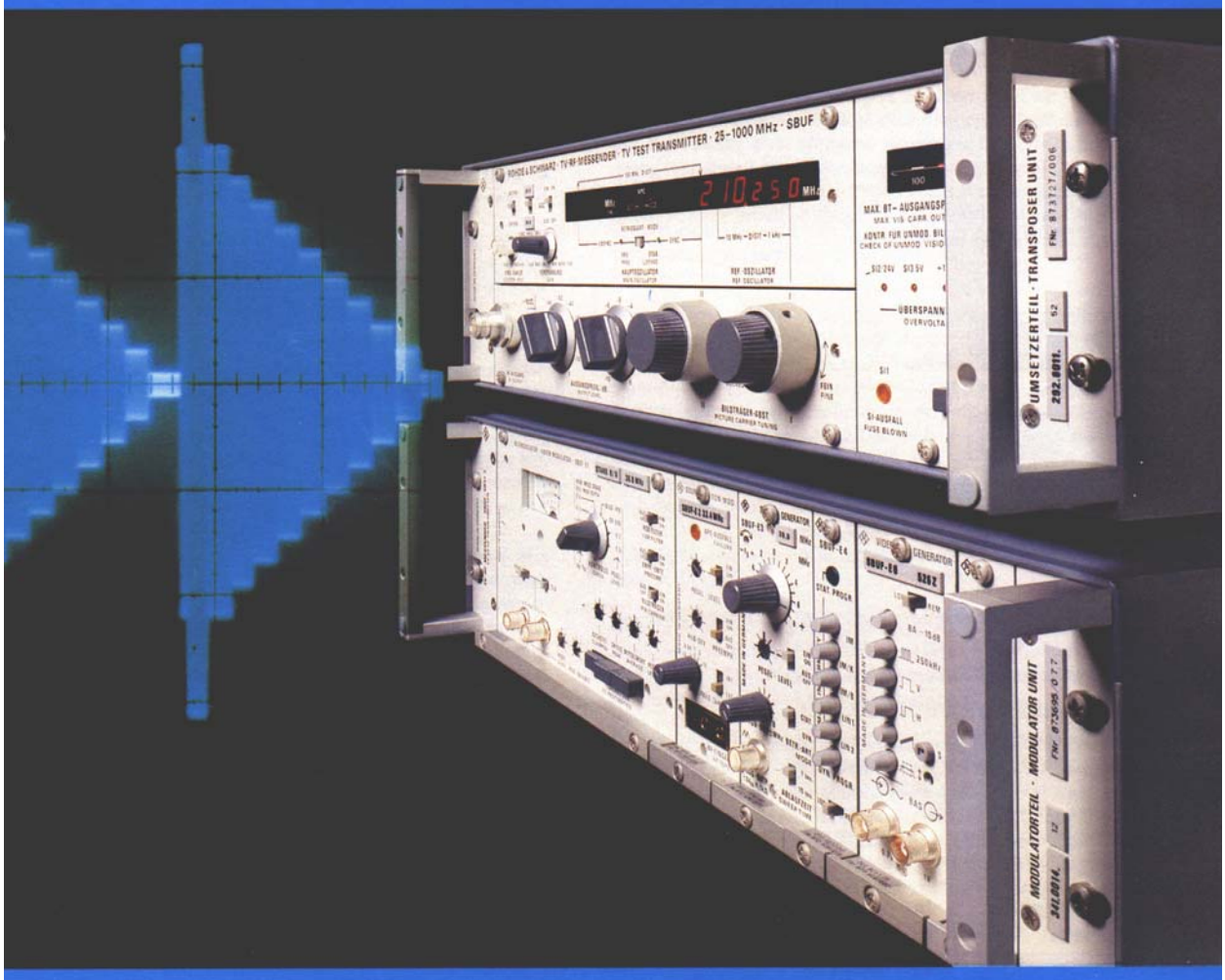
ROHDE&SCHWARZ

SBUF

TV TEST TRANSMITTER SBUF

25 to 1000 MHz

Standard B/G, D/K, I, L, M



Continuously tunable TV test transmitter generating a wide selection of precise RF signals

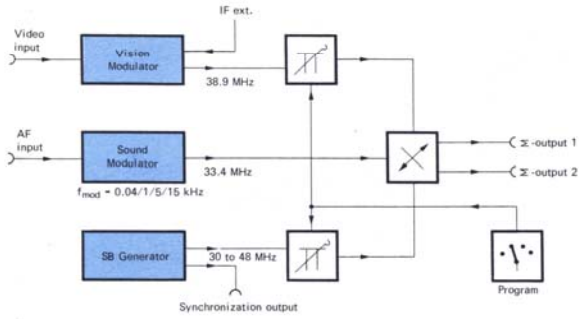
Suitable for use in programmable test systems

