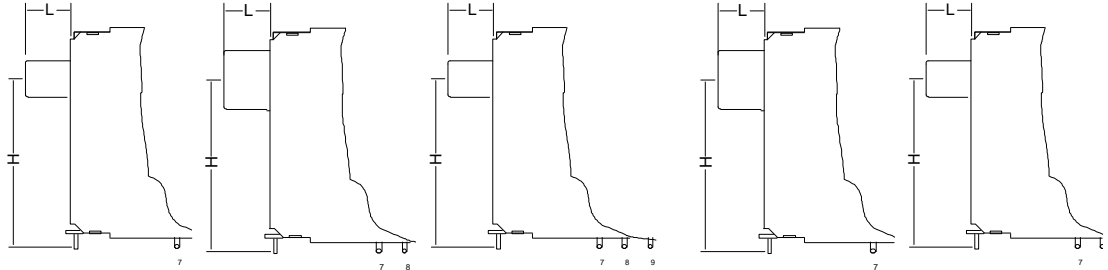
according drawing 3X 7805GZ

2.2. Weight: ca. 58 g

vertical:

according drawing 3X 8103GZ

2.3. Types



Tunertype	3X 7805	3X 7806	3X 7804	3X 8103 vertical	3X 8104 vertical
Sockettype	MINI PHONO	IEC	Phono	IEC	Phono
Socketlength	8.5 mm	14.0 mm	9.9 mm	14.0 mm	9.9 mm
Height	29.1 mm	29.1 mm	29.1 mm	30.0 mm	30.0 mm

3. Working Data:

3.1. Reception Standards:

B/G, I, D/K, L, L'

3.2. Frequency Range:

VHF low	ch A ...	S 10	45.75 MHz ... 168.25 MHz
VHF high	ch E 5 ...	S 39	175.25 MHz ... 447.25 MHz
UHF	ch S 40 ...	E 69	455.25 MHz ... 855.25 MHz

Margin:

VHF low	ch A...	S 10	+1 MHz / -0.5 MHz
VHF high	ch E 5 ...	S 39	+5 MHz / -7 MHz
UHF	ch S 40...	E 69	+3 MHz / -2 MHz

Recommended take over frequencies:

VHF low / VHF high	169 MHz
VHF high / UHF	454 MHz
Frequency referred to picture carrier.	

IF:

	B, G	I	L	L'	D/K
picture carrier	38.9	38.9	38.9	33.95	38.9
sound carrier 1	33.4	32.9	32.4	40.45	32.4
sound carrier 2	33.16				
NICAM sound carrier	33.05	32.348	33.05		33.05

all frequencies in MHz

Oscillator operates above received frequency.

3.3. Supply voltage:

Supply voltage V_{S1} 5 V +/- 5% max. 250 mA

3.4. Input impedance:

VHF/UHF common 75 Ω , unbalanced

3.5. Temperature:

Operating temperature: 0 ... 60 °C
Storage temperature: -25 ... 85 °C

4. Test conditions:

If not otherwise noticed all data are hold under following conditions:

Measurement tolerance: 10 % or 1 dB
Ambient temperature: 25 °C +/- 3°
Supply voltages: V_{S1} +/- 5%

5. Tuner Data:

	min.	typ.	max.	unit
5.1. VSWR:				
VHF low			4.0	
VHF high			4.0	
UHF			4.0	
Referred to channel center frequency.				

	min.	typ.	max.	unit
5.2. AGC-Range:				
VHF low	50			dB
VHF high	45			dB
UHF	40			dB

5.3. IF-Rejection:

VHF low	50			dB
VHF high	60			dB
UHF	60			dB

5.4. Image-Rejection:

ch A ... ch S 20	65	dB
ch S 21... ch S 39	60	dB
ch S40 ... ch E 60	50	dB

6. Output parameter:

6.1. Video output:

Output signal type: CVBS

Conditions:	Testsignal	min.	typ.	max.	unit
Ant. input level 66 dB μ V					
10% residual carrier (Standard B/G)					
12.5% residual carrier (Standard D/K)					
3% residual carrier (standard L/L')					
20% residual carrier (Standard I)					
CVBS - Output level (Standard B/G, D/K, L/L') :			1		V (p-p)
(Standard I) :			0.9		V (p-p)
Sync bottom dc level:			1.35		V
Load impedance			75		Ω
Load capacitance				20	pF
Video S/N (unweighted):					
Black with burst; 70dB μ V input level					
VHF		45			dB
UHF		45			dB
Frequency response:	(sin x)/x				
Ref.: 0.2 MHz					
1 MHz		-1.0		2.5	dB
2 MHz		-1.5		3.5	dB
3 MHz		-2.0		4.0	dB
4 MHz		-2.5		4.5	dB
4.43 MHz		-3.0		4.5	dB
4.8 MHz			-5		dB
Differential gain	Modulated 5 step staircase			5	% (p-p)
Differential phase	Modulated 5 step staircase			5	$^{\circ}$ (p-p)

Values referred to Standard B/G if not otherwise mentioned.

