1 General Notes

1.1 Test Equipment

1.1.1 Test Equipment for Repairs and Adjustments (see chapters 4 to 7)

The extent to which the SNA-20/-23 can be serviced depends on the test equipment available. The requirements have been split into 4 (+1) stages. The requirements for repair, replacement of printed circuit boards or adjustment of individual subassemblies are listed in chapter 1.2 on page 1-3.
A general check of the instrument should be made after every repair, pcb replacement or adjustment. A generator covering the same frequency range as the SNA is required for this. Refer to chapter 8 for more details.

Test equipment required

Requirement 1: (basic equipment)	Digital multimeter; 4 1/2 or (preferably) 5 1/2 digits Oscilloscope (400 MHz, with RF probes) Frequency counter
Requirement 2:	Requirement 1 + Selective level meter, level generator (22 MHz, 50 Ω) (e.g. PSM-139 or PS-19/SPM-19 with 2 x ZA 5075) + high-impedance probe (TK-11) + Spectrum and network analyzer, up to 500 MHz (up to 180 MHz in certain cases only) e.g. SNA-62 (SNA-1, SNA-2 or SNA-3 in some cases)
Requirement 3:	Requirement 2 + Spectrum analyzer (30 GHz [22 GHz]) (e.g. SNA-23/-33, SNA-7)
Requirement 4 :	Requirement 3 + Generator (Sweeper) HP 83640A + Power splitter HP 11667B + Power meter HP 838 A + Power sensor HP 8485 A + (10 dB DG HP 8493 C)? + Personal Computer PC AT 486 with national IEEE bus **+ Software SWP-XY (for frequency response correction)** *Note:* Requirement 4 includes the test equipment for measuring the frequency response.
Other items:	PSS-16 EPM-1 30 dB attenuator (2101-6521.002) Frequency standard (10 MHz ± 10^{-9})

1.1.2 Test Equipment for Verifying the Specifications (see chapter 8)

Refer to section 8.2 for details.

1.1.3 Accessories / Adapters

Description	Recommended type / Order no.	Manufacturer
Torque wrench for SMA screw connectors on microwave subassemblies	0000-7689.262	Suhner/W&G
Adapter cable (50-way ribbon cable), link between interface board and measurement unit controller		W&G
Adapter cable (34-way ribbon cable), link between interface board and measurement unit controller		W&G
2 x BNC to MCX plug adapter cables	2112-6546.003	W&G
BNC to MCX socket adapter cable	2112-6506.014	W&G
Adapter board for adjustment of logarithmizer	Test board 34-2101	W&G
External AT keyboard (MF-2 compatible)	Cherry G80 -1000 or similar	Cherry

1.1.4 Service Disk

Programs on the service disk

The service disk contains the following programs:

Program name	Use
- EEPROM	For initializing the EEPROM check sums for pcbs where the hardware status is stored in an EEPROM on the pcb itself.
- Form_B	For formatting the RAM disk on the memory board.

Using the service disk

The service disk is a boot disk, i.e. the operating system (DOS) can be loaded from the disk. If these programs are to be used, please note the following:

- Place the service disk in drive A:\ of the SNA and then switch the SNA on. This ensures that the operating system is loaded from the disk and the instrument (measurement) software is not loaded.
- If you want to change from one service program to another, first switch off the instrument and then reboot it from the disk.
- Batch files with the "names" of the service programs are located in the root directory of the disk. These batch files should always be used to start the service programs, as other files in addition to the *.EXE files are required for running the programs. The batch files load these automatically.

Important: The service disk programs may also be used for development purposes in addition to their service functions. Incorrect entries are normally not intercepted by the program, and the plausibility of entries is not checked. These programs do not conform to the general standards of quality which apply to Wandel & Goltermann software products.

1.2 Service Scope and Test Equipment Requirements

1.2.1 Servicing the Input Section Subassemblies

Circuit board or sub-assembly	Name	Service action	Test equipment requirement (adjustments required)
2 P38	RF converter (Rosenberger)	Subassembly replacement	Requirement 4 (Frequency response correction)
2 AT1	Attenuator	Subassembly replacement	Requirement 4 (Frequency response correction)
2 FL1	8 GHz lowpass (Suhner)	Subassembly replacement	Requirement 4 (Frequency response correction, input section level correction)
2 K1 2101-ZH (2 DX1)	Coaxial relay (Series A+ B) Diplexer (from series C, replaces coaxial relay 2K1)	Subassembly replacement	Requirement 4 (Frequency response correction, input section level correction)
2101-ZA	Integration Band 0, complete (Series A to E)	Subassembly replacement	Requirement 4 (Frequency response correction, input section level correction)
2101-ZC	Fundamental mixer, complete	Subassembly replacement	Requirement 4 (Frequency response correction, input section level correction)
2101-ZE incl. 2101-AQ	IF switch, complete	Subassembly replacement	Requirement 4 (Frequency response correction, input section level correction)
2101-AS1 plus 3FI1	**Service kit** YIG filter control plus YIG filter (YIG filter calibrated and matched with control unit. The YIG correction data are stored in FLASH EPROMS on the control unit)	Subassembly replacement	Requirement 4 (Frequency response correction)
2101-AR	Input section control	Repair/Subassembly replacement	Requirement 1 (External mixer bias)