Data sheet
294 001
E-2

OVERVIEW / MODULATOR UNIT

- Modular construction of modulator section for adaptation to different TV standards
- Transposer section with digital vision carrier indication to an accuracy of ±1 kHz
- Programmed pushbutton selection of vision, sound and sideband levels; for use in systems
- Measurement of intermodulation, spurious responses and line-time nonlinearity using sinusoidal sideband signals
- Full field signals to 525- and 625-line standards
- Dual-sound coding and modulation

The **TV Test Transmitter SBUF** offers a variety and quality of high frequency TV test signals that have not until now been attained by any other test transmitter with continuously variable tuning. These attributes open up a wide field of applications in laboratories and in testing and maintenance of TV receivers, amplifiers and transposers, as well as their modules and in CATV systems. Together with ancillary equipment it is also suitable for use with automatic test systems in research and production (as SBTF 2). It consists of two self-contained functional units, the Modulator Unit SBUF/SBTF 2 and the Transposer Unit SBUF, which are available as separate items of equipment, each with its own power supply.



Block diagram of Modulator Unit of TV Test Transmitters SBUF and SBTF 2

Modulator Unit SBUF/SBTF 2

Thanks to its modular design, the Modulator Unit can be adapted to a full range of measurement tasks. The basic equipment comprises the Vision Modulator and the Sound Modulator (for FM or AM depending on the standard) which are accommodated in a Modulator Frame SBUF-B (19″; with power supply). The units correspond to those in the SBTF 2 system. The following configurations are possible:

Cassette	SBUF-	Combinations		
Vision Modulator	E1	×	×	×
Sound Modulator 1 (FM/AM)	E2	×	×	×
SB Generator	E3		×	
Program Selector	E4		×	
Sound Modulator 2 (FM)	E5	×		×
Video Generator	E6		×	×
TV Dual-sound Coder	E7	×		×

The Modulator Unit generates IF carrier signals modulated with vision and sound components in accordance with the standard involved. For the measurement of intermodulation distortion, a static or swept sideband can be added to this signal.

Vision Modulator SBUF-E1 The video signal can be applied at switch-selected loop-through inputs on the front or the rear panel. The receiver precorrection filter can be disabled. The balanced modulator uses one of the following modes of clamping:

1. clamping to the sampled value of the back porch
2. peak-value rectification to sync pulse level
3. mean-value clamping for symmetrical modulation signals

The carrier frequency is supplied by an internal crystal oscillator or an external signal source. A switch is fitted for **double-sideband modulation** (1-dB bandwidth ±8 MHz) or – via a group-delay-equalized filter – **vestigial-sideband operation.**

The check meter indicates either supply voltages, deviation (or modulation depth) or output level of the vision, sideband or sound carrier.

For the **CATV mode** using adjacent TV channels Vision Modulators with increased selectivity (surface wave filters) are available for Standards B/G and M.

FM Sound Modulator SBUF-E2 The Sound Modulator is designed both for mono transmission and for **modulation of stereo signals** (VHF). A low-distortion signal from an internal sinewave generator which can be set to 0.04/1/5/15 kHz or an external signal (two parallel balanced inputs) is used for frequency modulation. The preemphasis can be disconnected. The centre frequency is stabilized by **frequency and phase control loops.** The FM deviation can be continuously adjusted.

AM Sound Modulator SBUF-E2 (for Standards C, L, L'). The AM Sound Modulator can be used instead of the FM Sound Modulator. It is also suitable for internal and external modulation; the modulation depth is continuously adjustable.

SB Generator SBUF-E3 For intermodulation and nonlinearity measurements on amplifiers – on TV transposers in particular – this cassette delivers a sinewave sideband signal which can be added – manually adjusted or swept – to the vision and sound carriers. The voltage-controlled oscillator (30 to 48 MHz) can be set by hand or swept at one of two speeds over an adjustable sweep width. Its output signal is kept constant by a levelling circuit and freed of harmonics by a lowpass filter.

Program Selector SBUF-E4 The **static programs** deliver test signals for intermodulation and linearity measurements. With the modulation disabled, several pushbutton-

TRANSPOSER UNIT

controlled standardized level combinations for the vision, sound and sideband carriers are automatically set. Linearity measurements are performed with the vision carrier switched over every 2 seconds.

