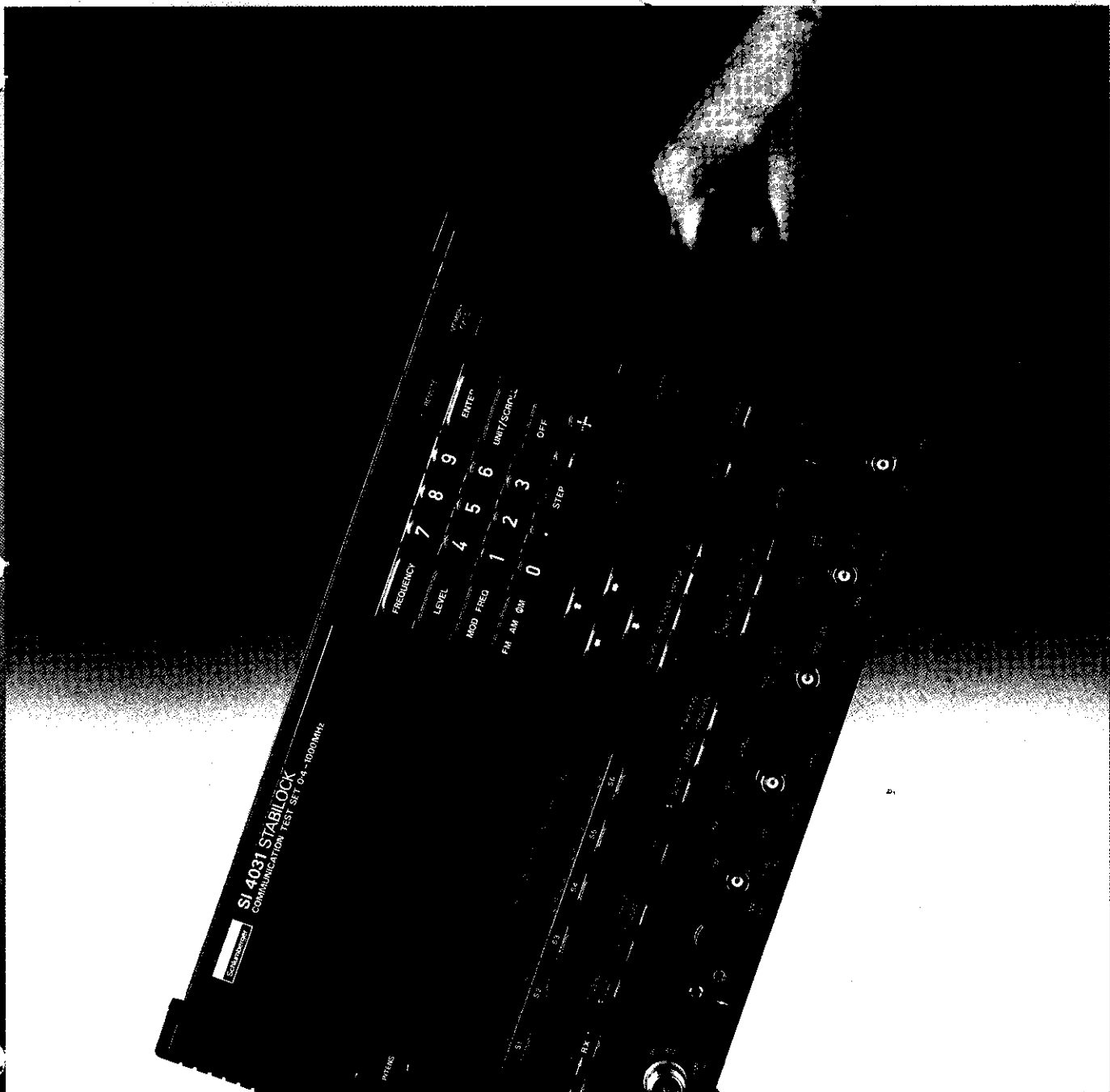# STABILOCK® 4031

The allround radio tester for the demanding

STABILOCK 4031
Professional radio testing for production and workshop

High technology, reliability and more than 30 years' experience in the field of RF test engineering are the solid foundation for the portable STABILOCK 4031 Communication Tester. It replaces as many as 24 individual instruments in impressive fashion to give you a genuinely allround radio test set.

STABILOCK 4031 earns a place and shows its worth throughout the wide range of its application: whether in computer-controlled production of mobile radios, in their maintenance or repair.

With STABILOCK 4031 you can sit back and watch your efficiency improve. Time is money, so the effort that goes into all those routine measurements and checks is reduced drastically. This is made possible by standard integrated test programs. And you can resolve special testing problems with your own programs, all the way through to comprehensive and automatic acceptance measurements.

Another plus point of STABILOCK 4031 is the unusual variety of its basic instrumentation. This includes a spectrum analyzer with panoramic display, a digital storage oscilloscope, a sequential-call encoder/decoder, memory for entire instrument setups and lots more.

SCHLUMBERGER will come to your aid even in application problems on an industrial scale. Make the most of our experience and just ask for advice. We can present you with solutions configured for entire systems.

More than a passing acquaintanceship: STABILOCK 4031 knows the ins and outs of the base stations of all the different cellular networks.

