# PROFESSIONAL SATELLITE CONTROL UNIT

## PSCU 6000

PROFESSIONAL


Grundig SAT Systems

# CONTENTS

# GENERAL

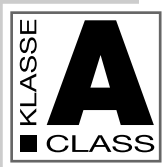
## Scope of delivery

1 professional satellite control unit PSCU 6000
1 user manual

## Optional accessories

GRUNDIG plug-in power supply unit SNT 10, order no. 29633-837.0100
GRUNDIG remote control unit PRCU 8, order no. GAH4400
– PC programme PRCU included

## Technical data





**This product conforms with the requirements of the 73/23/EC and 89/336/EC guidelines of the European Council.**
**The standards EN 50083-2, EN 50083-2/A1, EN 50083-1, and EN 60065 required for the CE certification are kept to.**

**Measurement device for analog TV picture carriers (AM)**

| | |
|---|---|
| Input frequency range: | 48.25 MHz ... 855.25 MHz |
| Channels: | C2–C69, S2–S41 |
| Input level range: | min. 60 dBµV, max. 80 dBµV |

**Measurement device for digital TV picture carriers (QAM)**

| | |
|---|---|
| Input frequency range (centre frequency): | 306.00 MHz ... 858.00 MHz |
| Symbol rate: | 1.5 ... 7 MSymbols/second |
| Modulation mode: | 16/32/64/128/256 QAM |
| Input level range: | min. 60 dBµV, max. 80 dBµV |

**Measurement device for FM carriers**

| | |
|---|---|
| Input frequency range: | 87.5 MHz ... 108 MHz |
| Input level range: | min. 60 dBµV, max. 80 dBµV |

**Common measurement input**

| | |
|---|---|
| Input impedance: | 75 Ω |
| Adjustment: | min. 9.5 dB |

**Measurement output**

| | |
|---|---|
| Output impedance: | 75 Ω |
| Adjustment: | min. 9.5 dB |
| Active amplification (measurement input on measurement output): | – 2 dB to + 2 dB |
| Passive amplification (measurement input on measurement output): | – 5 dB to – 1 dB |
| Decoupling (measurement output on measurement input): | 30 dB |

**Video and audio output**

| | |
|---|---|
| Video output impedance: | 75 Ω |
| Video output voltage: | 1 Vpp |
| Audio output impedance: | 1 kΩ |
| Audio output voltage – at 50 kHz deviation (TV sound carrier), or 75 kHz deviation (FM) with open circuit: | min. 1 Veff, max. 2 Veff |
| Deemphasis: | 50 µS |

**Continued on next page.**

## Technical data (continued)

**Video and audio input**

| | |
|---|---|
| Video input impedance: | 75 Ω |
| Video input voltage: | 1 Vpp |
| Audio input impedance: | 22 kΩ |
| Audio input voltage: | min. 1 Veff, max. 2 Veff |

**Modulator output**

| | |
|---|---|
| Impedance: | 75 Ω |
| Frequency range: | 471.25 MHz ... 855.25 MHz |
| Channels: | C21–C69 |
| Output level: | typ. 100 dBµV |
| – the modulator can be switched off | |

**Power supply**

| | |
|---|---|
| Internal | |
| – via 10-pin connector: | +12 V |
| External | |
| – via DC IN socket: | +10 V to +30 V, max. 700 mA |
| Power consumption: | typ. 5 Watt |

**Connectors, control elements, display:**

| | |
|---|---|
| RF input: | 1 IEC connector, female |
| RF output (measurement output): | 1 IEC connector, male |
| RF output (modulator): | 1 IEC connector, female |
| Video (input/output socket): | 1 Chinch socket |
| Audio (input/output socket): | 1 Chinch socket |
| Push button: | starts the channel search |
| DC IN (low-voltage socket): | outer diameter 5 ... 6 mm<br>inner diameter 2.1 mm |
| LED (green): | normal operation/channel search |
| 9-pin Sub-D socket RS 232: | serial interface |
| – Baud rate: | 9600 Bit/second |
| – Data bits: | 8 |
| – Parity: | no |
| – Stop bit: | 1 |
| – Protocol: | Xon/Xoff |
| 10-pin connector: | for all supply voltages and the $I^2C$ bus |

**Note:**
It is possible to connect the GRUNDIG remote control unit PRCU 8 (optional accessory) to the 9-pin Sub-D socket RS 232 (serial interface) on the front panel of the satellite control unit.
A software update for the satellite control unit is carried out via a PC or Notebook connected to the same socket.