The **dynamic program** corresponds to normal operation and permits modulation of the vision and sound carriers, the SB carrier being disabled. The following level combinations (in dB) can be called up:

Program type		Vision carrier	Sound carrier	Sideband
Dynamic (with modulation)		0	-10*)	off
Static (no modulation)				
Intermodulation	IM	0	-10	off
Intermodulation	IM/K	-8	-10	-16.5
Intermodulation	IM/B	-5.5	-11.5	-11.5
Linearity	LIN	-2.5/-8	-10	-32
Linearity	LIN 2	-2.5/-20	-10	-32

Levels for two-tone modulation: Set 1st sound modulator to -13 dB with front-panel control, 2nd sound modulator at -20 dB.
*) With AM sound, carrier unmodulated.

FM Sound Modulator SBUF-E5 for TV dual-sound or stereo measurements (the specifications are the same as those of Sound Modulator E2). The TV Dual-Sound Coder E7 is required for operation (see below).

Video Generator SBUF-E6 The SBUF-E6 delivers a standard composite video signal (625 or 525 lines) with a selectable test signal for rapid checking and measuring of the transmission characteristics of TV transmission systems, in particular receivers and transposers. It makes the SBUF or SBTF 2 into a complete TV test transmitter. The five test signals can be selected either by pushbuttons or by external TTL levels. A mean grey pedestal can be connected for application of external signals (e.g. a sweep signal). The Video Generator SBUF-E6 may be used instead of the SB Generator SBUF-E3 (suitable for external control) or of the FM Sound Modulator SBUF-E5.

TV Dual-sound Coder SBUF-E7 The plug-in permits encoding of the AF signals for the FM Sound Modulators E2 and E5 and adjustment of amplitude and phase of the two sound channels. The E7 also delivers the pilot frequency and the modulation frequencies for mode identification.

Output signal The combined signals from the Vision Modulator, Sound Modulator 1, Sideband Generator and Sound Modulator 2 are brought out to two sum outputs for frequency conversion in the Transposer. The levels of the signal components are determined automatically by attenuators in accordance with the selected program. Adjustment by a further ±3 dB is also possible on each component, or the components can be switched off.

The nonlinear distortion of the device under test can be efficiently measured with the aid of these signals by evaluation with an analyzer or selective receiver. The expense of three continuously variable signal generators with calibrated attenuators and decoupling networks, the separate tuning to three frequencies and the setting of three levels can thus be eliminated.

Transposer Unit SBUF

In the transposer section the sum IF signal from the modulator section is up-converted and down-converted to obtain a carrier frequency anywhere in the range 25 to 1000 MHz. Unwanted spurious emissions are suppressed by fixed bandpass filters and a lowpass filter. Wideband mixers make sure that the quality of the measurement signals is constant over the entire tuning range.

Frequency setting The frequency can be set in one of two ways.

"Unsync." mode Adjustment with tuning knob II only (YIG oscillator). Frequency indication (3½ digits) calibrated in MHz (error ≦ ±10 MHz).

"Sync." mode Additional setting with tuning knob I only (reference oscillator). Frequency indication calibrated for 0 to 100 MHz to an accuracy of ±1 kHz via a counter, locked to full 10-kHz steps. The channel frequency is set ignoring the 100-MHz decade, which is derived from the adjustment of tuning knob II after phase locking.

It is thus possible to set and read off the desired channel frequency without an IF signal being applied at the input of the transposer.

By way of a **counter input** with a 10:1 prescaler the reference-frequency input can be used for measuring external frequencies in the range **25 to 300 MHz.**

Second intermediate frequency The transposer unit can be provided with a second input IF, for instance 45.75 MHz, in addition to 38.9 MHz. Both IFs are marked in MHz on the front-panel switch. A "lower sideband" model is available for special applications (designation derived from position of useful signal). At an IF of 32.7 MHz the two switch positions correspond to Standards L and L'. The IF of 38.9 MHz may be converted into any other IF if the lower sideband is included. Switching to the lower sideband ensures correct positioning in the transmission channel. The required output IF is set in MHz (as is the channel frequency) and available at the RF output.

Output level The levelled output signal can be continuously adjusted by varying the overall gain and is indicated by a row of LEDs. A **calibrated attenuator** further allows the output level to be set in smallest steps of 1 dB.

To increase the output level to 2 V, the **CATV Broadband Amplifier AKF** can be connected after the SBUF for 25 to 300 MHz. Together with the Modulator Unit SBUF/SBTF 2 a continuously tunable test and standby transmitter can be made up. Especially in systems using fixed-frequency channel transmitters, for instance for applying test signals to production lines of TV receivers, the combination SBUF/AKF forms a continuously tunable transmitter ideal for testing special channels or as standby transmitter.

