Transposeur agile 626 36710
5.74 626 36740
FT 626 25710

Contents :

1. INTRODUCTION

SF1200 satellite frontends are designed to cover all frequencies in the range of 950 MHz* to 2050 MHz suitable for D/D2MAC DBS, PAL/SECAM FSS and optionally DSR (digital satellite radio) signals.

They are equipped with an I²C-bus for digital programmable phase locked loop frequency synthesis with crystal accuracy.
All SF1216/W types have switchable IF-bandwidth (via I²C-bus), 18/27,32/27 or 36/27 MHz, whereas SF1216 has single IF-Bw of 27 MHz.

All SF1216 types have integrated AFC interface (with keying) for digital AFC readout via I²C-bus. SF1216/A also includes a carrier detect function.

Type	12NC	Aerial Socket(s)	Car. det.	IF-Bw (MHz)	Mounting
SF1216F	311229710981	F-Connector female	no	27	vertical
SF1216D/FW1827	311229711381	2x F-Connector female	no	18/27	vertical
SF1216D/FW2732	311229711371	2x F-Connector female	no	27/32	vertical
SF1216D/W2736 AHM	311229711001	IEC female and male	yes	27/36	horizontal

The intermediate frequency is 479.5 MHz.
The IF part is equipped with a PLL FM demodulator IC and has the following output signals :

- Baseband (without de-emphasis).
- AGC out

All SF1200 types fulfil Amtsblatt No. 15/92 Vfg 115/1992, if properly applied, see chapter 10.4.

*tuning margin at 950 MHz: 40 MHz min

2. PRODUCT DESCRIPTION

SF1200 satellite frontends have an IEC or F-type aerial inputs with the possibility to supply a LNC via the inner conductor.

The D-versions are equipped with a second IEC (male) or F-Type aerial input. Separate LNC current supply is also possible via extra pin. Selecting the wanted antenna input is done by PLL Port P7.

The tuner is fitted with a pindiode switch at the input for selecting the wanted aerial input by means of I^2C-bus, followed by a broadband matching network which leads to the bipolar RF amplifier stage. The RF stage feeds the two-stage bandpass filter.

The selected signal is fed to a bipolar mixer driven by a negative resistance oscillator.
The converted signal is transferred to the first IF - filter.

Further IF amplification is made by a gain controlled stage with a Dual Gate Mosfet.

SF1216/W 18/27 MHz types can be switched between 18 MHz and 27 MHz bandwith especially for ASTRA reception under noisy conditions.

The IF-bandwith of all the other SF1216/W types can be chosen between 27 MHz and 32 (or 36) MHz for large-deviation signals.

The channel selectivity is realized by a dual-or single bandwidth SAW - Filter. Selecting the wanted IF bandwith is done by PLL - Port PO.

The IF-IC incorporates the PLL demodulator, the AGC interface, keyed AFC-function and a video amplifier. Optionally a carrier detect is applied.

The control of the unit is ensured via I^2C bus by a PLL synthesizer tuning IC located in the tuner section.

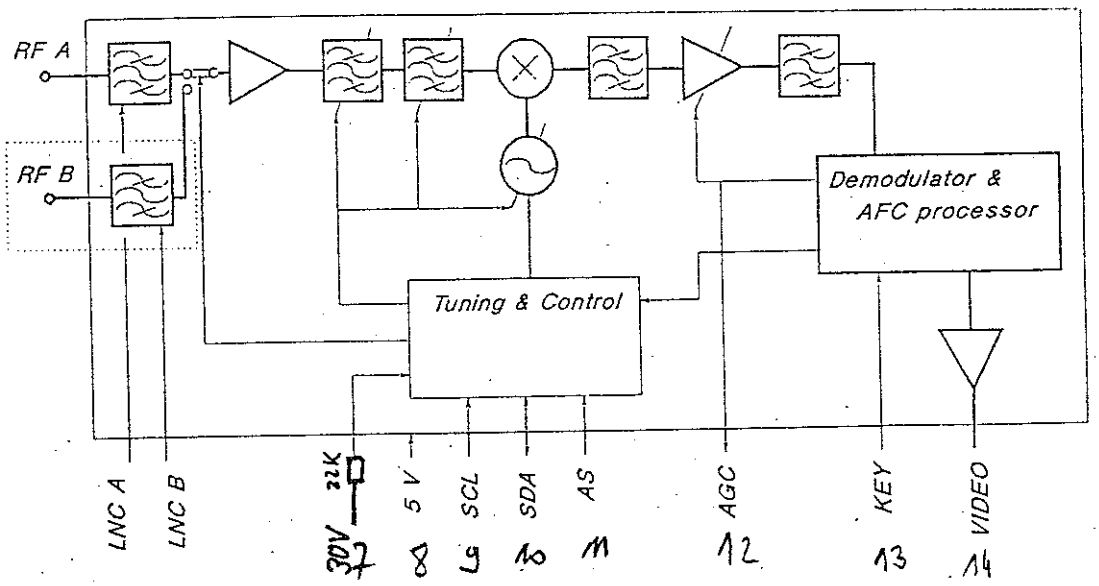
The internal AFC circuit is suitable for both PAL and D2 MAC. In PAL the AFC works continuously. In MAC-mode, the AFC can be keyed by external keypulses for operation only during databurst. AFC-readout is possible via I^2C bus.

