ROHDE&SCHWARZ

Test and Measurement
Division

Service Manual

I/Q Modulation Generator

AMIQ

1110.2003.02/.03/.04

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Contents of Manuals for I/Q Modulation Generator AMIQ

Service Manual

This service manual for I/Q Modulation Generator AMIQ provides information on checking the generator for compliance with rated specifications, as well as on adjustment, repair and troubleshooting. It further contains all the information necessary for repairing the generator by the replacement of modules.

The service manual comprises four chapters and an annex (chapter 5) containing the AMIQ circuit documentation:

Chapter 1 provides all the information necessary to check AMIQ for compliance with rated specifications. The required test equipment is included, too.

Chapter 2 describes the adjustment of the 2.5 MHz and 15 MHz filters, adjustment of the I/Q signals and fault diagnosis.

Chapter 3 describes the design of AMIQ as well as simple measures for repair and fault diagnosis, in particular, the replacement of modules and access to hardware settings by means of service commands.

Chapter 4 contains information on the extension and modification of AMIQ by installing instrument software and retrofitting options.

Chapter 5 contains spare parts lists and exploded views of AMIQ.

Chapter 6 contains the circuit documentation for module „IQ Analog/Digital Unit" (IQ board).

Chapter 7 contains the circuit documentation for option „Differential Outputs" (AMIQ-B2).

Operating Manual

The operating manual contains all information on the characteristics, putting into operation, operation and remote control of AMIQ. It further provides hints on preventive maintenance and fault diagnosis by means of warnings and error messages output by the unit.

1 Performance Test

This chapter informs you in detail on how to check the AMIQ for compliance with specifications. Please note the general instructions on the test procedure given on page 1.2. The measuring equipment needed for the performance test is listed below, and a test report form is included at the end of this chapter.

Adjusting the unit for compliance with specifications, as well as the measuring equipment needed, is described in chapter 2 of this service manual.

Required Measuring Equipment

Table 1-1 Measuring Equipment for Performance Test

Item	Instrument/ equipment	Required characteristics	Suitable unit	R & S Order No.	Described on page
1	Oscilloscope	Bandwidth > 100 MHz 2 channels	BOL	0374.2000.02	1.4 1.9 1.10 1.10
2	Frequency counter	Frequency min. 100 MHz, Accuracy higher than $1*10^{-6}$, time A-B, resolution min. 10 ps	Philips PM6680		1.3 1.3 1.8
3	AC voltmeter	RMS 25 MHz bandwidth	URE3	0350.5315.03	1.5 1.5 1.7
4	DC voltmeter	+/–5 Volt 0 V resolution min. 0.1 mV	UDS5	0349.1510.02	1.5 1.7
5	Spectrum analyzer	Min. 100 MHz, dynamic range min. 80 dB	FSE	1065.6000.20	1.6 1.8
6	Trigger generator	1 kHz, TTL	APN	0844.6001.04	1.10
7	50 Ω feed-through termination	0.5 W, 0.1%	RAD 50	0844.9352.02	
8	50 Ω BNC connecting cables	Lengths 0.5 m, 1 m, same type of cable for I and Q outputs			
9	9-pin SUB-D adapter	Connection of BER interface for test	see 5.2.12		1.11
10	IEC/IEEE-bus cable	Connection to IEC625/IEEE488	PCK	0292.2013.10	
11	Null-modem cable	9-pin RS232 cable with transposed RX-TX lines		1050.0346.02	
12	Controller	PC/XT/AT industry standard with IEC625/IEEE488 and RS232 interfaces	PSA 5 PSA 15 PSA 17	1006.3008.03 1012.1003.02 1026.1000.03	
13	Connector for digital output		e.g., AMP 750913		

Test Procedure

The AMIQ can be operated only by remote control. To check compliance with specifications, therefore, a suitable controller and control software are needed to transmit the commands for the required instrument settings. Transmission may be via the RS232 interface or the IEEE488 interface (see operating manual, chapter 2, "Getting Started").

A warm-up period of at least one hour should be allowed before checking the unit for compliance with specifications.

NOTE: *For the R&S service centers, a suitable DOS program is available for the easy setup of the AMIQ via the IEEE488 bus.*

Power-Up Sequence, Interface Test

Preparation: ➢ Connect the AMIQ to the AC supply and switch the unit on.

Test: On power-up, the AMIQ performs a simple self-test. After this test has run successfully, the *ON* LED lights permanently and the unit is ready to accept commands via the interfaces.

If the *ON* LED is flashing, an error has occurred during the self-test. More detailed information on the error can be requested via `:SYST:ERR?` (see operating manual, chapters 5 and 6).

IEC/IEEE-Bus Interface

Preparation: ➢ Connect the IEC/IEEE-bus interface of the AMIQ to that of the controller via the IEC/IEEE-bus cable.

Test: ➢ Send the character string '*IDN?<CR><NL>' from the controller to the AMIQ and read the answer string from the AMIQ.

The answer string should contain the following message:

'ROHDE & SCHWARZ,AMIQ<Var>,<Ser_Nr>,<Firmware_Vers._Nr>'

RS232 Interface

Preparation: ➢ Connect the RS232 interface of AMIQ to that of the controller via the null-modem cable (see page 1.1, "Required Measuring Equipment").

➢ Set the RS232 interface of the controller to 8 data bits, 1 start bit, 1 stop bit, no parity bit, XON/XOFF handshake and 19200 baud.

Test: ➢ Send the character string '*IDN?<CR><NL>' from the controller to the AMIQ and read the answer string from the AMIQ.

The answer string should contain the following message:

'ROHDE & SCHWARZ,AMIQ<Var>,<Ser_Nr>,<Firmware_Vers._Nr>'

Clock Generation

Preparation:
- ➢ Connect frequency counter to clock signal output of AMIQ.
  Select frequency measurement on frequency counter.

Commands:
- ➢

```
*RST                          Preset
CLOCK 100.000000MHz           For 100 MHz test
(CLOCK 10.000000Hz)           For 10 Hz test
ARM                           Preparation for start
TRIG                          Start
SClock EXTFast                Set to external CLOCK
```

Test:
- ➢ Measure frequency and compare with specifications in performance test report.

Testing the clock input (for Var. 03 and Var. 04 only):
- ➢ Connect Clock BNC female on the rear to the input.
- ➢ Connect REF output to the clock input via a BNC connecting cable.
  Next triggering of the wave causes the output to be controlled by the externally applied clock.
  After disconnecting the external clock input the output is stopped and the AMIQ signals an error message.

  Command for external CLK: `SCLock EXTFast` (see operating manual)

Note:
- ➢ The accuracy of the clock frequency at the clock signal output is determined by the internal 10 MHz reference frequency.
  Adjust reference frequency with the command `CAL:ROSC xxxx`
  (xxxx: value between 0 and 4095)
  Read calibration value with the command `CAL:ROSC?`

External Reference Frequency

For adjustment of the internal reference oscillator, synchronization to an external 10 MHz reference frequency is checked. The reference frequency is supplied by the frequency counter. The frequency measured by the frequency counter at the 10 MHz REF output will thus be accurate to the last digit.

Preparation:
- ➢ Connect reference frequency output of frequency counter to REF input of AMIQ.
- ➢ Connect REF output of AMIQ to test input of frequency counter.
- ➢ Select frequency measurement on frequency counter.

Commands:
- ➢

```
*RST
ROSC:SOUR EXT
ARM
TRIG
```

Test:
- ➢ Read frequency to check if reference PLL has locked.

  In locked condition, the reading is exactly 10 MHz.

Level and Offset Calibration

The internal level and offset calibration for the I and Q outputs is performed automatically when activated by the corresponding control command. There are various calibration commands for offset, level and the I and Q channels.

Commands: ➢ `*RST`
`CAL:ALL?  Calibration of level and offset for I and Q`

Test: ➢ Read message from AMIQ.
If calibration functions properly, AMIQ sends "0", in case of an error "1".
Information on the error source is obtained by reading the error queue.
(see operating manual, IEC/IEEE-bus control)

Waveform Memory, Standard Sine Curve

Test principle: ➢ Programming of sine curve with commands sent to AMIQ

The amplitude stored in the AMIQ waveform memory corresponds to 1.0 FS (full scale). The frequency of the sinusoidal signal is determined by the number of samples per period and by the selected clock frequency. The samples available in the waveform memory must be a multiple of the samples needed for the period of the curve. For testing, the whole memory (4000000 samples) is filled, which takes up about 30 seconds.

Sine frequency = clock frequency / samples(period)

Preparation: ➢ Connect oscilloscope to I and Q outputs.

Control: ➢

```
*RST                          Preset
CLOCK 100.0MHz                Clock frequency (100 MHz)
TEST:SDR:WAV SINE             Sine curve
TEST:SDR:PER 10000            Samples per period (10000)
TEST:SDR:PHAS 0               Phase diff. between I and Q (0)
TEST:SDR:AMPL 32000           Sinewave amplitude (1 FS)
TEST:SDR:OFFS 32768           Sinewave offset (0 FS)
TEST:SDR:FILL 4000000         Waveform memory
                              (4000000 samples)
OUTP:I FIX                    Output I: fix mode
OUTP:Q FIX                    Output Q: fix mode
ARM                           Start of output
TRIG
```

Test: ➢ Check sine curve of I and Q outputs on oscilloscope:

frequency 10 kHz, amplitude 1 V_{pp} with 50 Ω feed-through termination

"Fix" Mode

In the *fix* mode, a fixed signal level is present at outputs I and Q which can be varied only by the fine adjustment function of AMIQ. The output level and amplitude balance are checked on a 1 kHz sinusoidal signal at the outputs without terminations. Inaccuracies introduced by the termination are thus avoided. The residual DC offset of the two channels is measured with terminations. It is assumed that the unit has been amplitude- and offset-calibrated (see page 1.3, section "Level and Offset Calibration").

If option AMIQ-B2 (Differential Outputs) is fitted the AMIQ's outputs must be set to „SINGLE" (UNBAL) mode to avoid additional errors due to a non-adjusted option.

➢ `OUTP:TYPE UNBAL`

Output Level

Preparation: ➢ Connect AC voltmeter (RMS) to I or Q output without termination.
Resolution of voltmeter: min. 4-digit

Generation of 1 kHz sinusoidal signal at the I and Q outputs:

Commands:

```
➢ *RST                          Preset
  CLOCK 10.0MHz                 Clock frequency (10 MHz)
  TEST:SDR:WAV SINE             Sine curve
  TEST:SDR:PER 10000            Samples per period (10000)
  TEST:SDR:PHAS 0               Phase diff. between I and Q (0)
  TEST:SDR:AMPL 32000           Sinewave amplitude (1 FS)
  TEST:SDR:OFFS 32768           Sinewave offset (0 FS)
  TEST:SDR:FILL 10000           1 period in waveform memory
  OUTP:I FIX                    Output I: fix mode
  OUTP:Q FIX                    Output Q: fix mode
  ARM                           Start of output
  TRIG
```

Test: ➢ Measure output level of 1 kHz signal of I and Q channels and compare against specifications of test report.

Level Difference

Preparation: Measurement to section "Output Level", page 1.5.

Test: ➢ Determine percentage difference between I and Q output levels.

Level difference [%] = [(level I – level Q)/(level I)]*100%

➢ Compare the resulting level difference against specifications of test report.

Residual DC Offset

Preparation: ➢ Connect DC voltmeter with 50 Ω feed-through termination to I or Q output of AMIQ.

Resolution of DC voltmeter: min. 0.1 mV

Generation of 0 V DC signal (sinewave amplitude 0 FS) at I and Q outputs:

Commands:

```
➢ *RST                          Preset
  CLOCK 10.0MHz                 Clock frequency (10 MHz)
  TEST:SDR:WAV SINE             DC curve
  TEST:SDR:PER 10000            Samples per period (10000)
```

```
TEST:SDR:PHAS 0              Phase diff. between I and Q (0)
TEST:SDR:AMPL 00000          Sinewave amplitude (0 FS)
TEST:SDR:OFFS 32768          Sinewave offset (0 FS)
TEST:SDR:FILL 10000          1 period in waveform memory
OUTP:I FIX                   Output I: fix mode
OUTP:Q FIX                   Output Q: fix mode
ARM                          Start of output
TRIG
```

Test: ➢ Measure residual DC offset of I and Q channels and compare against specifications of test report.

Note: *If the DC voltmeter provides accurate residual DC offset measurement with the AC voltage (1 kHz) present, the DC residual offset can be measured without reprogramming the waveform (setting of AMIQ as described in section "Output Level", page 1.5).*

Spurious Free Dynamic Range (SFDR)

The spurious free dynamic range (SFDR) is that range of the spectrum of a signal under test which is free from harmonics or other spurious. It is normally specified in dB referred to the useful signal. In the case of D/A converters, SFDR is dependent on the clock frequency and the resolution and is a measure of the quality of a D/A converter. In measurements without anti-aliasing filter, SFDR is normally considered to be the range up to half the sample frequency (Nyquist/2), and this range is evaluated. Outside this range, aliasing products occur whose level may be considerably lower than the SFDR for reasons inherent in the system.

Preparation: ➢ Connect spectrum analyzer to I or Q output of AMIQ.

Settings on spectrum analyzer:

Start frequency 0 Hz
Stop frequency 5 MHz (Nyquist/2)
Reference level 3.0 dBm
Resolution bandwidth 1 kHz
Video bandwidth 3 kHz

Generation of 1 MHz sinewave signal at I and Q outputs:

Commands: ➢

```
*RST                         Preset
CLOCK 10.0MHz                Clock frequency (10 MHz)
TEST:SDR:WAV SINE            Sine curve
TEST:SDR:PER 10              Samples per period (10)
TEST:SDR:PHAS 0              Phase diff. between I and Q (0)
TEST:SDR:AMPL 32000          Amplitude (1 FS)
TEST:SDR:OFFS 32768          Offset (0 FS)
TEST:SDR:FILL 1000           100 periods in waveform memory
OUTP:I FIX                   Output I: fix mode
OUTP:Q FIX                   Output Q: fix mode
ARM                          Start of output
TRIG
```

Test: ➢ Determine SFDR on spectrum analyzer and compare against specifications of test report.

"Variable" Mode

In this mode, the output level can be set in the range 0 to 1 V peak amplitude (into 50 Ω) separately for the I and Q channel. An electronic attenuator in the AMIQ allows a level variation of 20 dB. Further attenuation can be effected by means of a mechanical 20 dB or 40 dB stage.

Output Level

Preparation: ➢ Connect AC voltmeter (RMS) to I or Q output without termination.
Resolution of voltmeter: min. 4-digit

Generation of 1 kHz sinusoidal signal with 1 V amplitude at I and Q outputs:

Commands: ➢

```
*RST                        Preset
CLOCK 10.0MHz               Clock frequency (10 MHz)
TEST:SDR:WAV SINE           Sine curve
TEST:SDR:PER 10000          Samples per period (10000)
TEST:SDR:PHAS 0             Phase diff. between I and Q (0)
TEST:SDR:AMPL 32000         Amplitude (1 FS)
TEST:SDR:OFFS 32768         Offset (0 FS)
TEST:SDR:FILL 10000         1 periode in waveform memory
OUTP:I VAR                  Output I: variable mode
OUTP:I:AMPL 1.0             I amplitude: Vp = 1 V
OUTP:Q VAR                  Output Q: variable mode
OUTP:Q:AMPL 1.0             Q amplitude: Vp = 1 V
ARM                         Start of output
TRIG
```

Test: ➢ Measure 1 V output level of 1 kHz signal for I and Q channels and compare against specifications of test report.

Commands: ➢

```
OUTP:I:AMPL 0.09999     I ampl.: Vp = 0.1 V (20 dB atten.)
OUTP:Q:AMPL 0.09999     Q ampl.: Vp = 0.1 V (20 dB atten.)
```

Test: ➢ Repeat measurement with 0.1 V output level of 1 kHz signal for I and Q channels and compare against specifications of test report.

Commands: ➢

```
OUTP:I:AMPL 0.009999    I ampl.: Vp = 0.01 V (40 dB atten.)
OUTP:Q:AMPL 0.009999    Q ampl.: Vp = 0.01 V (40 dB atten.)
```

Test: ➢ Repeat measurement with 0.01 V output level of 1 kHz signal for I and Q channels and compare against specifications of test report.

Residual DC Offset

Preparation: ➢ Connect DC voltmeter with 50 Ω feed-through termination to I or Q output of AMIQ. Resolution of DC voltmeter: min. 0.1 mV

Generation of 0 V DC signal (sinewave amplitude 0 FS) at I and Q outputs:

Commands: ➢

```
*RST                        Preset
CLOCK 10.0MHz               Clock frequency (10 MHz)
TEST:SDR:WAV SINE           generate DC voltage
TEST:SDR:PER 10000          Samples per period (10000)
TEST:SDR:PHAS 0             Phase diff. between I and Q (0)
TEST:SDR:AMPL 00000         Amplitude (0 FS)
TEST:SDR:OFFS 32768         Offset (0 FS)
TEST:SDR:FILL 10000         1 period in waveform memory
OUTP:I VAR                  Output I: variable mode
OUTP:I:AMPL 1.0             I amplitude: 1 Vp
OUTP:Q VAR                  Output Q: variable mode
```

```
OUTP:Q:AMPL 1.0                Q amplitude: 1 Vp
ARM                            Start of output
TRIG
```

Test: ➢ Measure residual DC offset with 1 V level for I and Q channels and compare against specifications of test report.

Note: *If the DC voltmeter provides accurate residual DC offset measurement with the AC voltage (1 kHz) present, the DC residual offset can be measured without reprogramming the waveform (setting of AMIQ as described in section "Output Level", page 1.7).*

Spurious Free Dynamic Range (SFDR)

(cf. section "Spurious Free Dynamic Range (SFDR)", page 1.6)

Preparation: ➢ Connect spectrum analyzer to I or Q output of AMIQ.
Settings on spectrum analyzer:
Start frequency 0 Hz
Stop frequency 5 MHz (Nyquist/2)
Reference level 3.0 dBm
Resolution bandwidth 1 kHz
Video bandwidth 3 kHz

Generation of 1 MHz sinusoidal signal at I and Q outputs:

Commands: ➢

```
*RST                           Preset
CLOCK 10.0MHz                  Clock frequency (10 MHz)
TEST:SDR:WAV SINE              Sine curve
TEST:SDR:PER 10                Samples per period (10)
TEST:SDR:PHAS 0                Phase diff. between I and Q (0)
TEST:SDR:AMPL 32000            Amplitude (1 FS)
TEST:SDR:OFFS 32768            Offset (0 FS)
TEST:SDR:FILL 1000             100 periods in waveform memory
OUTP:I VAR                     Output I: variable mode
OUTP:I:AMPL 0.1                I amplitude: 0.1 Vp
OUTP:Q VAR                     Output Q: variable mode
OUTP:Q:AMPL 0.1                Q amplitude: 0.1 Vp
ARM                            Start of output
TRIG
```

Test: ➢ Determine SFDR on spectrum analyzer and compare against specifications of test report.

Delay between I and Q Channel (Skew)

The skew is determined by measuring the delay of the two outputs with a suitable counter. To this end, a squarewave signal is to be programmed on both channels of AMIQ.
It should be noted that that normally the counter itself introduces a delay error between test inputs A and B. This error is to be taken into account.
Identical coax cables should be used for connecting the AMIQ outputs to the counter inputs.

Preparation: ➢ Connect counter inputs A and B with I and Q outputs of AMIQ using two identical cables.

Settings on counter:

Time A - B
Trigger level auto
Input impedance 50 Ω
Input coupling DC
Slope rising

Generation of 5 MHz squarewave signal at I and Q outputs:

Commands: ➢

```
*RST                    Preset
CLOCK 10.0MHz           Clock frequency (10 MHz)
TEST:SDR:WAV SQUARE     Squarewave
TEST:SDR:PER 2          Samples per period (2)
TEST:SDR:PHAS 0         Phase diff. between I and Q (0)
TEST:SDR:AMPL 32000     Amplitude (1 FS)
TEST:SDR:OFFS 32768     Offset (0 FS)
TEST:SDR:FILL 1000      500 periods in waveform memory
OUTP:I FIX              Output I: fix mode
OUTP:Q FIX              Output Q: fix mode
OUTP:FILT OFF           Filter off
ARM                     Start of output
TRIG
```

Test: ➢ Determine skew between channels I and Q. To this end, interchange the test cables on the I and Q outputs of AMIQ. The difference in delay measured after interchanging the cables corresponds to the skew of AMIQ. Compare this value against specifications of test report.

Internal Filters

AMIQ has two internal lowpass filters with cutoff frequencies 2.5 MHz and 25 MHz for each channel. These filters are adjusted in production for optimum transmission characteristics as well as amplitude balance and group delay by means of special instruments. Readjustment of the filters with the appropriate instruments is required only in case of repair.