## The professional satellite control unit PSCU 6000

The professional satellite control unit is operated inside the GRUNDIG professional headend stations PSU 8 and PSU 12.

The professional satellite control unit PSCU 6000 is used for controlling the output signal of a wideband cable system in the frequency range of 47 – 862 MHz.

In addition, an info channel about the channel assignment of the cable system including the station name which is determined via the RDS or VPS data, is processed and fed into the cable network.
The following parameters are controlled:
– Analog TV channels: RF level and synchronization pulse.
– Digital TV channels: RF level, BER (Bit Error Rate).
– Radio programmes: RF level.

With the help of a PC or Notebook, the optional accessory GRUNDIG remote control unit PRCU 8, and the GRUNDIG PC programme PRCU, it is very convenient to set up the satellite control unit's configuration (see also page 12 of this user manual).

### The channel search

**Important!**
To ensure a high measurement accuracy for the channel search, the professional satellite control unit must be in operation for about 30 minutes so that it can reach its optimum operating temperature.

The search function for the creation of an info channel is started with the push button on the front panel of the satellite control unit. Press and hold down the push button for about 5 seconds to prevent an inadvertent overwriting of the channel table.
During the search function, the green LED on the front panel of the satellite control unit is flashing. In normal operation, it is constantly lit.
The search function can take up to 10 minutes.

The search starts with the analog TV channels in ascending channel order:
channels C2 ... C4, special channels S2 ... S10, channels C5 ... C12, special channels S11 ... S41, and finally the channels C21 ... C69.
As criteria for the analog TV channels, the synchronization pulse and the RF level are used. The station name is determined via the VPS identification signal. The RF level is measured and stored as reference value for the control function.
For analog TV channels without VPS identification signal, blanks are entered as station name.

**Continued on next page.**

When the search for analog channels is completed, digital TV channels in the frequency range of 306.00 MHz to 858.00 MHz are searched in steps of 8 MHz.
The criteria for digital TV channels are the RF level and the fact that the tuner „locks" on one of the different modulation modes and symbol rates.
The centre channel frequency and the symbol rate are displayed. The RF level is measured and stored as reference value for the control function.
Meaning of the letters:

A = 64 QAM/6.900 MSymbols/second
B = 64 QAM/6.875 MSymbols/second
C = 64 QAM/6.111 MSymbols/second
D = 128 QAM/6.547 MSymbols/second

The search finally explores the frequency range of 87.5 MHz to 108 MHz in steps of 50 kHz for FM radio programmes.
The RF level is used as criterium for FM programmes. If a radio programme is found, the satellite control unit tries to determine the station name via the RDS data. The RF level is measured and stored as reference value for the control function.
For FM stations without RDS identification signal, blanks are entered as station name.

## The »Info Channel« OSD menu

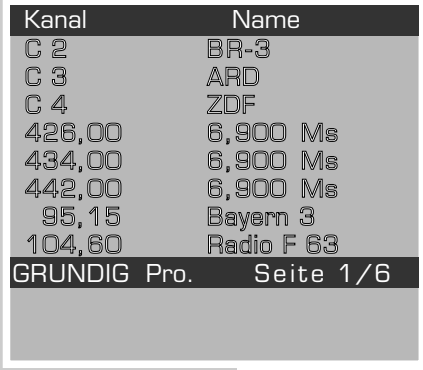
When the search function is completed, the following channel data is displayed in the »Info Channel« OSD menu
(in the example in the »extended« display mode).


With analog TV channels:
channel, station name, RF level in dBµV.

With digital TV channels:
centre channel frequency in MHz, symbol rate in MSymbols/second, BER (Bit Error Rate), and RF level in dBµV.
– If "Err." (Error) appears under BER, the digital channel has been recognized, but it is currently not „locked".