SI 4031 STABILOCK ®
Schlumberger COMMUNICATION TEST SET 0·4–1000MHz
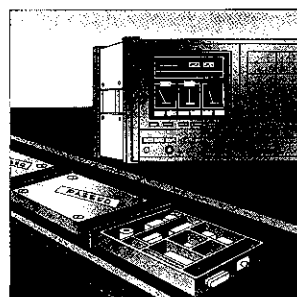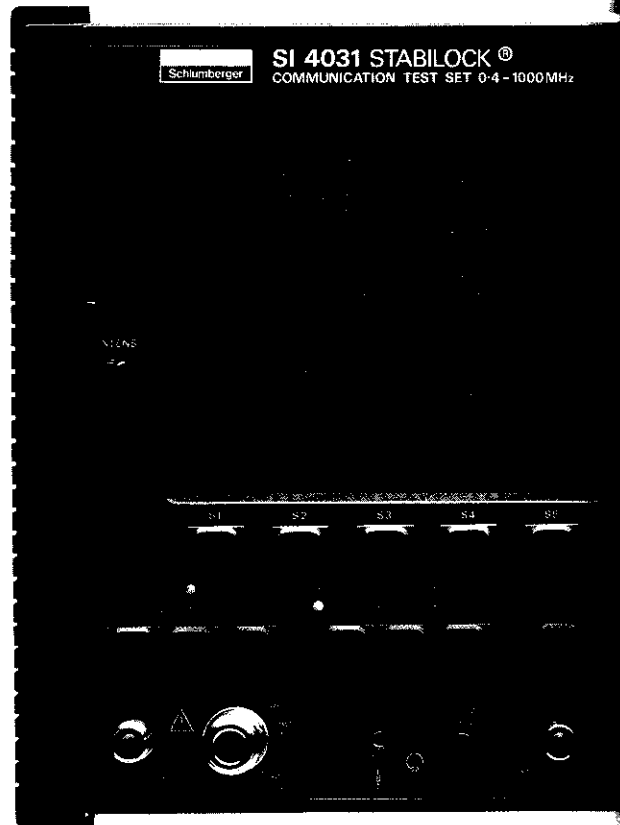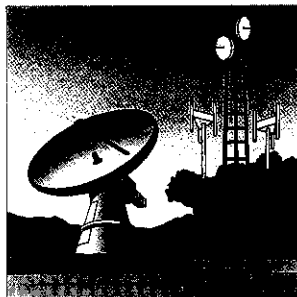
Assembly-line production: responding to the commands of an IEEE-488 controller, STABILOCK 4031 checks out each mobile. Speedily, reliably and thoroughly. So that the right quality emerges at the end.
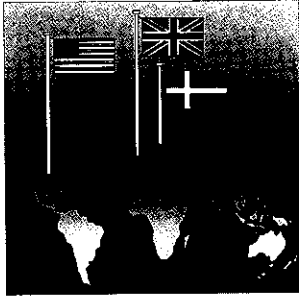
Worldwide compatibility: whether produced in the USA, sold in Great Britain or serviced in Scandinavia, STABILOCK 4031 can accompany a mobile through all stations in its useful life. Even national mobile-radio standards are no obstacle.
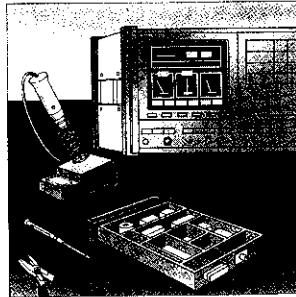
Building block for the best of service: STABILOCK 4031 makes its way with ease in the most elaborately equipped service centers. Fast, integrated test programs take the ballast off your hands, so you are able to concentrate on the vital aspects.
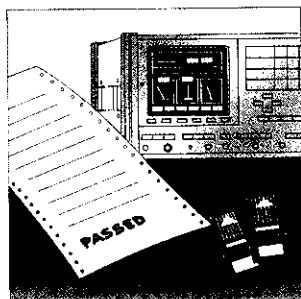
Records from A to Z: for reading out test reports you can link the optional IEEE-bus printer. Or use conventional printers with a serial/parallel interface. The result: clearly formatted reports with accompanying explanatory text.

A whole load of options for tailored performance plus

The wealth of basic instrumentation in STABILOCK 4031 will cover all your requirements for standard tests. And if you have more specialized measuring chores, there is a wide choice of software and hardware options.

Software options

Software options are ready programs on memory cards the size of a cheque card. Together with the Data Module hardware option these programs can simulate the base stations of cellular networks and radio-data systems for instance. You can use them to test vital signaling procedures of mobile telephones like connection setup, change of channel and change of power level. We can offer you software options for all **NMT systems**, for **AMPS, TACS, RC 2000, C-Net, trunking** and many other systems. Just ask, we are constantly adding to the selection. And that final little something: changing a memory card is all you have to do to match STABILOCK 4031 to a particular system; there is no need for tampering inside the set.

Hardware options

All hardware options have one thing in common: you can retrofit them on the job at any time – all you need is a screwdriver.

The **duplex FM/ΦM stage** adds a second synthesizer to STABILOCK 4031. So the signal generator and test receiver can be active at the same time.

With the **adjacent-channel power meter** you can test, with strict adherence to CEPT directive T/R-27-01, how strong the carrier signal in an adjacent channel is. Channel spacing and upper/lower adjacent channel can be selected for this.

The **SSB module** expands STABILOCK 4031 into an SSB test set. Within seconds the test routines will then present important specifications like carrier and opposite sideband suppression.

The **tracking stage** is just what you need for frequency-dependent network analysis of twoports. Together with a VSWR bridge (accessory) it also permits measurement of reflection coefficient. In this way you can locate precisely any breaks in antenna cables for example.

The **control interfaces** with relays and TTL inputs/outputs handle control tasks (remote control of radio sets), the **RS-232-C/Centronics interface** controls conventional printers, and the **option card** will hold many more optional modules, like AF filters.

Turn on to the "Ordering data" section for a summary of all software and hardware options plus useful accessories.

