

FRONTEND 4032FY5

3X 9499

3X 7004, 3X 9498, 3X 9789*

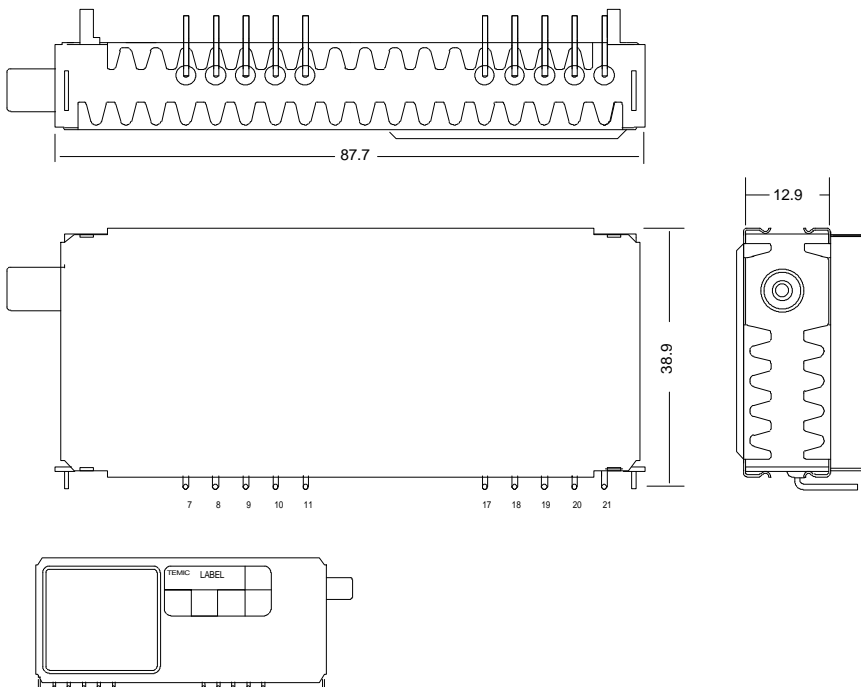
SPECIFICATION ELECTRICAL DATA

1. Description:

The frontend 4032 FY5 is specially designed for multimedia applications. Reception standard is NTSC M/N. The frontend includes a hyperband tuner which covers the frequency range from 54 to 805 MHz and an IF-part with SAW-filter, IF-amplifier, video and sound demodulator. So the CVBS signal is available at the video output terminal, the AF signal at the audio output terminal.

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 feed to an analogue/digital converter which is built in PLL-IC and readable via I²C-bus.



PIN	
4	
5	
6	
7	SUPPLY VOLTAGE VS2 33V
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 CONNECTED
18	2nd IF
19	VIDEO OUTPUT CVBS
20	SUPPLY VOLTAGE VS1 FOR IF PART 5V
21	AF SOUND OUTPUT

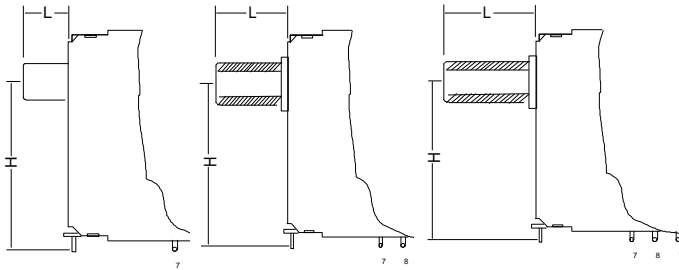
2. Mechanical Characteristics:

2.1. Dimensions:

according drawing 3X 9499GZ

2.2. Weight: ca. 51 g

2.3. Types



Tunertyp	3X 9499 3X 9789*	3X 7004	3X 9498
Sockettyp	MINI PHONO	F-CONNECTOR	F-CONNECTOR
Socketlength	8.5 mm	18.0 mm	21.5 mm
High	29.1 mm	29.1 mm	29.1 mm

*special customer type

3. Working Data:

3.1. Reception Standard:

NTSC M/N

3.2. Frequency Range:

VHF low	ch 02 ... G	54 MHz ...	157.25 MHz
VHF high	ch H ... W+28	162 MHz ...	463.25 MHz
UHF	ch W+29 ... 69	468 MHz ...	801.25 MHz

Margin:

VHF low	ch 02 ... G	+1MHz/-3MHz
VHF high	ch H ... W+28	+1MHz/-5MHz
UHF	ch W+29 ... 69	+3MHz/-6MHz

Recommended take over frequencies:

VHF low / VHF high	158MHz
VHF high/ UHF	464MHz

Frequency referred to picture carrier.

IF:

picture carrier:	45.75 MHz
sound carrier:	41.25 MHz

Oscillator operates above received frequency.

3.3. Supply voltage:

Supply voltage V_{S1}	5 V +/- 5%	max. 190 mA
Supply voltage V_{S2}	33V +/- 5%	max. 1.7 mA

3.4. Input impedance:

VHF/UHF common	75 Ω , unbalanced
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3.5. Temperature:

Operating temperature:	0 ...60 °C
Storage temperature:	-25 ...60 °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}, V_{S2} +/- 5%

5. Tuner Data:

(Except : FM - frequency range 88 --- 105 MHz).

5.1. Voltage Gain:

Voltage gain is measured between antenna input and IF1-Mp and IF2-Mp.
For this measurement the input is loaded with 75 Ω , the output is loaded with a test circuit according diagram.

	min.	typ.	max.	unit
ch 02 ... ch 69	40		50	dB

5.2. Noise Figure:

VHF low			7.0	dB
VHF high			8.0	dB
UHF			10.0	dB

5.3. VSWR:

VHF low			4.0
VHF high			4.0
UHF			4.0

Referred to channel center frequency.