In this test, the filters are checked for proper functioning by measuring the squarewave rise time.

Preparation: ➢ Connect oscilloscope to I and Q outputs.

Generation of 1 MHz squarewave signal at I and Q outputs:

Commands: ➢

```
*RST                    Preset
CLOCK 10.0MHz           Clock frequency (10 MHz)
TEST:SDR:WAV SQUARE     Squarewave
TEST:SDR:PER 10         Samples per period (10)
TEST:SDR:PHAS 0         Phase diff. between I and Q (0)
TEST:SDR:AMPL 32000     Amplitude (1 FS)
TEST:SDR:OFFS 32768     Offset (0 FS)
TEST:SDR:FILL 1000      100 periods in waveform memory
OUTP:I FIX              Output I: fix mode
OUTP:Q FIX              Output Q: fix mode
OUTP:FILT OFF           Filter off
(OUTP:FILT 2.5MHz       Filter 2.5 MHz)
(OUTP:FILT 25MHz        Filter 25 MHz)
ARM                     Start of output
TRIG
```

Test: ➢ Check rise time of squarewave signals on I and Q outputs on oscilloscope for the various filter settings.

The rise times need not be measured exactly. They merely indicate the various filter settings:

The following typical rise times should be obtained:

with filter off	5 ns
with filter 25 MHz	15 ns
with filter 2.5 MHz	150 ns

External Trigger

To check the external trigger, a trigger generator is required which supplies a TTL control signal as trigger signal.
In the gate mode, the signals at the I and Q outputs are switched on and off by the trigger signal. This function can easily be checked on the oscilloscope.

Preparation: ➢ Connect oscilloscope to I and Q outputs.
Apply 1 kHz TTL trigger signal to trigger input of AMIQ.

Generation of 100 kHz sinusoidal signal at I and Q outputs:

Commands:

```
➢ *RST                      Preset
  CLOCK 10.0MHz             Clock frequency (10 MHz)
  TEST:SDR:WAV SINE         Sinewave
  TEST:SDR:PER 100          Samples per period (100)
  TEST:SDR:PHAS 0           Phase diff. between I and Q (0)
  TEST:SDR:AMPL 32000       Amplitude (1 FS)
  TEST:SDR:OFFS 32768       Offset (0 FS)
  TEST:SDR:FILL 10000       100 periods in waveform memory
  OUTP:I FIX                Output I: fix mode
  OUTP:Q FIX                Output Q: fix mode
  TRIG:MODE:GAT             Trigger mode: gate
  TRIG:SLOP POS             Trigger polarity
  TRIG:SOUR EXT             Trigger source: external
  ARM                       Start of output
```

Test: ➢ Check I and Q output signals (100 kHz sinewave) of AMIQ on oscilloscope. The output signals are switched on and off synchronously with the external trigger signal.

Marker Outputs

The marker outputs are controlled by programming the two LSBs of the 16-bit waveform memory of the I and Q channel. These bits are automatically programmed in programming the waveforms (see above) for the various tests for compliance with specifications. For testing the marker outputs it is sufficient to check the four marker outputs by means of an oscilloscope. A pulse train must be present at each of the four marker outputs.

Preparation: ➢ Connect oscilloscope to marker outputs 1 to 4 one after the other using a 50 Ω termination.

Generation of 1 kHz sinusoidal signal at the I and Q outputs:

Commands:

```
➢ *RST                          Preset
  CLOCK 10.0MHz                 Clock frequency (10 MHz)
  TEST:SDR:WAV SINE             Sinewave
  TEST:SDR:PER 10000            Samples per period (10000)
  TEST:SDR:PHAS 0               Phase diff. between I and Q (0)
  TEST:SDR:AMPL 32000           Amplitude (1 FS)
  TEST:SDR:OFFS 32768           Offset (0 FS)
  TEST:SDR:FILL 40000           4 periods in waveform memory
  OUTP:I FIX                    Output I: fix mode
  OUTP:Q FIX                    Output Q: fix mode
  ARM                           Start of output
  TRIG
  OUTP:MARK1 ON                 switch on markers 1 to 4
  OUTP:MARK2 ON
  OUTP:MARK3 ON
  OUTP:MARK4 ON
```

Test:

➢ Check pulse train and pulse amplitude for each marker output.
Pulse amplitude at 50 Ω feed-through termination: typ. 2 V
Pulse period (corresponding to clock frequency): 100 ns

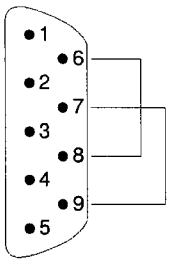
BER Interface

The BER interface is used for performing bit error rate measurements by means of the AMIQ. For these measurements, the software option AMIQ-B1 is required.

The interface is to be checked irrespective of whether this option is implemented or not. The inputs and outputs of the interface are interconnected via an adapter and checked for proper functioning.

Preparation:

➢ Prepare adapter (SUB-D, 9-pin, female) as shown below and plug onto BER interface of the instrument.



SUB-D connector female

Commands:

```
➢ *RST                          Preset
  TEST:BERT?                    Test BER interface
```

Check:

If the BER interface is functioning properly, "0" is returned by AMIQ.

If an error is found, "1" is returned.

More detailed information on the error can be queried with `:SYST:ERR?`.

Bias Voltage and Offset (with Built-in AMIQ-B2 Option)

The operating point of a DUT can be adjusted by superimposing a DC voltage upon the output signal. This requires option AMIQ-B2 (Differential Outputs) to be fitted. As the residual offset voltage of AMIQ-B2 can not be compensated for during calibration, it must be tested separately.

Preparation: ➢ Connect DC voltmeter to all four output sockets in succession.

Commands: ➢
```
:OUTP:OIMP R50
:OUTP:I: AMPL:BAL 0V
:OUTP:Q: AMPL:BAL 0V
:OUTP:TYPE BAL
:OUTP:I:BIAS -2.5V
:OUTP:I:BIAS 2.5V
:OUTP:Q:BIAS -2.5V
:OUTP:Q:BIAS 2.5V
:OUTP:I:BIAS 0V
:OUTP:Q:BIAS 0V
```

Check: ➢ If the option operates correctly the voltages of –2.5 V and +2.5 V must be measured at the outputs on open circuit. The non-inverting and the corresponding inverting outputs show the same voltage, I and Q can be set independent from each other (tolerance ±10 mV). The last two commands set a bias voltage of 0 V at all four outputs. The offset volage measured now must not exceed ±0.1 mV.

Digital I/Q Output (with Built-in AMIQ-B3)

The AMIQ-B3 option is provided to supply the digital signals of up to 16 bits in width required for the control of circuits and devices with digital inputs (e.g., digital/analog converters). Besides, the option provides a supply voltage (+3.3 V or +5 V) and clock signals at the digital output of the AMIQ.

Preparation:➢ Adapt an appropriate connector to the 68-pin DIGITAL OUTPUT socket. Connect pins 66 to 67 to prevent all outputs from being high-impedance.
Pins 67 and 68 are used to select the voltage supplied at the digital output (+3.3 V or +5 V) and, thus, also the amplitude of the digital signals.

Control: ➢
```
TEST:ABO:DIG_OUT_EN ON    (Digital outputs active)
TEST:SDR:DAC 43690,43690  (output AAAA hex)
TEST:SDR:DAC 21845,21845  (output 5555 hex)
MMEM:LOAD, 'SINE.WV'      (output sinewave)
```

Test: ➢ Pin 67 connected to pin 68: +3.3 V at pin 67
Pin 68 not connected: +5.0 V at pin 67
Measure the supply voltage applied at pin 67 and compare against specifications of performance test report.

The data outputs are statically checked by alternately outputting two test patterns at the individual data lines (I0... I15, Q0... Q15).

With output of
`5555(0101...)` the outputs `I/Q 0, 2, 4, are` high
the outputs `I/Q 1, 3, 5, are` low
`AAAA(1010...)` the outputs `I/Q 0, 2, 4, are` low
the outputs `I/Q 1, 3, 5, are` high

After loading and starting 'SINE.WV' the frequency applied to the two clock outputs corresponds to the frequency applied at the CLOCK output.

The clock outputs (pins 33 and 34) are tested by comparing their clock frequencies to the CLOCK output on the rear of AMIQ.

Test Report

ROHDE & SCHWARZ	I/Q Modulation Generator AMIQ	1110.2003.02
Serial No.:		
Test engineer:		
Date:		
Signature:		

Table 1-2 Test Report

Item No.	Characteristic	Measuremt. to page	Min.	Actual	Max.	Unit
1	Power-up sequence	1.2	------		------	------
2	IEC625 / IEEE488 interface	1.2	------		------	------
3	RS232 interface	1.2	------		------	------
4	Clock generation Frequency 100 MHz Frequency 10 Hz external	1.3	 99.99900 9.999900 ------		 100.001 10.0001 ------	 MHz Hz ------
5	External synchronization	1.3	------		------	------
6	Level and offset calibration	1.3	------		------	------
7	Waveform memory, sinewave	1.4	------		------	------
8	Fix mode Output level, I channel Output level, Q channel	1.5	 0.7000 0.7000		 0.7142 0.7142	 V_{rms} V_{rms}
9	Level difference (I-Q)	1.5	- 0.2		+ 0.2	%
10	Residual DC offset, I channel Residual DC offset, Q channel	1.5	- 0.5 - 0.5		+ 0.5 + 0.5	mV mV
11	SFDR, I channel SFDR, Q channel	1.6	70 70		------ ------	dB dB
12	Variable mode Output level, I channel 1V Output level, Q channel	1.7	 1.386 1.386		 1.443 1.443	 V_{rms} V_{rms}
	Output level, I channel 0.1V Output level, Q channel	1.7	0.1386 0.1386		0.1443 0.1443	V_{rms} V_{rms}
	Output level, I channel 0.01V Output level, Q channel	1.7	0.01386 0.01386		0.01443 0.01443	V_{rms} V_{rms}
13	Residual DC offset, I channel Residual DC offset, Q channel	1.7	- 5 - 5		+ 5 + 5	mV mV
14	SFDR, I channel SFDR, Q channel	1.8	50 50		------ ------	dB dB
15	Skew, I-Q channel	1.8	- 0.5		+ 0.5	ns

Item No.	Characteristic	Measuremt. to page	Min.	Actual	Max.	Unit
16	Internal filters off 2.5 MHz 25 MHz	1.9	 ------ ------ ------		 ------ ------ ------	 ------ ------ ------
17	External trigger	1.10	------		------	------
18	Marker outputs Marker 1 Marker 2 Marker 3 Marker 4	1.10	 ------ ------ ------ ------		 ------ ------ ------ ------	 ------ ------ ------ ------
19	BER interface	1.11	------		------	------
If option AMIQ-B2 (Differential Ouputs) is fitted the following test points are added:						
20	Differential Outputs, residual offset Output I Output $\overline{I}$ Output Q Output $\overline{Q}$	1.11	 –0.1 –0.1 –0.1 –0.1		 +0.1 +0.1 +0.1 +0.1	 V V V V
21	Setting range for bias voltage Output I and $\overline{I}$ Output I and $\overline{I}$ Output Q and $\overline{Q}$ Output Q and $\overline{Q}$	1.11	 –2.51 +2.49 –2.51 +2.49		 –2.49 +2.51 –2.49 +2.51	 V V V V
If option AMIQ-B3 („Digital I/Q Output") is fitted, the following test points are added:						
22	Ext. supply voltage +3.3 V rated +5 V rated	1.13	 +3,0 +4.5		 +3.5 +5.5	 V V
23	Data outputs 5555 AAAA	1.13	 - - - - - -		 - - - - - -	
24	Clock outputs	1.13	- - -		- - -	

2 Adjustment

This chapter describes the filter and I-Q adjustments of AMIQ including the adjustment of option AMIQ-B2 (if fitted) for the purpose of restoring compliance with specifications.

An overview of the I-Q adjustment facilities of AMIQ will be found in chapter four of the operating manual in the form of a simplified block diagram.

Required Measuring Equipment

Table 2-1 Measuring Equipment for Adjustment of AMIQ

Item	Instrument/ equipment	Required characteristics	Suitable unit	R & S Order No.	Described on page
1	Vector network analyzer	500 kHz to 20 MHz	ZVRE, basic unit SWR bridges 50 Ω, passive, ZVR-A55 Step attenuator, receiver, 2 ports, ZVR-B24	1043.0009.50 1043.7755.20 1044.0025.22	2.1 2.2
2	2 N/SMB test cables		See "Conversion" in section "Preparation of Network Analyzer"		2.1
3	SMB calibration kit	Through, open, short, match	See "Calibration" in section "Preparation of Network Analyzer"		2.1
4	Frequency counter	Function TIME A-B, resolution 10 ps	Philips PM6680		2.6
5	DC voltmeter	±5 V, resolution 0,1 mV	UDS5	0349.1510.02	2.8

Preparation of Network Analyzer

Conversion:

➢ Adapt network analyzer from N to SMB connectors.

The inputs and outputs of the filters incorporated in AMIQ are accessible via SMB connectors on the IQ_ANALOG/DIGITAL_UNIT module. For this reason, the two test ports of the network analyzer, too, must be adapted from N or BNC to SMB connectors by means of adapter cables.

Calibration:

➢ Calibrate network analyzer for SMB connectors:

Before measurements are performed, the network analyzer must be calibrated for the SMB connectors. For R&S Network Analyzer ZVRE, this is done by means of the **TOSM** procedure (**t**hrough, **o**pen, **s**hort, **m**atch).

Through: The cables of ports 1 and 2 are connected with each other.
Open: The cable of port 1 or 2 is open.
Short: The cable of port 1 or 2 is short-circuited.
Match: The cable of port 1 or 2 is terminated with 50 Ω.

By this calibration, all measurement uncertainties involved in the test setup consisting of the network analyzer and the SMB cables are taken into account. The subsequent measurement reveals the frequency response of the DUT connected between the SMB cables.

For calibration, an SMB calibration kit is required:

Through	SMB connector/connector adapter (R&S Order No. 0017.6259)
Open	SMB cable is open
Short	SMB connector, short-circuited with wire
Match	50 Ω termination (R&S Order No. 0521.9401, female) + SMB connector/connector adapter or SMB connector terminated with 50 Ω, 0.1%.

Adjustment of Filters

Preparation:

➢ Select transmission measurement S21 on network analyzer (see section "Adjustment of 25 MHz Filters"). Connect output (port 1 on ZVRE) to input of filter on IQ board (X13, X8, X17, X26). Connect output of filter (X15, X6, X23, X24) to input (port 2 on ZVRE).

Commands:

➢

```
*RST                          Preset
CLOCK 10.0MHz                 Clock frequency (10 MHz)
TEST:SDR:WAV Sine             Curve (DC)
TEST:SDR:PER 4                Samples per period (4)
TEST:SDR:PHAS 0               Phase diff. between I and Q (0)
TEST:SDR:AMPL 0000            Amplitude (0 FS)
TEST:SDR:OFFS 32768           Offset (0 FS)
TEST:SDR:FILL 1000            250 periods in waveform memory
OUTP:I FIX                    Output I: fix mode
OUTP:Q FIX                    Output Q: fix mode
OUTP:FILT OFF                 Filter off
ARM                           Start of output
TRIG
```

Notes: *The IQ_ANALOG/DIGITAL_UNIT module must be fitted in AMIQ since the intermediate panel acts like a shielding cover on the solder side.*

The shielding covers on the component side have an effect in adjustment. It is sufficient if the covers rest on the shielding panels during adjustment; they need not be screwed on.

Only non-metallic tools may be used for adjustment.

Adjustment of 25 MHz Filters

The passband of the filters is adjusted for flat frequency response of amplitude and group delay.

To reduce the delay and magnitude errors of the filters to a minimum, both channels must be adjusted in each case. First the I channel filter is to be adjusted. The frequency response curves are stored. Then the Q channel filter is adjusted. The frequency response of the two filters should be as identical as possible.

Note: *Adjustment of the filters is required only when a component in the signal path of the filters has been replaced.*

Preparation:

➢ Settings on network analyzer:

SWEEP	LOG SWEEP
START	500 kHz
STOP	50 MHz
IF BANDWIDTH	1 kHz
NUMBER OF POINTS	401
CH1:	
MEAS	S21 FWD TRANS
FORMAT	MAGNITUDE
SCALE - MAX VALUE	+0.25 dB
SCALE - MIN VALUE	–0.25 dB
CH2:	
MEAS	S21 FWD TRANS
FORMAT	GROUP DELAY
SCALE - MAX VALUE	50 ns
SCALE - MIN VALUE	45 ns
STEP APERTURE	10
TRACE - SMOOTHING	ON
TRACE - SMOOTHING APERTURE	5%
Generator level	–10 dBm
Attenuator on PORT2	10 dB

➢ Carry out calibration.

Adjustment of I Filter

Connection:

➢ Connect I filter:

➢ Connect port 1 of network analyzer to X13 and port 2 to X15.

Adjustment:

➢ Magnitude (MAG):
Use **C190** to adjust for flat frequency response.
Tolerance: ±0.05 dB up to 20 MHz
Reference: value at 500 kHz, typically –0.025 dB

➢ Group delay (DLY):
Use **C189** to adjust for flat frequency response in the range 1 MHz to approx. 7 MHz.
Use **L79** to adjust for flat frequency response up to 20 MHz. Readjust with **C189**.

Tolerance:

±250 ps from 1 MHz to 20 MHz
Reference: value at 1 MHz, typically 48 ns

➢ Readjust magnitude (MAG) with **C190**.

Note:

The typical value of 48 ns at 1 MHz should be attained. If this is not the case, it may not be possible to adjust the Q filter.

➢ Store and display the two curves.

Adjustment of Q Filter

Connection:

- ➢ Connect Q filter:
- ➢ Connect port 1 of network analyzer to X17 and port 2 to X23.

Adjustment:

- ➢ Magnitude (MAG):
  Use **C192** to adjust for flat frequency response.
  Tolerance: ±0.05 dB up to 20 MHz
  Reference: value at 500 kHz, typically -0.025 dB

The difference between I-MAG and Q-MAG should be as small as possible. A small vertical offset (ie a constant difference in gain) between the curves is permissible as absolute level accuracy is subsequently corrected by the software.

- ➢ Group delay (DLY):
  Use **C191** to adjust for flat frequency response in the range 1 MHz to approx. 7 MHz.
  Use **L80** to adjust for flat frequency response up to 20 MHz. Readjust with **C191**.

Tolerance: ±250 ps from 1 MHz to 20 MHz. Reference: value at 1 MHz.

- ➢ Readjust magnitude (MAG) with **C192**.
  The difference between I-DLY and Q-DLY should be as small as possible.

The I-DLY and Q-DLY values should be identical in the range 1 MHz to 10 MHz. In this case, a small vertical offset (difference in group delay) between the two channels is undesirable since this offset cannot be subsequently corrected by the software.

Adjustment of 2.5 MHz Filters

The passband of the filters is adjusted for flat frequency response of amplitude and group delay.

To reduce the delay and magnitude errors of the filters to a minimum, both channels must be adjusted in each case. First the I channel filter is to be adjusted. The frequency response curves are stored. Then the Q channel filter is adjusted. The frequency response of the two filters should be as identical as possible.

Note: *Adjustment of the filters is required only when a component in the signal path of the filters has been replaced.*

Preparation:

- ➢ Settings on network analyzer:

SWEEP	LOG SWEEP
START	500 kHz
STOP	5 MHz
IF BANDWIDTH	1 kHz
NUMBER OF POINTS	401
CH1:	
MEAS	S21 FWD TRANS
FORMAT	MAGNITUDE
SCALE - MAX VALUE	+0.25 dB
SCALE - MIN VALUE	–0.25 dB
CH2:	
MEAS	S21 FWD TRANS
FORMAT	GROUP DELAY
SCALE - MAX VALUE	50 ns
SCALE - MIN VALUE	45 ns
STEP APERTURE	10

TRACE - SMOOTHING	ON
TRACE - SMOOTHING APERTURE	5%
Generator level	–10 dBm
Attenuator on PORT2	10 dB

➢ Carry out calibration.

Adjustment of I Filter

Connection

➢ Connect I filter:

➢ Connect port 1 of network analyzer to X8 and port 2 to X6.

Adjustment:

➢ Magnitude (MAG):
Use **C241** to adjust for flat frequency response.
Tolerance: ±0.05 dB up to 2 MHz
Reference: value at 500 kHz, typically -0.025 dB

➢ Group delay (DLY):
Use **C376** to adjust for flat frequency response from approx. 700 kHz to 1 MHz.
Use **L9** to adjust for flat frequency response up to 2 MHz.
Readjust with **C376** for frequencies <1 MHz.

Tolerance: ±2.5 ns up to 2 MHz. Reference: value at 800 kHz, typically 410 ns

➢ If necessary, readjust magnitude (MAG) with **C241**.

