ROHDE&SCHWARZ

Test and Measurement
Division

Supplements to the FSP Operating Manual TV-Demodulator

FSP-B6

1129.8642.02

Dear FSP Customer,

The following collection of pages is intended to supplement your FSP operating manual.

Printed in the Federal
Republic of Germany

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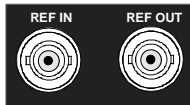
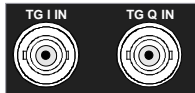|		
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Reserved for options	

Option FSP-B6 - TV- and RF-Trigger

Option TV- and RF-Trigger supplies the FSP with the capability of triggering on TV signals or on the presence of a RF carrier outside the resolution bandwidth.

For this purpose the hardware board is equipped with a TV demodulator, which produces the trigger signals necessary for analysis of TV signals. In addition to the pure trigger function the board also creates a demodulated CCVS video signal for operation of external TV monitors. Apart from using the internal IF for creating the trigger signals the FSP can also make use of an externally supplied CCVS signal; the corresponding connector is placed at the rear panel of the instrument.

In order to display different sections of a TV video signal, the FSP derives several trigger signals from the video signals. This allows triggering as well on the frame repetition as on each line of the TV video signal.

Additionally the option includes a broadband RF detector (bandwidth = 80 MHz), which allows triggering on a carrier signal far away from the selected frequency range. This RF power trigger can be used as long as the RF signal at the input mixer is in the range of -10 dBm to –50 dBm. The resulting range for the input signal at the RF input connector can be calculated using the following formula:

$$Mixerlevel_{min} + RFAtt - \Pr eampGain \ \leq \ Input \ Signal \ \leq \ Mixerlevel_{max} + RFAtt - \Pr eampGain$$

Configuration of the TV- Trigger

The configuration menu for TV and RF trigger settings can be reached with key sequence *TRIG – NEXT – TV TRIG SETTINGS::*

TRIG - NEXT Menü:

```
TV TRIG
SETTINGS
```
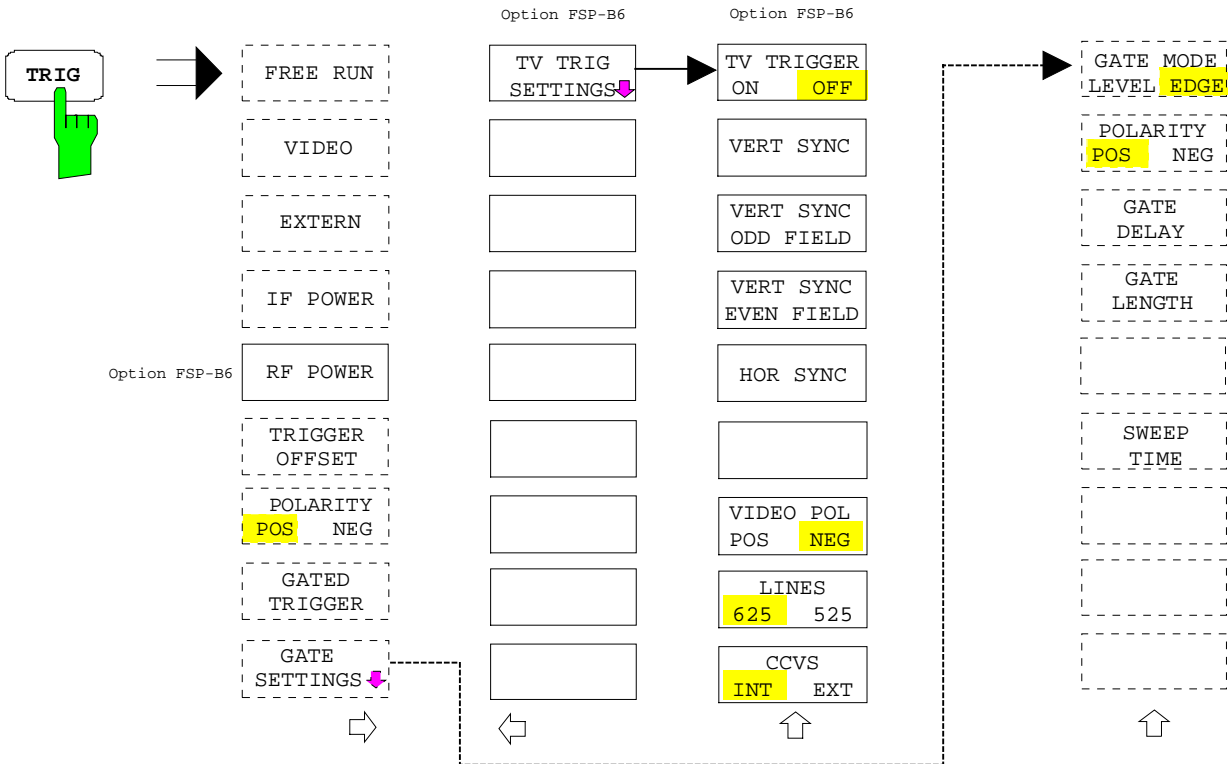
Softkey *TV TRIG SETTINGS* switches the TV trigger on and opens a submenu for configuration of the TV signal parameters.