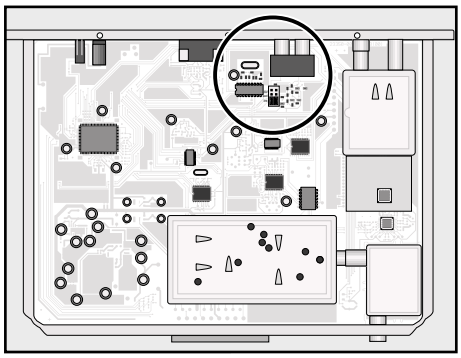
With FM radio programmes:
frequency in MHz, station name, RF level in dBµV.

The corresponding measurement values are updated after every menu page.



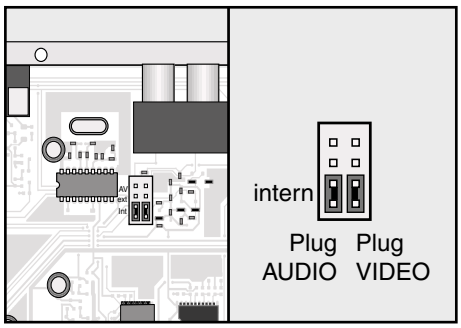

In »normal« display mode of the »Info Channel« menu, no RF level (dBµV) and BER (Bit Error Rate) are shown. However, the measurement for the control function is carried out in the background.

# INSTALLATION

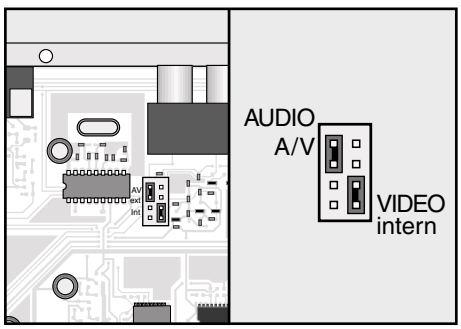


**1** Undo the fixing screws of the satellite control unit's cover (component side) then remove the cover.

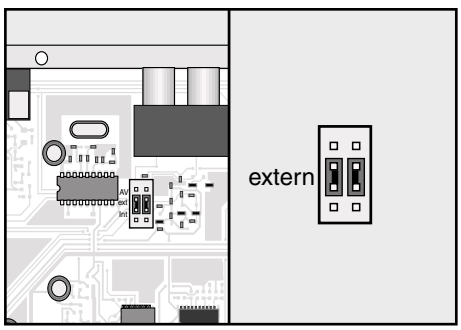
**The following audio and video settings are possible by changing the jumper configuration:**



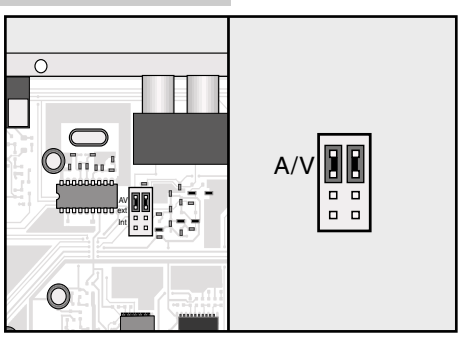

**Position »intern«** (factory setting):
The info channel is fed into the cable system only via the output channel set on the modulator.
Check:
Connect the TV set to the RF output socket of the cable system.




**Positions »Audio A/V« and »Video intern«:**
External audio signals can be fed via the »**AUDIO**« input socket into the cable system to provide the picture of the info channel with music background.
Check:
Connect the TV set to the RF output socket of the cable system.