Note: *The typical value of 410 ns at 800 kHz should be attained. If this is not the case, it may not be possible to adjust the Q filter.*

➢ Store and display the two curves.

Adjustment of Q Filter:

Connection:

➢ Connect Q filter:

➢ Connect port 1 of network analyzer to X26 and port 2 to X24.

Adjustment:

➢ Magnitude (MAG):
Use **C242** to adjust for flat frequency response.
Tolerance: ±0.05 dB up to 2 MHz
Reference: value at 500 kHz, typically -0.025 dB

The difference between I-MAG and Q-MAG should be as small as possible. A small vertical offset (ie a constant difference in gain) between the curves is permissible as absolute level accuracy is subsequently corrected by the software.

➢ Group delay (DLY):
Use **C377** to adjust for flat frequency response from approx. 700 kHz to 1 MHz.
Use **L10** to adjust for flat frequency response up to 2 MHz.
Readjust with **C377** for frequencies <1 MHz.

Tolerance: ±2.5 ns up to 2 MHz. Reference: value at 800 kHz

➢ If necessary, readjust magnitude (MAG) with **C242**.

The difference between I-DLY and Q-DLY should be as small as possible.

The I-DLY and Q-DLY values should be identical in the range 800 kHz to 1 MHz. In this case, a small vertical offset (difference in group delay) between the two channels is undesirable since this offset cannot be subsequently corrected by the software.

I/Q Adjustment

I/Q Skew Adjustment

Two tunable RC elements in AMIQ make it possible to shift the DAC clock edges of the I and Q channels relative to each other (see circuit diagram, sheet 10). This allows a variation in delay between the output signal of the I channel and that of the Q channel.

The delay can be varied by the *Skew* user correction function (command :CORR:SKEW, see operating manual, chapter 4, section "I/Q Adjustment"). With this function, the capacitance of the RC elements is varied by means of a D/A converter and varactors. Skew adjustment is to be made with R756 such that minimum skew is obtained at the output of AMIQ when the user correction is set to zero.

Adjustment is made using a programmed squarewave signal at a clock frequency of 50 MHz. It should be noted that the counter normally has a constant inherent error. This error can be determined by applying identical signals to inputs A and B.

Preparation: ➢ Connect counter inputs A and B to the I and Q outputs of AMIQ using two identical cables.

Settings on counter:

Time	A - B
Trigger level	Auto
Input impedance	50 Ω
Input coupling	DC
Slope	Rising

Generation of 12.5 MHz squarewave signal at I and Q outputs:

The *RST (Preset) command sets all user correction values to zero.

Commands:

```
➢ *RST                          Preset
  CLOCK 50.0MHz                 Clock frequency (50 MHz)
  TEST:SDR:WAV SQUARE           Squarewave
  TEST:SDR:PER 4                Samples per period (4)
  TEST:SDR:PHAS 0               Phase diff. between I and Q (0)
  TEST:SDR:AMPL 32000           Amplitude (1 FS)
  TEST:SDR:OFFS 32768           Offset (0 FS)
  TEST:SDR:FILL 1000            250 periods in waveform memory
  OUTP:I FIX                    Output I: fix mode
  OUTP:Q FIX                    Output Q: fix mode
  OUTP:TYPE UNBAL               Outputs to unbalanced mode
  OUTP:FILT OFF                 Filter off
  ARM                           Start of output
  TRIG
```

Adjustment: ➢ Use **R756** to adjust the skew between the I and Q channels so that the measured skew between the I and Q channels changes only minimally when the cables at the AMIQ outputs are interchanged.

The absolute reading is dependent on the delay of the counter and not relevant in the measurement.

Tolerance: ➢ Maximum variation of measured delay after interchanging I and Q channels:
+/- 0.1 ns

I/Q Amplitude and Offset Adjustment

The amplitude and residual offset voltages for the I and Q channels are automatically adjusted in AMIQ after activating the corresponding commands.

In adjustment, the DC voltage at the I and Q outputs is measured using a high-precision 16-bit A/D converter, and the amplitude and the residual offset are adjusted by means of electronic controls in AMIQ. In amplitude adjustment, the waveform D/A converter is programmed with the DC voltage value that exactly corresponds to the full-scale peak amplitude value of the D/A converter. Analogously, to minimize the residual offset, a zero line is programmed for the waveform D/A converter.

In automatic adjustment, offset and gain errors of the filters are adjusted too. Any external filters connected are included in the adjustment.

The following control commands are available for automatic adjustment:

Commands:

➢ `CAL:ALL?`	`Amplitude and offset adjustment for I and Q`
`CAL:AMPL?`	`Amplitude adjustment for I and Q`
`CAL:AMPL:I?`	`Amplitude adjustment for I`
`CAL:AMPL:Q`	`Amplitude adjustment for Q`
`CAL:OFFS?`	`Offset adjustment for I and Q`
`CAL:OFFS:I?`	`Offset adjustment for I`
`CAL:OFFS:Q`	`Offset adjustment for Q`

If one of these operations is carried out error-free, "0" is returned. If an error occurs, a value unequal to 0 is returned (see chapter 6 of operating manual).

The correction values thus determined for amplitude and offset are stored in the EEPROM of AMIQ. The values are overwritten when automatic adjustment is activated again.

Adjustment of Measurement Accuracy of Internal A/D Converter

The internal 16-bit A/D converter for automatic amplitude and offset adjustment is operated with a precision reference voltage so that normally no correction of measured values is required. A new correction factor can be entered in case of repair and for increasing measurement accuracy. The results obtained with the internal converter are then multiplied by this factor.

The internal A/D converter has a resolution of approx. 76 µV. The correction factor should be changed only if a high-precision, calibrated AC voltmeter is available for subsequent amplitude measurement. If such a voltmeter is available, the output amplitude of AMIQ can be accurately adjusted to the nominal value by entering the correction factor.

To avoid measurement errors resulting from inaccurate termination, the output amplitude is measured in open-circuit condition (1 kHz).

Preparation: ➢ Connect I or Q output of AMIQ to AC voltmeter (do not use a termination).

Generation of 1 kHz sinusoidal signal at I and Q outputs:

The *RST (Preset) command sets all user correction values to zero.

Commands:

➢ *RST	Preset
CLOCK 10.0MHz	Clock frequency
TEST:SDR:WAV SINE	Sinewave
TEST:SDR:PER 10000	Samples per period
TEST:SDR:PHAS 0	Phase diff. between I and Q (0)
TEST:SDR:AMPL 32000	Amplitude (1 FS)
TEST:SDR:OFFS 32768	Offset (0 FS)
TEST:SDR:FILL 40000	4 periods in waveform memory
OUTP:I FIX	Output I: fix mode
OUTP:Q FIX	Output Q: fix mode
OUTP:FILT OFF	Filter off
ARM	Start of output
TRIG	
Amplitude adjustment:	
CAL:DIAG 1.000	Correction factor for A/D converter
CAL:AMPL?	I and Q amplitude adjustment
CAL:DIAG 1.xxx	New correction factor
CAL:AMPL?	Readjustment of amplitude

Adjustment:

➢ Measure amplitude of sinusoidal signal (1 kHz) and determine deviation from nominal value. From the deviation, determine correction factor for A/D converter. Values above 1 will decrease the amplitude, values below 1 will increase the amplitude.

➢ Repeat automatic adjustment of amplitude and measure amplitude. If the result does not agree with the nominal value of V_{rms} = 0.7071 V, the procedure can be repeated.

Note:

➢ If the correction factor is changed by the maximum possible amount (correction factors between 0.9 and 1.1 are permissible), internal amplitude adjustment may no longer be possible. AMIQ will send a corresponding error message in response to a query.

Offset Adjustment for Option AMIQ-B2

The AMIQ's internal offset adjustment performed during calibration affects only the two outputs of the I/Q board. The outputs of option AMIQ-B2 must therefore be individually adjusted to zero with the potentiometers R1, R2, R3 and R4.

➢ Signal inputs of option 0 V, 50 Ω
(:OUTP:OIMP R50)
(:OUTP:I:AMPL:BAL 0V)
(:OUTP:Q:AMPL:BAL 0V)

➢ Set I/Q outputs to *balanced* mode (:OUTP:TYPE BAL)

➢ Activate outputs (*var* mode) (:OUTP:I VAR), (:OUTP:Q VAR)

➢ Set bias voltages to zero
(:OUTP:I:BIAS 0V)
(:OUTP:Q:BIAS 0V)

➢ Connect DC voltmeter to the outputs I, $\overline{I}$, Q and $\overline{Q}$ successively and adjust DC voltage to 0 V (EMF) using the potentiometers R1, R2, R3 and R4.

Tolerance: 0 V ± 0.1 mV

Diagnosis

AMIQ incorporates a diagnostic function to facilitate troubleshooting. In this process, the internal A/D converter is connected to 16 different test points via a multiplexer. Measured values are output via the interface.
The individual functions of AMIQ can then be checked by means of the circuit diagram.

Test Points				
No. <n>	**Measurement function**	**Division factor**	**Sheet of circuit diagram**	**Value/Range**
0	Ground reference		27	0 V
1	V_{ref} for A/D converter	(1/2 * REF 2.5 V)	27	1.25 V
2	V_{ref} for adjustment DACs		26	1.2 V
3	10 MHz VTCXO voltage	(1/2 * V-VTCXO)	19	0 to 2.5 V
4	VCO control voltage	(1/10 * V-VCO)	20	0 to 1.8 V
5	I DAC, output		12	–1 V to +1 V
6	Q DAC, output		15	–1 V to +1 V
7	External I filter, input		13	–1 V to +1 V
8	External Q filter, input		16	–1 V to +1 V
9	I amplitude variation, output		14	–2 V to +2 V
10	Q amplitude variation, output		17	–2 V to +2 V
11	I output, DC		14	–1 V to +1 V (fix) –2 V to +2 V (var)
12	I RF amplitude, RF detector		14	0 V to +1 V (fix) 0 V to +2 V (var)
13	Q output, DC		17	–1 V to +1 V (fix) –2 V to +2 V (var)
14	Q RF amplitude, RF detector		17	0 V to +1 V (fix) 0 V to +2 V (var)
15	I/Q phase difference (zero-phase meter for I and Q)		14	0 to 2.5 V

Test points on the I/Q board can be queried with the following command:

Command: ➢ `DIAG:TPO<n>?` `Measured value query for test point n`

By this command, the desired test point n is selected, the internal A/D converter is started and the result output. For repeated measurement, the command must be repeated.

Moreover, the ID of the I/Q board and thus the modification level can be queried with the following command:

Command: ➢ `DIAG:ABO:ID?` `Query of board ID`

Selftest of AMIQ

Starting with firmware version 2.10, the I/Q board's performance and compliance with the technical data can be tested automatically without using any additional test equipment. This selftest performs the necessary instrument settings, sets the diagnosis multiplexer to the individual internal diagnosis points, measures the voltages generated at these points and compares them with the rated values.

The selftest is started with the „*TST?" command.

- If none of the measured values exceeds the tolerance limits AMIQ responds with a „0". If the instrument is controlled via WinIQSIM the final message „selftest completed successfully" is output if no error was detected.
- On the other hand, if one or several of the measured values (e.g. in the case of successive errors) exceed the tolerance limits, AMIQ responds with a „1". If the instrument is controlled via WinIQSIM or via AMIQ's service program the individual error messages containing the wrong measured values are output successively after the selftest is completed.

Whether a minor violation of the permissible range (possibly due to aging or missing calibration) or a completely wrong value (due to a hardware defect, e.g. defective modules) occurred can be decided by comparing with the following table listing the rated values together with the permissible ranges.

Test Procedure

The selftest is performed in several steps:

- The current device state is saved, the outputs are switched off to avoid damage of any devices which may be connected to AMIQ (only if a complete selftest is called up).
- The diagnosis system test itself (its own ground and reference voltages).
- The setting ranges of the offset corrections are tested.
- The calibration settings are used to measure the current offset voltages in the individual branches of the electric network.
- The reference and VCO frequencies are checked.
- The signal levels are tested by means of an applied sinewave signal.
- The attenuator is tested with a DC level.
- A rectangular signal with a phase shift of 180° between I and Q is applied to test whether the filters in both (I and Q) channels are equal.
- The device state saved before the selftest was started is restored.

Table of Rated Values and Permissible Ranges:

To perform a statistical analysis of a detected error the individual test points or groups of test points can be selected separately. These diagnosis commands are explained in detail in chapter 6 of the AMIQ operating manual. If option AMIQ-B2 (differential outputs) is fitted the instrument must be set to SINGLE mode (UNBal), otherwise the level settings are changed.

Test function	Test point (see circuit diagram)	Rated value [V]	Permissible range [V]
Ground diagnosis system	0	0.0	-0.005 ... +0.005
Diagnosis reference	1	1.25	+1.24 ... +1.26
DAC reference voltage	2	1.235	+1.22 ... +1.25
I-offset adj. (FIX) with 0000	5	0.1235	+0.1 ... +0.147

Test function	Test point (see circuit diagram)	Rated value [V]	Permissible range [V]
I-offset adj. (FIX) with 4095	5	-0.1235	-0.147 ... -0.1
Q-offset adj. (FIX) with 0000	6	0.1235	+0.1 ... +0.147
Q-offset adj. (FIX) with 4095	6	-0.1235	-0.147 ... -0.1
I-offset adj. (VAR) with 0000	9	-0.3	-0.56 ... -0.04
I-offset adj. (VAR) with 4095	9	+0.3	+0.04 ... +0.56
Q-offset adj. (VAR) with 0000	10	-0.3	-0.56 ... -0.04
Q-offset adj. (VAR) with 4095	10	+0.3	+0.04 ... +0.56
I-offset (FIX) LIN	11	0.0	-0.005 ... +0.005
I-offset (FIX) 2.5 MHz	11	0.0	-0.005 ... +0.005
I-offset (FIX) 25 MHz	11	0.0	-0.005 ... +0.005
I-offset (FIX) LIN	13	0.0	-0.005 ... +0.005
I-offset (FIX) 2.5 MHz	13	0.0	-0.005 ... +0.005
I-offset (FIX) 25 MHz	13	0.0	-0.005 ... +0.005
Reference frequency with 0000	3	0.0	-0.005 ... +0.005
Reference frequency with 4095	3	2.5	+2.3 ... +2.7
VCO with 51 MHz	4	0.225	+0.15 ... +0.3
VCO with 100 MHz	4	1.45	+1.3 ... +1.6
I-level (FIX) LIN with 0000	12	1.3	+1.17 ... +1.43
I-level (FIX) LIN with 4095	12	0.76	+0.61 ... +0.91
I-level (FIX) 2.5 MHz with 0000	12	1.3	+1.17 ... +1.43
I-level (FIX) 2.5 MHz with 4095	12	0.76	+0.61 ... +0.91
I-level (FIX) 25 MHz with 0000	12	1.3	+1.17 ... +1.43
I-level (FIX) 25 MHz with 4095	12	0.76	+0.61 ... +0.91
Q-level (FIX) LIN with 0000	14	1.3	+1.17 ... +1.43
Q-level (FIX) LIN with 4095	14	0.76	+0.61 ... +0.91
Q-level (FIX) 2.5 MHz with 0000	14	1,3	+1.17 ... +1.43
Q-level (FIX) 2.5 MHz with 4095	14	0.76	+0.61 ... +0.91
Q-level (FIX) 25 MHz with 0000	14	1.3	+1.17 ... +1.43
Q-level (FIX) 25 MHz with 4095	14	0.76	+0.61 ... +0.91
I-level (VAR) with 0000	12	2.27	+1.82 ... +2.72
I-level (VAR) with 4095	12	2.27	+1.82 ... +2.72
Q-level (VAR) with 0000	14	2.27	+1.82 ... +2.72
Q-level (VAR) with 4095	14	2.27	+1.82 ... +2.72
I-attenuator -20 dB	11	0.1	+0.08 ... +0.12
I- attenuator -40 dB	11	0.01	+0.005 ... +0.015

Test function	Test point (see circuit diagram)	Rated value [V]	Permissible range [V]
Q- attenuator -20 dB	13	0.1	+0.08 ... +0.12
Q- attenuator -40 dB	13	0.01	+0.005 ... +0.015
Lowpass 2.5 MHz I/Q	15	> 2.0	–
Lowpass 25 MHz I/Q	15	> 2.0	–

The numbers 0000 and 4095 denote the data word of the corresponding DAC responsible for the level or offset setting.

3 Repair

This chapter describes the hardware of AMIQ as well as simple measures for repair and fault diagnosis (see chapter 8 of operating manual). Repair measures include in particular the replacement of modules. For fault diagnosis, a group of service commands is available that allow direct hardware settings and queries.

The fitting of options and updating of software are dealt with in chapter 4 of this service manual. Chapter 4 of the operating manual provides an overview of the AMIQ I/Q adjustment facilities by means of a simplified block diagram.

Replacement of Modules

Warning!

Disconnect unit from AC supply before opening the case. Observe the safety instructions given at the beginning of this manual.

Make sure that cables are neither damaged nor disconnected when putting the casing back in place.

Hardware of AMIQ

AMIQ consists of an industry-compatible PC (in the upper part of the unit) and the AMIQ hardware (IQ board + options). To make settings on the PC, therefore, a monitor card, monitor and keyboard must be connected.

Monitor and monitor card

To make settings on the PC, a monitor card for a PCI slot and monitor are required. The monitor card and the monitor need not have any special characteristics; they must be capable of displaying BIOS and DOS messages (see section "Setting of BIOS"). For installation, the rear cover of the monitor card is to be removed and the monitor connected to the plugged card.

Keyboard

A keyboard with a PS/2 connector is needed. There is no special keyboard driver installed, so the keyboard assignment is international. The keyboard is to be connected to X12(K).

Replacement of PC Board

The PC board is a socket 7 board in ATX format. The jumpers are to be set in accordance with the enclosed board documentation. The PCI bus clock is to be set to 60 MHz and the CPU core voltage according to the CPU imprint (3.5 V for IDT C 6). The CPU clock multiplier must be set to 2. Replace PC board as follows:

- Switch unit off and disconnect it from the AC supply. Unscrew rear feet and withdraw casing towards the rear.
- Unplug ISA bus adapter. Do not touch contacts.
- Unplug cables for loudspeaker, floppy disk drive and hard disk. Disconnect ATX power connector.
- Remove PC board screws and slide.
- Undo screws of the rear panel sheet and remove PC board.

- Unscrew rear cover from old ATX board and screw it to new board. When replacing ATX board make sure to install the correct board version. Early AMIQ instruments, model 02, accommodate an ATX board with single-row arrangement of connectors. This board has the Order No. 1110.3180.00. The ATX board with two-row arrangement of connectors has the Order No. 1110.3216.00. Stick adhesive rubber spacers to solder side of new board (4 spacers: R&S Order No.: 0265.4390.00), one in the middle below socket 7, one in the middle of the board, one at the hard disk connectors, and one on the corner pointing towards the power board.
- Remove memory, CPU and CPU cooler from old board and mount them on new board.
- Fit and fix new board; mount slide as required for board size.
- Plug cables for loudspeaker, floppy disk drive and hard disk. Observe correct polarity. The hard disk is to be connected to IDE port 1 (or *primary*). Plug ATX power connector, lay cables neatly and secure them by means of cable ties.
- Connect ISA bus adapter. Do not touch contacts.
- Fit monitor card and connect a monitor.
- Connect unit to AC supply and switch it on. The built-in PC board should now signal on the monitor. Check BIOS settings.
- Reassemble unit. Take care not to damage any cables.

Replacement of Battery on PC Board

The battery of the type CR2032 is accommodated on the controller in the upper part of the unit. Replace battery as follows:

- Switch unit off and disconnect it from the AC supply. Unscrew rear feet and withdraw casing towards the rear.
- Remove old battery from its holder and insert new battery (observe correct polarity).
- Connect monitor and keyboard (see above).
- Connect unit to AC supply and switch it on. The built-in PC board should now signal on the monitor. Check BIOS settings.
- Reassemble unit.

Setting of BIOS

- Stop startup procedure by pressing DEL key and go to setting menu for BIOS.
- Select 'Default' or AUTO in BIOS setting menu, then set hard disk by means of AUTO DETECT'. If BIOS allows speed setting of the PCI bus, set bus to 60 MHz (but not faster for reasons of thermal stability). For detailed information on BIOS setting please refer to enclosed (original) information on PC motherboard.
- Set boot sequence to C:,A:.

Note: *The information on the PC motherboard is enclosed as an additional document with the Rohde & Schwarz equipment documentation.*

Replacement of Hard Disk

- Switch unit off and disconnect it from AC supply. Screw off rear feet and withdraw casing towards the rear.
- Unplug and remove hard disk.
- Plug new hard disk on adapter (make sure that connection is correct), mount adapter on supporting panel and fit it into AMIQ. If the spacing of the fixing holes is not sufficient with early instruments of model 02, replace the supporting panel for the hard disk.
- Connect monitor and keyboard (see above).
- Set boot sequence A:,C: or First Boot Device: Floppy in BIOS in order to boot from the AMIQ-Preparation Disk. To this end, press DEL to go to BIOS and set boot sequence in setting menu.
- Sign on new hard disk with BIOS by means of AUTO DETECT.