3. SEMICONDUCTORS AND KEY-COMPONENTS

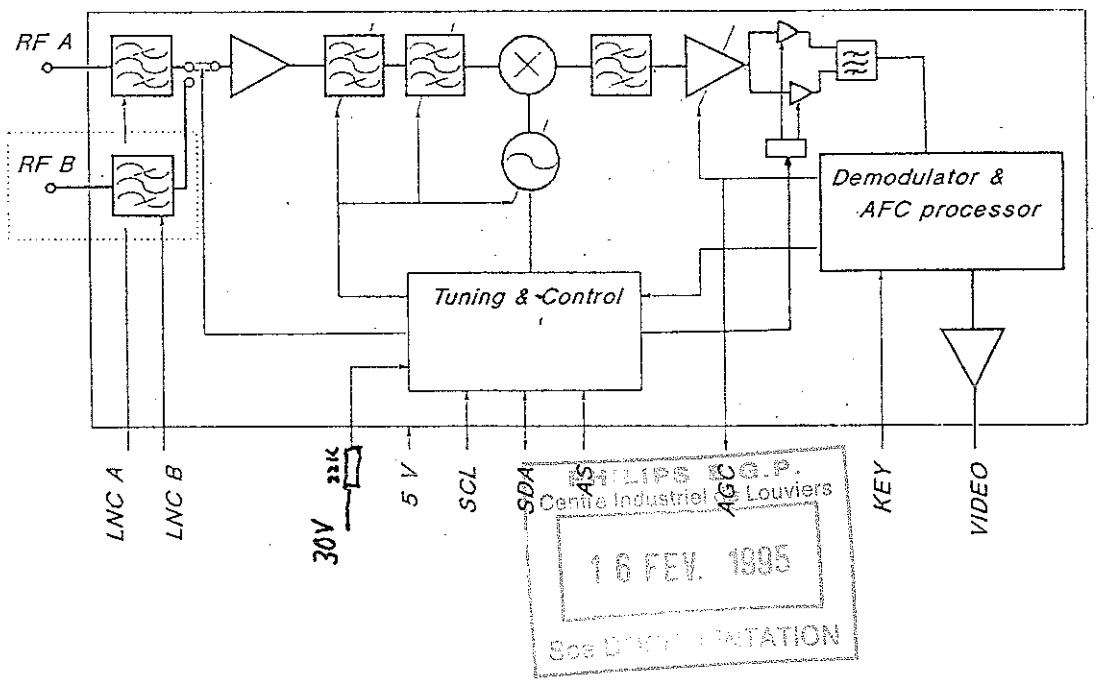
RF transistor	BF772R
PIN diodes	BA595
Mixer transistor	BF775W
Oscillator transistor	BFR93AW
Tuning diodes	HVU316
PLL tuning IC	TSA5055T
Gain control	BF904R
IF-amplifier	μPC1688G
Charge pump buffer transistor (NPN)	BC847BW
IF-bandwidth switch	2 x BC858B
RF switch	BC858BW
	BC848BW

SAW filter	B619/B611/B608/B615
PLL demodulator	TDA8012
Video buffer	BC848B
AGC buffer	BC848B

4.1 SF1216 Block diagram

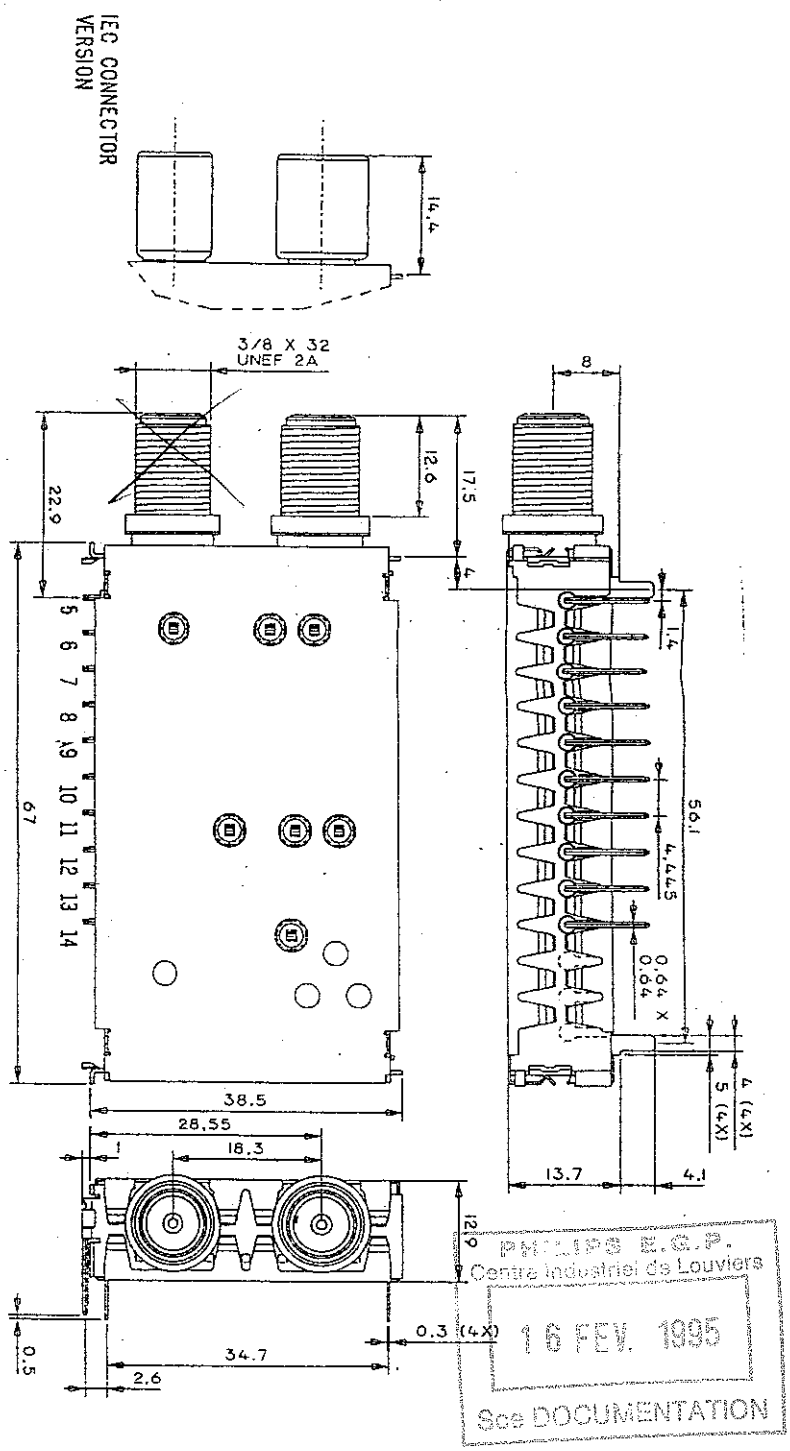


4.2 SF1216/W Block diagram



		SATELLITE FRONTEND GROUP SF1200			S P E C I F I C A T I O N			
					3112 299 0022		93-10-08	
93-10-08								
Name: Kerkow		supers.		5	10	190 - 4		A4
KR		Date: 93-02-12		(c) PHILIPS GmbH Werk Krefeld				

5.1.2 Horizontal mounting versions



		SATELLITE FRONTEND GROUP SF1200			SPECIFICATION			
					3112 299 0022		1	93-10-08
93-10-08								
Name: Kerkow		supers.		7	10	190 - 6		A4
KR		Date: 93-02-12	(c) PHILIPS GmbH Werk Krefeld					

5.2 Aerial Connection: /F-versions: F-connector(s) 75 Ω

all other single input versions : IEC (FEMALE) 75 Ω

all other dual input versions : IEC (FEMALE) / IEC (MALE) 75 Ω

5.2.1 The IEC female connector fulfils the requirements listed according to IEC 169-2.

Of which the most important criteria are:

Insertion force

Plug gauge 3122 121 22380 into the connector, insertion force max. 50 N.