6
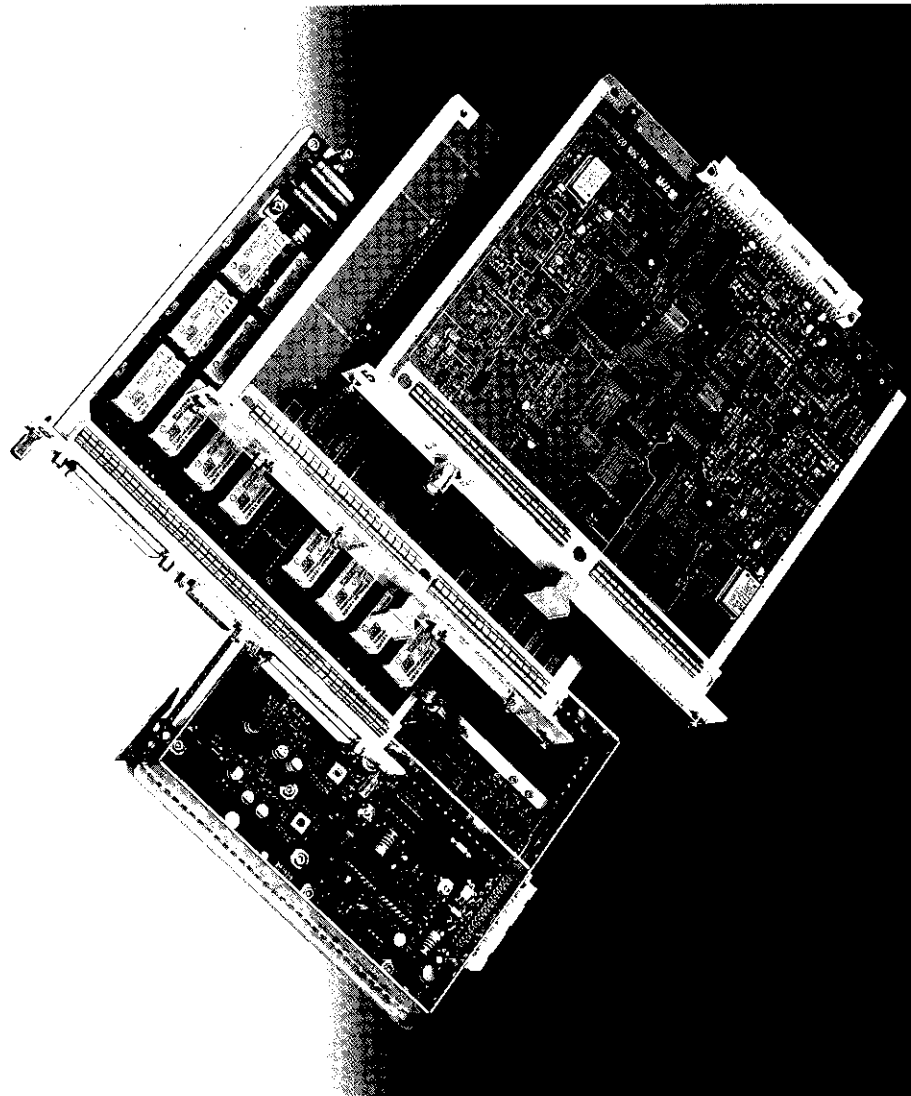
The Schlumberger way to operating ease

AUTORUN

All functions of STABILOCK 4031 that can be worked manually can also run automatically in AUTORUN programs. In this way you solve complex testing tasks in minimal time, and errorfree. But AUTORUN programs also relieve you of the burden of performing routine series of tests. Once you have started the AUTORUN program you want, STABILOCK 4031 executes a complete set of measurements fully automatically. If adjustment and entry instructions are necessary, they are simply flashed on the monitor in plain text. The IEEE-bus printer (recommended extra) logs all the measured results including text accompaniment, eg as verification for your customers.

AUTORUN programs use the common Basic programming language and IEEE-488 commands. So within a short time you will be capable of entering your own AUTORUN programs.

```
──────────── AUTORUN FUG_EXTEND────────
LIST 760,850
760 rem TEST CHANNEL 400
770 S=75.275 MHZ
780 FREQUENZ #S
790 PAUSE "Channel 400 !"
800 rem
810 rem MOD SENSITIVITY
820 rem
830 GENAL 5 MV
840 RDOUT(MDEMOD,A,B)
850 PRINT "1.3 Mod-Sens.       (5mV)      :",A

EDIT 830
830 GENAL 5 MV

830 GENAL 5 MV
```

LIST   PRINTER   HELP_VAR   RUN   RETURN

Listing of an AUTORUN program. There is a line editor available for entering and correcting program lines.
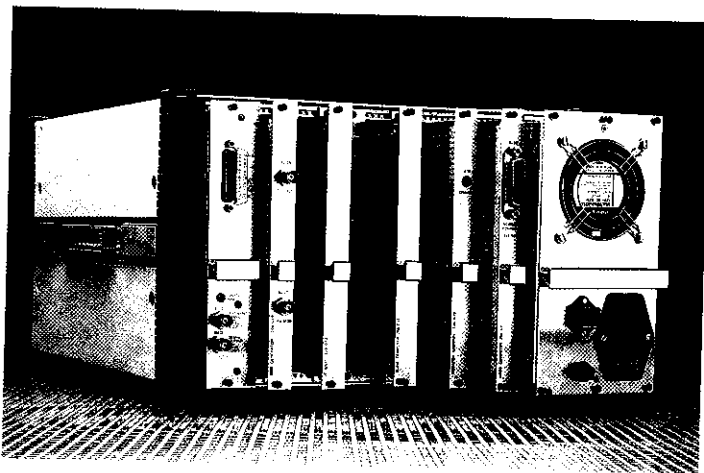
High-Tech production methods guarantee the reliability of STABILOCK 4031.