The hard disk must be partitioned and formatted, and the operating system must be installed. For this, insert disk labelled **"AMIQ Preparation Disk"** and switch unit on.

Subsequent to booting from the Preparation Disk , various entries and settings have to be made according to the messages output on the VGA monitor. These entries may vary according to the version of the Preparation Disk.

The AMIQ models 03, 04 require a preparation disk of the version ≥1.3 to be used.

While the Preparation Program is running, the hard disk is partitioned, formatted and a minimum operating system is installed. Besides, the FPGA components in the AMIQ are programmed, taking into consideration the AMIQ model. Thus, with IQ-board replacement, the serial number is also entered.

The Preparation Disk does not install the AMIQ firmware. Use the AMIQ Program Disk to this end.

- Set boot sequence A:,C: in BIOS. To this end, press Del key to go to BIOS and set boot sequence in setting menu.
- Remove **AMIQ Preparation Disk** from drive and make normal reinstallation of AMIQ software (see chapter 4).

Replacement of IQ Board

- Switch unit off and disconnect it from AC supply. Screw off rear feet and withdraw casing towards the rear.
- Turn unit and unplug IQ board.
- Unplug LED board, ISA adapter and IEC/IEEE-bus cables as well as cables of I and Q outputs.
- If option AMIQB19 is fitted, remove it and mount it on new IQ board.
- Fit new IQ board and replug all cables.
- Reassemble unit. Take care not to damage any cables.
- Switch unit on. The serial number and options installed should be stored in the EEPROM.
- Trigger calibration: Command `:CAL:ALL?`
- Restore and check reference oscillator: 10 MHz should be measured at reference output.

The following note applies to the removal of a functioning IQ board which is to be used in another unit. In this case, any modifications made to the IQ board by AMIQ must be restored to their original condition prior to removing the board.

Note: *The serial number of AMIQ, the release of options installed (if these are soft-*

ware options) and all calibration data are stored in an EEPROM on the IQ board. Prior to removing the IQ board, the following should be noted:

- *When an IQ board is fitted, the serial number and option list are transferred to the hard disk. The EEPROM contents must therefore erased prior to removing the IQ board.*
- ***The EEPROM is always erased completely.** For this reason, the calibration data for the reference oscillator must be read out of the EEPROM prior to removal and stored again when the IQ board is re-used.*

1. Saving of calibration data

The command `:CAL:ROSC?` reads the tuning voltage for the reference oscillator from the EEPROM.

Take down this value and enter into the unit when the IQ board is re-used (see point 3).

2. Erasing of EEPROMs

The command `:TEST:EEPRom 0` erases the contents of the EEPROM on the IQ board.

The command causes the first byte of the EEPROM to be overwritten with 0. Since the first byte is part of the checksum on the EEPROM, the EEPROM content thus becomes invalid. In fact, the EEPROM is completely erased in this way. This includes the serial number, the list of options installed and all calibration data.

3. Restoring of calibration data

After erasing the EEPROM and fitting the IQ board into another unit, all calibration data must be restored:

- ➢ Write the noted calibration value for the reference oscillator into the EEPROM with the command `:CAL:ROSC`.
- ➢ All the other calibration values can be restored with the command `CAL:ALL?` without any further adjustment or measuring equipment needed.

Replacement of Power Supply

- ➢ Switch unit off and disconnect it from AC supply. Screw off rear feet and withdraw casing towards the rear.
- ➢ Unscrew lateral handles, remove front cover.
- ➢ Remove cover of power supply; the front screws are accessible through holes in the front supporting plate.
- ➢ Undo connections of power supply and remove power supply (2 screws on the rear, 2 screws at the bottom; if the screws are concealed by options, remove options first).
- ➢ Fit new power supply, make the required connections and fit cover.
- ➢ Reassemble unit. Take care not to damage any cables.

TEST System

The TEST system provides commands for the self-test and for fault diagnosis. The commands directly access the instrument hardware. The „*TST?“ command calls up a complete selftest performing measurements at all test points available and checking whether the measured values are within the tolerance limit (for a detailed description refer to chapter 6 of the operating manual).

Warning!

The settings listed below bypass the normal safety precautions and may create undesired conditions.

- Normal operating status can be restored by switching the unit off and on again or by *RST.
- *RST has no direct effect on the values set via the TEST system. Rather does *RST reset other AMIQ parameters whose change then affects the values set via the TEST system. Because of this indirect effect, it is not expedient to specify separate *RST values for the setting parameters of the TEST system.

Table 3-1 TEST - Self-Test and Diagnosis

Command	Parameter		Page
:TEST:ABOard:DAC_SKEW_ADJ	0...4095		3.7
:TEST:ABOard:DIFF	0|1	(OFF/ON) (AMIQ-B2)	3.7
:TEST:ABOard:DIG_OUT_EN	0|1	(OFF/ON) (AMIQ-B3)	3.7
:TEST:ABOard:I_AMPL_ADJ	0...4095		3.7
:TEST:ABOard:I_AMPL_VAR	0...4095		3.7
:TEST:ABOard:I_AMPL_VAR_EN	0|1	(OFF/ON)	3.7
:TEST:ABOard:I_ATT_SEL	0...3		3.8
:TEST:ABOard:I_Bias	0...4095	(AMIQ-B2)	3.8
:TEST:ABOard:I_EN	0|1	(OFF/ON) (AMIQ-B2)	3.8
:TEST:ABOard:I_EN_INV	0|1	(OFF/ON) (AMIQ-B2)	3.8
:TEST:ABOard:I_FILT_SEL	0...3		3.8
:TEST:ABOard:I_OFFSETA_ADJ	0...4095		3.9
:TEST:ABOard:I_OFFSETB_ADJ	0...4095		3.9
:TEST:ABOard:I_OUT_EN	0|1	(OFF/ON)	3.9
:TEST:ABOard:Q_AMPL_ADJ	0...4095		3.9
:TEST:ABOard:Q_AMPL_VAR	0...4095		3.9
:TEST:ABOard:Q_AMPL_VAR_EN	0|1	(OFF/ON)	3.9
:TEST:ABOard:Q_ATT_SEL	0...3		3.9
:TEST:ABOard:Q_Bias	0...4095	(AMIQ-B2)	3.10
:TEST:ABOard:Q_EN	0|1	(OFF/ON) (AMIQ-B2)	3.10

Command	Parameter	Page
:TEST:ABOard:Q_EN_INV	0|1 (OFF/ON) (AMIQ-B2)	3.10
:TEST:ABOard:Q_FILT_SEL	0...3	3.10
:TEST:ABOard:Q_OFFSETA_ADJ	0...4095	3.10
:TEST:ABOard:Q_OFFSETB_ADJ	0...4095	3.10
:TEST:ABOard:Q_OUT_EN	0|1 (OFF/ON)	3.11
:TEST:ABOard:VTCXO_TUNE	0...4095	3.11
:TEST:BERTest?		3.11
:TEST:ABOard:I_AMPL_ADJ	0...4095	3.11
:TEST:DIAGnostic:ADCAL	0|1 (OFF/ON)	3.11
:TEST:DIAGnostic:ADCONV	0|1 (OFF/ON)	3.11
:TEST:DIAGnostic:IRELais	0|1 (OFF/ON)	3.12
:TEST:DIAGnostic:QRELais	0|1 (OFF/ON)	3.12
:TEST:DIAGnostic:VALue?		3.12
:TEST:EEPRom	<numeric_value>	3.12
:TEST:LED<n>	0|1 (OFF/ON)	3.12
:TEST:SDR:RUN	–	3.12
:TEST:SDRam:DAC	<i-value>,	3.13
:TEST:SDRam:DATA?	<start>,	3.13
:TEST:SDRam:FILL	<length>	3.13
:TEST:SDRam:AMPL	<level>	3.13
:TEST:SDRam:MODE	SLOW|FAST	3.13
:TEST:SDRam:OFFSet	<offset>	3.13
:TEST:SDRam:PERiod	<samples>	3.14
:TEST:SDRam:PHASe	<samples>	3.14
:TEST:SDRam:WAITpattern	<i-value>,	3.14
:TEST:SDRam:WAVeform	SINE|SQUARe|DC	3.14
:TEST:SYNThesizer:REFerence	0...3	3.14
:TEST:SYNThesizer:PRESCale	0...3	3.14
:TEST:SYNThesizer:DDSClock	0...3	3.15
:TEST:SYNThesizer:DDSFinc	0...4294967294	3.15
:TEST:SYNThesizer:SOSelect	0...7	3.15
:TEST:SYNThesizer:N<n>	0...255	3.15
:TEST:SYNThesizer:ROSelect	0|1	3.15

:TEST:ABOard

With the following commands, settings can be made on the analog board. Any settings for this board not included here will be found as regular IEC/IEEE-bus commands in another section. Most of the commands cannot be abbreviated and are therefore given in full length and in capital letters. It is possible to read the results, but not directly from the hardware. Only values stored in the AMIQ software can be read.

:TEST:ABOard:DAC_SKEW_ADJ 0...4095

This command defines the 12-bit D/A converter value for adjusting clock synchronism for the I and Q waveform D/A converters.

Example: `:TEST:ABO:DAC_SKEW_ADJ 2048`

:TEST:ABOard:DIFF 0|1

This command activates the differential outputs provided that option AMIQ-B2 is fitted. Otherwise the error message `<Error 241, „Necessary option not installed; TEST:ABO:DIFF x">` is output. This hardware-related command sets directly the relays required for activating the differential outputs.

0 Asymmetric outputs (signal by-passes the B2-operational amplifiers)

1 Symmetric outputs (all four outputs active)

The internal logic implies that it depends on the I_EN, Q_EN and DIFF settings whether a signal is acually applied to the outputs.

:TEST:ABOard:DIG_OUT_EN 0|1

This command activates the digital output of the AMIQ provided that option AMIQ-B3 is fitted. When switched off, the data and clock outputs are high-impedance. If the option is not installed, the error message `<Error 241, „Necessary option not installed; TEST:ABO: DIG_OUT_EN x">` is output.

0 Digital output switched off (high-impedance)

1 Digital output activated

Example `:TEST:ABO:DIG_OUT_EN 1`

:TEST:ABOard:I_AMPL_ADJ 0...4095

This command is for fine adjustment of the I channel amplitude (variation of reference voltage for I channel D/A converter).

Example: `:TEST:ABO:I_AMPL_ADJ 2048`

:TEST:ABOard:I_AMPL_VAR 0...4095

This command is for entering the electronic level variation for the I channel.

0 (-1) Maximum negative level

2048 (0) Minimum level

4095 (+1) Maximum positive level

Example: `:TEST:ABO:I_AMPL_VAR 2048`

:TEST:ABOard:I_AMPL_VAR_EN 0|1

This command switches the electronic level variation for the I channel on or off.

Example: `:TEST:ABO:I_AMPL_VAR_EN 1`

:TEST:ABOard:I_ATT_SEL 0...3

This command selects the mechanical attenuator for the I channel.

0 = 0 dB
1 = 20 dB
2 = 40 dB
3 = off, relay open

Example: `:TEST:ABO:I_ATT_SEL 1`

:TEST:ABOard:I_Bias 0 ... 4095

This command defines the amplitude of the bias voltage of the I channel. It must be activated only if option AMIQ-B2 is fitted. Otherwise the error message `<Error 241, „Necessary option not installed; TEST:ABO:I_Bias x">` is output. This command affects the DAC directly. The bias voltage can be set in the range of –2,5 V to +2,5 V.

0 +2,5V

4095 –2,5V

To be able to measure the bias voltage at the outputs, I_EN and DIFF must be set to 1.

:TEST:ABOard:I_EN 0|1

This command switches the I output on or off. It must be used only if option AMIQ-B2 is fitted. Otherwise the error message `<Error 241, „Necessary option not installed; TEST:ABO:I_EN x">` is generated.

0 I-output is switched off

1 I- output is switched on (if DIFF = 1 at the same time)

:TEST:ABOard:I_EN_INV 0|1

This command controls the output relay K2 of the inverted I output directly. It must be used only if option AMIQ-B2 is fitted. Otherwise the error message `<Error 241, „Necessary option not installed; TEST:ABO:I_EN_INV x">` is generated.

0 $\overline{I}$ is switched off

1 $\overline{I}$ is switched on

The bias voltage can be measured at the $\overline{I}$ output if it is switched on and the device is set appropriately. The internal logic implies that it depends on the I_EN and DIFF settings whether the inverted I signal is also output.

:TEST:ABOard:I_FILT_SEL 0...3

This command selects the filter for the I channel.

0 = off

1 = filter 1

2 = filter 2

3 = external filter

Example: `:TEST:ABO:I_FILT_SEL 1`

:TEST:ABOard:I_OFFSETA_ADJ 0...4095

This command is for fine adjustment of the I channel offset without electronic attenuator (calibration).

Example: `:TEST:ABO:I_OFFSETA_ADJ 2048`

:TEST:ABOard:I_OFFSETB_ADJ 0...4095

This command is for varying the I channel offset; it compensates the unwanted offset caused by the electronic attenuator.

Example: `:TEST:ABO:I_OFFSETB_ADJ 2048`

:TEST:ABOard:I_OUT_EN 0|1

This command switches the I channel output on (1) or off (0) via a relay.

Example: `:TEST:ABO:I_OUT_EN 1`

:TEST:ABOard:Q_AMPL_ADJ 0...4095

This command is for fine adjustment of the Q channel amplitude (variation of reference voltage of Q channel D/A converter).

Example: `:TEST:ABO:Q_AMPL_ADJ 2048`

:TEST:ABOard:Q_AMPL_VAR 0...4095

This command is for entering the electronic level variation for the Q channel:

0	(-1)	Maximum negative level
2048	(0)	Minimum level
4095	(+1)	Maximum positive level

Example: `:TEST:ABO:Q_AMPL_VAR 2048`

:TEST:ABOard:Q_AMPL_VAR_EN 0|1

This command switches the electronic level variation for the Q channel on or off.

Example: `:TEST:ABOard:Q_AMPL_VAR_EN 0`

:TEST:ABOard:Q_ATT_SEL 0...3

This command selects the mechanical attenuator for the Q channel.

0 = 0 dB
1 = 20 dB
2 = 40 dB
3 = off, relay open

Example: `:TEST:ABO:Q_ATT_SEL 1`

:TEST:ABOard:Q_Bias 0 ... 4095

This command defines the amplitude of the bias voltage of the Q channel. It must be activated only if option AMIQ-B2 is fitted. Otherwise the error message `<Error 241, „Necessary option not installed; TEST:ABO:Q_Bias x">` is output. This command affects the DAC directly. The bias voltage can be set in the range of –2,5 V to +2,5 V.

0 +2,5V

4095 –2,5V

To be able to measure the bias voltage at the outputs, Q_EN and DIFF must be set to 1.

:TEST:ABOard:Q_EN 0|1

This command switches the Q output on or off. It must be used only if option AMIQ-B2 is fitted. Otherwise the error message `<Error 241, „Necessary option not installed; TEST:ABO:Q_EN x">` is generated.

0 Q-output is switched off

1 Q- output is switched on (if DIFF = 1 at the same time)

:TEST:ABOard:Q_EN_INV 0|1

This command controls the output relay K2 of the inverted Q output directly. It must be used only if option AMIQ-B2 is fitted. Otherwise the error message `<Error 241, „Necessary option not installed; TEST:ABO:Q_EN_INV x">` is generated.

0 $\overline{Q}$ is switched off

1 $\overline{Q}$ is switched on

The bias voltage can be measured at the $\overline{Q}$ output if it is switched on and the device is set appropriately. The internal logic implies that it depends on the Q_EN and DIFF settings whether the inverted Q signal is also output.

:TEST:ABOard:Q_FILT_SEL 0...3

This command selects the filter for the Q channel.

0 = off

1 = filter 1

2 = filter 2

3 = external filter

Example: `:TEST:ABO:Q_FILT_SEL 1`

:TEST:ABOard:Q_OFFSETA_ADJ 0...4095

This command is for fine adjustment of the Q channel offset without electronic attenuator (calibration).

Example: `:TEST:ABO:Q_OFFSETA_ADJ 2048`

:TEST:ABOard:Q_OFFSETB_ADJ 0...4095

This command is for varying the Q channel offset; it compensates the unwanted offset caused by the electronic attenuator.

Example: `:TEST:ABO:Q_OFFSETB_ADJ 2048`

:TEST:ABOard:Q_OUT_EN 0|1

This command switches the Q channel output on (1) or off (0) via a relay.

Example: `:TEST:ABO:Q_OUT_EN 1`

:TEST:ABOard:VTCXO_TUNE 0...4095

This command defines the 12-bit D/A converter value for tuning the 10 MHz reference oscillator when an internal reference is used.

Example: `:TEST:ABO:VTCXO_TUNE 2048`

:TEST:BERTest

Low-level commands for checking the built-in bit error rate test system.

:TEST:BERTest?

This command is for checking the BER interface at the rear. Before the command is issued, a test adapter (see chapter 1, "BER Interface") must be plugged. If the test is successful, '0' is returned, in case of an error '1'.

Example: `:TEST:BER?`

:TEST:CALibrate

Low-level commands enabling direct access to calibration data.

:TEST:CALibrate:RESet

This command erases all calibration values from the EEPROM and replaces them by internal default values.

IMPORTANT: *All the old values are irrevocably erased by this command and cannot be restored by *RST! The unit must in any case be recalibrated after this command.*

Example: `:TEST:CAL:RES`

:TEST:DIAGnostic

Low-level commands for control of the built-in diagnostic system. At a higher level, this system supplies direct voltage values at various test points with the command :DIAGnostic:TPOint?. The commands given below allow direct control of the diagnostic hardware.

:TEST:DIAGnostic:ADCAL ON|OFF

This command causes the reset or calibration signal line of the diagnostic A/D converter to assume logic 1 or logic 0.

Example: `:TEST:DIAG:ADCAL OFF`

:TEST:DIAGnostic:ADCONV ON|OFF

This command switches the "conversion" bit of the diagnostic A/D converter on or off.

Example: `:TEST:DIAG:ADCONV OFF`

:TEST:DIAGnostic:IRELais ON|OFF

This command switches the diagnostic relay of the I channel on, thus connecting the diagnostic A/D converter to test point 11, 12 or 15.

Note: *The command* `DIAGnostic:TPOINT<n>?` *switches the relay on for <n> = 11, 12 or 15 and switches it off automatically after the measurement; no separate switch-off command is required.*

Example: `:TEST:DIAG:IREL OFF`

:TEST:DIAGnostic:QRELais ON|OFF

This command switches the diagnostic relay of the Q channel on, thus connecting the diagnostic A/D converter to test point 13, 14 or 15.

Note: *The command DIAGnostic:TPOINT<n>? switches the relay on for <n> = 13, 14 or 15. After the measurement, the relay is switched off automatically; no separate switch-off command is required.*

Example: `:TEST:DIAG:QREL ON`

:TEST:DIAGnostic:VALue?

This is a mere query command for reading the instantaneous value (decimal number) at the output of the A/D converter.

IMPORTANT! *No conversion is triggered by this command, nor does the system wait for any on-going conversion to be completed before the value is read.*

Example: `:TEST:DIAG:VAL?`

:TEST:EEPRom <number>

This command overwrites the first byte of the EEPROM with the specified number. Since the first byte is part of the checksum on the EEPROM, the EEPROM content thus becomes invalid. In fact, the EEPROM is completely erased in this way. This includes the serial number, the list of options installed and all calibration data.

Example: `TEST:EEPR 0`

:TEST:LED<n> ON|OFF

This command switches the specified LED on or off:

- LED0 ON LED,
- LED1 RUNNING LED
- LED2 CONTROL LED

IMPORTANT. *The RUNNING LED is normally hardware-controlled; ie the command* `:TEST:LED1` *switches between hardware control and ON. The RUNNING LED cannot be switched off.*

Example: `:TEST:LED<n> ON`

:TEST:SDR:RUN

This command triggers the output of a calculated curve.

:TEST:SDRam

With the following commands, data can be written to and read from the output memory (SDRAM).

:TEST:SDRam:DAC <i-value>, <q-value>

This command writes the two specified values to the D/A converters of the output memory. The command also sets the voltages at the two output connectors directly to the corresponding values without any action being required by the output memory nor by the software. Any waveform currently being output by the memory is stopped.

The two values must be indicated with 16 bits (the two least significant bits – the marker bits – are ignored). The value 32768 corresponds to a voltage of 0 V.

There is *no* query form of this command.