Note:
Triggering on TV signals is only possible in time domain (span = 0 Hz). Therefore the softkey TV TRIG SETTINGS is without function in frequency domain.
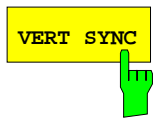
IEC/IEEE-bus command: `TRIG:SOUR  TV`

TV TRIG SETTINGS Submenu:

```
TV TRIGGER
ON    OFF
```
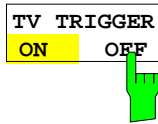
Softkey *TV TRIGGER ON/OFF* switches the TV Trigger on or off. When switching off the TV trigger the selected trigger source will be *FREE RUN.*

IEC/IEEE-bus command: `SENS:TV    ON | OFF`

```
VERT SYNC
```

Softkey *VERT SYNC* configures the trigger for the vertical sync signal. The FSP triggers on the frame repetition without distinction between the two fields.

IEC/IEEE-bus command: `TRIG:VID:FIEL:SEL ALL`

```
VERT SYNC
ODD FIELD
```

Softkeys *VERT SYNC ODD FIELD* and *VERT SYNC EVEN FIELD* configure the trigger for the vertical sync signal of the first or second field.

IEC/IEEE-bus command: `TRIG:VID:FIEL:SEL EVEN | ODD`

```
VERT SYNC
EVEN FIELD
```

```
HOR SYNC
```
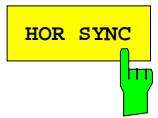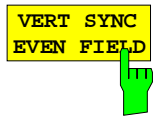
Softkey *HOR SYNC* configures the trigger for the horizontal sync signal and opens the data entry field for selection of the corresponding line.

The trigger can be set on any line number, which can be in the range of 1 to 525 or 1 to 625, depending on the line system. The maximum possible line number will be selected if the active range is exceeded.

In order to trigger on test line 17 according to CCIR 473-4, for example, the line value has to be set to 17. This is the default setting after switching on the TV trigger.

IEC/IEEE-bus command: `TRIG:VID:LINE:NUM 17`

```
VIDEO POL
POS   NEG
```

Softkey *VIDEO POL POS / NEG* selects the polarity of the video signal.

Positive video polarity is to be selected e.g. for standard L signals, negative video polarity for signals according to the standards B/G/I/M (color standard PAL or NTSC). Default setting is *VIDEO POL NEG.*
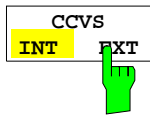
IEC/IEEE-bus command: `TRIG:VID:SSIG:POL NEG`
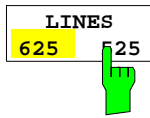
Softkey *LINES 625 / 525* selects the line system currently in use.

Default setting is *625 LINES*.

IEC/IEEE-bus command: `TRIG:VID:FORM:LPFR 625`

Softkey *CCVS INT / EXT* selects the input channel for the TV trigger input signal. An external CCVS signal can be supplied via the corresponding connector at the rear panel of the instrument.

IEC/IEEE-bus command: `SENS:TV:CCVS INT`

Configuration of the RF Power Trigger

The RF Power Trigger can be selected and configured in the trigger menu (*TRIG)* using the softkey *RF POWER*::
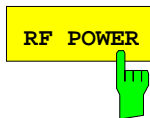
The *RF POWER* softkey activates triggering of the measurement via signals which are outside the measurement channel.