Withdrawal force

Plug gauge 3122 121 22380 out of the connector, withdrawal force between 10 N and 50 N.

Loading of the connector, cable pulling

The connector stands a loading with maximum of 25 N in 4 radial directions at the top of it for 5 seconds. (4 radial directions = 4 wind directions of compass).

5.2.2 The IEC male connector fulfils the requirements listed according to IEC 169-2.

Of which the most important criteria are:

Loading of the connector, cable pulling

The connector stands a loading with maximum of 25 N in 4 radial directions at the top of it for 5 seconds. (4 radial directions = 4 wind directions of compass).

5.2.3 The female F connector fulfils the following requirements, of which the most important criteria are:

Insertion force

Plug gauge 7122 030 08970 into the connector, insertion force max. 15 N.

Withdrawal force

Plug gauge 7122 030 08980 out of the connector, withdrawal force min. 0,5 N.
Value obtained after 4 times inserting gauge 7122 030 08970.

Loading of the connector, cable pulling

The connector stands a loading with maximum of 25 N
in 4 radial directions at the top of it for 5 seconds.
(4 radial directions = 4 wind directions of compass).

Screwthread

Outer shell has a screwthread of 3/8 x 32 UNEF 2A.

Innerwire

Diameter of inner wire must be 0.5...0.8 mm.

5.3 Terminals

A1. Aerial input (female IEC or F-connector)
A2. Aerial input (only for D-version; male IEC or F-connector)
5. Outdoor unit supply
6. Outdoor unit supply (only D-version)
7. Tuning voltage, 30 V (via 22 kΩ)
8. + 5 V,
9. SCL (serial clock line)
10. SDA (serial data line)
11. Adress select
12. AGC output
13. Keypulse input
14. Baseband output

5.4 Test Points

TP1 IF out 1
TP2 IF out 2 (after SAW Filter)
TP3 VCO damping

5.5 Mounting Tags

M1, M2 ground

5.6 Mass : approx. 80 g

5.7 Marking

The following data are printed:

- type number
- code number
- origin letter of factory
- change code
- year and week code

5.8 Solderability: (acc. to UAN-D1537)

The solderability of the terminals and the mounting tags when tested initially and after 16h steam aging according to IEC 68-2-20 test Ta, method 1 (solder bath 235 °C, 2 sec) results in a wetted area of 95 %. No dewetting will occur when soldered at 260 °C, 5 sec.

5.9 Resistance to Soldering Heat: (acc. to UAN-D1537)

The product will not be damaged when tested acc. to IEC 68-2-20 test Tb, method 1A (solder bath 260 °C, 5 sec.)

5.10 Robustness of Terminations: (acc. to UAN-D1537)

All terminals, withstand a tensile force of 20 N and a thrust force of 4 N in axial direction.
Verification according to standard IEC 68-2-21, tests Ua1 and Ua2.

6. RATINGS

6.1 Under Non Operational Conditions

Ambient temperature	-25°C to +85°C	
Relative humidity	100%	max.
Bump acceleration	245 m/s² (25g)	max.
Shock acceleration	490 m/s² (50g)	max.
Vibration amplitude (10-55 Hz)	0.35 mm	max.

6.2 Under Operational Conditions

Ambient temperature	-10 °C to +60 °C		
Relative humidity	95 %		max.
Supply voltage (term. 8)	5.5 V		max.
Tuning voltage (via 22kΩ)	32.0 V		max.
Bus input voltage SCL	-0.3 V min.	6 V	max.
Bus input / output voltage SDA	-0.3 V min.	6 V	max.
Bus current SDA (open collector)	-1 mA min.	+5 mA	max.

7. OPERATIONAL CONDITIONS AND SUPPLY DATA

A proper frontend function is guaranteed under the following conditions:

7.1 Environmental

Ambient temperature	-10°C to +60°C	
Relative humidity	95 %	max.

7.2 Supply Voltage (term.8)

5 V ± 5 %

	150 mA	min.
Relevant current	200 mA	typ.
	250 mA	max.
Ripple susceptibility	see application information ch.10.5	

7.3 Tuning Supply Voltage (term. 7 connected by 22 kΩ resistor)

An external pull-up resistor of 22 kΩ ± 5 % must be connected between the tuning supply voltage and close to terminal 7.

Tuning supply voltage	30 V	
	28 V	min.
	32 V	max.
Tuning supply current	1.7 mA	max.
Ripple susceptibility (50 Hz - 500 kHz)	30 mVpp	max.

7.4 LNC - Supply Voltage

Terminal 5	20 V max.	500 mA max.
Terminal 5 and 6 (For D-versions)	20 V max.	500 mA max.

7.5 Baseband Output (term. 14)

Load impedance : resistance	470 Ω ± 10 %	
capacitance	22 pF max.	

7.6 Keypulse Input (term. 13)

Voltage for PAL mode: (Key on)	pin open or ≤ 0.5 V
Voltage for D2-MAC mode:	≤ 0.5 V during data burst (Key on) ≥ 4 V for the remaining line-time; max. voltage 5 V (Key off).

7.7 Address select

- C2 is always valid, other addresses dependend from voltage at pin 11. See table below:

Write	Read	Voltage applied on p
C 0	C 1	0 to 0.1 VCC
C 2	C 3	always valid
C 4	C 5	0.4 to 0.6 VCC
C 6	C 7	0.9 VCC to 13.5 V

TABLE: ADDRESS SELECTION

8. ELECTRICAL DATA

Unless otherwise specified all electrical values apply at:

- Ambient temperature	25°C ± 5°C
- Relative humidity	60 ± 10 %
- Supply voltage	5 V ± 0.2 V
- Tuning supply voltage via 22kΩ	30 V ± 0.5 V
- AGC pin open	

Preheating time of 10 minutes min. is needed before measurements.
The Front End is tuned by means of a built-in I²C bus controlled synthesiser.
For detailed information about frequency and control settings see section 10.1.

Note 1 : All specified input levels refer to 75 Ω input impedance.

Test fixtures to be used:

- De-emphasis unit	7122 030 06880
- Test jig	7122 030 09140
- Measuring probe TP1	t.b.f.
- Damping probe VCO (TP3)	t.b.f.
- Test jig adapter	t.b.f.