Maintenance

An integrated diagnostics program and modularity throughout are the guarantee for high availability of STABILOCK 4031. Any repair can be carried out quite simply on the job by exchanging the faulty subassembly, and **without any need for subsequent realignment**.
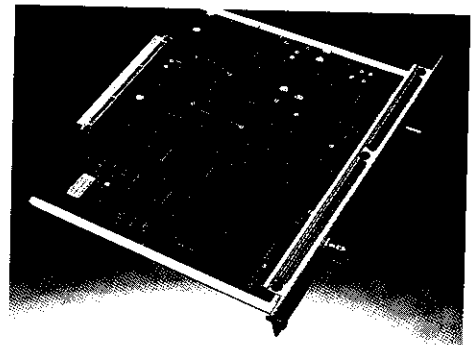
STABILOCK 4031: Technical Data

Synthesizer

Spectral purity
- Phase noise
  (25-kHz offset)
  - $f < 500\,\text{MHz}$ $< -121\,\text{dBc/Hz}$
  - $f \geq 500\,\text{MHz}$ $< -115\,\text{dBc/Hz}$
- Residual FM
  - $f < 500\,\text{MHz}$ 4 Hz (rms, CCITT-weighted)
  - $f \geq 500\,\text{MHz}$ 8 Hz (rms, CCITT-weighted)

- Nonharmonic spurious
  signals
  $> 500\,\text{Hz}$ off carrier $< -55\,\text{dBc}$
- Harmonics
  - Level $< -15.1\,\text{dBm}$ $< -25\,\text{dBc}$
  - Level $\geq -15.1\,\text{dBm}$ $< -20\,\text{dBc}$
- Residual AM $< 0.02\,\%$ (rms, CCITT-weighted)

10-MHz reference oscillator
- Warmup time < 3 min for frequency error $< 5 \cdot 10^{-7}$ ($T = 20\,°\text{C}$)
  < 10 min for frequency error $< 10^{-7}$
- Frequency error $< 1 \cdot 10^{-7}$ ($T = 0$ to $45\,°\text{C}$)
- Aging $< 5 \cdot 10^{-8}/\text{month}$
- Output level   approx. 0.4 V (into 50 Ω)
- Synchronization   10 MHz, V $> 150\,\text{mV}_{rms}$ (into 200 Ω)

Receiver test

Carrier frequency
- Frequency range   0.4 to 999.9999 MHz
- Resolution
  - $f < 500\,\text{MHz}$ 50 Hz
  - $f \geq 500\,\text{MHz}$ 100 Hz
- Frequency error   as reference oscillator

Output level
- RF socket -142 to -7 dBm (max. -13 dBm with AM)
- RF DIRECT socket -122 to $+13$ dBm (max. $+7$ dBm with AM)
- Resolution   0.1 dB

- Level error into 50 Ω
  RF socket
  - Level $\geq -130\,\text{dBm}$ $< 1.3\,\text{dB}$
  - Level $> -15.0\,\text{dBm}$ $< 2\,\text{dB}$
  RF DIRECT socket
  - Level $\geq -110\,\text{dBm}$ $< 1.6\,\text{dB}$
  - Level $> +5.0\,\text{dBm}$ $< 2.5\,\text{dB}$
- VSWR (50 Ω) RF socket < 1.1
- EMF setting range
  without interruption
  (not with AM)   0 to 20 dB
  Additional level error   0.1 dB per dB

RX modulation

FM (AC-coupled)
- Frequency deviation   0 to 40 kHz
- Modulation frequency
  (int. and ext.)   30 Hz to 30 kHz
- Resolution   10 Hz
- Setting error
  - $f_{mod} = 300\,\text{Hz}$ to 3 kHz $< 5\,\% + 3$ digits
  - $f_{mod} = 30\,\text{Hz}$ to 20 kHz $< 10\,\% + 3$ digits
- Distortion
  dev. $< 10\,\text{kHz}$,
  $f_{mod} = 300\,\text{Hz}$ to 3 kHz $< 1\,\%$
- Ext. mod. input   20 kHz FM = 0.707 V_{rms} into 600 Ω

FM (external DC-coupled)
- Frequency deviation   0 to 5 kHz
- Modulation frequency   0 to 30 kHz
- Centre-frequency
  error $< 100\,\text{Hz}$ + frequency error of reference oscillator

ΦM
- Phase deviation   0 to 6 rad ($f_{mod} \cdot \text{rad} \leq 20\,\text{kHz}$)
- Resolution   0.01 rad
- Modulation frequency   200 Hz to 6 kHz
- Setting error
  $f_{mod} = 300\,\text{Hz}$ to 3 kHz $< 6\,\% + 0.02$ rad
- Distortion
  $f_{mod} = 300\,\text{Hz}$ to 3 kHz $< 1\,\%$
- Ext. mod. input   20 rad ΦM = 0.707 V_{rms} into 600 Ω

AM
- Modulation depth $m = 0$ to 99.9%
- Resolution   0.1 %
- Modulation frequency   30 Hz to 10 kHz
- Setting error
  for $m \leq 90\,\%$
  $f_{mod} = 30\,\text{Hz}$ to 10 kHz $< 0.1 \cdot m + 1$ digit
- Distortion
  for $m < 50\,\%$
  $f_{mod} = 300\,\text{Hz}$ to 3 kHz $< 2\,\%$
- Ext. mod. input   50 % AM = 0.707 V_{rms} into 600 Ω

Transmitter test

Frequency measurement
- Frequency range   2 to 999.9999 MHz
- Resolution   10 Hz
- Admissible input level
  on RF socket   0.1 mW to 125 W
- Measuring error   as reference oscillator
      + 10 Hz

Frequency-offset measurement
- Frequency range   2 to 999.9999 MHz
- Measuring range   0 to ±99.99 kHz
- Resolution
  $f <$ 10 kHz   1 Hz
  $f \geq$ 10 kHz   10 Hz
- Admissible input level
  on RF socket   2 μW to 125 W
  on RF DIRECT socket   1 mV to 1 V
      (measuring range:
      0 to ±15 kHz)

- Measuring error   as reference oscillator
      + 3 Hz
      (+ 1 digit for offset
      $\geq$ 10 kHz)

RF-power measurement (broadband)
- Frequency range   2 to 999.9999 MHz
- Measuring range   1 mW to 125 W (average)
- Resolution
  $P <$ 1 W   1 mW
  $P <$ 10 W   10 mW
  $P \geq$ 10 W   100 mW
- Measuring error
  (w/o modulation)
  $P >$ 200 mW $<$ 10 % + 1 digit
      (f = 20 to 500 MHz)
      $<$ 12 % + 1 digit
      (f = 6 to 999.9999 MHz)

