Tracking

Software Option   897 806

Operating Instructions

(60_strack)   Doc. Version: 9609-101-A

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Supplement to operating manual; file under Chapter 10

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Introduction

If STABILOCK 4031/4032 is fitted with the tracking option, frequency-related network analyses can be performed, eg graphic display of a filter curve. The Communication Test Set produces a sweep signal for the purpose, which has to be fed into the network that is being examined. At the same time the signal level following the network is measured and shown as a curve on the monitor of the Communication Test Set as a function of frequency.

Fig. 10.1:
Connection of a two-terminal
network to the Communication
Test Set.
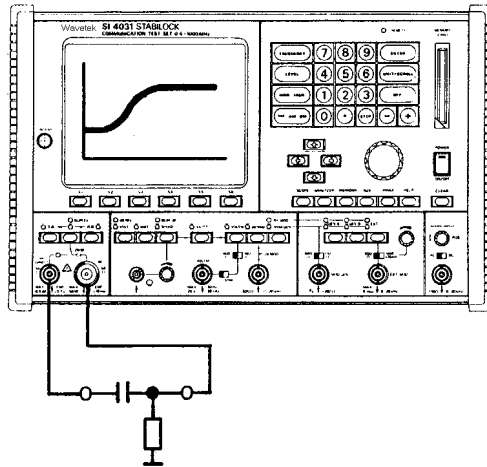
RF input/output sockets

☞ The choice of RF sockets on which the test signal is output and input depends on whether the Communication Test Set is fitted with the 2.3-GHz frequency extension option.

RF input/output sockets for tracking			
with 2.3-GHz frequency range extension		**without** 2.3-GHz frequency range extension	
Output:	RF socket	Output:	RF DIRECT socket
Input:	RF DIRECT socket	Input:	RF socket

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Preparations

Firmware requirements

The software option sets up on the firmware of the Communication Test Set. So check that the firmware of your STABILOCK meets the conditions stated below.

Check procedure ❍ Call up the STATUS mask: [AUX]+{DEF. PAR}+{STATUS}
  ❍ Check for the following entries under SOFTWARE-VERSIONS:

STABILOCK 4031	**STABILOCK 4032**
HOST-MCU $\geq$ 4.13	HOST-MCU $\geq$ 6.13
CRT-MCU $\geq$ 2.59*	CRT-MCU $\geq$ 2.59*
RF/AF-MCU $\geq$ 3.05**	RF/AF-MCU $\geq$ 5.05***

* $\geq$ 3.12 if the "fast spectrum analyzer" option is incorporated.

** $\geq$ 4.13 if the "2.3-GHz frequency range extension" is incorporated.

*** $\geq$ 6.13 if the "2.3-GHz frequency range extension" is incorporated.

If you have older firmware in any of these cases, contact the nearest Wavetek office.

Hardware requirements

The software option also makes certain requirements of the hardware of your Communication Test Set (HOST computer, SLAVE computer, MONITOR control). These requirements are checked automatically when you install the software. Any conflicts appear onscreen in plain text, enabling you to update with special-to-board firmware.

Compatibility

The software option is compatible with all STABILOCK models (serial number 1188000 and later). Existing functionality is not affected.

Software installation

The software option is a licensed application, so a separate procedure is necessary for installation on each STABILOCK Communication Test Set.

After installation on a Communication Test Set the memory card is no longer necessary for executing tracking.

⚠️ The installation is registered on the memory card. Dual installations are *not* possible. Accidental dual installation on one and the same Communication Test Set is recognized in good time by the installation program and prevented (**Fig. 10.2**).

☞ In any subsequent firmware update the software option installed on the Communication Test Set is maintained.

Fig. 10.2:
The installation program recognizes whether the option is already installed on a test set.

```
------ TRACKING INSTALLATION PROGRAM ------

 COPYRIGHT 1996 WAVETEK
 Wireless Communications Division



Checking configuration.

Configuration not ok.

TRACKING already present.          ⬅
Program terminated.

Please remove memory card.
```

```
 EXIT    EXIT    EXIT    EXIT    EXIT    EXIT
```

Installation instructions

1) Be careful when choosing the test set (STABILOCK 4031/4032) on which you want to install the software. Once it has been installed, the software can only be removed from the Communication Test Set at the Wavetek plant (Germany).

2) Check the position of the write protect switch on the memory card: write protection must *not* be activated (see STABILOCK manual, Chapter 7).

3) Power on the Communication Test Set and insert the memory card in the front panel slot.

4) Call up the MEMORY mask with [MEMORY].

5) Move the cursor bar to the TRACKING.SYS entry with the cursor keys and start installation with {RECALL}. The installation program then checks that the current configuration of the Communication Test Set meets requirements. If not, the screen will show which modules are affected (**Fig. 10.3**). Note any such messages and contact your nearest Wavetek office.