8.1 RF Parameters

8.1.1 In channel VSWR referred to 75 Ω

- VSWR	1.5	typ.
	3	max.

8.1.2 Antenna terminal disturbance voltage

From 40 MHz to 2050 MHz 54 dBµV max.

8.1.3 Surge Protection

5 kV min.

8.1.4 Tuning Range

Frequency range	950...2050 MHz	
Margin at 2050 MHz	20 MHz	min.
Margin at 950 MHz	40 MHz min	

The frontend can always be tuned at any wanted channel under any combination of the specified operational conditions.

8.1.5 RF Input Level Range

79 dBµV max.

Minimum level: 48 dBµV

8.1.6 RF Switch Suppression (only D-types)

at max. gain	40 dB	typ.

Note: Definition in section 12.1

8.1.7 Noise Figure :

nom. gain to 10 dB gain reduction	10 dB	typ.

8.1.8 Image Rejection

at max. gain	40 dB	typ.

8.1.9 IF Rejection

at max. gain	40 dB	typ.

8.1.10 In-channel (Ch1) 75 dBµV min.
third order intermodulation

Note: Definition see 12.2

8.1.11 Adjacent Channel Protection (input immunity)
6 dB min.

Note: Definition in section 12.3

8.1.12 Disturbance Radiation

All SF1216 types comply with "Amtsblatt No. 15/92, Vfg 115/1992.
Total radiated power = 57 dBpW max.
Note: Application layout see 10.4.

8.1.13 Immunity from radiated fields 2 V/m min.

8.1.14 Oscillator Characteristics

The oscillator is tuned with a 125 kHz pitch.

Stability of the locked oscillator frequency under any combination of the operational condition (section 7): 80 ppm max.

Tuning speed (charge pump high, 930-2070 MHz) 150 ms typ.

8.1.15 I²C Noise Susceptibility of I²C Bus — 1 Vpp max.

8.2 VIDEO PARAMETERS GENERAL

Note: Term 14 loaded with 470 Ω ± 5 %

8.2.1 DC level (with unmod. carrier) — 1.5 V typ.

8.2.2 Video Polarity — positive

8.3 VIDEO PARAMETERS 18 MHz BANDWIDTH

only for SF1216W/1827 - types
set PO = 0 (see 10.1.1)

MEASUREMENT CONDITIONS (unless otherwise specified):

RF input level	: 60 dbμV
C/N level	: 30 dB min.
PAL signal	: - CCIR-625 pre/deemphasis, - deviation 16 MHz/V - 75% saturated colour bar. - no dispersal, no sound

All C/N values are based on 27 MHz noise bandwidth.

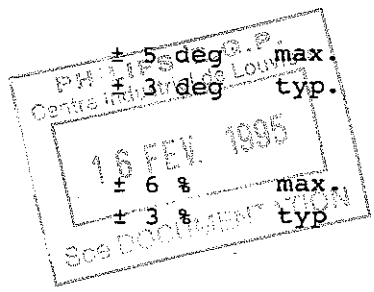
8.3.1 C/N Limit for Click Threshold — 11 dB max.

NOTE: The C/N limit for which chrominance clicks are just visible.

8.3.2 Luminance Non-Linearity — 4 % max. / 1.5 % typ.

8.3.3 Differential Phase — ± 5 deg max. / ± 3 deg typ.

8.3.4 Differential Gain — ± 6 % max. / ± 3 % typ.



8.4 Video Parameters 27 MHz Bandwidth For all SF1216W - types set P0 = 1

MEASUREMENT CONDITIONS (unless otherwise specified):

RF input level	: 60 dbμV
C/N level	: 30 dB min. (measured in 27 MHz bandwidth)
PAL signal	: - CCIR-625 pre/deemphasis,
	- deviation 25 MHz/V
	- 75% saturated colour bar.
	- no sound carrier

All C/N values are based on 27 MHz noise bandwidth.

8.4.1 Video output level 250 mVpp typ.

NOTE: From top sync to white, directly at term 14, no de-emphasis.

* General Note: Relation between terminal 14 and BU4 at test jig CVBS output (if loaded with 75 Ω) is :

1) for AC amplitude : $V_{term.14} = 2.45 * V_{BU4}$
2) for DC amplitude : $V_{term.14} = (2.45 * V_{BU4}) + 0.7$ V.

8.4.2 Video output steepness 40 mV/MHz typ.

8.4.3 Baseband Frequency Response 1 dB max.

NOTE: Maximum amplitude deviation between 0.1 MHz and 5 MHz with as reference the de-emphasis cross-over frequency.

8.4.4 C/N Limit for Click Threshold 13 dB max.

NOTE: The C/N limit for which clicks are just visible.

8.4.5 Static demod. threshold 5 dB typ.
6 dB max.

8.4.6 Unweighted S/N at C/N=14 dB 39 dB min.
40 dB typ.

8.4.7 Luminance Non-Linearity 4 % max.
1.5 % typ.

8.4.8 Differential Phase — ± 5 deg max. / ± 2 deg typ.

8.4.9 Differential Gain — ± 5 % max. / ± 3 % typ.

8.4.10 Dispersal differential gain — ± 5 % max. / ± 3 % typ.

Note: with energy dispersal signal 2 MHz deviation.

8.4.11 MAC-Parameters for BW2 (27 MHz, PO = 1)

MEASUREMENTS CONDITIONS (unless otherwise specified) :

RF input level : 60 dBuV
C/N level : 20 dB min.
D2MAC signal : 75 % saturated colour bar or multiburst
D2MAC pre-emphasis, deviation 13.5 MHz/V.
D2MAC de-emphasis interface including an 8.4 MHz LPF.
no energy dispersal

All C/N values based on 27 MHz noise bandwidth.

8.4.11.1 Baseband Frequency Response — 1 dB max

NOTE: See 8.3.1.3, up to 8,4 MHz.

8.4.11.2 C/N Limit for Clicks — 9 dB max.

NOTE: The C/N value for which chrominance clicks are just visible.

8.4.11.3 Weighted S/N at C/N = 14 dB — 44 dB min.

8.4.11.4 Groupdelay Inequality — 50 nsec max.

NOTE: Within video bandwidth from 0.3 and 8,4 MHz.