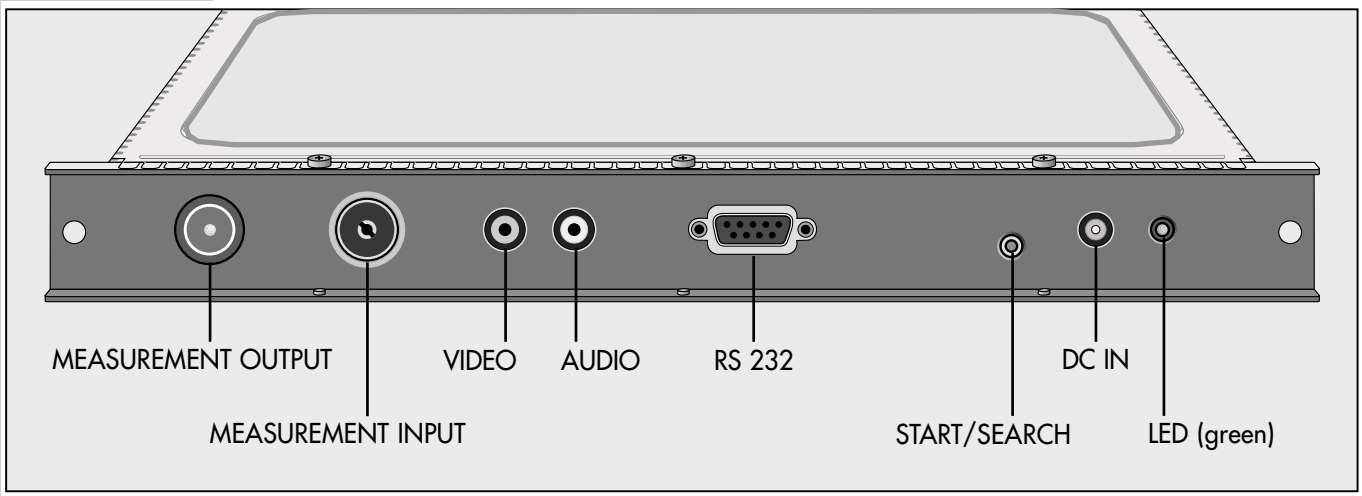



**Position »extern«:**
The info channel is emitted only via the output sockets »**AUDIO**« and »**VIDEO**« of the satellite control unit.
Check:
Connect the TV set/monitor to the output sockets »**AUDIO**« and »**VIDEO**« .




**Position »A/V«:**
External video and audio signals can be fed into the cable system via the input sockets »**AUDIO**« and »**VIDEO**« of the satellite control unit. In this case, no info channel can be displayed.

**Continued on next page.**




## Installing the satellite control unit into the headend station and connecting it

**Attention!**
**Before fitting a new satellite control unit or replacing one, it is absolutely necessary to disconnect the headend station from the mains socket.**

**Important!**
To ensure a high measurement accuracy, heating up of the satellite control unit should be kept as low as possible.
We recommend to fit the satellite control unit into the first plug-in location of the headend station (at the left, seen from the front).

**1** Remove the fixing screws from the holding frame of the headend station, insert the satellite control unit into the first plug-in location, and then fix it with the screws.

**2** Connect the RF socket »**MESSAUSGANG**« (Measurement output) of the GRUNDIG hybrid amplifier PAMP 4 of the cable system with the RF socket »**MESSEINGANG**« (Measurement input) of the satellite control unit using an RF cable.