Example: `:TEST:SDR:DAC 8192, 4000`

:TEST:SDRam:DATA? <start>, <count>

This command reads the specified range from the output memory. The range is output as a list of ASCII characters (alternating I and Q values) with commas as delimiters.

Example: `:TEST:SDR:DATA? 0, 100`

:TEST:SDRam:FILL <length>

This command fills the defined number of points ('length') of the output memory with the waveform defined by `:TEST:SDRam:WAV`. The command also sets the loop pattern.

Example: `:TEST:SDR:FILL 1000`

:TEST:SDRam:AMPL <level>

This command defines the level (measured from the selected offset to the peak). Here, the D/A converter values are to be specified. For example, with an offset of 32768 (0x8000), values between 0 (0x00) and 32767 (0x7FFF) are possible. This setting is ignored for the DC waveform. The sum of offset and amplitude must not exceed 0xFFFF, and the amplitude must not be larger than the offset.

Example: `:TEST:SDR:AMPL 8192`

:TEST:SDRam:MODE SLOW|FAST

This command defines the mode of the output memory. The mode can be queried.

Example: `:TEST:SDR:MODE SLOW`

:TEST:SDRam:OFFSet <offset>

This command defines the DC offset for the desired waveform. This value is added to each sample of the waveform; possible values therefore range from 0 (0x00) to 65535 (0xFFFF). The sum of offset and amplitude must not exceed 0xFFFF, and the amplitude must not be larger than the offset.

Example: `:TEST:SDR:OFFS 32768`

:TEST:SDRam:PERiod <samples>

This command defines the period of the waveform in the output memory in the form of samples (curve points). This value need *not* be integer. For the DC waveform, defining the period makes no sense but it must be defined nevertheless. The period can be queried.

Example: `:TEST:SDR:PER 100.5`

:TEST:SDRam:PHASe <samples>

This command defines the phase between I and Q in the form of samples (curve points). Positive values cause a lag of Q relative to I, negative values cause a lead of Q relative to I. The phase can be queried.

Example: `:TEST:SDR:PHAS 10`

:TEST:SDRam:IDLE <i-value>, <q-value>

This command defines the value to be output by AMIQ while it is waiting for a trigger signal. The permissible range of values is 0 to 2^{16}.

Example: `:TEST:SDR:IDLE 8192, 8192`

:TEST:SDRam:WAVeform SINE|SQUARe|DC

This command defines the waveform to be written to the output memory by means of `TEST:SDRam:FILL`. The sinewave starts on zero crossing. The squarewave starts with a high level.

Example: `:TEST:SDR:WAV SINE`

:TEST:SYNThesizer

This command set enables settings of the clock synthesizer hardware.

:TEST:SYNThesizer:REFerence 0...3

This command defines the reference frequency for the PLL:

0 OFF
1 2.5 MHz
2 5 MHz
3 10 MHz

Example: `:TEST:SYNT:REF 1`

:TEST:SYNThesizer:PREScale 0...3

This command defines the divider between VCO and high clock:

0 corresponds to a divider of 2
1 and 2 correspond to a divider of 4
3 corresponds to a divider of 8

Example: `:TEST:SYNT:PRES 1`

:TEST:SYNThesizer:DDSClock 0...3

This command defines the divider between high clock and DDS clock:

0 OFF,

1 12.5 MHz to 25 MHz

2 25 MHz to 50 MHz

3 50 MHz to 100 MHz

Example: `:TEST:SYNT:DDSC 1`

:TEST:SYNThesizer:DDSFinc 0... (2^32)-1

This command defines the setting value for the DDS.

Example: `:TEST:SYNT:DDSF 8000`

:TEST:SYNThesizer:SOSelect 0...7

The command `:TEST:SYNThesizer:SOSelect` (SOS = synthesizer output select) switches dividers 0 to 6 into the signal path or switches clock generation off (SOSelect 7).

Example: `:TEST:SYNT:SOS 0`

:TEST:SYNThesizer:N<n> 0...255

This command defines the setting values for the divider factors of the "rear" three dividers (<n> = 1, 2, 3). The "front" dividers have a fixed factor of 2.

Example: `:TEST:SYNT:N1 8`

:TEST:SYNThesizer:ROSelect 0|1

The command `TEST:SYNThesizer:ROSelect` (ROS = reference output select) switches the internal 10 MHz VTCXO (1) or the reference input (0) through to the reference output.

Example: `:TEST:SYNT:ROS 1`

4 Firmware Update/Fitting of Options

This chapter provides information on the extension and modification of AMIQ. Here you can file any descriptions and instructions supplied together with a firmware update or subsequently purchased options.

Installation of New AMIQ Software

Insert the update floppy (3.5") into the drive of the unit and switch the unit off and on.

On power-up, the unit checks if an update floppy is inserted. If this is the case, the programs in question are loaded. To this end, the floppy is searched for a file named AMIQxxxx.DAT, with xxxx being the version identification.

Re-Installation of Previous Software

Normally, a firmware update on power-up of AMIQ is performed only if the software to be installed is a later version than the software provided in the unit. If necessary, an older software version can be installed. Proceed as follows:

➢ Rename the file AMIQxxxx.DAT (with xxxx being the version identification) on the installation disk into AMIQFORC.DAT. The software will then be installed even if a later version is provided in AMIQ.

Fitting of Options

The following options are available for AMIQ:

BER Measurements	AMIQ-B1	1110.3500.02
Differential Outputs	AMIQ-B2	1110.3500.02
Digital I/Q Output	AMIQ-B3	1122.2103.02
I/Q Rear-Panel Connection	AMIQB19	1110.3700.02
IS-95 CDMA	AMIQK11	1122.2003.02

On demand, AMIQ is supplied with the options fitted

To install the hardware options AMIQ-B2 and AMIQB19, the instrument must be opened. This will break the calibration seal so that the calibration is no longer valid. Installation should be done by an authorized R&S service representative only. No additional measuring equipment is required.

The installation and setup instructions are provided with the basic documents in the corresponding register of this manual. They are also enclosed with the respective option.

The following applies to all hardware options:

CAUTION!

Disconnect unit from AC supply before opening the case. Observe safety instructions given at the beginning of this manual.

The unit contains electrostatically sensitive components. The applicable ESD rules for such components must be observed.

- Switch AMIQ off and disconnect power cable.
- Unscrew feet from the rear of the unit (four size 2 Phillips screws).
- Slide casing towards the rear and remove upwards.
- Fit option and refit casing.

CAUTION!

Make sure that cables are neither damaged nor disconnected when putting the casing back in place.

- Switch AMIQ on. If the option includes additional software, install the software in accordance with the instructions given above (see section "Installation of New AMIQ Software") and enable the additional software functions (see installation instructions for the option in question). The software will then detect the new option automatically. If calibration is necessary, this can be performed without external measuring equipment.

Option AMIQ-B1, "BER Measurements"

AMIQ-B1 is a software option which does not require opening of the unit. Install the option in accordance with the instructions enclosed.

Option AMIQ-B2, "Differential Outputs"

To install the option AMIQ-B19, the unit must be opened, and the front panel must be replaced. Install the option in accordance with the instructions enclosed.

Option AMIQ-B3, "Digital I/Q Output "

The unit must be opened. Install the option in accordance with the instructions enclosed.

Option AMIQB19, "Rear I/Q Outputs"

To install the option AMIQ-B19, the unit must be opened. The option uses marker outputs 3 and 4 for its I and Q outputs so that these outputs cannot be assigned otherwise. Install the option in accordance with the instructions enclosed.

Enabling Option AMIQ-B1, Bit Error Rate Test

Software option **AMIQ-B1, Bit Error Rate Test,** is available for instruments with firmware **version 2.0** or higher. The option must be activated with a key code following the instructions below:

Simulation software WinIQSIM version 2.0 or higher available	**Without WinIQSIM, or WinIQSIM version lower than 2.0**
Connect AMIQ to a controller with WinIQSIM software via IEEE-bus cable and put both instruments into operation. Option BER Test must be enabled in WinIQSIM by means of the following menu steps: • **AMIQ** • **Remote Control and BERT** (see WinIQSIM software manual, Chapter "Remote Control and BERT") • **Test and Adjustment** • **Send Command to AMIQ.** In this editor field, arbitrary commands can be transmitted to the AMIQ. Enter the following commands:	It is recommended to order a free firmware update to version 2.0 or higher for both AMIQ and WinIQSIM from your R&S representative. Afterwards, the steps described on the left can be performed. Alternatively, the following commands may be entered via a controller with IEEE-bus interface:

`SYST:OPT AMIQB1,xxxxxxxxx`

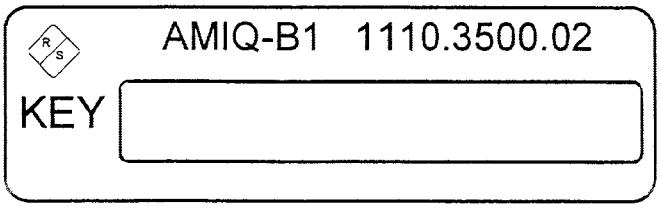
`xxxxxxxxx` is the key number which can be taken from the sticker supplied with the option. The option is installed as soon as the key number has been transmitted.
In order to enable BER tests with PRBS sequences, the PRBS operating mode must be activated. This is done by means of the command:

`BERT:SEL 'PRBS'.`

This initiates loading of the appropriate configuration file into the device hardware.

As the configuration file is loaded into the device hardware during the startup procedure, the AMIQ must now be switched off and on again. The measurement mode needs to be configured only once. The configuration will be preserved after a firmware update.

Sticker:



Manufacturer's entry

This key code is linked to the AMIQ serial number:

Manufacturer's entry

The sticker should be safely attached to the rear of the AMIQ casing because the R&S service representative might need the key code in case of repair or maintenance works.

Installation of Option AMIQ-B19 (I/Q rear installation)

- Switch off AMIQ and disconnect power cable.
- Remove feet at rear (screwdriver, size 2).
- Withdraw enclosure towards the rear.
- Turn unit by 180° so that I/Q Analog/Digital Unit is accessible.
- Remove lateral handles after undoing two screws on each side (screwdriver, size 2)
- Remove labelled front panel.
- Unplug SMB cables to front BNC connectors on I/Q board 1110.2655.02 (X111 and X112).
- Unscrew BNC bracket from front mounting plate (undo three countersunk screws M2.5 by means of screwdriver, size 0).
- Unplug SMB cable from BNC bracket. Screw BNC bracket back to front-panel mounting plate (screwdriver, size 0).
- Affix option labels (1110.2403.00) to front mounting plate.
- Push labelled front panel onto front unit and fix to front frame by fastening screws in handles.
- Unplug short-circuit connectors from X123 and X124 on I/Q board 1110.2655.02
  Plug cable W111 (1110.3439.00) from X111 to X134
  Plug cable W112 (1110.3439.00) from X112 to X133
  Fix two cables in the center shielding by means of a cable tie.
- Affix option label to rear panel.
- Push enclosure from rear onto unit and fasten feet at rear.

  Note: The enclosure must make good contact with the front frame for correct RF shielding of AMIQ. When mounting the feet make sure that the enclosure fits properly into the groove of the frame.

Information on putting into operation

After switch-on, the unit is operated as usual by WinIQSIM or SMIQ.
I/Q outputs can be plugged into at the rear.

Important: Please note that AMIQ cannot be equipped with options B19 **and** B2 at the same time.

Required tools

Phillips screwdriver, sizes 0 and 2.

Installation of Option AMIQ-B2 (Differential Outputs)

- Switch off AMIQ and unplug power cable from AC supply
- Unscrew rear panel feet of AMIQ (screwdriver size 2)
- Push the panelling slightly backwards and remove it
- Turn AMIQ by 180° to allow I/Q analog/digital unit to be accessed
- Unscrew front grips on both sides (screwdriver size 2)
- Remove front panel from AMIQ
- Unplug the SMB cable from the BNC jacks on the mounting panel of I/Q analog/digital unit (X111 and X112)
- Unscrew and remove the BNC jack bracket from mounting panel (screwdriver size 0)
- Push option AMIQ-B2 from the rear into the mounting panel and fix it (screwdriver size 0)
- Fix option AMIQ-B2 with two screws (M2,5) on intermediate plate
- Push front panel on mounting panel and fix it with two screws on both sides of the unit
- Plug 20-pole flat cable between option AMIQ-B2 (X25) and I/Q analog/digital unit (X25)
- Plug the two SMB cables between option AMIQ-B2and I/Q analog/digital unit (X111 and X112 on both units)
- Remount panelling and feet to unit (screwdriver size 2)

Note: The panelling must be in good contact with the front frame to ensure RF shielding of AMIQ. Therefore, when mounting the feet, make sure that the panelling is correctly placed in the grooves of the frame.

Putting into operation

On power up of the instrument, the installed option will be automatically recognized by the software and can be controlled via WinIQSIM or SMIQ. Option AMIQ-B2 contains four potentiometers to compensate for undesired natural offset voltages. These multiturn potentiometers are well balanced in the factory and don't have to be modified.

Attention: It is not possible to install both options AMIQ-B2 **and** AMIQB19! Option AMIQB19 connects the outputs I and Q to the rear of the unit, so no input signals are available for AMIQ-B2.

Tools required

Phillips screwdriver sizes 0 and 2.

Installation of Option AMIQ-B3 (Digital I/Q Output)

- Switch off AMIQ and unplug power cable from AC supply
- Unscrew rear panel feet of AMIQ (screwdriver size 2)
- Push the panelling slightly backwards and remove it
- Turn AMIQ by 180° to allow I/Q analog/digital unit to be accessed
- Unscrew front grips on both sides (screwdriver size 2)
- Remove front panel from AMIQ
- Push option AMIQ-B3 from the rear into the mounting panel and fix it with two M2.5 countersunk-head screws (screwdriver size 0)
  Make sure that the shielding plate is correctly seated on the 68-pin connector.
- Fix option AMIQ-B3 with two M2.5 Phillips screws on the intermediate plate (screwdriver size 0)
- Push front panel on mounting panel and fix it with two grips on the two sides of the unit (screwdriver size 2)
- If there is no option AMIQ-B2 (differential outputs) fitted, plug 20-core flat cable between option AMIQ-B3 (X25) and I/Q analog/digital unit (X25).
  If an option AMIQ-B2 is already fitted,
  then replace the 20-core flat cable by the newer one delivered with AMIQ-B3.
- Plug the two 34-core flat cables X39 and X40 between option AMIQ-B3 and I/Q analog/digital unit. Cables and connectors on option and I/Q analog/digital unit have identical markings.
- Remount panelling and rear feet to unit (screwdriver size 2)

  Note: The panelling should be in good contact with the front frame to ensure RF shielding of AMIQ. Therefore, when mounting the feet, make sure that the panelling is correctly placed in the grooves of the frame.

Putting into operation

On power-up of the instrument, the installed option will be automatically recognized by the software and can be operated via WinIQSIM. Option AMIQ-B3 contains no adjustment devices and is ready for operation immediately. After fitting the option, the digital output is inactive as per default and must be switched on by the control software.

Tools required

Phillips screwdriver sizes 0 and 2.

5 Circuit Documents

This chapter contains the circuit documents for the AMIQ basic unit. The circuit documents for the modules "IQ Analog/Digital Unit" (IQ Board) and „Differential Outputs" are relegated to chapters 6 and 7, respectively. Chapter 8 contains the basic documents for the module "Digital I/Q Outputs". To order replacement parts and modules please contact our *spare parts express service* or your Rohde & Schwarz service representative and note the hints given in the following section, "Module and Cable Exchange".

The address of our *spare parts express service* and a list of Rohde & Schwarz representatives can be found at the beginning of this service manual.

Module and Cable Exchange

Table 5-1 at the end of this section lists all power cables available. The stock numbers necessary for ordering replacement parts and modules can be found in the component lists further down.

Important Note!

When replacing a module please note the safety instructions and the repair instructions given in chapter 3 of this service manual.

Ordering replacement parts

To deliver replacement parts promptly and correctly we need the following indications:

- Stock number (see component lists in this chapter)
- Designation
- Component number according to component list
- Number of pieces
- Instrument type the replacement part belongs to
- Contact person for possible questions

Replaced modules

Replaced modules are an economic alternative for original modules. It should be kept in mind that replaced modules are not new, but repaired and fully tested parts. They may have traces from use but they are electrically and mechanically equivalent to new modules.

To find out which replaced modules are available, please refer to your Rohde & Schwarz representative (or to the central service division, Rohde & Schwarz Munich). The identification number is usually the same as for the original module, but with a variant index .95, .96, .97 or .98.

Ordering and delivery of replaced modules

For ordering replaced modules, the same indications as for ordinary parts are required, however, with the corresponding variant index appended to the stock number.

Taking back defective replacement modules

Defective modules of the replacement program which can be repaired are taken back within **3 months** after delivery of the replaced module. A repurchasing value is credited.

Excluded are parts which can not be repaired, e.g. PCBs that are burnt, broken or damaged by repair attempts, incomplete modules, parts which are heavily damaged mechanically.

The defective parts must be sent back with a **returned accompanying document** containing the following information:

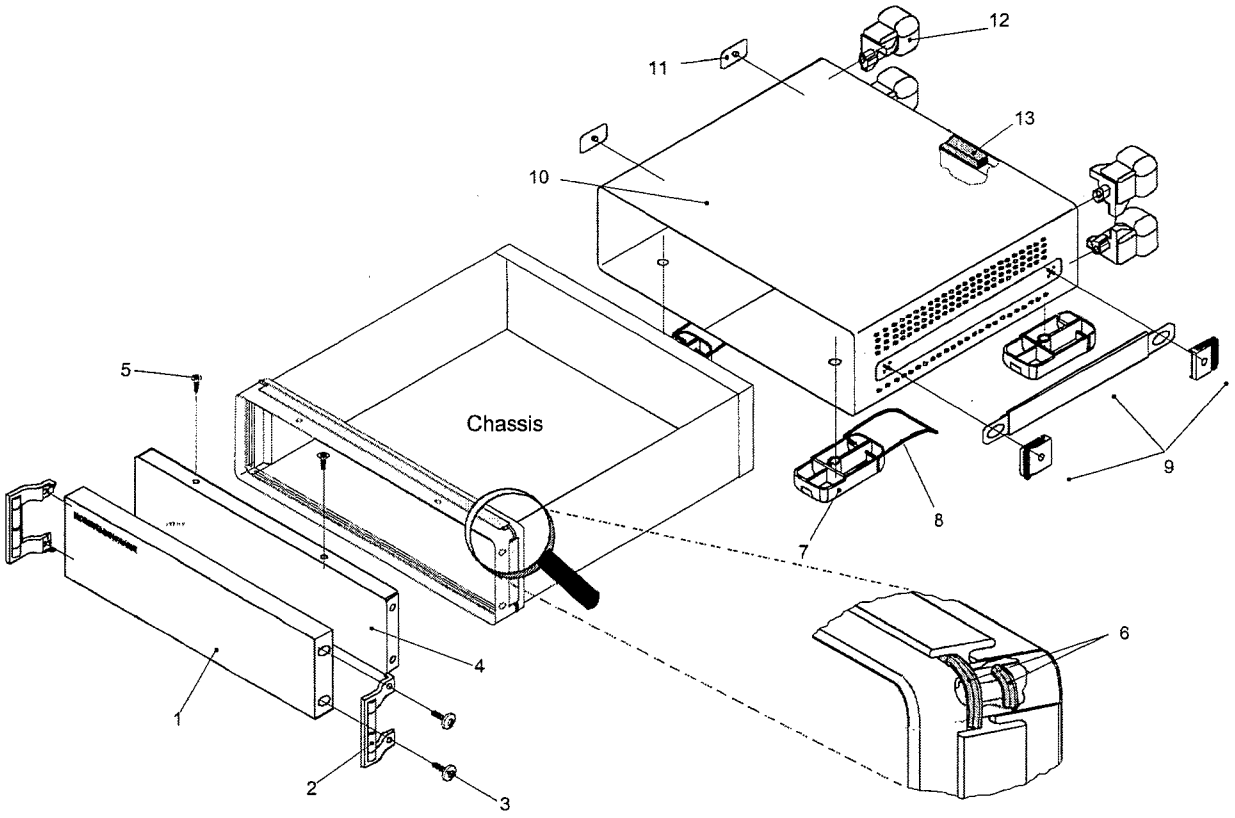
- Stock number, serial number and designation of the dismounted part,
- **Precise** description of the error,
- Stock number, serial number and designation of the instrument the part was dismounted from,
- Date of dismounting,
- Name of the technician who exchanged the part.

A returned accompanying document is provided with each replacement module.