6.2. Sound output:

Conditions:	Testsignal	min.	typ.	max.	unit
Ant.input level: 66 dB μ V Video signal: color bar					

6.2.1 FM Sound

PC / SC : 13dB (PAL B/G)	1kHz, 27 kHz deviation, 50 μ s preemphasis
PC / SC : 7dB (PAL I)	
PC / SC : 10dB (PAL D/K) Deemphasis built in	

AF Output level: DC		2.4		V
Load impedance:	1.5			k Ω
AF- level :		500		mV rms
THD :		0.2	0.5	%
S/N (CCIR weighted) :		45		dB
Frequency response: (6 kHz deviation) 40 Hz ... 15 kHz	-1		1	dB

6.2.2 AM Sound

PC / SC : 10dB (Secam L/L')	1kHz, 54% modulation
-----------------------------	----------------------

AFOutput level: DC		2.4		V
AC		500		mV rms
THD :		0.5	1.0	%
S/N (CCIR weighted) :		45		dB

6.3. 2nd IF output

Pal B/G, D/K, I: PC/SC: 13dB, 10dB, 7dB; SC2 off
Standard L: without modulation

AC level of 5.5, 6.0, 6.5 MHz:	275	400	525	mV (p-p)
--------------------------------	-----	-----	-----	----------

Pal B/G, D/K: PC/SC1: 13dB; PC/SC2: 20dB AC level of 5.74 MHz, 6.26MHz: (p-p)			180	mV
---	--	--	-----	----

Load impedance	0.5			k Ω
----------------	-----	--	--	------------

7. I²C bus

7.1 Write data format

	MSB							LSB	
Address byte	1	1	0	0	0	MA1	MA0	R/W	A
Divider byte 1	0	n14	n13	n12	n11	n10	n9	n8	A
Divider byte 2	n7	n6	n5	n4	n3	n2	n1	n0	A
Control byte 1	1	CP	T2	T1	T0	RSA	RSB	OS	A
Control byte 2	P7	P6	P5	P4	P3	P2	P1	P0	A

A : Acknowledge

R/W : Read / Write mode 0 : Write mode

7.1.1 Address selection

MA1	MA0	Address	Voltage at Pin 11
0	0	C0	(0 to 0.1) * V _{S1}
0	1	C2	open or (0.2 to 0.3) * V _{S1}
1	0	C4	(0.4 to 0.6) * V _{S1}
1	1	C6	(0.9 to 1) * V _{S1}

7.1.2 Oscillator frequency and divider byte calculation:

RSA	RSB	Reference divider	Min. tuning step [kHz]	f _{ref} [kHz]
1	1	512	62.5	7.8125
X	0	640	50.0	6.25
0	1	1024	31.25	3.90625

$$f_{osc} = f_w + 38.9 \text{ MHz (33.95MHz in case of L')}$$

f_{osc} : Local oscillator frequency

f_w : wanted frequency

$$f_{osc} = f_{ref} * 8 * \mathbf{SF}$$

f_{ref} Crystal reference frequency / 512 = 7.8125 kHz (RSA = 1, RSB = 1)

SF : Programmable scaling factor

$$\mathbf{SF} = 16384 * n_{14} + 8192 * n_{13} + 4096 * n_{12} + 2048 * n_{11} + 1024 * n_{10} + 512 * n_9 + 256 * n_8 + 128 * n_7 + 64 * n_6 + 32 * n_5 + 16 * n_4 + 8 * n_3 + 4 * n_2 + 2 * n_1 + n_0$$

7.1.3 Control byte settings

Control byte 1 :

CP	: Charge pump	1	: fastest tuning
T2	: Test mode bit	0	: normal mode
T1	: Test mode bit	0	: normal mode
T0	: Test mode bit	1	: normal mode
RSA	: Reference divider		: according 7.1.2
RSB	: Reference divider		: according 7.1.2
OS	: PLL disabling	0	: normal mode

7.1.4 Control byte 2 (Bandselection) :

Band	P7	P6	P5	P4	P3	P2	P1	P0
VHF low	1	0	1	0				
VHF high	1	0	0	1				
UHF	0	0	1	1				

P3, P2, P1 and P0 are used for standard switching

7.1.5 Standard switching

Standard	P3	P2	P1	P0
B/G	1	1	0	1
D/K	1	0	0	1
I	0	1	0	1
L	1	0	1	1
L'	1	0	1	0

7.2. Read data format

	MSB						LSB		
Address byte	1	1	0	0	0	MA1	MA0	R/W	A
Status byte	POR	FL	I2	I1	I0	A2	A1	A0	A

R/W	:	Read / Write mode		1	: Read mode
POR	:	Power on reset flag		1	: at power on
FL	:	In lock flag		1	: PLL is locked
I2, I1, I0	:	Digital levels for I/O ports P7, P5 and P4			
A2, A1, A0	:	Digital output of 5-level ADC for AFC function			
	:	Value for correct tuning:		A2 = 0, A1 = 1, A0 = 0	

8. ESD Protection



The tuner contains components that can be damaged by static discharge.

Observe these precautions:

Ground yourself before handling the tuner.

Do not touch the tuner connector pins without ESD protection.

We reserve the right to make changes to improve technical design without further notice

TEMIC TELEFUNKEN Hochfrequenztechnik GmbH, Kriegsstr. 1 D-85098 Großmehring GERMANY

Phone: +49 (0)8407 9270 – 20

Fax: +49 (0)8407 9270 – 24

	J. Kreil					
DATE	31.01.2000					
REV.:	01					
FÄM.- NO.	008/2000					
DATE	31.1.2000					
NAME	Kreil					
SIGNATURE						