Remote-controlled operation An analog voltage of between 0 and 5 V (e.g. from an external D/A converter) is required for the 100-MHz decade (tuning II) in the case of external frequency adjustment. The signal for fine frequency tuning (tuning I) may be derived from a programmable synthesizer (for instance SMS, 150 to 250 MHz; 300 mV). Both frequency settings are synchronized (PLL). Back-signalling is made via the data line. The overall gain (100 or 106 dBμV) and the modulator programs are selected by means of TTL signals.

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Modulator Unit SBUF/SBTF 2

Vision Modulator SBUF-E1

Video input signal

Signal level	0.5 to 2 V_{pp} (CCVS)
DC offset	max. ±5 V
Input (switch-selected)	loop-through filter, BNC connectors; high-impedance or 75-Ω termination; front or rear panel
Return loss (0 to 8 MHz)	
Front-panel input	≧34 dB, external termination ≧26 dB, internal termination[1])
Rear-panel input	≧20 dB, internal termination

IF output signal

Vision carrier	38.9 MHz (B/G, D/K, I, M) 32.7 MHz (L) 45.75 MHz (M-CATV)
Frequency error	≦±1×10^{-5}
Output level[2])	200 mV_{rms}, sync peak (white level with standard L)
Setting range	approx. ±3 dB, carrier can be disabled

Modulation characteristics

Type of modulation	C3F (A5C), negative (B/G, D/K, I, M) C3F (A5C), positive (L)
Modes of operation	double sideband, vestigial sideband, with or without receiver group-delay correction filter
Clamping (pushbutton-selected)	
Sampled	to back porch
Peak	by peak rectification to sync level
Mean value	for symmetrical modulation

Transmission characteristics

Transmission range (IF)	±8 MHz, ref.: vision carrier
Amplitude response	
Double-sideband operation	<±0.2 dB, ±10 Hz to ±6 MHz <±0.5 dB, ±6 Hz to ±8 MHz
Vestigial-sideband filter	see bottom left[5])
Receiver group-delay correction	additional amplitude response:
Standard B/G	±0.2 dB, 10 Hz to 4.8 MHz
D/K	±0.2 dB, 10 Hz to 5.5 MHz
I (South Africa)	±0.2 dB, 10 Hz to 4.8 MHz
L and I (Great Britain)	0 (no correction)
M	±0.2 dB, 10 Hz to 3.8 MHz
Group-delay response	
Double-sideband operation	<10 ns, ±10 Hz to ±6 MHz
Vestigial-sideband operation	additional ripple (peak-to-peak value):
Standard B/G	≦40 ns, −4.8 to +0.5 MHz
B/G – CATV	≦70 ns, −4.8 to +0.5 MHz
D/K	≦40 ns, −5.5 to +0.5 MHz
I	≦30 ns, −5.2 to +1.0 MHz
L	≦40 ns, −1.25 to +6.0 MHz
M	≦40 ns, −4.0 to +0.5 MHz
M – CATV	≦70 ns, −4.0 to +0.5 MHz
Receiver group-delay correction	see bottom right[5])

[1]) Applies only if no cable is used.
[2]) Level at rear-panel IF summing outputs.
[3]) Measured via TV Demodulator AMF 2; ref.: black-to-white transition.

Nonlinearity of modulation characteristic	≦3%, 8 to 100% modulation
Differential gain at colour subcarrier frequency	≦2%, 10 to 85% modulation
Differential phase at colour subcarrier frequency	≦2°, 10 to 85% modulation
Signal-to-noise ratio[3])	
for 0.1 to 5 MHz	≧64 dB (rms)
for 0 to 1 kHz	≧60 dB (peak-to-peak)
Hum suppression[3]) in clamped mode	≧57 dB (with 30% superimposed hum)
Check meter	for carrier level, modulation and supply voltages

Monitoring connector

(vision carrier)	test output: approx. 0.5 V into 50 Ω oscillator input: 1 to 3 V

Sound Modulator 1 SBUF-E2 and Sound Modulator 2 SBUF-E5

AF input signal

Signal level	+6 dBm for 0 to ±80 kHz deviation, continuously adjustable
Frequency range	40 Hz to 75 kHz
Input	floating, Z_{in} approx. 5 kΩ, switchable external/internal
Connector	front panel: 3-way female rear panel: 30-way male

Internal AF generator

Frequency, switchable to	0.04/1/5/15 kHz and "off"
Amplitude response	<±0.3 dB, ref. to 1 kHz
Harmonic distortion	<0.3%