Table 5-1 List of power cables available

Stock No.	Earthed-contact connector	Preferably used in
DS 006.7013	BS1363: 1967' complying with IEC 83: 1975 standard B2	Great Britain
DS 006.7020	Type 12 complying with SEV-regulation 1011.1059, standard sheet S 24 507	Switzerland
DS 006.7036	Type 498/13 complying with US-regulation UL 498, or with IEC 83	USA/Canada
DS 006.7107	Type SAA3 10 A, 250 V, complying with AS C112-1964 Ap.	Australia
DS 0025.2365 DS 0099.1456	DIN 49 441, 10 A, 250 V, angular DIN 49 441, 10 A, 250 V, straight	Europe (except Switzerland)

Construction of the Casing According to Design 2000



The casing essentially consists of a device-specific chassis, the panelling [10], instrument feet [7, 8, 12] and front grips [2].

The device-specific chassis is shown in the center of the figure above. It consists of a front frame and a module support with rear panel. The front frame is made of a bended aluminum profile, the module support is shaped out of a piece of sheet metal.

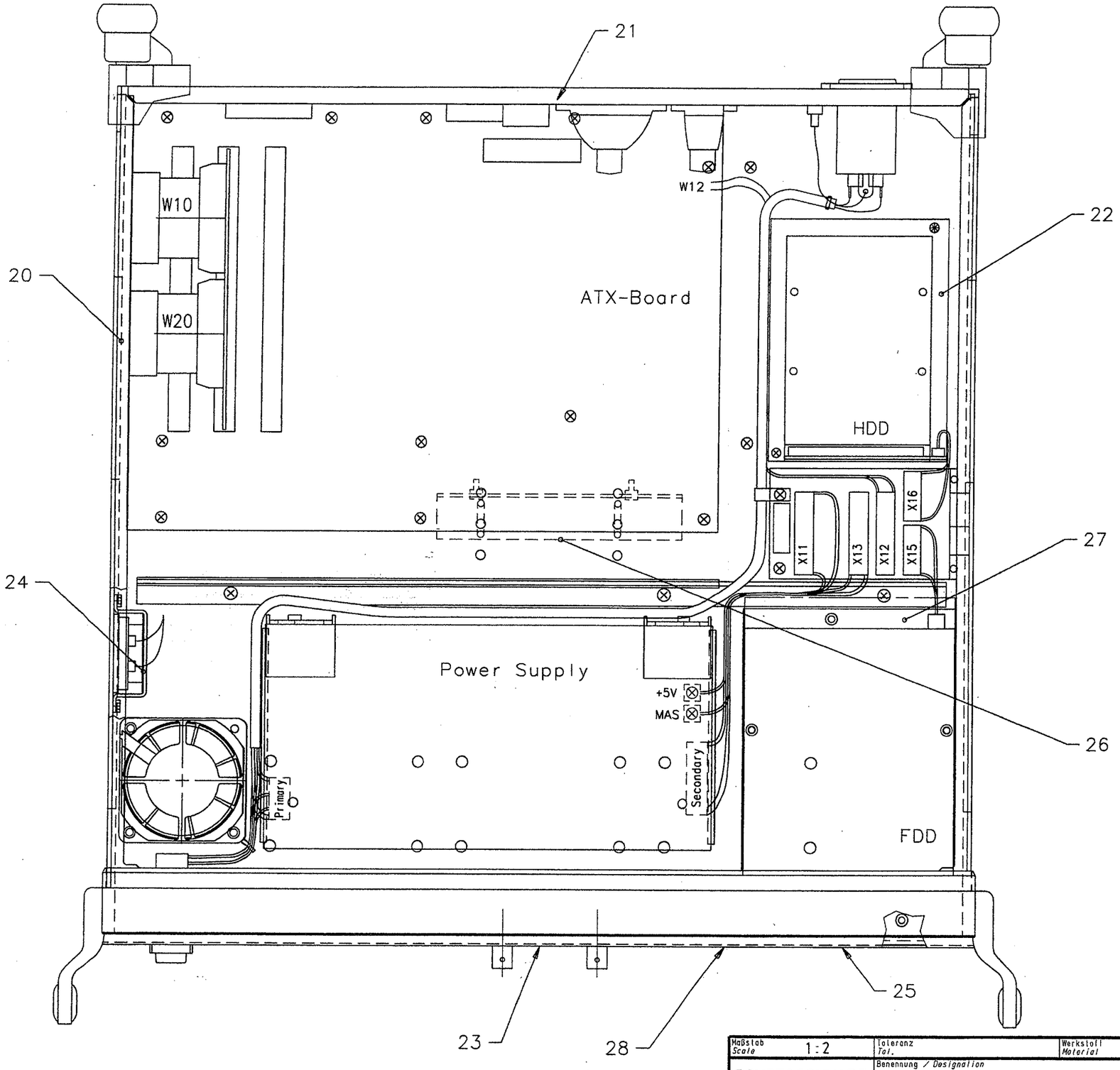
The front side is completed by a device-specific mounting panel [4] and a front panel [1].

To close the casing, push the panelling over the chassis starting on the rear side of the instrument.

Screw on the panelling by means of the rear-panel feet [12] equipped with elastic buffers.

The lower instrument feet [7, 8] are tightly screwed to the panelling. They prevent the instrument from gliding, in particular if several instruments are piled up.

The contact edges between the different parts of the casing can be sealed by means of the RF seals [6, 13] provided with the instrument.



Projektions-methode
Projection Method

Maßstab *Scale* 1:2	Toleranz *Tol.*	Werkstoff *Material*			
ROHDE&SCHWARZ	Benennung / *Designation* AMIQ I/Q-Mod Gen			Sprache / *Lang.* de en	Aei. / *C.I.*	Blatt / *Sh.* 2
Typ *Type* AMIQ				Zeichn.Nr. / *Drawing No.* 1007.9022 D		
i.Z. *used in*	Datum *Date* 3.2.2000	Abteilung *Dept.* 1GPK	Name *Name* Hi/St			

List of mechanical parts

The AMIQ is constructed in accordance with R&S design 2000.

Size of the casing: 2E 1/1 T450

Overall dimension: 87,6 mm x 465,1 mm x 495 mm

Accessories: 19"-Adapter ZZA-211, Stock no. 1096.3260.00

Current No.	No. of Parts	Designation	Stock No.
1	1	Front panel AMIQ var 02 Front panel AMIQ var 03, 04	1110.2132.00
2	2	Front grip	1096.1468.00
3	4	Screw M4x12	1096.4780.00
4	1	Mounting panel	1110.2161.00
5	6	DIN 965 – M3x6 - A4 - PA	0396.8023.00
6	2 m	RF seal O-Prof. 2,0 SI	0396.1035.00
7	4	Instrument foot	1096.2506.00
8	2	Foot	1096.2529.00
9*)	1	Carrying handle, lateral	not available for AMIQ
10	1	Panelling	1096.6760.00
11	4	Cover	1096.2558.00
12	4	Rear-panel foot	1096.2487.00
13	m	RF seal FL 9,53x6,35	1096.4867.00
20	1	AMIQ frame with cut-out for single-row ATX board AMIQ frame with cut-out for two-row ATX board	1110.2155.00 1110.2484.00

*) optional

Additional Instrument-specific Mechanical Parts

Current No.	Number	Designation	Stock No.
21	1	Rear panel, single-row for ATX board 1110.3180 Rear panel, two-row for ATX board 1110.3216	1110.2310.00 1110.2355.00
22	1	Supporting panel for hard disk	1110.2284.00
23	1	Mounting panel for I/Q output var 02 Mounting panel for I/Q output var 03, 04	1110.2932.00 1110.2984.00
24	1	Fixing brackets for loudspeaker	1110.2226.00
25	1	Shielding panel for digital outputt	1110.2384.00
26	1	Mounting panel for ATX board	1110.2249.00
27	1	Mounting panel for FDD	1110.2278.00
28	1	Sheding plate for FDD	1110.2336.00

The location of the individual parts can be obtained from the assembly drawing contained in the basic documents of instrument.

Circuit Documents

The rest of this chapter contains the circuit diagram and part lists for AMIQ basic unit.

- For circuit diagrams, part lists, component plan and XY list for "IQ Analog/Digital Unit" refer to chapter 6.
- For circuit diagrams, part lists, component plan and XY list for "Differential Outputs" refer to chapter 7.
- Chapter 8 of this manual contains the installation instructions, circuit diagrams, part list, component plan and XY list for "Digital I/Q Outputs" (AMIQ-B3).
- Following this document register, the ATX Mainboard manual may be filed which is supplied with the instrument. Prior to filing, it must be punched accordingly.

ROHDE&SCHWARZ

Circuit Diagram

Part List

for AMIQ Basic Unit

1110.2003.02

INSTRUCTION SHEET FOR LPQ15X SERIES
(EINBAU ANLEITUNG FEUR LPQ15X SERIE)

OUTPUT RATINGS
(AUSGANGS WERTE)

MODEL (MODEL)	OUTPUT - VOLTAGE (AUSGANGS SPANNUNG) (V)	CONVECTION COOLING (BEI RUHENDER LUFT)			30 CFM FORCE AIR COOLING (BEILUFTSTROM MIT 30 CFM)		
		MAX. OUTPUT CURRENT (MAXIMALE AUSGANGS STROM) (A)	MAX. OUTPUT POWER (MAXIMALER AUSGANGS LEISTUNG) (W)		MAX. OUTPUT CURRENT (MAXIMALE AUSGANGS STROM) (A)	MAX. OUTPUT POWER (MAXIMALER AUSGANGS LEISTUNG) (W)	
			with cover (mit abdeckung)	without cover (ohne abdeckung)		with cover (mit abdeckung)	without cover (ohne abdeckung)
LPQ152	+5	15.0	75	110	22.0	130	150
	+12	6.0			8.0		
	-12	2.0			2.5		
	5 to 25	2.5			3.0		
LPQ153	+5	15.0	75	110	22.0	130	150
	+15	4.8			6.4		
	-15	1.6			2.0		
	5 to 25	2.5			3.0		
LPQ154	+5	15.0	75	110	22.0	130	150
	+12	6.0			8.0		
	-12 (OPTIONAL)	2.0			2.5		
	24 (OPTIONAL)	3.5			4.5		

CONNECTOR PIN DESIGNATION
(STIFT BELEGUNG AM STECKER)

OUTPUT CONNECTOR (AUSGANGS STECKER)		LPQ152	LPQ153	LPQ154
SK1	Pin (Stift) 1	INHIBIT -ve	INHIBIT -ve	INHIBIT -ve
	Pin (Stift) 2	INHIBIT +ve	INHIBIT +ve	INHIBIT +ve
	Pin (Stift) 3	+12V	+15V	+12V
	Pin (Stift) 4	No Connection	No Connection	No Connection
	Pin (Stift) 5	Common	Common	Common
	Pin (Stift) 6	-Sense	-Sense	-Sense
	Pin (Stift) 7	+Sense	+Sense	+Sense
	Pin (Stift) 8	C-Share	C-Share	C-Share
SK2 (OPTIONAL)	Pin (Stift) 1, 2	+12V	+15V	+12V
	Pin (Stift) 3,4,5	Common	Common	Common
	Pin (Stift) 6	-12V	-15V	-12V
	Pin (Stift) 7	POK	POK	POK
	Pin (Stift) 8	5 to 25V (Float)	5 to 25V (Float)	+24V
	Pin (Stift) 9	Common (Float)	Common (Float)	Common
SK3 (OPTIONAL)	T.B.-2	+5V	+5V	+5V
	T.B.-1	Common	Common	Common

INPUT CONNECTOR (EINGANGS STECKER)		LPQ152	LPQ153	LPQ154
SK4	Pin (Stift) 1	GND (ERDE)	GND (ERDE)	GND (ERDE)
	Pin (Stift) 2	Pin Removed (Stift Enfernt)	Pin Removed (Stift Enfernt)	Pin Removed (Stift Enfernt)
	Pin (Stift) 3	Live (Spannungs-Fuehrend)	Live (Spannungs-Fuehrend)	Live (Spannungs-Fuehrend)
	Pin (Stift) 4	Pin Removed (Stift Enfernt)	Pin Removed (Stift Enfernt)	Pin Removed (Stift Enfernt)
	Pin (Stift) 5	Neutral	Neutral	Neutral

CONNECTOR OF OUTPUT WIRE HARNESS ASSEMBLY (OPTIONAL FOR LPQ154)

PIN DESIGNATION	OUTPUT
PIN 1-5	+5V
PIN 6-7, 9-11	COMMON
PIN 12	+12V

X11 M X12 K X20 NET X14 RS232 X13 LPT1 X15 X16 X17 X18

REF REF CLK FILT Q Q MARK 1 2 MARK 3 4 FILT I I TRIG BER

IEC625 IEEE488

X107 X108 X109 X115 X116 X100 X101 X102 X103 X117 X118 X104 X106

D2 SDRAM DIMM168

D4 CPU

E4 CPU FAN

A2 ATX MOTHERBOARD

X1 X2

A7 ISA BUS ADAPTER 1110.2632.02

X10 W10 X10

X20 W20 X20

X30 A B C D

A3 IQ BOARD 1110.2655.02/03/04 INCLUDED IN 1110.2532.02/03/04

X105 W2

SPEAKER CONNECTOR POWER CONNECTOR HDD CONNECTOR FDD CONNECTOR

X2 X30 X40 (VAR03/04) X39 X25 X111 X112

W22 W12 W13 W6

X14 X12 X13 X60

A4 POWER BOARD 1110.2732.02

X16 W16 X61

X15

X11 1 2 3 4 5 6 7 8 9 10

W11

W15 W5

A60 HDD ADAPTER 1110.2678.02 INCLUDED IN 1110.2532.02

X63

W30

W40 W39 W25 W111 W112 W111 W112

E2

M E1

X1 GN/GE GN/GE W100

Z1

100–240V 50–60Hz 150VA L N SW BL

SK3 SK2 SK4

A1 POWER SUPPLY 1104.2463.00

A5 3.5" FDD

A6 2.5" HDD

A8 LED BOARD 1110.2661.02 INCLUDED IN 1110.2532.02

AMIQ–B3 DIGITAL OUTPUT 1122.2103.02

AMIQ–B2 DIFF.OUTPUT 1110.3700.02

X40 X39 X25

A30 DIGITAL OUTPUT BOARD 1122.2203.02

X25 X111 X112

A20 I/Q DIFF. OUTPUT BOARD 1110.3768.02

X1 X1 X2 X3 X4

W1 P2 P1 1A 2A

S1

	FUSE
F1	IEC127–T2,5 H/250V
F2	IEC127–T2,5 H/250V

VARIANTENERKLAERUNG/VERSIONS

VAR 02 = GRUNDAUSFUEHRUNG
MOD 02 = BASIC MODEL
VAR 03 = MODIF. GRUNDAUSF.
MOD 03 = MODIF BASIC MODEL
VAR 04 = ERWEIT. WAVEFORM RAM
MOD 04 = EXTENDED WAVEFORM RAM

I/Q DIGITAL AMIQ–B3 OUTPUT

I Ī Q Q̄ AMIQ–B2 OUTPUT

I Q OUTPUT (BASIC MODEL)

ROHDE&SCHWARZ

Aend. Zust.	Aenderunsmitteilung	Datum	Name	Aend. Zust.	Aenderunsmitteilung	Datum	Name
03							

	Datum	Name
1GPK	Datum	Name
Bearb.	99–03–16	SR
Gepr.	99–03–16	SR
Norm		

Benennung: AMIQ I/Q MODULATOR

PLOTT: 99–03–16 SCHWAIGE | ZU GERAET AMIQ

Zeichn.–Nr.: 1110.2003.01 S

REG. I. V. 1110.2003 V | ERSTE Z. 1110.2003.01

BLATT–NR. 1+

ROHDE&SCHWARZ

Circuit Documents

for Module

IQ Analog/Digital Unit

1110.2532.02

from
ATX BOARD

AT-BUS DATA

AT-BUS ADRESS

X10/X20

IEC625
IEEE488

X105

IEC BUS
CONTROLLER

40 MHz

G2
100 MHz

EEPROM

ANALOG
SETUP

D7
ADDRESS
GENERATOR

24

6

D2
CONTROLLER

TRIGIN

DIG_CLK_1

SINGLE_CLK

DIG_CLK_2

SINGLE_CLK

SYN_OUT_CLK

DIG_CLK_1

DIG_CLK_2

SINGLE_CLK

SLOW

FAST

SRCLK

DAC_CLK

MARKER_CLK

DIG_OUT_CLK

BER_CLK

SRADR-BUS

CRTL

SRMUX

SRSTROBE

ENAWR

WRITEDQ

WRITEDI

READDQ

READDI

SRCLK1

SRCLK2

SRCLK3

SRCLK4

SRCLK5

SRCLK6

SRCLK

LATCH

DQ-BUS

LDQ-BUS

DI-BUS

LDI-BUS

SDRAM

SDRAM

16

DIG_OUT_Q
CONNECTOR

X39

SRCLK3

16

14

QDATA

4

TRIGOUT

4

14

IDATA

16

DIG_OUT_I
CONNECTOR

X40

SRCLK3

SRCLK5

16

ACHTUNG: EGB !
ELEKTROSTATISCH GEFAEHRDETE
BAUELEMENTE ERFORDERN EINE
BESONDERE HANDHABUNG.
ATTENTION ESD !
ELECTROSTATIC SENSITIVE DEVICES
REQUIRE A SPECIAL HANDLING

BLOCK DIAGRAM DIGITAL UNIT

AEND. IND.	AENDERUNGS-MITTEILUNG	DATUM	NAME
06.06			

1GPK	DATUM	NAME	BENENNUNG
BEARB.		SR	IQ ANALOG/DIGITAL UNIT
GEPR.		SR	IQ ANALOG/DIGITAL UNIT
NORM			TOP/TOP.1
PLOTT	00-09-06	SCHWAIGE	

ROHDE&SCHWARZ

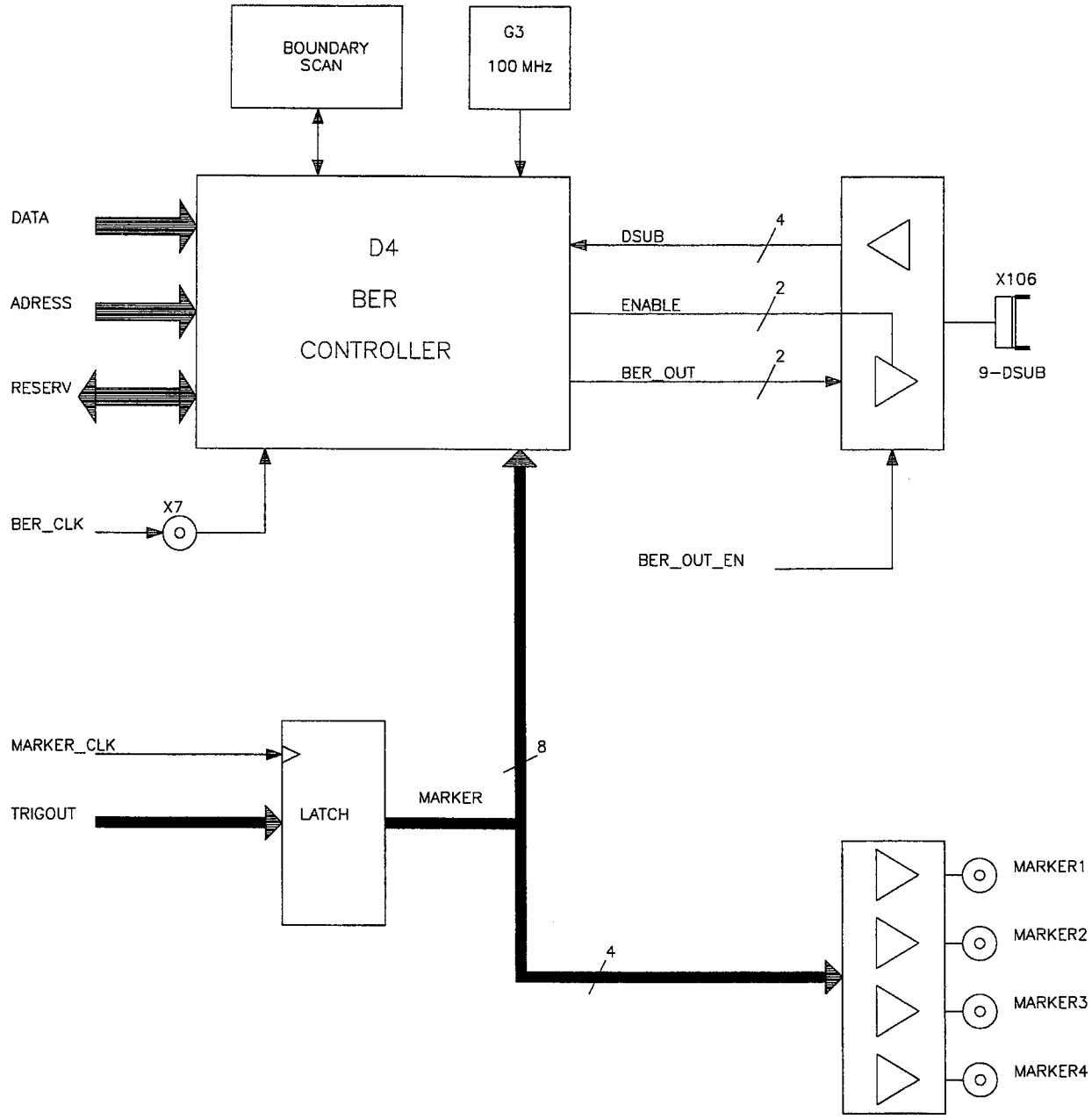
ZEICHN.-NR. 1110.2532.01 S

BLATT-NR. 1 +

ZU GERAET AMIQ

REG.I.V. 1110.2003

ERSTE Z. 1110.2003.01



ACHTUNG: EGB !
ELEKTROSTATISCH GEFAEHRDETE BAUELEMENTE ERFORDERN EINE BESONDERE HANDHABUNG.
ATTENTION ESD !
ELECTROSTATIC SENSITIVE DEVICES REQUIRE A SPECIAL HANDLING