6) If the hardware check is ok, the installation program then checks the licence information on the memory card. If the card can be installed, this is indicated by Card valid.

7) If the licence check is ok, you will be asked if you are sure that the software really is to be installed on this particular Communication Test Set. {NO} enables you to abort installation (**Fig. 10.4**).

```
┌─────── TRACKING INSTALLATION PROGRAM ───────┐
│                                             │
│  COPYRIGHT 1996 WAVETEK                      │
│   Wireless Communications Division           │
│                                             │
│ Configuration not ok.                        │
│                                             │
│ RF/AF board needs newer firmware.            │
│ HOST board needs newer firmware.             │
│ Upgrade hardware and firmware.               │
│ Upgrade if-unit hardware.                    │
│                                             │
│ For update, please contact WAVETEK.          │
│                                             │
│ Installation aborted.                        │
│                                             │
│ Please remove memory card.                   │
│                                             │
└─────────────────────────────────────────────┘
```

EXIT   EXIT   EXIT   EXIT   EXIT   EXIT

Fig. 10.3: Example of a message that appears if hardware requirements are not satisfied.

```
┌─────── TRACKING INSTALLATION PROGRAM ───────┐
│                                             │
│  COPYRIGHT 1996 WAVETEK                      │
│   Wireless Communications Division           │
│                                             │
│                                             │
│ Checking configuration.                      │
│ Configuration check passed.                  │
│                                             │
│ Validate memory card.                        │
│ Card valid.                                  │
│ All tests passed. Ready to install.          │
│                                             │
│ Install TRACKING in this STABILOCK ?         │
│                                             │
│ Please answer with softkeys YES OR NO.       │
│                                             │
└─────────────────────────────────────────────┘
```

YES   YES   YES   NO   NO   NO

Fig. 10.4: Display of a memory card ready for installation and a last question before you proceed.

8) If you answer {YES}, the software is permanently installed on the Communica-
   tion Test Set. Once this has been completed, you will read TRACKING
   successfully installed (**Fig. 10.5**). After this remove the memory card
   and quit the installation program with {EXIT}. The Communication Test Set
   then reboots to enable the software option.

9) Keep the memory card in a safe place (card is proof of purchase) and note
   the expiry date of its backup battery (see STABILOCK manual, Chapter 7).

Fig. 10.5:
Following installation the installation pro-
gram prompts you to remove the
memory card.

```
-------- TRACKING INSTALLATION PROGRAM --------

 COPYRIGHT 1996 WAVETEK
 Wireless Communications Division


Validate memory card.
Card valid.
All tests passed. Ready to install.

Install TRACKING in this STABILOCK ?

Please answer with softkeys YES OR NO.

TRACKING successful installed.

Please remove memory card.
```

EXIT   EXIT   EXIT   EXIT   EXIT   EXIT

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Operation

Callup of tracking mask

First set STABILOCK 4031/4032 to duplex mode. Then tap the [ANALYZER] key. This no longer leads to the message Analyzer only on TX possible, but instead to display of the tracking mask. After a short pause, during which the message Calculating appears, display of the curve begins on the screen (if the test input is open, this will be a straight line at the bottom edge of the screen window). In the tracking mask.

[HELP] also briefly illuminates all entry fields. You can move to any entry field with the cursor keys. The entry field for the RF output level can also be positioned on with [LEVEL].
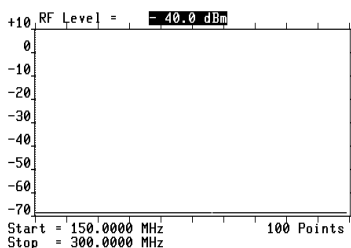
Fig. 10.6:
Tracking mask.

Setting RF output level

The numeric field RF Level at the top edge of the mask is for setting the RF output level on the Communication Test Set. Select the unit (dBm, dBµ, µV/mV) as in the basic RX mask. There is no limit to the RF output level, ie as long as the RF input level remains below defined values:

Maximum permissible RF input level	
with 2.3-GHz frequency range extension	**without** 2.3-GHz frequency range extension
−20 dBm on RF DIRECT socket	−10 dBm on RF socket

Higher input levels are limited by the duplex input stage and thus lead to unwanted compression of the displayed curve. It is especially important to remain within the maximum permissible RF input level when testing active (amplifying) networks.

Meaning of level scale

For relative level measurements the tracking mask shows a scale with 10-dB divisions along the left margin. Relative level measurement means that only level differences (in dB) can be measured, and not absolute levels (eg in dBm). A typical relative level measurement is that of tracing the –3-dB point in a filter curve. For exact measurement of level differences an adjustable marker line can be produced on the screen with the {MARKER} softkey.