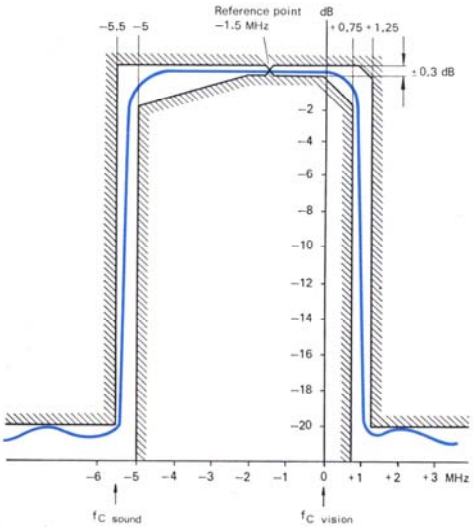
IF output signal

Sound carrier frequency[4])	
Standard B/G	33.4 MHz (sound 2: 33.158 MHz)
D/K	32.4 MHz
I	32.9 MHz
M	34.4 MHz (CATV: 41.25 MHz)
Frequency error	<±500 Hz
Centre frequency stabilization	frequency and phase control; ref.: vision carrier
Output level[2]) SBUF-E2	<45 to >90 mV_{rms} } carrier can
SBUF-E5	<14 to >28 mV_{rms} } be disabled
Nominal level for single sound	45/63/90 mV, corresponding to vision/sound power ratio 20:1/10:1/5:1
dual sound	45 mV (20:1) for sound 1, 20 mV (100:1) for sound 2

Modulation characteristics for standards B/G, D/K, I, M

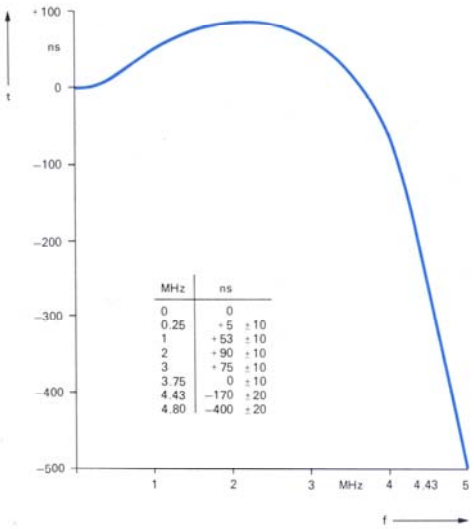
Type of modulation	F3E (F3), with preemphasis
Modulation frequency response flatness	<±0.3 dB, 40 Hz to 53 kHz <±0.5 dB, 53 to 75 kHz ref.: 1 kHz, preemphasis disabled

[4]) Please enquire for different frequencies.
[5]) See also data sheet SBTF 2.



Left:
Tolerance mask for frequency response of IF sideband spectrum (standard B/G)

Right:
Group-delay/frequency response of video group-delay precorrection



SPECIFICATIONS

Sound Modulator 1 SBUF-E 2 and Sound Modulator 2 SBUF-E5 (continued)

Preemphasis (switched)	50 µs ±5% (M: 75 µs)
Modulation distortion	≦0.5%, 40 Hz to 15 kHz, deviation ±75 kHz (preemphasis disabled)
Stereo crosstalk	>40 dB down, 0.1 to 5 kHz (measured with coder and decoder)
Signal-to-noise ratio	>70 dB (mono), >66 dB (stereo), weighted and unweighted; ref.: ±40 kHz deviation
Incidental AM	>40 dB down; for f_{mod} 1 kHz and deviation ±40 kHz; ref.: 100% modulation

Modulation characteristics for standard L (offering characteristics)

Type of modulation	A3E (A3), without preemphasis
AF input signal, level	+12 dBm for 0 to 100% modulation, continuously adjustable
Frequency range	30 Hz to 15 kHz
IF output signal	
Sound carrier frequency	39.2[1]) MHz ±500 Hz, crystal-controlled
Output level[2])	<50 to >100 mV_{rms}, unmodulated
Modulation frequency response flatness	<±0.5 dB, 30 Hz to 15 kHz; ref.: 1 kHz
Modulation distortion	≦1% (up to 90% modulation)
Signal-to-noise ratio	>70 dB, weighted and unweighted; ref.: 100% modulation

SB Generator SBUF-E3

Frequency range	30 to 48 MHz
Frequency setting	manual or swept
Sweep width	0 to ±8 MHz; ref.: 38.9 MHz
Sweep time, switch-selected	1 or 10 s (triangular)
Nominal output level	−16.5 dB (approx. 30 mV); ref.: vision carrier at summing output
Setting range	approx. ±3 dB, carrier can be disabled; can be controlled from SBUF-E4
Frequency response flatness	≦2% (automatic control)
Harmonics	≧40 dB down
Output for triangular signal	±5 V ±5%; Z_{out} approx. 1 kΩ