RF-power measurement (bandwidth approx. 3 MHz)
- Frequency range   2 to 999.9999 MHz
- Measuring range
  RF socket   −45 to +37 dBm
  RF DIRECT socket   −65 to +17 dBm
- Measuring error $<$ 3 dB
- Resolution   0.1 dBm

TX modulation measurement

FM measurement, RF socket (broadband)
- Frequency range   2 to 999.9999 MHz
- Input level   0.1 mW to 125 W
- Measuring range   0 to 25 kHz
- Resolution   10 Hz
- Measuring error
  (dev. $<$ 10 kHz)
  f_{mod} = 300 Hz to 3 kHz $<$ 5 % + 1 digit
      + peak residual FM
  f_{mod} = 100 Hz to 10 kHz $<$ 10 % + 1 digit
      + peak residual FM
- Demodulation distortion
  f_{mod} = 300 Hz to 3 kHz $<$ 0.5 %
- Peak residual FM $<$ 50 Hz or
      $<$ 10 Hz/100 MHz

FM measurement, RF DIRECT socket (narrowband)
- Frequency range   2 to 999.9999 MHz
- Input level   −50 to −20 dBm
- Measuring range   0 to 10 kHz
      (f_{mod} · dev. $<$ 10 kHz)
- Modulation frequency f_{mod} = 0 to 6 kHz
- Resolution   10 Hz
- Sensitivity   better than 2 μV
      (3 kHz FM dev.,
      10 dB SINAD,
      CCITT-weighted)
- IF bandwidth   30 kHz

ΦM measurement, RF socket (broadband)
- Frequency range   2 to 999.9999 MHz
- Input level   0.1 mW to 125 W
- Measuring range   0 to 6 rad
      (FM dev. $<$ 50 kHz)
- Resolution   0.01 rad
- Measuring error
  f_{mod} = 300 Hz to 3 kHz $<$ 6 % + 2 digits
  f_{mod} = 200 Hz to 10 kHz $<$ 10 % + 2 digits
- Demodulation distortion
  f_{mod} = 300 Hz to 3 kHz $<$ 0.5 %

ΦM measurement, RF DIRECT socket (narrowband)
- Frequency range   2 to 999.9999 MHz
- Input level   −50 to −20 dBm
- Measuring range   0 to 3 rad
      (f_{mod} · ΦM dev.
      $<$ 15 kHz)
- Modulation frequency   200 Hz to 6 kHz
- Sensitivity   better than 2 μV
      (3 rad ΦM dev.,
      10 dB SINAD,
      CCITT-weighted)
- IF bandwidth   30 kHz

AM measurement
- Frequency range   2 to 999.9999 MHz
- Measuring range   0 to 100 %
- Input level
  RF socket   1 mW to 125 W
  RF DIRECT socket   0.01 mW to 0.5 W
- Resolution   0.1 %
- Measuring error
  (m $\geq$ 10 %)
  f_{mod} = 200 Hz to 10 kHz $<$ 10 % + 2 digits
- Demodulation distortion
  f_{mod} = 300 Hz to 3 kHz $<$ 1 %
- Modulation frequency   DC to 10 kHz

Spurious-modulation measurement
- Input level
  RF socket   1 mW to 125 W
  RF DIRECT socket   20 mV to 1 V
- Measuring range   0 to −40 dB
      (CCITT-weighted)
      referred to
      3 kHz FM dev.,
      3 rad ΦM dev.
      or 30 % AM
- Measuring error $<$ 1 dB

AF generator

Modulation generator GEN A

• Frequency range	30 Hz to 30 kHz	• Resolution		• Distortion		
• Resolution		EMF ≤ 5 V	10 mV	f = 30 Hz to 3 kHz	<0.5 %	
f < 3 kHz	0.1 Hz	EMF ≤ 1 V	1 mV	f > 3 kHz	< 1 %	
f ≥ 3 kHz	1 Hz	EMF ≤ 0.1 V	0.1 mV	• Output impedance		
• Frequency error	< 0.01 %	EMF ≤ 10 mV	10 μV	(balanced)		
• Level range (EMF)	0.1 mV$_{rms}$ to 5 V$_{rms}$	• Level error		f = 300 Hz to 3 kHz	< 10 Ω	
		f = 100 Hz to 10 kHz	< 3 %	f = 30 Hz to 30 kHz	< 40 Ω	
		f = 30 Hz to 30 kHz	< 10 %	• Output impedance		
				(unbalanced)	600 Ω ± 5 %	
				• Permissible load impedance	> 200 Ω	

AF evaluation

AF voltmeter

• Frequency range	30 Hz to 30 kHz or to CCITT P 53A
• Measuring range	0.1 mV to 20 V
• Resolution	
Level < 0.1 V	0.1 mV
Level < 1 V	1 mV
Level < 10 V	10 mV
Level < 20 V	100 mV
• Measuring error	
f = 300 Hz to 3 kHz	< 3 %
f = 50 Hz to 15 kHz	< 6 %
• Source impedance	> 100 kΩ or 600 Ω ±3 %
• Input capacitance	20 pF

AF counter

• Frequency range	30 Hz to 30 kHz
• Input level	5 mV to 20 V
• Resolution	
f < 300 Hz	0.1 Hz
f < 10 kHz	1 Hz
f ≥ 10 kHz	10 Hz
• Measuring error	< 0.01 % + 1 digit

Distortion meter

• Input level	0.1 to 20 V
• Test frequency	1 kHz ±5 Hz
• Measuring range	0 to 99 %
• Resolution	0.1 %
• Measuring error	
d = 1 to 90 %	< 5 % of meas. value + 3 digits