The test equipment for each requirement category is listed in section 1.1.1 on page 1-1

1.2.2 Servicing the Synthesizer Subassemblies

Circuit board or sub-assembly	Name	Service action	Test equipment requirement (adjustments required)
2101-B	Time-base / YTO driver	Repair/Sub-assembly replacement	Requirement 1 + Spectrum analyzer up to 9 GHz (Requirement 3) (YTO frequency limits / switching noise)
2101-F	400 MHz oscillator	Repair/ Subassembly replacement	Requirement 1 (LC resonance adjustment)
2101-C	Standard frequency adapter (NFO adapter)	Repair/ Subassembly replacement	Requirement 1 + frequency standard (10 MHz std. freq. adjustment)
50 OS1	(YTO) YIG oscillator (Sievers)	Subassembly replacement	Requirement 4 (YTO frequency limits, frequency response correction)
2101-A	Synthesizer control	Subassembly replacement	Requirement 1 (no adjustment)
2101-ZG	SHF pre-attenuator	Subassembly replacement	Requirement 1 (no adjustment)
2101-K	Synchronous attenuator / phase meter	Subassembly replacement	Requirement 1 (no adjustment)

The test equipment for each requirement category is listed in section 1.1.1 on page 1-1

1.2.3 Servicing the 422 MHz/10 kHz Converter and the IF Measurement Section Subassemblies

Circuit board or sub-assembly	Name	Service action	Test equipment requirement (adjustments required)
6 IF-1	422 MHz bandpass (Interdigital filter)	Subassembly replacement	Requirement 2 (Input section level correction)
2101-X	422/22 MHz converter	Subassembly replacement	Requirement 2 (Input section level correction)
2101-Y	422 MHz/10 kHz converter	Subassembly replacement	Requirement 2 (Input section level correction)
IF selection, complete 2101-L plus 5 x 2101-R 5 x 2101-S	**Service kit** IF selection incl. 5 x LC bandpass and 5 x amplifier stage	Repair/ Subassembly replacement	Requirement 2 + PSS-16 (IF selection adjustment)
Logarithmizer, complete 2101-M plus 10 x 2101-Q	**Service kit** Logarithmizer incl. 10 x 10 dB log. stages (The correction data for the logarithmizer are stored on disk.)	Subassembly replacement	Requirement 2 (Installation of logarithmizer correction data)
2101-O	**Service kit** IF converter (Matched subassemblies)	Subassembly replacement	Requirement 1 (no adjustment)
2101-P	Measurement section control	Subassembly replacement	Requirement 1 (no adjustment)
2101-N	Calibration generator	Repair/ Subassembly replacement	Requirement 2 + PSS-16 + EPM-1 + 30 dB DG (2101-6521.002) (or precision power meter, -30 dBm instead of EPM-1, DG and PSS) (Internal and external CAL source level correction) (Demodulator adjustment)

The test equipment for each requirement category is listed in section 1.1.1 on page 1-1

1.2.4 Servicing the Controller Subassemblies

Circuit board or sub-assembly	Name	Service action	Test equipment requirement (adjustments required)
(18) AT 386	AT-CPU (3011-9305.006)	Subassembly replacement	Requirement 1 (Initialize setup) (Initialize hardware code)
4111-A	Screen controller board (BSK-3)	Subassembly replacement	Requirement 1 (Initialize hardware code)
(16) DS 1	Electroluminescent display	Subassembly replacement	Requirement 1 (no adjustment)
2101-AO	Connector board	Repair/ Subassembly replacement	Requirement 1 (no adjustment)
2101-AG	Interface board	Subassembly replacement	Requirement 1 (Initialize hardware code)
2101-AF	Memory board	Subassembly replacement	Requirement 1 (Load software) (Load compensation data) (Initialize hardware code)
2101-AL	Keyboard controller	Repair/Subassembly replacement	Requirement 1 (Initialize hardware code)
2101-AJ	Input keyboard	Repair/Subassembly replacement	Requirement 1 (no adjustment)
2101-AK	Rotary control	Repair/Subassembly replacement	Requirement 1 (Offset)
(18) A1	Floppy disk drive	Subassembly replacement	(no adjustment)

The test equipment for each requirement category is listed in section 1.1.1 on page 1-1

1.2.5 Servicing the Power Supply Unit Subassemblies

Circuit board or sub-assembly	Name	Service action	Test equipment requirement (adjustments required)
CG44 (Gossen)	AC power supply	Subassembly replacement	Requirement 1 (Adjust power supply output voltages)
2101-BD	Voltage distributor	Repair/Subassembly replacement	Requirement 1 (Overtemperature cutout)
2101-BE	24 / 12 V converter	Repair/Subassembly replacement	Requirement 1 (no adjustment)

The test equipment for each requirement category is listed in section 1.1.1 on page 1-1