Program Selector SBUF-E4

Coupling network for vision, sound and SB signals	passive, attenuators selected with program buttons or externally
Program types	5 static programs plus normal operation, see text

Levels for the different programs

Program	Vision carrier	Sound carrier	Sideband
IM	0 dB	−10 dB	off
IM/K	−8 dB	−10 dB	−16.5 dB
IM/B	−5.5 dB	−11.5 dB	−11.5 dB
LIN 1	−2.5/−8 dB*)	−10 dB	−32 dB
LIN 2	−2.5/−20 dB*)	−10 dB	−32 dB
DYN	0 dB	−10 dB**)	off

*) alternating every 2 s
**) unmodulated carrier at AM sound

External program selection	by TTL level: 0 = activ

Sound Modulator SBUF-E5 same as E2

Video Generator SBUF-E6

Pulse generator	mode H+V	
System	**625 lines**	**525 lines**
Line frequency	15.625 kHz ±0.1%	15.750 kHz ±0.1%
Field frequency	50 Hz	60 Hz
Colour subcarrier frequency	4.433618 MHz ±10 Hz	3.579545 MHz ±10 Hz

CVS output signal (data common to the signals listed below)

Picture component, switch-selected	0.7/0.22 V (0/−10 dB)
S component, fixed	0.3 V
Output (front panel)	75 Ω; A ≧34 dB (up to 10 MHz); BNC
Signal-to-noise ratio	>50 dB (peak measurement at grey pedestal, ref. to 0.7 V)
Rise and fall times	200 ns −10/+20 ns

250-kHz squarewave

Tilt	≦1%
Synchronization	H signal

V squarewave

Tilt	≦1%

H squarewave and 2T pulse

Squarewave (duration)	approx. 17 or 52 µs
Tilt/overshoot	≦1%/≦2%
2T pulse, switch-selected	normal/inverted position

Sawtooth with superimposed RF (CCIR signal No. 3)

Sawtooth signal (duration)	approx. 12 to 64 µs after S leading edge
Superimposed colour subcarrier	100 mV/32 mV ±10% (corresponding to picture component 0/−10 dB)
Diff. gain/phase	≦0.2%/≦0.3°

Pedestal plus external signal

Input signal	0.7 V for 10 to 70% superimposed RF
Frequency response flatness	<±0.1 dB (50 Hz to 6 MHz)
Input (front panel)	75 Ω; A ≧34 dB (up to 10 MHz); BNC
Blanking	3 µs before to 12 µs after S leading edge
Grey pedestal, adjustable	30 to 100% picture component
Signal selection	by pushbuttons or external signal (TTL level when inserted in compartment 3)
Accessories supplied	75-Ω cable, BNC, 0.5 m long

TV Dual-sound Coder SBUF-E7

AF input signals	L/R or AF 1/AF 2
(Nominal) signal level	+6 dBm for ±30 kHz deviation
Maximum input level	+12.5 dBm
Preemphasis, can be disabled	50 µs ±5%
Input (front panel)	Z_{in} approx. 5 kΩ; 6-way

AF output signals (coded)

(Nominal) signal level	+6 dBm	
Frequency response flatness	<±0.5 dB (40 Hz to 15 kHz)	
Signal type	sound channel 1	sound channel 2
Mono without pilot	AF 1	AF 2
Mono with pilot	AF 1	AF 2 + pilot
Dual sound	AF 1	AF 2 + pilot
Stereo	M = 0.5 (L+R)	R + pilot

Crosstalk dual sound/stereo	>70 dB/>50 dB down
Setting of deviation symmetry	level approx. ±0.5 dB; phase approx. ±3° (at 15 kHz)
Pilot carrier	in sound channel 2
Pilot level	−15.6 dBm, ±6 dB adjustable (corresponding to deviation ±2.5 kHz)
Pilot frequency	54.6875 kHz (= 3.5 f_H)
Frequency stabilization	
with vision modulation	synchronized with line frequency f_H
without vision modulation	error < ±5 Hz
Operating mode identification	pilot carrier amplitude-modulated with identification frequency
Identification frequencies	mono: without (unmodulated) dual sound: 274.1 Hz (= f_H/57) stereo: 117.5 Hz (= f_H/133)
Modulation depth	adjustable from 40 to 60%
Accessories supplied	female multipoint connector for use with Sound Modulators