8.5. Video-Parameters for BW = 32or 36 MHz (only for SF1216/W2732 or SF1216/W2736 types)

D2-MAC MEASUREMENT CONDITIONS (unless otherwise specified):

RF input level	: 60 dBµV
C/N level	: 30 dB min. (measured in 27 MHz bandwidth)
D2-MAC signal	: multiburst, staircase, testpattern D2-MAC pre-emphasis, deviation 22 MHz/V, no dispersal D2-MAC de-emphasis interface incl. an 8.4 MHz LPF.

8.5.1 Baseband Frequency Response — 1 dB max

NOTE: See 8.4.1.3, up to 8.4 MHz.

8.5.2 C/N Limit for Clicks — 14 dB max. (testpattern, multiburst)
12 dB max. (staircase signal)

NOTE: The C/N value for which clicks are just visible.

8.5.3 Weighted S/N at C/N = 14 dB — 45 dB typ. (measured with 50 % grey signal)

8.5.4 Groupdelay inequality — 50 nsec max.

NOTE: Within video bandwidth from 0.3 and 8.4 MHz.

8.5.5 PAL Video parameter

Measurement conditions see 8.4.

8.5.5.1 C/N Limit for click threshold	= 13 dB
8.5.5.2 Luminance Non-Linearity	= 4 % max. 2 % typ.
8.5.5.3 Diff. gain	= ± 5 % max., ± 3 % typ.
8.5.5.4 Diff. phase	= ± 5 ° max., ± 2 ° typ.
8.5.5.5 disp. Diff. gain (2 MHz dispersal)	= ± 5 % max. ± 3 % typ.

8.6 AFC Parameters (internal AFC)

8.6.1 Keypulse input voltages (Pin 13)

For PAL, keypulse input must be open or low.

Low level voltage	0.5 V	max.
Keypulse input must be low		
during databurst	min. 8 μs	
Low level voltage	0.5 V	max.
Outside databurst, keypulse must be high.		
High level voltage	3.0 V	min.
	5.0 V	max.

8.6.2 IIC-Bus readout (A2, A1, A0) *without carrier detect function

Input signal is a PAL signal with dispersal deviation of 2 MHz.

Tuning window width for which readout is valid (see also 10.1.2)	250 kHz	typ.

Recommended readout: 0 0 1 or 0 1 0

Note: readout 0 0 0 means frontend tuned too high
readout 0 1 1 means frontend tuned too low

8.7 AGC Output (terminal 12)

Output impedance	10 kΩ	typ.
Output load	100 kΩ	min.
AGC output voltage (CF = 1350 MHz)		
- 79 dBμV unmodulated RF signal	1.3 V	typ.
- 48 dBμV unmodulated RF signal	2.5 V	typ.
	4.0 V	max.

8.8 Carrier Detect (only /A-types)

see chapter 10.6

8.9 OVERALL PERFORMANCE

8.9.1 Microphonics

For sound signals in the audio frequency range 100 Hz to 10 kHz sound pressure levels up to 105 dB (20μPa) the video signal to sound interference ratio will be more than 40 dB.

8.9.2 ESD protection

- Alle terminals of the frontend are protected against electrostatic discharge up to: 2 kV.
  The product is classified in category B (MIL-STD-883C).

8.9.3 Stability with antenna load

With the antenna open, shorted, or properly terminated and at any input signal, there shall be no evidence of instability on any channel.

8.9.4 PLL function

Proper PLL function for all channels in the band and for both charge pump low and high under any combination of the operational conditions.

9. ENVIRONMENTAL AND RELIABILITY DATA

9.1 Reliability tests and requirements

The reliability is specified and tested according to standard UAN-D-1727.

9.1.1 Max. cumulative percent catastrophic failures

F (300)	-	< 0.1 %
F (10,000)	-	< 1.5 %
F (30,000)	-	< 3.5 %

9.1.2 Environmental conditions

Max. T (chamber) : 60°C

9.1.3 Loading during conditioning

Tuner V supply	:	5.25 V
V tuning	:	30 V (via 22 kΩ series resistor)
CVBS load	:	470 Ω

9.1.4 Definition of catastrophic failures

- Front end cannot be tuned or is in-operative on one or more channels.
- Change of differential gain 5 % max.
- Click threshold more than 15 dB C/N

9.1.5 Degradation of characteristics

The characteristics will be measured after reconditioning time of one hour at nominal conditions as described in section 8.
Stability of the following characteristics after 2000 hours.

- change of differential gain 3 % max.

9.2 Environmental tests according to UAN-D-1537 and requirements

The evaluation methods to verify, whether the frontend meets the storage, transport conditions of section 7.1, 7.2 are the tests and requirements mentioned below.

9.2.1 Tests non packed.

Cold test	: IEC 68-2-1 test Ab, temp. -25°C; duration 96 hours.
Dry heat test	: IEC 68-2-2 test Bb, temp. +85°C; duration 96 hours.
Damp heat test, cyclic	: IEC 68-2-30 test Db, temp. +25°C ... 40°C; 21 cycles of 24 hours.
Damp heat test, steady state	: IEC 68-2-3 test Ca, temp. +40°C; RH 93%, duration 21 days.
Rapid change of temperature	: IEC 68-2-14 test Na, temp. 3 hours -25°C; 3 hours +85°C; number of cycles 5.
Vibration test	: IEC 68-2-6 test Fc, mounting see section 6.4 Test procedure B4 (endurance conditioning by sweeping); axes of vibration 3; swept frequency range 10-55-10 Hz; vibration amplitude 0.35 mm endurance conditioning duration 90 minutes (30 minutes for each direction).
Bump test	: IEC68-2-29 test Eb, mounting see section 6.4 acceleration 25g; number of bumps 1000; number of directions 6.
Shock test	: IEC68-2-27 test Ea, mounting see section 6.4 duration of pulse 11 ms; pulse shape half sine; acceleration 50g; number of directions 6, number of shocks 3 times per direction.
Solderability test	: IEC 68-2-20 test Ta, method 1: wetting: solder bath 235°C, 2 sec. ageing :16 hrs. steam ageing dewetting: 260° c, 5 sec. requirement: wetted area; 95% or more.
Resistance to soldering heat	: IEC 68-2-20 test Tb, method 1A: solder bath 260° C, 5 sec. requirement: no damage of frontend
Robustness of termination	: IEC 68-2-21 test : - Ua1, tensile, 20N in axial direction - Ue2, tensile, 4N in axial direction requirement: no damage of terminations.

9.2.2 Tests packed.

Climatic tests : UAN-D 1537
Transport tests : UAN-D 1463

9.2.3 Requirements

After each test, described in section 9.2.1, the following requirements will be met after a reconditioning time of one hour under nominal environmental conditions (see section 8.):

- no catastrophic failures (for definition see 9.1.4) to be checked within 10 minutes after termination of the test
- no degradation of characteristics (for definition see 9.1.5).