SINAD meter

• Input level	0.1 to 20 V
• Measuring range	1 to 46 dB
• Resolution	
SINAD < 30 dB	0.1 dB
SINAD ≥ 30 dB	0.5 dB
• Measuring error for SINAD < 30 dB	< 0.8 dB + 1 digit

Scope & Analyzer

Spectrum analyzer

• Frequency range	2 to 999.9999 MHz
• Frequency accuracy	better than 2 % of sweep width
• Input-level range for measuring error < 3 dB in the frequency range $0.5 \cdot f_c \leq f \leq 2 \cdot f_c$	
RF socket	−70 to +47 dBm
RF DIRECT socket	−90 to +13 dBm
• Sweep width	200 kHz, 2 MHz, 10 MHz
• Sweep time	
Sweep width 2 MHz and 10 MHz	approx. 500 ms
Sweep width 200 kHz	approx. 2 s
• Evaluation bandwidth	
Sweep width 2 MHz and 10 MHz	30 kHz
Sweep width 200 kHz	6 kHz
• Inherent noise on RF DIRECT socket	
Sweep width 2 MHz and 10 MHz	−95 dBm
Sweep width 200 kHz	−105 dBm

Oscilloscope

• Inputs	
external	Z_i = 1 MΩ/40 pF (AC/DC)
internal	RX mod, TX demod, duplex demod, AF voltmeter, residual distortion
• Frequency range	DC (3 Hz) to 20 kHz
• Level error	< 10 % + 0.2 div
• Grating	6 x 10 div
• Horizontal deflection	100 μs/div to 500 ms/div
• Vertical deflection	2 mV/div to 10 V/div or 160 Hz/div to 8 kHz/div (FM); 0.16 rad/div to 8 rad/div (ΦM); 0.8 %/div to 40 %/div (AM)
• Trigger	± slope selectable trigger level
• Operating modes	auto, norm, one-shot, freeze, time measurement (max. resolution 2.5 μs)

Selective-call encoder and decoder

Standard tone sequences
- ZVEI 1   CCIR   VDEW
- ZVEI 2   EEA   NATEL
- EIA   EURO   CCITT

User-defined tone sequences
Sequence of up to 30 tones can be stored by user.
Also double tones and underlying continuous tone (with
GEN B option).

Encoder

Operating modes
- Single-tone sequence (max. 30 tones)
- Double-tone sequence (with GEN B option)
  (single-tone and double-tone sequences can be
  transmitted continously)
- Acknowledgement call (max. 15 double tones)
  from response time of < 100 ms acknowledgement
  call only possible with optional duplex FM/PhM stage
- Frequency error $1 \cdot 10^{-4}$ Hz

Setting ranges
With all standard and user-defined tone sequences it is
possible to vary tones 1 to 15 in all parameters (tones 16
to 30: duration and pause can only be varied uniformly).
- Frequency   200 to 3000 Hz
- Resolution   0.1 Hz
- Tone duration   1 to 9999 ms
     at least 1 cycle
- Resolution   1 ms
- Pause duration   0 to 9999 ms
- Resolution   1 ms

Decoder
Decoding of each tone of tone sequences
(max. 30 tones). Continuous decoding can be set.

Frequency measurement
- Measuring range   300 to 3000 Hz
- Resolution   0.1 Hz
- Measuring error *)   < 2 digits

Tone-duration measurement
- Measuring range   40 to 9999 ms
- Resolution   0.1 ms
- Measuring error *)   < 3 ms + 2 cycles
  of lowest frequency
  in tone sequence

Pause-duration measurement
- Measuring range   2 to 9999 ms
- Resolution   0.1 ms
- Measuring error *)   < 3 ms + 2 cycles
  of lowest frequency
  in tone sequence

*) Measuring errors referred to signal on VOLTM socket with level
> 360 mV$_{rms}$.

Receiving bandwidth
- Setting range   ±0.1 to ±9.9 %
- Response-time
  measurement   2 to 9999 ms
- Resolution   1 ms

Options

HARDWARE OPTIONS

Duplex FM/ΦM stage
- Frequency range   27 to 999.9999 MHz
- Input level   1 mW to 125 W
- Measuring range   0 to 20 kHz
     0 to 6 rad
- Measuring error   as for FM or
  ΦM measurement
- Peak residual FM   < 50 Hz or 15 Hz/
  100 MHz

All other values as for FM and ΦM measurement

Tracking
This permits frequency-dependent network analysis,
eg the graphic display of filter curves (screen or printer).
- Frequency range   27 to 999.9999 MHz
- Min. window width   1 MHz
- Max. frequency resolution   5 kHz/pixel
- Displayed level
  dynamic range   70 dB

Modulation generator GEN B
Specifications as for GEN A

Control interface A
- Changeover relays *)   8
- TTL inputs   8 (electric strength:
  ±30 V)
- Trigger inputs   1

Control Interface C
- Changeover relays *)   24 (16 BCD-,
  BCD-inv.- or
  HEX-encodeable)
- TTL control outputs   20 (open collector)
- TTL inputs   8 (electric strength:
  ±30 V)
- TTL trigger inputs   2

*) I$_{max}$ = 1 A, V$_{max}$ = 30 V

RS-232/Centronics interface
- Baud rate   110/150/300/600/
  1200/2400/4800/
  9600 Bd
- Transmission protocol   7/8 bits, even/odd
  parity, 1/2 stop bits
- Socket connectors   25-way submin D

Keyboard
ASCII keyboard for writing Autorun programs and for
interactive entries (eg adjustment instructions) in the
course of a program.

Option card
The option card houses the optional modules.