BLOCK DIAGRAM BER UNIT

06.06				1GPK	DATUM	NAME	BENENNUNG
				BEARB.		SR	IQ ANALOG/DIGITAL UNIT
				GEPR.		SR	IQ ANALOG/DIGITAL UNIT
				NORM			TOP/TOP.2
				PLOTT	00-09-06	SCHWAIGE	
				ROHDE&SCHWARZ			ZEICHN.-NR. 1110.2532.01 S
							BLATT-NR. 2 +
AEND. IND.	AENDERUNGS-MITTEILUNG	DATUM	NAME	ZU GERAET AMIQ			REG.I.V. 1110.2003 ERSTE Z. 1110.2003.01

I-FILTER EXTERN

SKEW_ADJ

D A

Q_DAC_CLK

CLK BUFFER

DAC_CLK
max 100 MHz

I_DAC_CLK

OUTPUT AMPLTUDE 1Vpp INTO 50 OHM

50 OHM

OUTPUT PROTECTION

INPUT AMPLTUDE 1Vpp

50 OHM

INPUT PROTECTION

G=6dB

DIAG7
EXT-IFILTER

OVER VOLTAGE PROTECTION

DATA LATCH

SRCLK4

WAVEFORM
I_DATA

14

HIGH SPEED WAVEFORM DAC

DIFFERENTIAL AMPLIFIER

DIAG5
IDAC-OUTPUT

FILTER OFF

LOW PASS FILTER

2,5 MHz

LOW PASS FILTER

25 MHz

AMPL FIX/VAR

OUTPUT AMPLIFIER

OUTPUT ATT

0 dB
20 dB
40 dB

I-OUTPUT

Output Amplitude:

fix:
max 1Vpp into 50 Ohm

var:
max 2Vpp into 50 Ohm

max +/- 2V

I_DIAG_EN

DIAG11
I-OUTPUT

I_AMPL_ADJ

D A

I_OFFSET_ADJ1

D A

VARIABLE ATTENUATOR

DIAG9
I-AMPL-VAR

HF DETECTOR

DIAG12
I-HF_AMPL

AMPL CNTRL

OFFSET

I-FILTER_SELECT

U-REF

1,2V

U-REF

DIAG2
Uref ADJ-DAC

I-AMPL_VAR

D A

U-REF

I-OFFSET_ADJ2

D A

I-,Q-
PHASE
METER

from Q-CHANNEL

DIAG15
I/Q PHASE

I-CHANNEL

ACHTUNG: EGB !
ELEKTROSTATISCH GEFAEHRDETE BAUELEMENTE ERFORDERN EINE BESONDERE HANDHABUNG.
ATTENTION ESD !
ELECTROSTATIC SENSITIVE DEVICES REQUIRE A SPECIAL HANDLING

AEND. IND.	AENDERUNGS-MITTEILUNG	DATUM	NAME
06.06			

	DATUM	NAME
1GPK		
BEARB.		SR
GEPR.		SR
NORM		
PLOTT	00-09-06	SCHWAIGE

BENENNUNG
IQ ANALOG/DIGITAL UNIT
IQ ANALOG/DIGITAL UNIT
TOP/TOP.3

ROHDE&SCHWARZ

ZEICHN.-NR. 1110.2532.01 S

BLATT-NR. 3 +

ZU GERAET AMIQ | REG.I.V. 1110.2003 | ERSTE Z. 1110.2003.01

Q-FILTER EXTERN

OUTPUT AMPLTUDE 1Vpp INTO 50 OHM

50 OHM

OUTPUT PROTECTION

INPUT AMPLTUDE 1Vpp

50 OHM

INPUT PROTECTION

G=6dB

DIAG8 EXT-QFILTER

OVER VOLTAGE PROTECTION

Q_DAC_CLK

DATA LATCH

SRCLK3

WAVEFORM Q_DATA

14

HIGH SPEED WAVEFORM DAC

DIFFERENTIAL AMPLIFIER

DIAG6 QDAC-OUTPUT

FILTER OFF

LOW PASS FILTER

2,5 MHz

LOW PASS FILTER

25 MHz

AMPL FIX/VAR

OUTPUT AMPLIFIER

OUTPUT ATT

0 dB
20 dB
40 dB

Q-OUTPUT

Output Amplitude:

fix:
max 1Vpp into 50 Ohm

var:
max 2Vpp into 50 Ohm

max +/- 2V

Q_DIAG_EN

DIAG13 Q-AMPL

HF DETECTOR

DIAG14 Q-HF AMPL

to Phase Meter

Q_AMPL_ADJ

Q_OFFSET_ADJ1

D A

U-REF

U-REF

Q-FILTER_SELECT

VARIABLE ATTENUATOR

DIAG10 Q-AMPL-VAR

AMPL CNTRL

OFFSET

DIAG1

2,5V

A/D REF

DIAG0

DIAG15

MUX

A D

DIAGNOSE DATA

CLOCK

DIAG-MEASUREMENT SELECT

Q-AMPL_VAR

U-REF

Q-OFFSET_ADJ2

Q-CHANNEL

ACHTUNG: EGB !
ELEKTROSTATISCH GEFAEHRDETE BAUELEMENTE ERFORDERN EINE BESONDERE HANDHABUNG.
ATTENTION ESD !
ELECTROSTATIC SENSITIVE DEVICES REQUIRE A SPECIAL HANDLING

AEND. IND.	AENDERUNGS-MITTEILUNG	DATUM	NAME
06.06			

	DATUM	NAME
1GPK		
BEARB.		SR
GEPR.		SR
NORM		
PLOTT	00-09-06	SCHWAIGE

ROHDE&SCHWARZ

ZU GERAET AMIQ

BENENNUNG

IQ ANALOG/DIGITAL UNIT

IQ ANALOG/DIGITAL UNIT

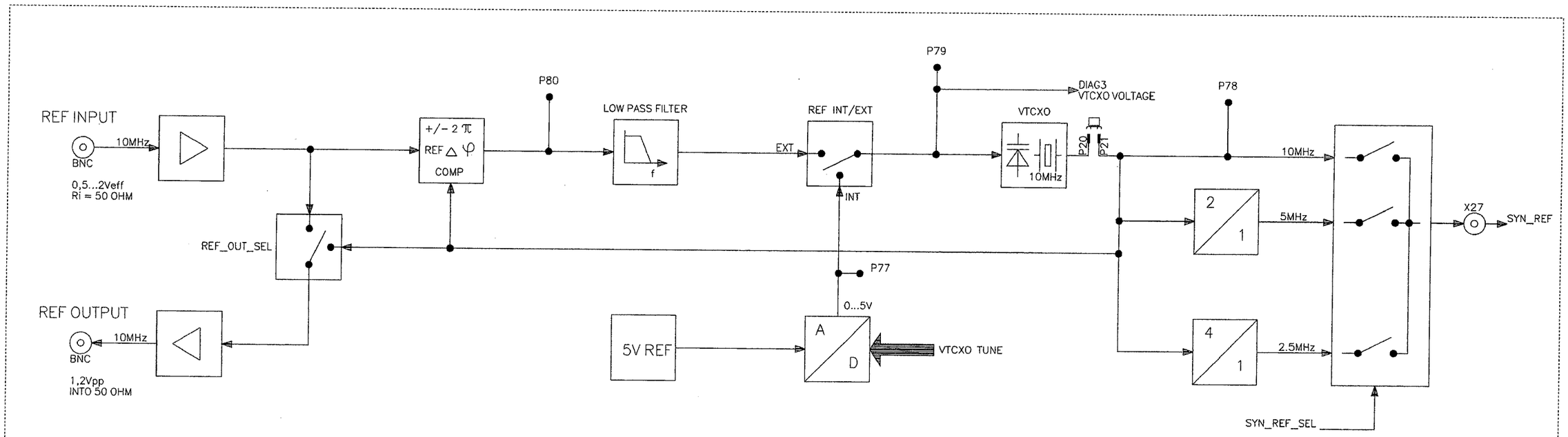
TOP/TOP.4

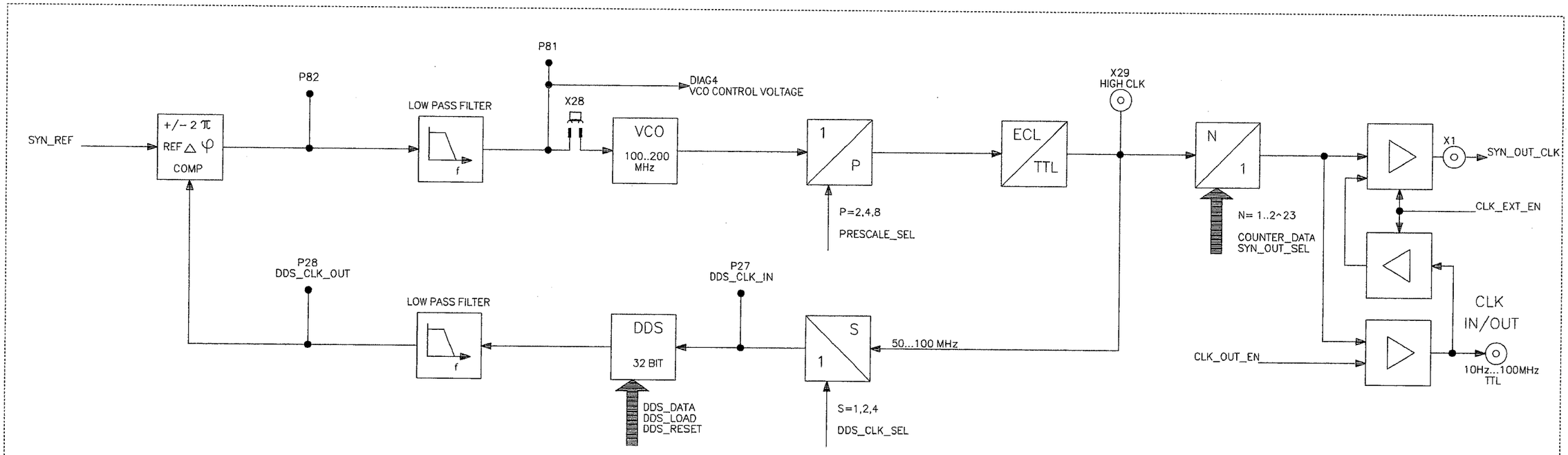
ZEICHN.-NR. 1110.2532.01 S

BLATT-NR. 4 +

REG.I.V. 1110.2003

ERSTE Z. 1110.2003.01





ACHTUNG: EGB !
ELEKTROSTATISCH GEFAEHRDETE BAUELEMENTE ERFORDERN EINE BESONDERE HANDHABUNG.
ATTENTION ESD !
ELECTROSTATIC SENSITIVE DEVICES REQUIRE A SPECIAL HANDLING

AEND. IND.	AENDERUNGS-MITTEILUNG	DATUM	NAME
06.06			

	DATUM	NAME
1GPK		
BEARB.		SR
GEPR.		SR
NORM		
PLOTT	00-09-06	SCHWAIGE

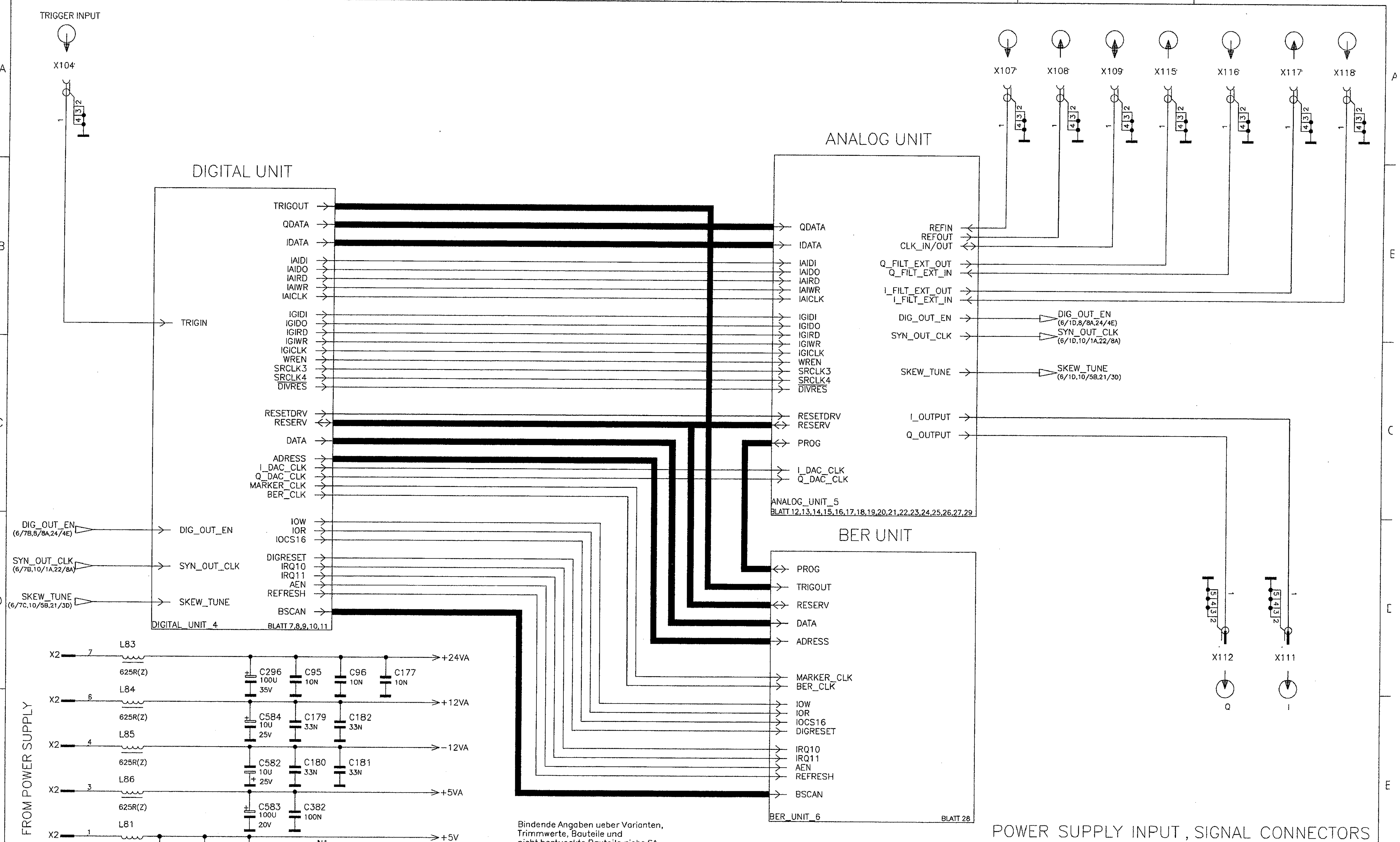
BENENNUNG
IQ ANALOG/DIGITAL UNIT
IQ ANALOG/DIGITAL UNIT
TOP/TOP.5

ROHDE&SCHWARZ

ZEICHN.-NR. 1110.2532.01 S

BLATT-NR. 5 +

ZU GERAET AMIQ | REG.I.V. 1110.2003 | ERSTE Z. 1110.2003.01


TRIGGER INPUT
X104
X107
X108
X109
X115
X116
X117
X118
DIGITAL UNIT
TRIGOUT
QDATA
IDATA
IAIDI
IAIDO
IAIRD
IAIWR
IAICLK
TRIGIN
IGIDI
IGIDO
IGIRD
IGIWR
IGICLK
WREN
SRCLK3
SRCLK4
DIVRES
RESETDRV
RESERV
DATA
ADRESS
I_DAC_CLK
Q_DAC_CLK
MARKER_CLK
BER_CLK
IOW
IOR
IOCS16
DIG_OUT_EN (6/7B,8/8A,24/4E)
DIG_OUT_EN
SYN_OUT_CLK (6/7B,10/1A,22/8A)
SYN_OUT_CLK
SKEW_TUNE (6/7C,10/5B,21/3D)
SKEW_TUNE
DIGRESET
IRQ10
IRQ11
AEN
REFRESH
BSCAN
DIGITAL_UNIT_4
BLATT 7,8,9,10,11
ANALOG UNIT
QDATA
IDATA
IAIDI
IAIDO
IAIRD
IAIWR
IAICLK
IGIDI
IGIDO
IGIRD
IGIWR
IGICLK
WREN
SRCLK3
SRCLK4
DIVRES
RESETDRV
RESERV
PROG
I_DAC_CLK
Q_DAC_CLK
REFIN
REFOUT
CLK_IN/OUT
Q_FILT_EXT_OUT
Q_FILT_EXT_IN
I_FILT_EXT_OUT
I_FILT_EXT_IN
DIG_OUT_EN
DIG_OUT_EN (6/1D,8/8A,24/4E)
SYN_OUT_CLK
SYN_OUT_CLK (6/1D,10/1A,22/8A)
SKEW_TUNE
SKEW_TUNE (6/1D,10/5B,21/3D)
I_OUTPUT
Q_OUTPUT
ANALOG_UNIT_5
BLATT 12,13,14,15,16,17,18,19,20,21,22,23,24,25,26,27,29
BER UNIT
PROG
TRIGOUT
RESERV
DATA
ADRESS
MARKER_CLK
BER_CLK
IOW
IOR
IOCS16
DIGRESET
IRQ10
IRQ11
AEN
REFRESH
BSCAN
BER_UNIT_6
BLATT 28
X112
Q
X111
I
FROM POWER SUPPLY
X2
L83
625R(Z)
L84
625R(Z)
L85
625R(Z)
L86
625R(Z)
L81
625R(Z)
C296 100U 35V
C95 10N
C96 10N
C177 10N
+24VA
C584 10U 25V
C179 33N
C182 33N
+12VA
C582 10U 25V
C180 33N
C181 33N
−12VA
C583 100U 20V
C382 100N
+5VA
+5V
N1 LT1084CP
+3.3V
C380 100N
C664 100U 20V
C56 100U 20V
C1 1U
R49 200
C57 100U 25V
C58 22U 35V
R62 330

Bindende Angaben ueber Varianten, Trimmwerte, Bauteile und nicht bestueckte Bauteile siehe SA.