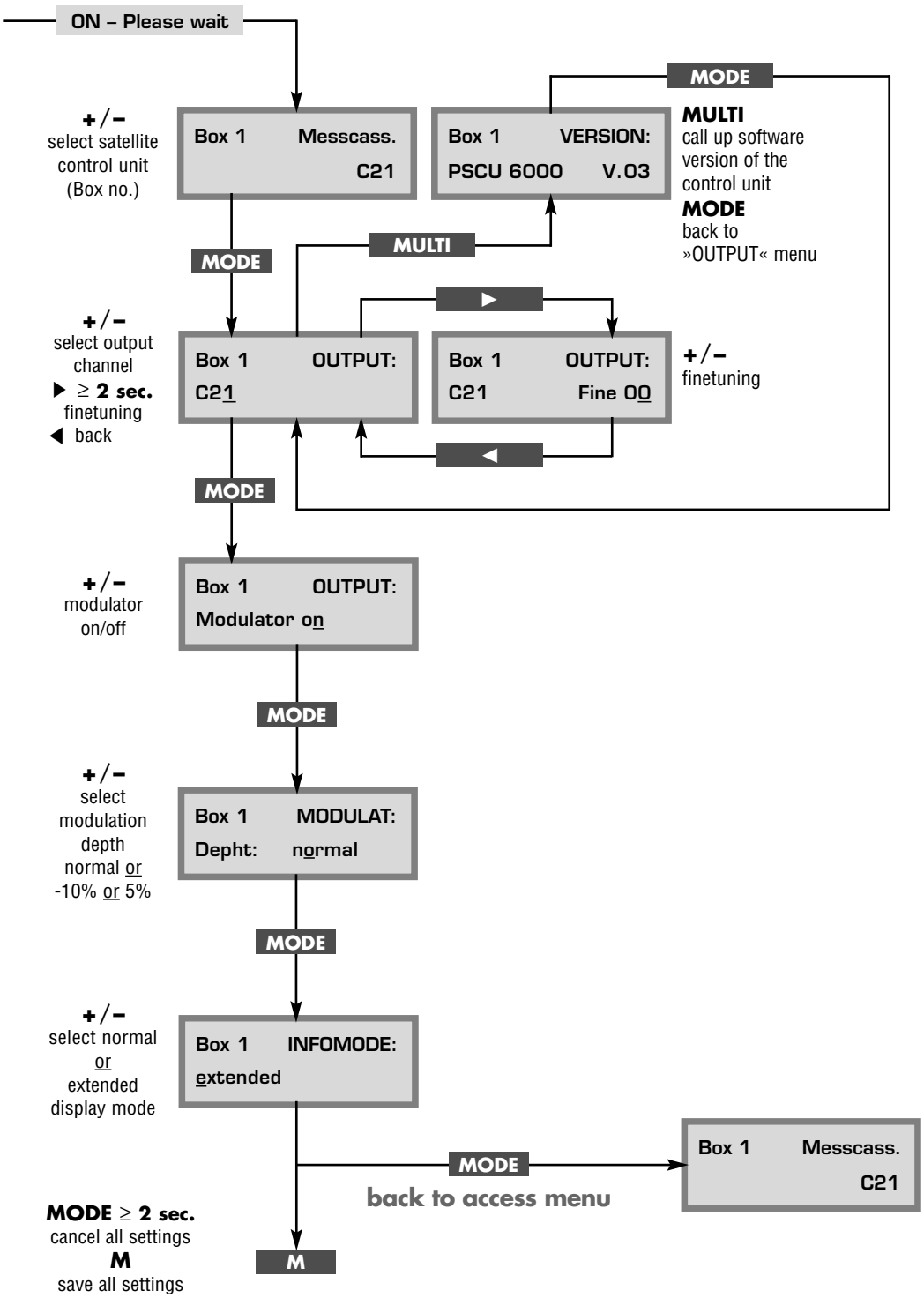
**Important!**
The input level of the satellite cocntrol unit is not allowed to exceed 80 dBµV. If necessary, plug a commercially available level control into the RF input socket of the satellite control unit and adjust the input level accordingly.

**3** Reconnect the headend station with the power supply.
– The satellite control unit is now connected with all required supply voltages and data lines and ready for use. The green LED is lit.

**Note:**
It is possible to connect an additional power supply (e.g. GRUNDIG plug-in power supply unit SNT 10) via the »**DC IN**« input socket of the satellite control unit to ensure the control function of the system even if the internal power supply fails to operate.

# THE MENU GUIDE


**Note:**
Press the »**MODE**« button to select menus or menu items. To return to the access menu without saving the settings, press the »**MODE**« button longer than 2 seconds.
When in a menu, use the »◄« and »►« buttons to select the desired parameters, and then the »**+** or **–**« button to change the settings.
To return to the access menu and save all settings, press the »**M**« button.




Continued on next page.

## Settung up the satellite control unit


The satellite control unit is set up with the buttons of the headend station's control panel.
The user is guided via the 2-line display of the control panel.

The following menu items can be selected:
– Access menu, select satellite control unit (Box no.).
– Call up software version of the box.
– Select output channel, finetuning.
– Modulator (output channel) off/on.
– Select modulation depth.
– Select »Info Channel« display mode.
– Save all settings.