For this purpose the FSP uses a level detector at the first intermediate frequency. The detector threshold can be selected in a range between - 50 dBm and -10 dBm at the input mixer. The resulting trigger level at the RF input is calculated via the following formula:

$$Mixerlevel_{\min} + RFAtt - \Pr eampGain \ \leq \ Input\ Signal \ \leq \ Mixerlevel_{\max} + RFAtt - \Pr eampGain$$

The bandwidth at the intermediate frequency is 80 MHz. The FSP is triggered as soon as the trigger threshold is exceeded within a 40 MHz range around the selected frequency (= start frequency in the frequency sweep). Thus, the measurement of spurious emissions, eg for pulsed carriers, is possible even when the carrier lies outside the selected frequency span.

IEC/IEEE-bus command: `TRIG:SOUR   RFP`
                                             `SWE:EGAT:SOUR   RFP`

GPIB command set

Option Identification

*OPT?
> **OPTION IDENTIFICATION QUERY** queries the options included in the instrument and returns a list
> of the options installed. The options are separated from each other by means of commas.

Position	Option	
1	FSP-B3	Audio Demodulator
2	FSP-B4	OCXO
3		reserved
4	FSP-B6	TV- und RF-Trigger
5		reserved
6		reserved
7	FSP-B9	Tracking Generator 3 GHz / can be I/Q-modulated
8	FSP-B10	Ext. Generator Control
9...13		reserved
14	FSP-B16	LAN Interface
15...18		reserved
19		reserved
20...22		reserved
23	FSP-B25	Electronic Attenuator + 5dB Attenuator Steps
24...29		reserved
30	FS-K5	FS-K5 GSM-MS
31...40		reserved

Example:
B3,B4,0,B6,0,0,B9,B10,0,0,0,0,0,B16,0,0,0,0,0,0,0,0,B25,0,0,0,0,0,0,K5,0,0,0,0,0,0,0,0,0,0,0

SENSe:TV - Subsystem

This subsystem controls the TV trigger part of option FSP-B6 (TV and RF trigger). The setup of the individual trigger parameters is included in subsystem *TRIG*ger.

COMMAND	PARAMETERS	UNIT	COMMENT
[SENSe<1|2>]			
:TV			Option TV- und RF-Trigger
[:STATe]	<Boolean>	--	
:CCVS	INTernal	EXTernal	--	

[SENSe<1|2>:]TV[:STATe]ON | OFF

This command switches triggering on TV signals on or off.

Example: "TV ON"

Characteristics: *RST-Wert: OFF
                        SCPI: gerätespezifisch

Modes: A-T

This command is only available with option FSP-B6 (TV- and RF-Trigger).

[SENSe<1|2>:]TV:CCVS INTernal | EXTernal

This command selects between an internal and an external CCVS signal as TV demodulator input signal.

Example: "TV EXT"

Characteristics: *RST-Wert: INT
                        SCPI: gerätespezifisch

Modes: A-T

This command is only available with option FSP-B6 (TV- and RF-Trigger).

TRIGger - Subsystem

TRIGger<1|2>[:SEQuence]:SOURce   IMMediate | EXTernal | VIDeo | IFPower | RFPower | TV

This command selects the trigger source for the start of a sweep.

Note:

➢ *This function is not available during GSM measurements. The trigger source selection has to be done with the command TRIGger<1|2>[:SEQuence]:SYNChronize:ADJust..*

➢ *The selection RFPower or TV is only available with option FSP-B6 (TV- and RF-Trigger).*

Parameter:	IMMediate =	automatic triggering the next measurement at the end of the previous one.The value IMMediate corresponds to the FREE RUN setting.
	EXTernal =	the next measurement is triggered by the signal at the external trigger input.
	VIDeo =	the next measurement is triggered by the detection of a signal at the video filter output.
	IFPower =	the next measurement is triggered by the detectíon of a signal at the instrument IF (10 MHz bandwidth)
	RFPower =	the next measurement is triggered by the detectíon of a signal at the instrument RF (80 MHz bandwidth)
	TV =	the next measurement is triggered by the detectíon of a TV signal according to the settings of the `TRIGger:SEQuence:VIDeo`-subsystem

Example:	`"TRIG:SOUR EXT"`	selects the external trigger input as source of the trigger signal

Characteristics:	*RST value:	IMMediate
	SCPI:	conforming

Mode: all, except GSM

TRIGger<1|2>[:SEQuence]:LEVel:RFPower   -50 to –10DBM

This command sets the level of the RF power trigger source.