10. APPLICATION INFORMATION

10.1 I²C bus control

Information regarding general aspects of I²C bus control see the Philips Components I²C specification:
The I²C bus specification, published by Philips Components.

10.1.1 Write mode ($R/\overline{W}$ = 0)

Logic diagram

	MSB							LSB
Address byte	1	1	0	0	0	MA1	MA0	$R/\overline{W}$
Prog.div. byte 1	0	n14	n13	n12	n11	n10	n9	n8
Prog.div. byte 2	n7	n6	n5	n4	n3	n2	n1	n0
Control byte 1	1	CP	T1	T0	1	1	1	OS
Control byte 2	P7	0	*	*	0	*	*	P0

* Note: don't care

Address (MA1, MA0)

The address of the front end is dependent on the voltage at pin 11:

Write	Read	Voltage applied at pin 11
C0	C1	0 to 0.1 VCC
C2	C3	always valid
C4	C5	0.4 to 0.6 VCC
C6	C7	0.9 VCC to 13.5 V

Programmable divider setting

Divider ratio : $N = 8 * f_{osc}/[MHz]$

$$N = 16384*n14 + 8192*n13 + 4096*n12 + 2048*n11 + 1024*n10 + 512*n9 + 256*n8 + 128*n7 + 64*n6 + 32*n5 + 16*n4 + 8*n3 + 4*n2 + 2*n1 + n0$$

Control byte 1

Charge pump setting: CP can be set to either 0 (low current) or 1 (high current). CP=1 results in fastest tuning.

Test mode setting : T1, T0 = 0 for normal operation

PLL disabling : OS=0 for normal operation.
OS=1 switches the charge pump transistor to non-conducting state, the frontend can than be tuned manually with a variable tuning voltage applied at terminal 11.
When selecting OS=1, it is recommended to set simultaneously T0=1.

Control byte 2

Port P7 : for single input version:
P7 = Don't care

for dual input version:

Antenna input select
P7 = 0 for input RF1
P7 = 1 for input RF2

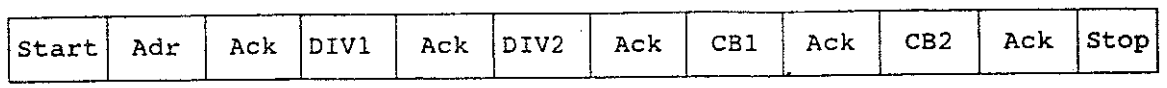
Port 0 : for single Bandwidth versions:

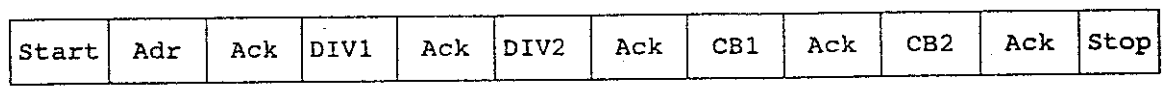
P0 = don't care

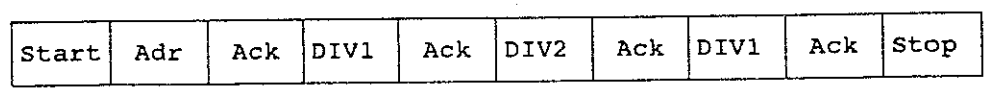
for SF1216/W versions:

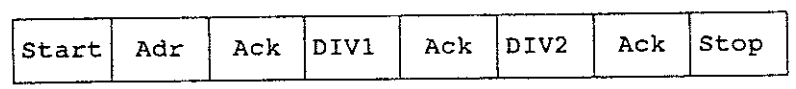
P0 = 1 for 27 MHz Bandwidth
P0 = 0 for 18/32/36 MHz dependend from version.

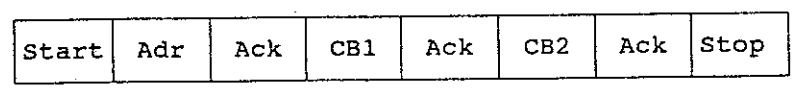
Telegram examples WRITE mode:

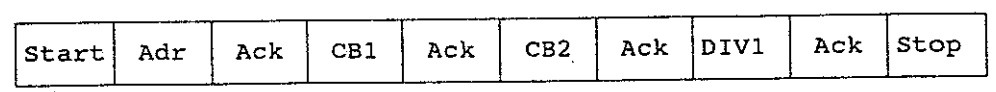












Start = start condition
Adr = address
Ack = acknowledge
DIV1 = divider ratio byte 1
DIV2 = divider ratio byte 2
CB1 = control byte 1
CB2 = control byte 2
Stop = stop condition

10.1.2 Read mode ($R/\overline{W}$ = 1)

Logic diagram

	MSB							LSB
Address byte	1	1	0	0	0	MA1	MA0	$R/\overline{W}$
Status byte	POR	FL	*	*	*	A2	A1	A0

* = don't care

Status byte

POR : Power on reset indicator, set to logic 1 if the power supply to the device has dropped below 3 V. The POR is set to 0 when the read sequence is terminated by a stop command.

FL : Phase Lock Detect Flag:
1 = device is phase locked
0 = device is unlocked.

A2, A1 and A0 : 5 level ADC data from P6, Frontend pin 17 can be used to feed AFC information to the microprocessor from the IF section. See application note 10.6

Telegram examples READ mode from processor:

Start	Adr	Ack	STB	Ack	STB		Stop

no acknowledge = end of data

Start	Adr	Ack	STB		Stop

From PLL :
Start = start condition
Adr = address
Ack = acknowledge
STB = status byte
Stop = stop condition

10.2 Mounting of the frontend on PWB of the set

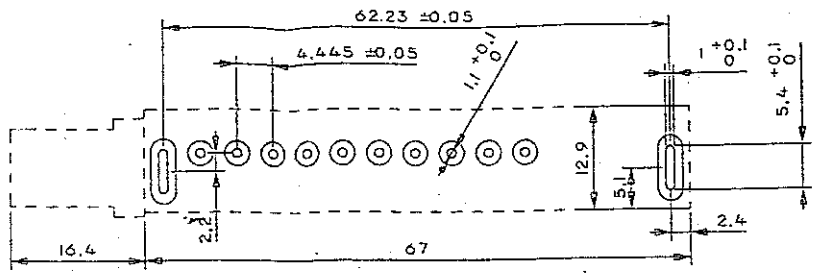
The frontend has to be mounted on board without clearance between frontend supporting surfaces and PWB.
In this condition the frontend has to be soldered to the PWB.