### The access menu – selecting the box number

After switching on the headend station, the access menu appears in the headend station's control panel.

| | |
|---|---|
| Box 1 | Messcass. |
| | C21 |

1 Use the »**+** or **–**« button to select the box number (number of the satellite control unit), e.g. »Box 1 Messcass.«.

### Selecting the output channel

| | |
|---|---|
| Box 1 | OUTPUT: |
| C21 | |

1 Press the »**MODE**« button. The »OUTPUT:« menu appears in the display.

2 Use the »**+** or **–**« button to select the desired output channel.

### Finetuning

**Attention!**
The finetuning setting should be changed only in exceptional cases, as a corresponding finetuning adjustment must be carried out on all TV sets connected to the cable system.

| | |
|---|---|
| Box 1 | OUTPUT: |
| C21 | Fine 00 |

1 Press and hold down the »►« button until »Fine 00« appears in the display, and then use the »**+**« or »**–**« button to change the finetuning setting. Press the »◄« button to return to the output channel display.

### Calling up the software version of the box

| | |
|---|---|
| Box 1 | VERSION: |
| PSCU 6000 | V.03 |

1 If desired, the software version of the satellite control unit (box) can be called up by pressing the »**MULTI**« button.
– In the display appears "VERSION V.03", for example.

### Modulator off/on

| | |
|---|---|
| Box 1 | OUTPUT: |
| Modulator on | |

1 Press the »**MODE**« button. The »OUTPUT:« menu appears in the display.

2 Using the »**+**« or »**–**« button it is possible to switch the modulator (output channel) of the satellite control unit (box) off and on again.

## Selecting the modulation depth

If a picture-contents-dependent hum is audible, this can be suppressed by lowering the modulation depth.

| Box 1 | MODULAT: |
|---|---|
| Depth: | normal |

1 Press the »**MODE**« button. The »MODULAT:« menu along with, e.g. »Depth: normal«, appears in the display.

2 Use the »**+**« or »**–**« button to select the modulation depth (normal, -5%, or -10%).

## Selecting the »Info Channel« display mode

| Box 1 | INFOMODE: |
|---|---|
| extented | |

1 Press the »**MODE**« button. The »INFOMODE:« menu appears in the display.

2 Use the »**+**« or »**–**« button to select the »normal« or »extended« display mode of the »Info Channel.

## Saving all settings

**Attention!**
If you wish to restore all old settings, press and hold down the »**MODE**« button until the access menu, »Box 1 Messcass.« for example, re-appears in the display.
– The old settings are restored.

| Box 1 | Messcass. |
|---|---|
| | C21 |

1 Press the »**M**« button to save all new settings.
– The access menu, »Box 1 Messcass.« for example, re-appears in the display.

# Starting the channel search

Before starting the channel search, the professional satellite box must be in operation for about 30 minutes so that it can reach its optimum operating temperature.

The search function explores all boxes fitted into the headend station for the set TV and radio channels and lists all channels in the »Info Channel« menu.

1 Press and hold down for about 5 seconds the push button on the front panel of the satellite control unit to start the channel search.

With analog TV channels, the channel number (e.g. C59) is displayed in the bottom menu row.

| Kanal | Name | BER | dBµV |
|---|---|---|---|
| C 2 | BR-3 | | 63 |
| C 3 | ARD | | 62 |
| C 4 | ZDF | | 64 |
| 426,00 | 6,900 Ms 1 e-7 | | 51 |
| 426.0 MHz A | | Seite 1/1 | |