Modules for option card
- DTMF device
  Encoder/decoder
  Tone/pause duration user-defined
- Network C expander

- DC voltmeter/ammeter
  Voltmeter
  Measuring range   0 to ±42 V
  Resolution   100 µV to 100 mV
  Measuring error   ≤ 1 % ±1 digit
  Ammeter
  Measuring range   0 to ±15 A
  Resolution   1 to 100 mA
  Measuring error   ≤ 4 % ±10 mA
- Variable notch filter   200 to 600 Hz
- 300-Hz highpass filter
- 300-Hz lowpass filter
- 3-kHz lowpass filter
- 4-kHz bandpass filter
- 6-kHz bandstop filter

Data module
For generating and decoding FFSK, NRZ and RZ signal-
ing. The data module is the hardware requirement for
testing cellular car telephones and radio-data systems
with the software options.

VSWR test probe
- Frequency range   25 to 500 MHz
- Admissible forward
  power   1 to 50 W

Options

SSB stage					ACPM

TX

- Frequency range — 2 MHz to 999.9999 MHz
- RF power — 1 mW to 125 W
- Measuring error — see standard unit
- Preselectable intermodulation
  for power measurement — 0 to 45 dB
- Test tones/frequency — 2 / freely selectable
- Frequency offset — ±1 kHz
- AF bandwidth — 10 Hz to 30 kHz
- Carrier suppression — 0 to 60 dB
  for f = 1 kHz
- Opposite sideband
  suppression — 0 to 60 dB
  for f = 1 kHz
- Measuring error — 0 to 40 dB ± 1 dB
  0 to 60 dB ± 2 dB
- AGC delay time — 0 to 9999 ms
  selectable

RX

- Carrier-frequency range — 0.4 MHz to 999.9999 MHz
- SSB modulation — 0 to 30 kHz
- Resolution — 10 Hz
- Accuracy — as reference oscillator
- Intermod. meas. range
  for intermodulation product — 0 to 50 dB
  2.3 kHz or 2.7 kHz
- Measuring error — ±2 dB
- Measurable sensitivity — 1 to 10 dB SINAD
  freely selectable
- Measuring error — see standard unit
- Max. RF level
  on RF DIRECT socket — +13 dBm
  on RF socket — −7 dBm
- Max. RF level for
  intermod. measurement — −16 dBm
  on RF DIRECT socket — −15,5 dBm
  on RF socket — −36 dBm

Adjacent-channel power meter

- Standard — CEPT T/R-27-01
- Frequency range — 10 to 960 MHz
- Min. input level — > 100 mW
  on RF socket
- Measuring range — < −73 dBc
  for f < 492 MHz
  (typ. < −75 dBc)
  < −70 dBc
  for f ≥ 492 MHz
  (typ. < −72 dBc)
- Measuring error — < 3 dB
- Selectable channel spacing — 10 / 12.5 / 20 / 25 kHz

SOFTWARE OPTIONS

Tests on car telephones and radio-data systems call for the appropriate software option on a memory card (see check-list) and the data module.

General data

Dimensions
- H x W x D — 230 mm x 375 mm x 486 mm

Weight — approx. 18.5 kg

Power supply
- AC — 94 to 132 V or
  187 to 264 V
  (47 to 450 Hz)
- DC — 10.5 to 32 V
- P_{max} — approx. 110 W
  (incl. options)

Environment
- Operating temperature — 0 to 45°C
- Storage temperature — −40 to +70°C
- Relative humidity — max. 90 %

Mechanical strength
(to DIN 40046)
- Shock — 30 g
- Vibration — 5 to 10 Hz for
  10 mm amplitude
  10 to 60 Hz,
  2 g constant

- RFI — to VDE 0871 /
  class B corr.
  to PTT decree 1046/84

- Damp tropical/
  cold test — to Def. Std. 66-31
  issue 1/cat. 3
- Safety — to VDE 0411/IEC 348

IEEE-bus interface
- Standard — IEEE 488
- Connector — 24-way
- Functions — AH1, SH1, L2, T1,
  SR1, RL1, DC1

Ordering data

STABILOCK 4031 108801	300-Hz highpass filter .... 248199 [1] [2]	Network C (Portugal) 897062
	300-Hz lowpass filter .... 248174 [1] [2]	C-Net SAPO 897063
Hardware options	3-kHz lowpass filter .... 248186 [1] [2]	EAMPS 897950
	4-kHz bandpass filter .... 248175 [1] [2]	ETACS UK 897940
Duplex FM/ΦM stage 229062	6-kHz bandstop filter .... 248177 [1] [2]	ETACS Japan (JTACS) 897945
Tracking IF stage 229054	Variable notch filter .... 248179 [1]	RADIOCOM 2000 HD 897970
Control interface A 236035	[1] requires 1 x option card 236033	FMS 897082
Control interface C 236037	[2] max. 2 of 5 filters may be installed at one time	VDEW direct dialing 897086
Modulation gen. GEN B 208032		VDEW digital 897090
RS-232/Centronics interface 236043	**Software options**	ZVEI binary 897084
Keyboard 248192		ZVEI binary (600 baud) 897085
VSWR test probe 248104	NMT 450/900 (Scandinavia) 897900	POCSAG (NRZ) 897080
Data module 236034	NMT France 897925	POCSAG (FFSK) 897081
Option card 236033	NMT Benelux 897920	Cityruf 897083
SSB 248154	NMT Turkey 897901	Trunking (MPT 1327 / PAA 2424) 897089
Adjacent channel power meter (ACPM) 229035	NMT 450 Universal 897915	Microcell 897096
ACPM retrofit 248270	NMT Base-Station Test 897905	Combiner Test 897985
Network C expander .... 248116 [1]	NATEL-C (Switzerland) 897930	US-Signalling Formats 897092
DTMF device .... 248171 [1]	Network C (Austria) 897910	LTR + US Signalling 897093
DC voltmeter/ammeter .... 248172 [1]	Network C (FRG) 897960	ARE AUTORUN Editor
		(5 1/4 or 3 1/2" discettes) 897100