Transposer Unit SBUF

Frequency and level	
Input frequency range	38.9 MHz ±7 MHz / 45.75 MHz ±6 MHz / 32.7 MHz ±7 MHz } for standard, see Modulator Unit (combinations possible, see ordering information)
Nominal input level	200 mV ±0.5 dB
Input	BNC female connector on rear panel, Z_{in} = 50 Ω, return loss ≧20 dB
Output frequency f_{out} with f_{in} = ZF_{vision}	25 to 1000 MHz continuous tuning range
Frequency stabilization	APC with indicator, switched
Output frequency indication	1. with APC via counter, accurate to 10 kHz ±1 kHz 2. without APC via A/D converter and digital voltmeter, error <±10 MHz
Gain from input to output	adjustable from −6 to 0 dB
Frequency-response flatness of gain	≦2 dB with AGC ≦6 dB with manual setting
within f_{out} ±7 MHz	≦ ±0.5 dB, ≦ ±0.2 dB typ., channel-dependent

[1]) Please enquire for different frequencies.
[2]) Separate IF outputs for vision and sound carriers if separate Channel Unit SBTF 2 is used; IF summing output for Transposer Unit SBUF.

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Output level	30 µV to 200 mV into 50 Ω (106 dBµV max.), may be reduced in steps of 1 and 10 dB by calibrated attenuator
Error of output attenuator	fine ≦±0.2 dB coarse ≦±0.5 dB
Output	N female connector, adaptable; Z_{out} = 50 Ω, return loss ≧6 dB with output attenuator set to 0 dB, or BNC female connector; Z_{out} = 75 Ω (with matching pad)
Monitor outputs for local oscillators	approx. 0.1 V into 50 Ω, BNC female connectors on rear panel
Nominal frequency of first LO	70.366833 MHz
Nominal frequency of second LO and timebase	100.00000 MHz
Oscillator-frequency adjustment	≧5×10⁻⁶ with rear-panel potentiometers
Effect of crystal aging	≦2×10⁻⁸/day (manufacturer's data)
Output-level monitor	row of LEDs
Input for tuning signal I	150 to 250 MHz, 0.5 to 1 V_{rms}, BNC female connectors (rear panel)
Input for tuning signal II	0 to 5 V for 0 to 1000 MHz

Transmission characteristics

Spurious signals with vision/sound ratio of 10:1 (gain −6 dB)

Spurious emissions	≧66 dB down, 70 dB typ.,	channel-dependent
Vision carrier −5.5 MHz and +11 MHz	≧56 dB down, 60 dB typ.,	channel-dependent
Crossmodulation products	≧70 dB down	
Harmonics	≧40 dB down	
Spurious signals outside tuning range	≧40 dB down	

Video signal-to-noise ratio at 0 dB gain, referred to black-to-white transition	
0.1 to 5 MHz (noise)	≧60 dB (rms)
0 to 1 kHz (hum)	≧56 dB (peak-to-peak)
Audio signal-to-noise ratio up to 15 kHz (with pre- and deemphasis)	≧66 dB, referred to 40-kHz deviation

Frequency counter

Frequency counter for measurement of output frequency	switched external/internal
Frequency range for ext. use	25 to 300 MHz
Input voltage	50 mV_{rms} to 1 V_{rms} into 50 Ω
Input	50 Ω, BNC female connector (front panel)
Frequency of timebase	100 MHz ±5×10⁻⁷

CATV Broadband Amplifier AKF (option)

Frequency range	25 to 300 MHz
Gain	27 ±1.5 dB
Frequency-response flatness	≦±1 dB, for ±7 MHz: ≦±0.3 dB
Output level	≦2 V_{rms} into 50 or 75 Ω corresponding to 126 dBµV
Spurious components	for V_{out} = 1 V 2 V
Spurious signals, vision/sound ratio 10:1	≧56 dB down ≧50 dB down
Intermodulation products (DIN 45004 K)	≧70 dB down ≧66 dB down
Harmonics	≧30 dB down
Noise figure	≦14 dB
Input (front or rear panel)	50 or 75 Ω; BNC
Return loss	≧20 dB
Output (front or rear panel)	50 or 75 Ω; BNC
Return loss	≧10 dB
Checking of output level	meter, 120 to 126 dBµV
AC supply	115/125/220/235 V (16 VA)
Dimensions, weight	492 mm × 116 mm × 514 mm, 5.4 kg