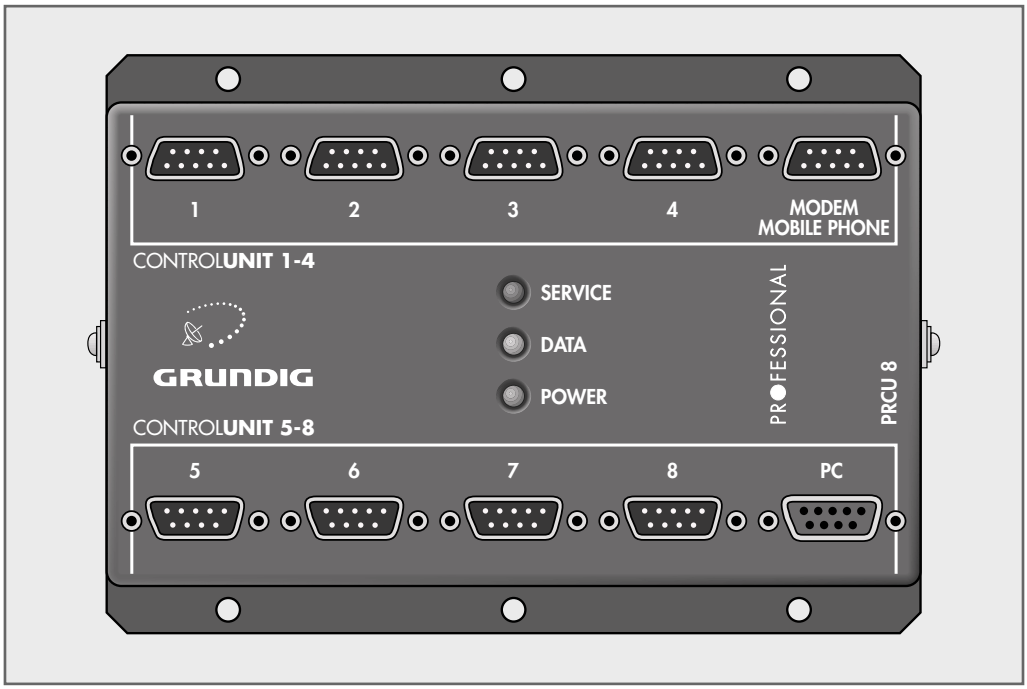
With digital TV channels, the bottom row of the menu indicates the centre channel frequency (MHz), the modulation mode, and the symbol rate (A) of the currently measured digital TV channel.
Meaning of the letters:

A = 64 QAM/6.900 MSymbols/second
B = 64 QAM/6.875 MSymbols/second
C = 64 QAM/6.111 MSymbols/second
D = 128 QAM/6.547 MSymbols/second

With radio programmes, the bottom menu row indicates the frequency (MHz).

The search may take up to 10 minutes. Please wait!
During the search, the green LED on the front panel of the satellite control unit flashes.
When the search is completed, the green LED is permanently lit.

# OPTIONAL ACCESSORIES




## The GRUNDIG remote control unit PRCU 8

It is possible to connect to the GRUNDIG remote control unit PRCU 8 the following equipment:
1 PC or Notebook, 1 analogue modem professional or 1 GSM modem, 8 basic satellite units, or 7 basic satellite units plus 1 satellite control unit PSCU 6000.
With the help of the PC or Notebook along with the remote control unit PRCU 8, the professional satellite control unit PSCU 6000, and the GRUNDIG PC programme PRCU, it is possible to remotely configure and monitor the cable system in a very convenient way.
The PC programme PRCU requires the following system conditions:
– Operating system Windows 95/98/ME/2000/XP.
– Serial interface (Sub-D socket RS 232).

### Remote configuration of the cable system

Editing the channel list of the satellite control unit:
– Add new channels .
– Delete existing channels.
– Enter the modulation mode and symbol rate for the manual search.
– Change the station name.
– Automatic combination of the channel lists of the satellite control unit and of the connected headend stations.
– Display of the current RF level of a selected channel.
– Entry of an input attenuation to display the actual RF level of the cable system if the RF input level of the satellite control unit had to be attenuated before.

### Remote monitoring of the cable system

– Entry of a minimum or maximum tolerance in dB. If the level exceeds or falls below this tolerance range, an alarm message is transmitted as SMS or Telefax to a layed down telephone number.
– Entry of a waiting time until the alarm message is to be transmitted.
– Monitoring activation/deactivation of individual channels.
– Documentation of the entire system with channel lists and setup data of all boxes.