The 0-dB mark on the scale corresponds approximately to a level of –10 dBm. (–20 dBm if the "2.3-GHz frequency range extension" is incorporated). Therefore a displayed curve may not exceed this mark if it is to be shown undistorted.

For analyzing passive networks it is best to set the scroll variable 0. Optimal use is then made of the tracking display window with dynamic range of 0 to –70 dB (see illustration).
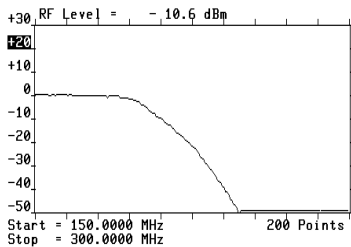

Fig. 10.7: Lowpass-filter curve plotted with the tracking function.
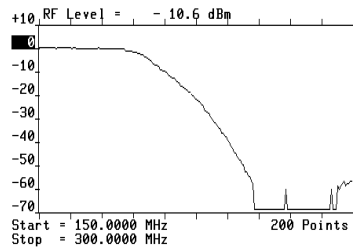

Fig. 10.8: When analyzing passive networks it is always best to spread the useful dynamic range to between 0 and –70 dB. Then the curve becomes visible in the lower level range.

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Setting start/stop frequencies

The start/stop frequency of the sweep signal is determined by the content of the appropriate numeric fields (bottom edge of mask). On the horizontal frequency axis of the tracking mask the start frequency is at the left edge of the mask and the stop frequency at the right edge.

without 2.3-GHz frequency range extension
Permissible values of start frequency: 27 MHz bis 998,9999 MHz
Permissible values of stop frequency: 28 MHz bis 999,9999 MHz

with 2.3-GHz frequency range extension
Permissible values of start frequency: 27 MHz bis 2,299 GHz
Permissible values of stop frequency: 28 MHz bis 2,300 GHz

After every alteration in the start/stop frequency the `Calculating` message appears for a few seconds in the status line before display of the curve commences. If inadmissible values are entered or if the sweep width (difference between start and stop frequency) is not at least 1 MHz, an error message will appear in the status line on the monitor.

Setting frequency resolution

The frequency resolution determines how precise a curve is displayed. The higher the frequency resolution, the more closely the displayed curve will correspond to the real characteristic. The frequency resolution is produced by the scroll field `Points` with the scroll variables `50`, `100` and `200`. The set scroll variable determines at how many frequency points on the displayed curve a measurement of level is made. This means that greater frequency resolution will always result in a slower update cycle for the curve, ie that alterations do not become visible until after a longish interval.

Meaning of softkeys

{MARKER}   Inserts a marking line with which the displayed curve can be precisely measured (level/frequency association). As long as the marker is visible, only the position of the marker can be varied with the spinwheel (scroll variables can no longer be selected). The current position of the marker is shown by the Marker Freq. display field, the associated relative level (referred to the 0-dB mark on the scale) appearing in the Level field.

{Calibr. }   No function at present.

{RETURN}   Takes you back to the mask that was previously active.

Fig. 10.9:
The marking line, which is adjustable with the spinwheel, permits exact measurement of relative level. The Marker Freq. field indicates the frequency at the current position of the marker, the Level field shows the corresponding relative level.
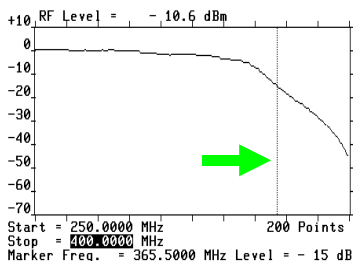
Technical data

Maximum permissible RF input level	
without 2.3-GHz frequency range extension	–10 dBm (Bu RF)
with 2.3-GHz frequency range extension	–20 dBm (Bu RF DIRECT)
Displayed level dynamic range	70 dB
Resolution in relative level measurement	1 dB
Maximum frequency range of sweep signal	
without 2.3-GHz frequency range extension	27 MHz to 999,9999 MHz
with 2.3-GHz frequency range extension	27 MHz to 2,3 GHz
Minimum sweep width	1 MHz
Maximum sweep width	
without 2.3-GHz frequency range extension	972,9999 MHz
with 2.3-GHz frequency range extension	2,2729999 GHz
Maximum frequency resolution	5 kHz

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Lifeline

The chronological lifeline tells you what modifications have been made to the software (SW) and the operating instructions. After a software update the lifeline helps you to find out quickly about all major changes (see code) in the updated operating instructions that are supplied.

Code: C = Correction, IN = Important Note, NF = New Feature

SW	Doc. Version	Δ pages	Code	Changes
1.01	9609-101-A	no		First edition.