General data

Rated temperature range	+5 to +35 °C
Operating temperature range	+5 to +45 °C
Storage temperature range	−20 to +70 °C
Connectors on Modulator Unit (rear panel)	
IF summing output (BNC)	2 for modulator configuration 1 for channel transmitter configuration
Return loss	≧18 dB, 30 to 48 MHz
Monitoring output	for vision carrier, 50 Ω, BNC
Video input	loop-through filter, BNC; see SBUF-E1
AF/control/status lines	30-way male connector to DIN 41622
AC supply	110/125/220/235 V +10/−15%, 47 to 63 Hz
Power consumption Modulator Unit	70 VA for Vision and Sound Modulators, 125 VA for fully equipped frame
Transposer Unit	130 VA
Overall dimensions (W×H×D)	
19" bench model (design 80)	492 mm×161 mm×514 mm
19" rackmount	483 mm×132 mm×506 mm

Weight of Modulator Unit	
19" bench model	17 kg fitted with Vision and Sound Modulators, 21 kg fully equipped
19" rackmount	15 kg fitted with Vision and Sound Modulators, 19 kg fully equipped
Weight of Transposer Unit	25 kg

Ordering information

Modulator Unit SBUF/SBTF 2

The basic version comprises the Modulator Frame SBUF-B plus the power supply, fitted with the Vision Modulator SBUF-E1 and the Sound Modulator SBUF-E2 (sound 1).

Order designations

Modulator	▶ Modulator Unit SBUF/SBTF 2	
Standard	19" rackmount	19" bench model
B/G – general	341.0014.11	341.0014.12
B/G – general – CATV	341.0014.41	341.0014.42
B/G – Norway	341.0014.81	341.0014.82
B/G – Sweden (A)	341.0014.83	341.0014.84
B/G – Denmark	341.0014.85	341.0014.86
B/G – Australia	341.0014.87	341.0014.88
B/G – New Zealand	341.0014.89	341.0014.90
D/K – CCIR Rep. 308	341.0214.11	341.0214.12
D/K – Czechoslovakia/Hungary	341.0214.15	341.0214.16
I – Great Britain	341.0414.11	341.0414.12
I – South Africa	341.0414.13	341.0414.14
L – France	341.0814.11	341.0814.12
M – 38.9 MHz	341.0614.11	341.0614.12
M – 45.75 MHz – CATV	341.0614.41	341.0614.42

Accessories supplied termination 124.0324.00, power cord 025.2365.00

Recommended extras

SB Generator SBUF-E3	294.6416.00
Program Selector SBUF-E4	294.7012.00
Sound Modulator (sound 2) SBUF-E5 for standard B/G (33.158 MHz)	294.7312.00
Please specify sound carrier frequency for other standards.	
Video Generator SBUF-E6	
625-line standard (CCIR)	340.8211.76
525-line standard (FCC)	340.8211.75
TV Dual-sound Coder SBUF-E7	241.3812.00
Adapters for servicing	
13-way plug-in	294.0260.13
21-way cable	294.1420.00
50-Ω cable	341.5245.00 (2 cables recommended)

Transposer Unit SBUF

Order designations ▶ Transposer Unit SBUF

Transposer Unit (one IF only):

IF_{vision} MHz	38.9[1])	38.9[2])	45.75	32.7[2])
19" bench model				
50 Ω	292.8011.52	292.8011.58	293.8215.52	293.8415.56
75 Ω	292.8011.72	292.8011.78	293.8215.72	293.8415.76
19" rackmount				
50 Ω	292.8011.51	292.8011.57	293.8215.51	293.8415.55
75 Ω	292.8011.71	292.8011.77	293.8215.71	293.8415.75

Transposer Unit, two-standard version (IF switch-selected):

$IF_{vision\ 1}$/$IF_{vision\ 2}$ MHz	38.9/45.75	38.9/32.7	45.75/32.7
19" bench model 50 Ω	292.8011.54	292.8011.56	293.8215.56
75 Ω	292.8011.74	292.8011.76	293.8215.76
19" rackmount 50 Ω	292.8011.53	292.8011.55	293.8215.55
75 Ω	292.8011.73	292.8011.75	293.8215.75

[1]) Please enquire for IF_{vision} = 38.0 MHz.
[2]) Can be switch-selected to lower or upper sideband.

Please enquire for further standards and special versions.

Accessories supplied connecting cable (50 Ω) 292.8970.00, power cord 025.2365.00

Recommended extras

CATV Broadband Amplifier AKF (for specifications see left)	
Input 50 Ω, output 50 Ω	262.9010.52
Input 50 Ω, output 75 Ω	262.9010.72
Input 75 Ω, output 75 Ω	262.9010.73
30-way female connector	063.9770.00 (with shell)
Three-way male connector	019.0458.00 (AF line jack)