Example:	`"TRIG:LEV:RFP –20DBM"`

Characteristics:	*RST value:	-20 DBM
	SCPI:	device-specific

Mode: all

This command is only available with option FSP-B6 (TV- and RF-Trigger).

TRIGger<1|2>[:SEQuence]:VIDeo:FORMat:LPFRame   525 | 625

This command defines the line system in use (525 or 625 lines) with active TV trigger.

Example:	`"TRIG:VID:FORM:LPFR 525"`

Characteristics:	*RST-Wert:	
	SCPI:	conforming

Mode: A-T

This command is only available with option FSP-B6 (TV- and RF-Trigger).

TRIGger<1|2>[:SEQuence]:VIDeo:LINE:NUMBer   <numeric_value>

With active TV trigger this command activates triggering at the horizontal sync signal of the indicated line number.

Example: `"TRIG:VID:LINE:NUMB 17"`

Characteristics: *RST-Wert:
                      SCPI: conforming

Mode: A-T

This command is only available with option FSP-B6 (TV- and RF-Trigger).

TRIGger<1|2>[:SEQuence]:VIDeo:FIELd:SELect   ALL | ODD | EVEN

With active TV trigger this command activates triggering at the vertical sync signa.

The measurement is triggered on both fields with selection ALL, on odd fields with selection ODD and on even fields with selection EVEN.

Example: `"TRIG:VID:FIEL:SEL ALL"`

Characteristics: *RST-Wert:
                      SCPI: conforming

Mode: A-T

This command is only available with option FSP-B6 (TV- and RF-Trigger).

TRIGger<1|2>[:SEQuence]:VIDeo:SSIGnal:POLarity   NEGative | POSitive

With active TV trigger this command selects the polarity of the video sync signal.

Example: `"TRIG:VID:SSIG:POL NEG "`

Characteristics: *RST-Wert:
                      SCPI: conforming

Mode: A-T

This command is only available with option FSP-B6 (TV- and RF-Trigger).

Contents - Chapter 8 "Maintenance and Instrument Interfaces"
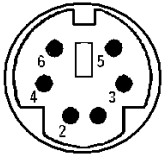
8 Maintenance and Instrument Interfaces

External Trigger Input (EXT TRIG/GATE)

The EXT TRIG/GATE connector is used for controlling the measurement via an external signal. The trigger voltages are TTL level (Low < 0.7 V, High > 1.4 V), typ. input impedance is 10 kOhm

Mouse Connector (MOUSE)

A PS/2 connector is provided at the rear panel to connect a PS/2 mouse:

Pin	Signal
1	MOUSEDATA
2	KEYBOARDDATA
3	MOUSEGND
4	MOUSEVD5
5	MOUSECLK
6	KEYBOARDCLK

Fig 8-7   Pin assignments for the MOUSE connector.

Reference Output/Input (REF IN and REF OUT)

For operation with an external reference, the internal reference oscillator is then synchronized to the 10-MHz reference applied to the connector. The necessary level is > 0 dBm.

The internal 10 MHz reference signal is also available at the REF OUT connector and thus provides the capability of, e.g., synchronization of external instruments to the FSP. The output level is 0 dBm.

Selection between internal and external reference is possible in the *SETUP* menu.

IF Output 20.4 MHz (20.4 MHz OUT)

The 2o,4 MHz IF signal of the FSP is available at the 20.4 MHz OUT BNC connector. The bandwidth corresponds to the selected bandwidth for a resolution bandwidth between 100 kHz and 10 MHz. For a resolution bandwidth below 100 kHz, the bandwidth of the output is 2.6 times the resolution bandwidth with a minimum of 2.6 kHz.

The signal level at the IF output is 0 dBm for resolution bandwidth $\geq$ 100 kHz, and −10 dBm for resolution bandwidth < 100 kHz (mixer level $\geq$ 60 dBm) .

Note: *This output is replaced by connector CCVS IN/OUT if option FSP-B6 is built in.*

CCVS Input and Output (CCVS IN/OUT, Option FSP-B6)

The BNC connector CCVS IN/OUT can be switched at CCVS input or CCVS output. If TV triggering is switched on, the demodulated TV signal is available for operating a CCVS monitor, provided triggering is set to the internal demodulation signal (CCVS INT). In case of TV triggering to an externally fed CCVS signal (CCVS EXT), the connector serves as an input.