This can be achieved by:

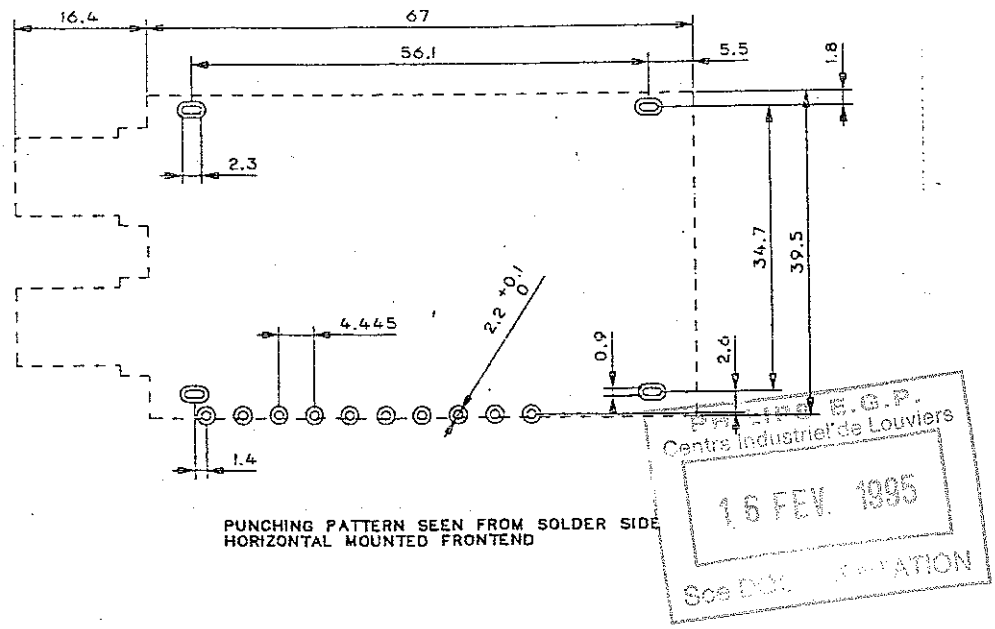
- Pressing the frontend vertically on the PWB during soldering or
- Supporting the frontend with its aerial connector in the right position or
- Twisting the ground tags (see sketch below).

General : In order to prevent any stress to the main PWB of the chassis it is recommended to support the frontend at its aerial connector.

10.3 Punching pattern of main PWB



PUNCHING PATTERN SEEN FROM SOLDER SIDE
VERTICAL MOUNTED FRONTEND

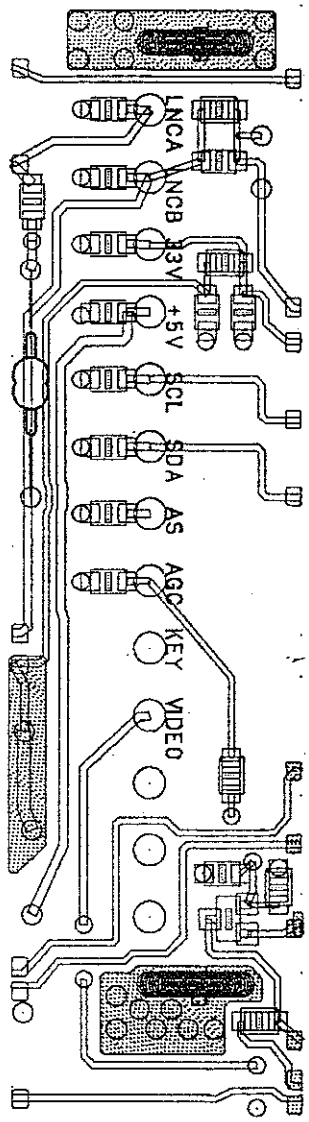


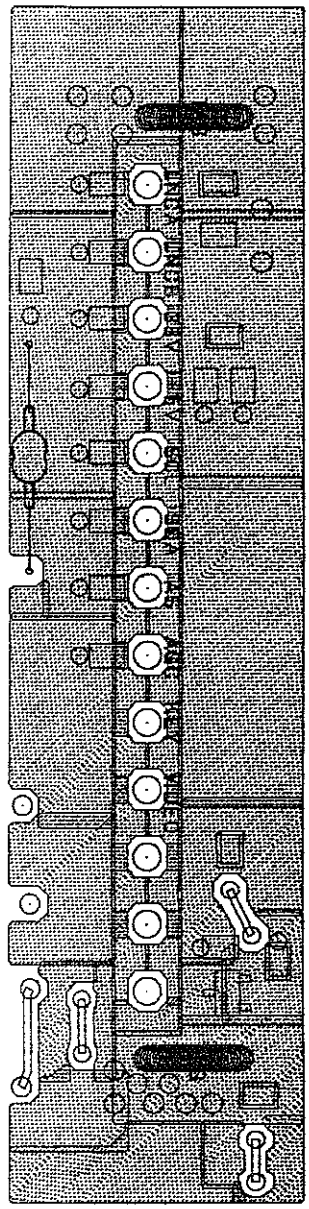
PUNCHING PATTERN SEEN FROM SOLDER SIDE
HORIZONTAL MOUNTED FRONTEND

		SATELLITE FRONTEND GROUP SF1200		SPECIFICATION			
				3112 299 0022	1	93-10-08	
93-10-08							
Name: Kerkow		supers.	29	10	190 - 28		A4
KR		Date: 93-02-12	(c) PHILIPS GmbH Werk Krefeld				

10.4 Test and preferred application lay-out

This application lay-out ensures that the TV set meets the Amtsblatt requirements for oscillator radiation.