## Kanal-/Frequenztabelle, Hyperband
## Channel/Frequency Table, Hyperband

| Kanal<br>Channel | Frequenz **Kanalmitte** in MHz<br>**Channel centre** frequency in MHz | (Frequenz Bildträger in MHz)<br>(Picture carrier frequency in MHz) |
|---|---|---|
| S 21 | **306,00** | (303,25) |
| S 22 | **314,00** | (311,25) |
| S 23 | **322,00** | (319,25) |
| S 24 | **330,00** | (327,25) |
| S 25 | **338,00** | (335,25) |
| S 26 | **346,00** | (343,25) |
| S 27 | **354,00** | (351,25) |
| S 28 | **362,00** | (359,25) |
| S 29 | **370,00** | (367,25) |
| S 30 | **378,00** | (375,25) |
| S 31 | **386,00** | (383,25) |
| S 32 | **394,00** | (391,25) |
| S 33 | **402,00** | (399,25) |
| S 34 | **410,00** | (407,25) |
| S 35 | **418,00** | (415,25) |
| S 36 | **426,00** | (423,25) |
| S 37 | **434,00** | (431,25) |
| S 38 | **442,00** | (439,25) |
| S 39 | **450,00** | (447,25) |
| S 40 | **458,00** | (455,25) |
| S 41 | **466,00** | (463,25) |

## Kanal-/Frequenztabelle, Band IV/V, CCIR
## Channel/Frequency Table, Band IV/V, CCIR

| Kanal<br>Channel | Frequenz **Kanalmitte** in MHz<br>**Channel centre** frequency in MHz | (Frequenz Bildträger in MHz)<br>(Picture carrier frequency in MHz) |
|---|---|---|
| C 21 | **474,00** | (471,25) |
| C 22 | **482,00** | (479,25) |
| C 23 | **490,00** | (487,25) |
| C 24 | **498,00** | (495,25) |
| C 25 | **506,00** | (503,25) |
| C 26 | **514,00** | (511,25) |
| C 27 | **522,00** | (519,25) |
| C 28 | **530,00** | (527,25) |
| C 29 | **538,00** | (535,25) |
| C 30 | **546,00** | (543,25) |
| C 31 | **554,00** | (551,25) |
| C 32 | **562,00** | (559,25) |
| C 33 | **570,00** | (567,25) |
| C 34 | **578,00** | (575,25) |
| C 35 | **586,00** | (583,25) |
| C 36 | **594,00** | (591,25) |
| C 37 | **602,00** | (599,25) |
| C 38 | **610,00** | (607,25) |
| C 39 | **618,00** | (615,25) |
| C 40 | **626,00** | (623,25) |
| C 41 | **634,00** | (631,25) |
| C 42 | **642,00** | (639,25) |
| C 43 | **650,00** | (647,25) |
| C 44 | **658,00** | (655,25) |
| C 45 | **666,00** | (663,25) |
| C 46 | **674,00** | (671,25) |
| C 47 | **682,00** | (679,25) |
| C 48 | **690,00** | (687,25) |
| C 49 | **698,00** | (695,25) |
| C 50 | **706,00** | (703,25) |
| C 51 | **714,00** | (711,25) |
| C 52 | **722,00** | (719,25) |
| C 53 | **730,00** | (727,25) |
| C 54 | **738,00** | (735,25) |
| C 55 | **746,00** | (743,25) |
| C 56 | **754,00** | (751,25) |
| C 57 | **762,00** | (759,25) |
| C 58 | **770,00** | (767,25) |
| C 59 | **778,00** | (775,25) |
| C 60 | **786,00** | (783,25) |
| C 61 | **794,00** | (791,25) |
| C 62 | **802,00** | (799,25) |
| C 63 | **810,00** | (807,25) |
| C 64 | **818,00** | (815,25) |
| C 65 | **826,00** | (823,25) |
| C 66 | **834,00** | (831,25) |
| C 67 | **842,00** | (839,25) |
| C 68 | **850,00** | (847,25) |
| C 69 | **858,00** | (855,25) |

**GSS Grundig SAT Systems GmbH** • Beuthener Str. 43 • D-90471 Nürnberg • http://www.gss.tv