Accessories

Accessories supplied	**Recommended extras**	
Set of miniature fuses consists of	IEEE-488 Interface PC II A	Carrying grip kit 378256
2 pieces 2 A 849031	(for ARE AUTORUN Editor) 860182	RF probe 860108
2 pieces 3,15 A 849037	Microphone 248170	Oscilloscope probe 860148
2 pieces 16 A 849062	Telescopic antenna 248120	Service manual 291088
Power cable 880604	Carrying bag 378258	Ink-jet printer 896092
TNC/BNC adapter 886255	Transport container 300692	Spare ink cartridge 860133
Protective front-panel cover 501350	Protective back-panel cover 501350	Printer paper 2500 sheets 860134
Headphones jack plug 884123	19-inch adapter 378257	50-way D connector
Connector for battery cable 884015	Connector set 300690	for control interface 300643
1 memory card (blank, 32 KByte) 897050	N/BNC adapter	25-way connector
Operating manual 290088	2 x 1 m cable BNC/BNC	for control interface 300641
	1 x 1 m cable N/N	Battery attachment 248185
	1 x 1 m cable BNC/banana	Carrying rack 248191
	Memory card (32 KByte) 897050	Protective bracket 248190
	Memory card (64 KByte) 897051	
	Memory card (128 KByte) 897052	

Check-List

Measuring task	860 182 IEEE-488 Interface PC II A	236 035 Control interface A	236 037 Control interface C	208 032 Audio generator GEN B	229 062 Duplex FM/ΦM stage	236 033 OPTION CARD	248 199 300 Hz high-pass filter	248 174 300 Hz low-pass filter	248 175 4 kHz band-pass filter [1]	248 179 variable notch filter	248 171 DTMF module	248 116 Netz-C expander module	248 172 DC voltage/ammeter	248 104 VSWR directional coupler	236 034 Data module	229 054 Tracking IF stage	248 192 Keyboard [2]	248 154 SSB	229 035 ACPM	Memory Card containing system software
Control of radio under test with 8 relays		●																		
Control of radio under test with 24 relays + 20 TTL output			●																	
Simulation of fast answer back systems (response time < 100 ms)				●																
Distortion measurement 200 to 600 Hz						●				●										
DC voltage/current measurements						●							●							
DTMF signal encoding/decoding						●					●									
Subaudio squelch tones (CTCSS) and double tone signalling			●																	
Measurement on squelch tone radios						●	●	●												
Program controlled measurements (AUTORUN)																	●			
ARE: Software package for PC based development of AUTORUN programs	●																			
Tracking (graphic display of filter curves)						●										●				
Measuring result explanatory text																●				
VSWR measurement														●						
Measurements on SSB radios						●												●		
Adjacent-channel power measurement																			●	
Cellular system NMT 450/900 (Scandinavia)						●	●		●						●					897 900
Cellular system NMT France						●			●						●					897 925
Cellular system NMT Benelux						●	●		●						●					897 920
Cellular system NMT 450 Universal						●			●						●					897 915
Cellular system NMT Base-Station Test						●									●					897 905
Cellular system NMT Turkey						●			●						●					897 901
Cellular system NATEL C (Switzerland)						●	●		●						●					897 930
Cellular system C-Netz (Austria)						●	●		●						●					897 910
Cellular system Netz-C (FRG)						●	●					●			●					897 960
Cellular system Network C (Portugal)						●	●						●		●					897 062
Cellular system C-Net SAPO						●	●						●		●					897 063
Cellular system EAMPS						●									●					897 950
Cellular system ETACS UK						●									●					897 940
Cellular system ETACS Japan (JTACS)						●									●					897 945
Cellular system RADIOCOM 2000 HD						●									●					897 970
FMS						●									●					897 082
VDEW direct dialing						●	●				●									897 086
VDEW digital						●									●					897 090
ZVEI binary						●									●					897 084
ZVEI binary (600 baud)						●									●					897 085
POCSAG (FFSK)															●					897 081
POCSAG (NRZ)															●					897 080
Cityruf															●					897 083
Trunking (MPT 1327 / PAA 2424)						●									●					897 089
Microcell						●									●					897 096
Combiner Test																				897 985
US Signalling Formats						●									●					897 092
LTR + US Signalling						●									●					897 093

1) Required for SAT measurements only.
2) The use of the keyboard needs a control interface.

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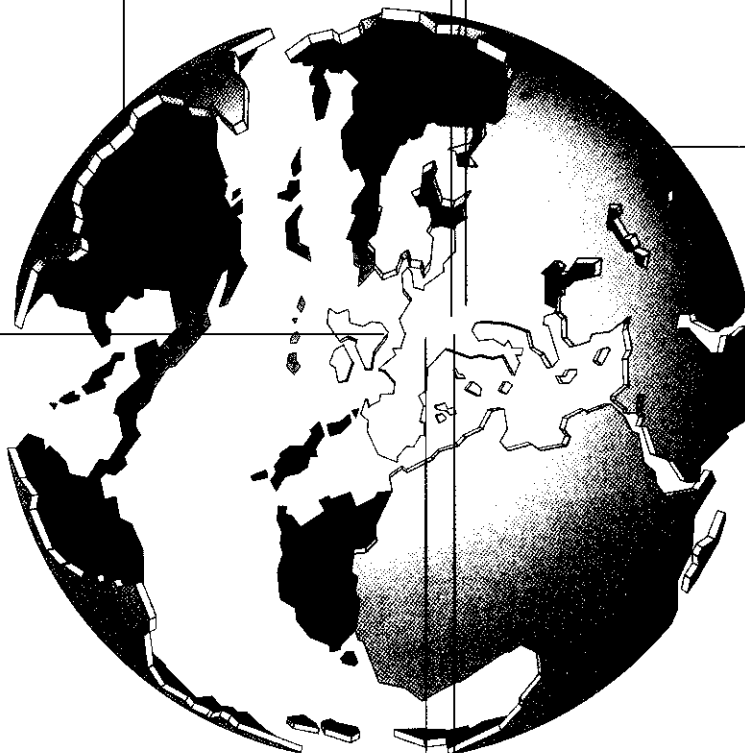
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