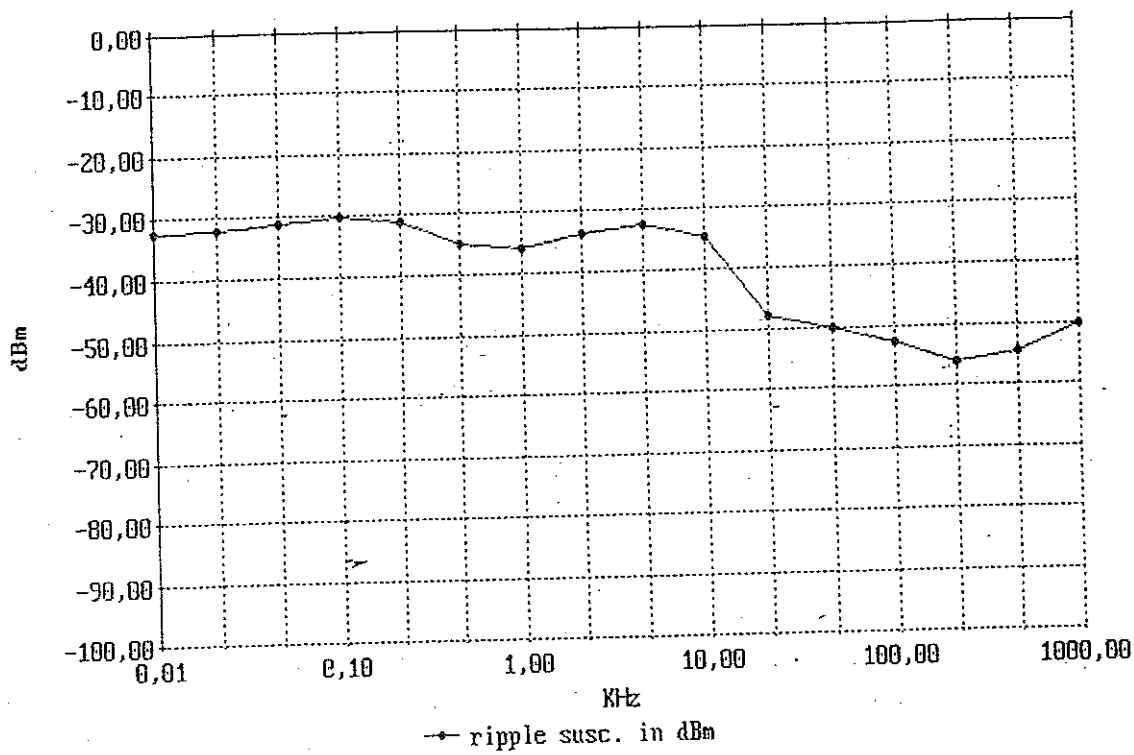
solder side
blocking cap's = 100 pF

SCALE 2 : 1

		SATELLITE FRONTEND GROUP SF1200			SPECIFICATION			
					3112 299 0022	1	93-10-08	
93-10-08								
Name: Kerkow		supers.	30	10	190 - 29		A4	
KR		Date: 93-02-12	(c) PHILIPS GmbH Werk Krefeld					

10.5 Power supply data

. The level of ripple voltage to be measured at pin 8 may not excued the curve given below to avoid disturbance on screen.



We recommend pin 7 to be blocked with 100nF and pin 8 to be blocked with 47μF cayacitors.

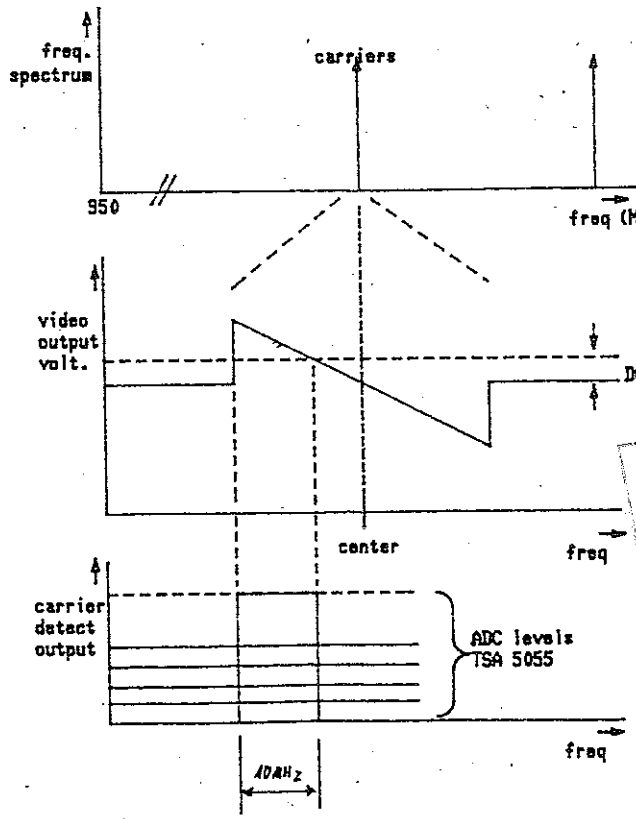
10.6 Carrier detect

In search tuning mode, the carrier detect function indicates if a satellite channel is approached.
The carrier detect signal indication, can be used to increase the search tuning speed.
The level on the ADC input (P6) of the tuning synthesizer TSA 5055 becomes high approaching a channel.
The output signal is independent on the video content and not influenced by video DC voltage fluctuations.
The carrier detect should detect signals, which are smaller than -65 dBm and also signals which have a C/N lower than 3dB.
In the figure below is given the carrier detect output signal and the corresponding input signals. Only unmodulated carriers are considered here.

The VCO of the FM demodulator will lock on the first carrier. This gives a voltage jump on the video output. If the video voltage exceeds the offset voltage of a comparator, the output of the carrier circuit becomes high. Tuning higher, the video output voltage will decrease until it is lower than the offset voltage. The carrier output becomes low again. Now the AFC function is activated.

Recommended values:

Tuning speed in search mode:	5 MHz/100 m sec
deoreased speed after carrier detection:	1 MHz/100 m sec
duration of carrier detect pulse:	10 MHz typ.



11. PACKAGING

The frontends (36) are packed in a cardboard box.
The transport of filled boxes can be done either with a box pallet or a pool (throw away) pallet.

Delivery quantities are:

Box pallet	maximum 3240
Pool (throw away) pallet	minimum 432, maximum 2592.

Note: Other frontend or tuner types can be mixed in a box or on a pool (throw away) pallet package, but a cardboard box must always be filled with the same frontend or tuner type.

12. DEFINITIONS

12.1 RF Switch Suppression

The level difference between a wanted signal at input A (B) and an unwanted signal at input B (A) which causes the same video level (for any AGC setting).

12.2 Channel I in Channel Intermodulation

The RF input level Lw for which the intermodulation product 2*Frf - Flo is 40 dB below Lw.

12.3 Adjacent Channel Protection

Is measured acc. "A 3.1.1 Anforderungen für die Eingangsstörfestigkeit", which is part of "EN55013, Ergänzung 1, DIN VDE 0872, Teil 13".