5.4. AGC-Range:

	min.	typ.	max.	unit
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VHF low	45	dB
VHF high	40	dB
UHF	35	dB

5.5. IF-Rejection:

VHF low	50	dB
VHF high	60	dB
UHF	60	dB

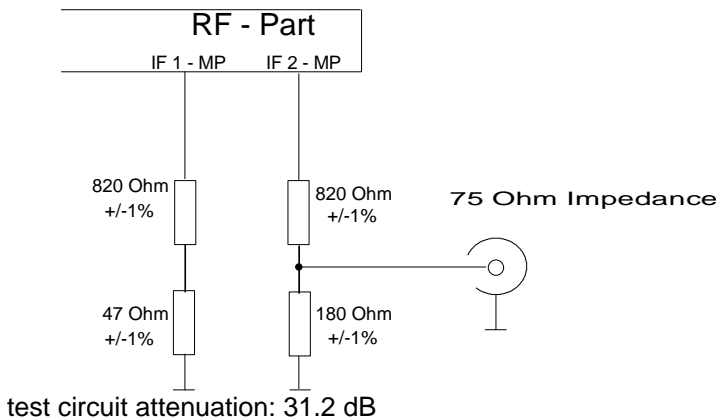
5.6. Image-Rejection:

VHF low		60	dB
VHF high	ch H ch 13	60	dB
VHF high	ch J ch W+28	50	dB
UHF		50	dB

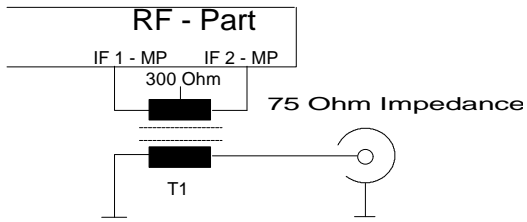
5.7. RF Tilt:

The amplitude difference between top of frequency response curve and any frequency between picture and sound carrier will not exceed 3 dB at nominal gain (except ch H ... ch 13 : 4 dB).

5.8. Test circuit for voltage gain:



5.9. Test circuit for noise figure:



6. Output parameter:

6.1. Video output:

Output signal type: CVBS

Conditions:	Testsignal	min.	typ.	max.	unit
Ant. input level 66 dB μ V 12.5% residual carrier					
CVBS - Output level:		1.7	2	2.3	Vpp
Sync bottom dc level:			1.35		V
Load impedance		1			k Ω
Load capacitance				20	pF
Video S/N (unweighted):					
	Flat Field (0 IRE)				
VHF		46			dB
UHF		45			dB
Frequency response:	(sin x)/x				
Ref.: 0.2 MHz					
1 MHz		-1.5		1.5	dB
2 MHz		-2		2	dB
3 MHz		-4		2	dB
3.58 MHz		-8		-1	dB
Differential gain	NTC 7 Composite			5	%pp
Differential phase	NTC 7 Composite			5	$^{\circ}$ pp
K - factor 2T	NTC 7 Composite			2.5	%

6.2. Sound output:

Conditions:	Testsignal	min.	typ.	max.	unit
Ant.input level 66 dB μ V Video signal: color bar	1kHz, 25 kHz deviation 75 μ s preemphasis				
Output level:	DC	AC	2.0	1.3	Vpp V
Load impedance:		2.2			k Ω
Measurements with 75 μ s deemphasis:					
AF - level :			200	250	300 Vrms
THD+N:				0.5	%
S/N:			51		dB
Frequency response: (6 kHz deviation)					
40 Hz ... 15 kHz		-1		1	dB

6.3. 2nd IF output

AC level of 4.5 MHz:	50	120	mVpp
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 = 0 : Write mode

CP = 1 : charge pump current high

7.1.1 Address selection

MA1	MA0	Address	Voltage at Pin 11
0	0	C0	(0 to 0.1) * V _{S1}
0	1	C2	always valid
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

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

f_{osc} : Local oscillator frequency

f_{ref} : Crystal reference frequency / 512 = 4 MHz / 512 = 7.8125 kHz

SF : Programmable scaling factor

Scaling factor

$$SF = 16348 * n_{14} + 8192 * n_{13} + 4096 * n_{12} + 2048 * n_{11} + 1024 * n_{10} + 512 * n_9 + 256 * n_8 + 128 * n_7 + 64 * n_6 + 32 * n_5 + 16 * n_4 + 8 * n_3 + 4 * n_2 + 2 * n_1 + n_0$$

7.1.3. Control byte 1 settings (default)

	MSB							LSB	
Control byte 1	1	1	0	0	1	1	1	0	A

7.1.4 Control byte 2 (Bandselection)

Band	Active port	P7	P6	P5	P4	P3	P2	P1	P0
UHF	P0	X	0	X	X	0	0	0	1
VHF high	P2	X	0	X	X	0	1	0	0
VHF low	P1	X	0	X	X	0	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 : 1 = Read mode
 POR : Power on reset flag (POR =1 at power on)
 FL : In lock flag (FL= 1 when PLL is locked)
 I2, I1, I0: not used
 A2, A1, A0: Internally used for AFC function
 Value for correct tuning: A2 = 0, A1= 1, A0 = 0

Note: Short circuit at pin 18,19 or 21 can damage internal circuits.

NAME	Reiß					
DATE	25.09.95					
REV.:	01	02				
FÄM.- NO.	208/95	461/95				
DATE	03.05.95	25.09.95				
NAME	Reiß	Reiß				
SIGNATURE						