FOR BINDING INFORMATION ON MODELS, TRIMMING AND COMPONENTS VALUES AND NONFITTED COMPONENTS SEE PARTS LIST

ACHTUNG: EGB !
ELEKTROSTATISCH GEFAEHRDETE BAUELEMENTE ERFORDERN EINE BESONDERE HANDHABUNG.
ATTENTION ESD !
ELECTROSTATIC SENSITIVE DEVICES REQUIRE A SPECIAL HANDLING

POWER SUPPLY INPUT , SIGNAL CONNECTORS

06.06		1GPK	DATUM	NAME	BENENNUNG
		BEARB.		SR	IQ ANALOG/DIGITAL UNIT
		GEPR.		SR	IQ ANALOG/DIGITAL UNIT
		NORM			TOP/TOP.6
		PLOTT	00-09-06	SCHWAIGE	
AEND. IND.	AENDERUNGS-MITTEILUNG	DATUM	NAME	ROHDE&SCHWARZ	ZEICHN.-NR. 1110.2532.01 S — BLATT-NR. 6 +
		ZU GERAET	AMIQ	REG.I.V. 1110.2003	ERSTE Z. 1110.2003.01

DATA (7/8A,8/1A,9/1A,11/1A,28/1A)

ADRESS (7/8A,11/1A,28/1A)

DATA (7/1A,8/1A,9/1A,11/1A,28/1A)

ADRESS (7/1A,11/1A,28/1A)

SRMUX (8/5A,9/5A)

SRSTROBE (8/3A,9/3A)

SRWE (8/1C,9/1C)

SRRAS (8/1C,9/1C)

SRCAS (8/1C,9/1C)

SRADR (7/8C,8/1D,9/1D)

D3 74LVT14DB

DIGRESET (7/4C,7/8C,28/3C)

RESETDRV (11/1C)

C669 1N

R743 100

+5V

R3 10K

R4 10K

R5 10K

R6 10K

R7 10K

R8 10K

R9 10K

R10 10K

D8 74HCT688T

COMP

G1

P

Q

1P=Q

X10 SD7 SD6 SD5 SD4 SD3 SD2 SD1 SD0

SA2 SA3 SA4 SA5 SA6 SA7 SA8 SA9

SA15 SA14 SA13 SA12 SA11 SA10

SD8 SD9 SD10 SD11 SD12 SD13 SD14 SD15

SD0

X20 SA9 SA8 SA7 SA6 SA5 SA4 SA3 SA2 SA1 SA0

AEN (7/4C,11/1B,28/1B,28/3C)

IOW (7/4C,11/1C,28/3C)

R67 150

C60 22P

REFRESH (7/4C,28/3C)

IOR (7/4C,11/1C,28/3C)

R66 150

C59 22P

C670 1N

R753 100

FAST (7/5C,10/1C)

+5V

G2

100MHZ

Q1

C2 100N

R84 51

100MHZ (7/7C)

R56 10K

IOCHRY (11/1B)

IRQ7 (11/1C)

SBHE (11/1B)

IOCS16 (7/4C,11/1C,28/3C)

IRQ10 (7/4C,28/3C)

IRQ11 (7/4C,28/3C)

DACK5 (11/1C)

DRQ5 (11/1C)

DIG_CLK_1 (10/4A)

TRIGIN (7/8C)

SDRAM_ENA (7/8B)

RESERV (7/8C,28/3D)

V1 BAV99

D3 74LVT14DB

TRIGIN

R53 221

R13 10K

R14 10K

R96 1K

R94 1K

R95 1K

R11 10K

R12 10K

X35

R779 10K

R748 10K

DIVRES (22/2A)

R747 680

X29 X29 X29 X29 X29

BOUNDARY SCAN

X29 X29 X29 X29 X29

TOP VIEW

D7 EPF10K10TC-4

SD0 SD1 SD2 SD3 SD4 SD5 SD6 SD7 SD8 SD9 SD10 SD11 SD12 SD13 SD14 SD15

DO D1 D2 D3 D4 D5 D6 D7 D8 D9 D10 D11 D12 D13 D14 D15

SA0 SA1 SA10 SA11 SA12 SA13 SA14 SA15

AO A1 A10 A11 A12 A13 A14 A15

CS NCS NCE NSTATUS CONFDONE CEO

IOW IOR IOCS16 DIGRESET

IOWR IORD IOCS16 NCONFIG

IRQ10 IRQ11 AEN REFR

OSCCLK DCLK CLK100 TRIGIN

SDRAM_ENA RESERV2 RESERV3 RESERV4 RESERV5 RESERV6

ACK MSEL0 MSEL1

TDI TMS TCK TDO

AOUT0 AOUT1 AOUT2 AOUT3 AOUT4 AOUT5 AOUT6 AOUT7 AOUT8 AOUT9 AOUT10 AOUT11 AOUT12 AOUT13 AOUT14 AOUT15 AOUT16 AOUT17 AOUT18 AOUT19 AOUT20 AOUT21 AOUT22 AOUT23

REQ OPC0 OPC1 CONREADY

RUN TON END

MUX UPDA FAST /FAST SEQRESERV TRIGRESERV CLKRESERV CMDRESERV

READ DI READ DQ WRITE DI WRITE DQ SEQCLK

DI1 DO1 RD1 WR1 CLK1

DI2 DO2 RD2 WR2 CLK2

EEDATA EECLK WREN LED0 LED1 LED2

R716 10K

R717 10K

R718 10K

R719 10K

R712 10K

R714 10K

R713 10K

UPDA (7/8C)

SLOW (10/1B)

FAST (7/3C,10/1C)

READDI (9/4A)

READDQ (8/4A)

WRITEDI (9/1A)

WRITEDQ (8/1A)

IAIDI (18/1C)

IAIDO (18/1E)

IAIRD (18/1D)

IAIWR (18/1D)

IAICLK (18/1E)

IGIDI (18/4C)

IGIDO (18/4E)

IGIRD (18/4D)

IGIWR (18/4D)

IGICLK (18/4E)

WREN (18/1C)

R54 10K

R55 10K

+3.3V

R723 470

R52 680

R51 680

R50 680

R17 10K

R664 10K

R16 10K

LED BOARD CONNECTOR

X30 X30 X30 X30 X30 X30 X30 X30 X30 X30

D2 EPM7128SQC100-7

SEQRESERV SADR0 SADR1 SADR2 SADR3 SADR4 SADR5 SADR6 SADR7 SADR8 SADR9 SADR10 SADR11 SADR12 SADR13 SADR14 SADR15 SADR16 SADR17 SADR18 SADR19 SADR20 SADR21 SADR22 SADR23

REQ REQCO REQC1 READY RESIN1 RUN TON END TRIGRESERV

CLKSEL CLK1 CLK2 CLK CLKRESERV SEQCLK TDI TMS TCK TDO

R2 10K +3.3V +3.3V R15 10K

(10/4A) (7/3D) (10/3D) DIG_CLK_2 100MHZ SRCLK6

R19 10K +3.3V

R750 680 SINGLE_CLK (10/1B)

R1 10K +5V

R751 10K +5V

ADR=010B=2

D1 X24164S8

SCL TEST SDA A0 A1 A2

X31 X31 X31 X31 X31

BOUNDARY SCAN

X31 X31 X31 X31 X31

TOP VIEW

BSCAN (28/8E)

SEQ_TCK SEQ_TDO SEQ_TMS SEQ_TDI

MUX DS WE RAS CAS

P24 P25 P34

SRADR0 SRADR1 SRADR2 SRADR3 SRADR4 SRADR5 SRADR6 SRADR7 SRADR8 SRADR9 SRADR10 SRADR11 SRADR12 SRADR13 SRADR14

ADROUT0 ADROUT1 ADROUT2 ADROUT3 ADROUT4 ADROUT5 ADROUT6 ADROUT7 ADROUT8 ADROUT9 ADROUT10 ADROUT11 ADROUT12 ADROUT13 ADROUT14 ADROUT15

BA1 BA0

+3.3V

R715 10K

SDRAM_ENA (7/4D)

SDRAM_ENA RESERV2 RESERV3 RESET RESERV5 RESERV6 RESERV7 RESERV8 RESERV9 TRIGIN RESERV11 RESERV12 SD_CS DD2 RD2 RESERV16 ENAWR

RES2 RES3 RES5 RES6 RES10

R41 10K +3.3V

DIGRESET (7/2A,7/4C,28/3C)

R76 10K +3.3V

UPDA (7/5C)

TRIGIN (7/3D)

P23

SD_CS (8/1C,9/1C)

RESERV (7/3D,28/3D)

SRADR0 SRADR2 SRADR5 SRADR7 SRADR15

SRADR (7/8B,8/1D,9/1D)

ENAWR (8/1A,9/1A)

RESET CLKOUT

R29 10K +3.3V

R780 10K +3.3V

R83 10K 51

SRCLK (10/1C,10/1E)

Bindende Angaben ueber Varianten, Trimmwerte, Bauteile und nicht bestueckte Bauteile siehe SA.

FOR BINDING INFORMATION ON MODELS, TRIMMING AND COMPONENTS VALUES AND NONFITTED COMPONENTS SEE PARTS LIST

ACHTUNG: EGB !
ELEKTROSTATISCH GEFAEHRDETE BAUELEMENTE ERFORDERN EINE BESONDERE HANDHABUNG.
ATTENTION ESD !
ELECTROSTATIC SENSITIVE DEVICES REQUIRE A SPECIAL HANDLING

C15 100N +5V

C17 100N +3.3V

D8 74HCT688T

D3 74LVT14DB

C4 C5 C6 C7 C8 C9 100N +3.3V

C10 C11 C12 C13 C14 100N +5V

C16 100N +5V

D7 EPF10K10TC-4

VCCIO VCCINT GND

D2 EPM7128SQC100-7

VCCIO VCCINT GND

D1 X24164S8

06.06				1GPK	DATUM	NAME
				BEARB.		SR
				GEPR.		SR
				NORM		
				PLOTT	00-09-06	SCHWAIGE

BENENNUNG

IQ ANALOG/DIGITAL UNIT

IQ ANALOG/DIGITAL UNIT

TOP/DIGITAL_UNIT_4/DIGITAL_UNIT.1

AEND. IND.	AENDERUNGS-MITTEILUNG	DATUM	NAME

ROHDE&SCHWARZ

ZEICHN.-NR. 1110.2532.01 S

BLATT-NR. 7 +

ZU GERAET AMIQ

REG.I.V. 1110.2003

ERSTE Z. 1110.2003.01

DATA (7/1A,7/8A,9/1A,11/1A,28/1A)
ENAWR (7/8D,9/1A)
WRITEDQ (7/5D)
SRSTROBE (7/8A,9/3A)
READDQ (7/5D)
+3.3V
R721 10K
R18 10K
D11 74LVT16374A
D12 74LVT16374A
D13 74LVT16244BDL
SD0 SD1 SD2 SD3 SD4 SD5 SD6 SD7
SD8 SD9 SD10 SD11 SD12 SD13 SD14 SD15
DQ0 DQ1 DQ2 DQ3 DQ4 DQ5 DQ6 DQ7
DQ8 DQ9 DQ10 DQ11 DQ12 DQ13 DQ14 DQ15
LDQ0 LDQ1 LDQ2 LDQ3 LDQ4 LDQ5 LDQ6 LDQ7
LDQ8 LDQ9 LDQ10 LDQ11 LDQ12 LDQ13 LDQ14 LDQ15

SRMUX (7/8A,9/5A)
LOW: A -> 1B
HIGH: A -> 2B
R23 10K
D14 SN74CBT16233DL
SEL0 TEST0 SEL1 TEST1
MUX 1B 2B 0A (1) (2) (3) (4) (5) (6) (7) (8) (9) (10) (11) (12) (13) (14) (15) (16)
LDQ15 LDQ0 LDQ14 LDQ1 LDQ13 LDQ2 LDQ12 LDQ3 LDQ11 LDQ4 LDQ10 LDQ5 LDQ9 LDQ6 LDQ8 LDQ7
DQ15 DQ0 DQ14 DQ1 DQ13 DQ2 DQ12 DQ3 DQ11 DQ4 DQ10 DQ5 DQ9 DQ6 DQ8 DQ7
TQ15 TQ0 TQ14 TQ1 TQ13 TQ2 TQ12 TQ3 TQ11 TQ4 TQ10 TQ5 TQ9 TQ6 TQ8 TQ7

QDATA (9/8C,15/1A)
R777 10K
D104 74LVT574DB
DIG_OUT_EN (6/1D,6/7B,24/4E)
R537 100
R772 56R
R771 56R
D103 74LVT574DB
R769 56R
R770 56R
SRCLK3 (10/3D,15/1A)
X39
ZU/TO DIGITAL OUTPUT (AMIQ-B3)

+3.3V
R720 10K
SRWE (7/8A,9/1C)
SRCAS (7/8A,9/1C)
SRRAS (7/8A,9/1C)
SRCLK1 (10/3C)
SD_CS (7/8C,9/1C)
R20 10K
R21 10K
R22 10K
D10 UPD4564163G5-A80-9JF
WE CAS RAS CS CLK CLE DQML DQMU N.C. N.C.
SRADR14 SRADR15
SRADR (7/8B,7/8C,9/10)
SRADR0 SRADR1 SRADR2 SRADR3 SRADR4 SRADR5 SRADR6 SRADR7 SRADR8 SRADR9 SRADR10 SRADR11 SRADR12 SRADR13
A0 A1 A2 A3 A4 A5 A6 A7 A8 A9 A10 A11 A12 A13
DQ0 DQ1 DQ2 DQ3 DQ4 DQ5 DQ6 DQ7 DQ8 DQ9 DQ10 DQ11 DQ12 DQ13 DQ14 DQ15
SRADR12 = BA1
SRADR13 = BA0

Bindende Angaben ueber Varianten, Trimmwerte, Bauteile und nicht bestueckte Bauteile siehe SA.

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ACHTUNG: EGB !
ELEKTROSTATISCH GEFAEHRDETE BAUELEMENTE ERFORDERN EINE BESONDERE HANDHABUNG.
ATTENTION ESD !
ELECTROSTATIC SENSITIVE DEVICES REQUIRE A SPECIAL HANDLING

+3.3V C673 100N D103 74LVT574DB
+3.3V C447 100N D104 74LVT574DB

DIGITAL QDATA

+3.3V C29 C26 C27 C28 C672 100U C22 C21 C23 C24 C25 C20 C18 100N
D10 UPD4564163G5-A80-9JF
D11 74LVT16374A
D12 74LVT16374A
D13 74LVT16244BDL
+5V C19 43 100N
D14 SN74CBT16233DL

AEND. IND.	AENDERUNGS-MITTEILUNG	DATUM	NAME
06.06			

	DATUM	NAME
1GPK		
BEARB.		SR
GEPR.		SR
NORM		
PLOTT	00-09-06	SCHWAIGE

BENENNUNG
IQ ANALOG/DIGITAL UNIT
IQ ANALOG/DIGITAL UNIT
TOP/DIGITAL_UNIT_4/DIGITAL_UNIT.2

ROHDE&SCHWARZ
ZEICHN.-NR. 1110.2532.01 S
BLATT-NR. 8 +
ZU GERAET AMIQ
REG.I.V. 1110.2003
ERSTE Z. 1110.2003.01

DATA (7/1A,7/8A,8/1A,11/1A,28/1A)
ENAWR (7/8D,8/1A)
WRITEDI (7/5D)
SRSTROBE (7/8A,8/3A)
READDI (7/5C)
+3.3V
R722 10K
R25 10K
D21 74LVT16374A
D22 74LVT16374A
D23 74LVT16244BDL
SD0 SD1 SD2 SD3 SD4 SD5 SD6 SD7 SD8 SD9 SD10 SD11 SD12 SD13 SD14 SD15
DI0 DI1 DI2 DI3 DI4 DI5 DI6 DI7 DI8 DI9 DI10 DI11 DI12 DI13 DI14 DI15
LDI0 LDI1 LDI2 LDI3 LDI4 LDI5 LDI6 LDI7 LDI8 LDI9 LDI10 LDI11 LDI12 LDI13 LDI14 LDI15

SRWE (7/8A,8/1C)
SRCAS (7/8A,8/1C)
SRRAS (7/8A,8/1C)
SRCLK2 (10/3E)
SD_CS (7/8C,8/1C)
R28 R27 R26 10K
+3.3V
SRADR (7/8B,7/8C,8/1D)
D20 UPD4564163G5-A80-9JF
WE CAS RAS CS CLK CLE DQML DQMU
N.C. N.C.
SRADR0 SRADR1 SRADR2 SRADR3 SRADR4 SRADR5 SRADR6 SRADR7 SRADR8 SRADR9 SRADR10 SRADR11 SRADR12 SRADR13
SRADR14 SRADR15
A0 A1 A2 A3 A4 A5 A6 A7 A8 A9 A10 A11 A12 A13
DQ0 DQ1 DQ2 DQ3 DQ4 DQ5 DQ6 DQ7 DQ8 DQ9 DQ10 DQ11 DQ12 DQ13 DQ14 DQ15
SRADR12 = BA1
SRADR13 = BA0

SRMUX (7/8A,8/5A)
LOW: A -> 1B
HIGH: A -> 2B
R24 10K
D24 SN74CBT16233DL
SEL0 TEST0 SEL1 TEST1
MUX (1) (2) (3) (4) (5) (6) (7) (8) (9) (10) (11) (12) (13) (14) (15) (16)
TI0 TI1 TI2 TI3 TI4 TI5 TI6 TI7 TI8 TI9 TI10 TI11 TI12 TI13 TI14 TI15

IDATA (12/1A)
D105 74LVT574DB
D106 74LVT574DB
D26 74LVT574DB
R778 10K
R72 10K
DIG_OUT_CLK (10/4B)
SRCLK4 (10/3D,12/1A)
SRCLK5 (10/3C)
R773 R774 R775 R776 56R
X40
ZU/TO DIGITAL OUTPUT (AMIQ-B3)
TQ0 TQ1 TQ2 TQ3
TRIGOUT2 TRIGOUT3 TRIGOUT6 TRIGOUT7 TRIGOUT0 TRIGOUT1 TRIGOUT4 TRIGOUT5
TRIGOUT (28/8C)
QDATA (8/8A,15/1A)

C40 C41 C42 C43 C35 C34 C33 C32 C31 C36 C38 C61 C37 C674 C675 100N
D20 UPD4564163G5-A80-9JF
D21 74LVT16374A
D22 74LVT16374A
D23 74LVT16244BDL
D26 74LVT574DB
D24 SN74CBT16233DL
D105 74LVT574DB
D106 74LVT574DB
VCC VCCQ VSS VSSQ

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DIGITAL IDATA

06.06				1GPK	DATUM	NAME	BENENNUNG	
				BEARB.		SR	IQ ANALOG/DIGITAL UNIT	
				GEPR.		SR	IQ ANALOG/DIGITAL UNIT	
				NORM			TOP/DIGITAL_UNIT_4/DIGITAL_UNIT.3	
				PLOTT	00-09-06	SCHWAIGE		
AEND. IND.	AENDERUNGS-MITTEILUNG	DATUM	NAME	ROHDE&SCHWARZ			ZEICHN.-NR. 1110.2532.01 S	BLATT-NR. 9 +
				ZU GERAET AMIQ			REG.I.V. 1110.2003	ERSTE Z. 1110.2003.01

CLOCK DISTRIBUTION

SKEW ADJ

SYN_OUT_CLK (6/10,6/7B,22/8A) — C671 10N, R733 7.5K, R759 10K

D41 74ABT16244 (EN1)
- R725 27.4 → DIG_CLK_1 (7/3D)
- R726 27.4 → DIG_CLK_2 (7/7C)
- R226 10K

R237 10K (+5V-CLK)

SLOW (7/5C) — R459 10K (+5V-CLK)

D41 74ABT16244 (EN2)
- R746 200
- P1

R283 10K (+5V-CLK)

D102 74ABT125D
- SINGLE_CLK (7/6D) — P29
- R287 2.2K

R463 10K (+5V-CLK)

D41 74ABT16244 (EN3)
- FAST (7/3C,7/5C)
- SRCLK (7/8D,10/1E)
- R460 51 → DIG_OUT_CLK (9/8A)
- R727 51 → MARKER_CLK (28/5B)
- R728 51 → BER_CLK (28/2D)

D17 74ABT16244 (EN1)
- R87 75 → SRCLK1 (8/1C) — to SDRAM Q
- R86 75
- R88 51 → SRCLK5 (9/7C) — to TRIGGER OUT LATCH
- R736 75

D17 74ABT16244 (EN2)
- R91 51 → SRCLK3 (8/7C,15/1A) — to DATA LATCH Q
- R90 51 → SRCLK4 (9/7B,12/1A) — to DATA LATCH I

D17 74ABT16244 (EN3)
- R85 51 → SRCLK6 (7/7C) — to CONTROLLER

D17 74ABT16244 (EN4)
- R89 75 → SRCLK2 (9/1C) — to SDRAM I
- R93 75
- R752 51
- R92 10K
- R80 10K
- R735 75

SRCLK (7/8D,10/1C)

DAC_CLK (P1) → R756 50R

SKEW_TUNE (6/10,6/7C,21/3D) 0...+10V

-12VA — R538 10K — V71 BAS216 — C442 1U 25V (-0,7V)

+12VA — R539 2K — V76 BZX284B10 — C402 1U 25V (+10V)

R647 24.3 — C618 56P — R640 100K — V72 BB147 — V74 BB147 (**)

R641 100K — C621 100N — V73 BB147 — V75 BB147 (**)

R646 100K — C619 56P

R724 24.3

R760 10

** = NOT FITTED

+5V-CLK — R541 10K

D41 74ABT16244 (EN4)
- R729 27.4 → I_DAC_CLK (12/1B)
- R730 27.4 → Q_DAC_CLK (15/1B)

R279 10K

+5V-CLK — R462 10K

D102 74ABT125D — D102 74ABT125D — R706 10K

+12VA — R731 10 1W — R732 10 1W — D84 LT1117CS (IN, OUT, OUT, ADJ/COM) — C72 10U 25V — R542 301 — R225 100 — C401 47U 10V

+5V-CLK

C496 100N, C497 100N, C498 100N, C495 100N — D41 74ABT16244

C627 100N, C73 100N, C626 100N, C620 100N — D17 74ABT16244

L25 1U, L34 1U

D102 74ABT125D — C665 100N

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AEND. IND.	AENDERUNGS-MITTEILUNG	DATUM	NAME
06.06			

	DATUM	NAME
1GPK		
BEARB.		SR
GEPR.		SR
NORM		
PLOTT	00-09-06	SCHWAIGE

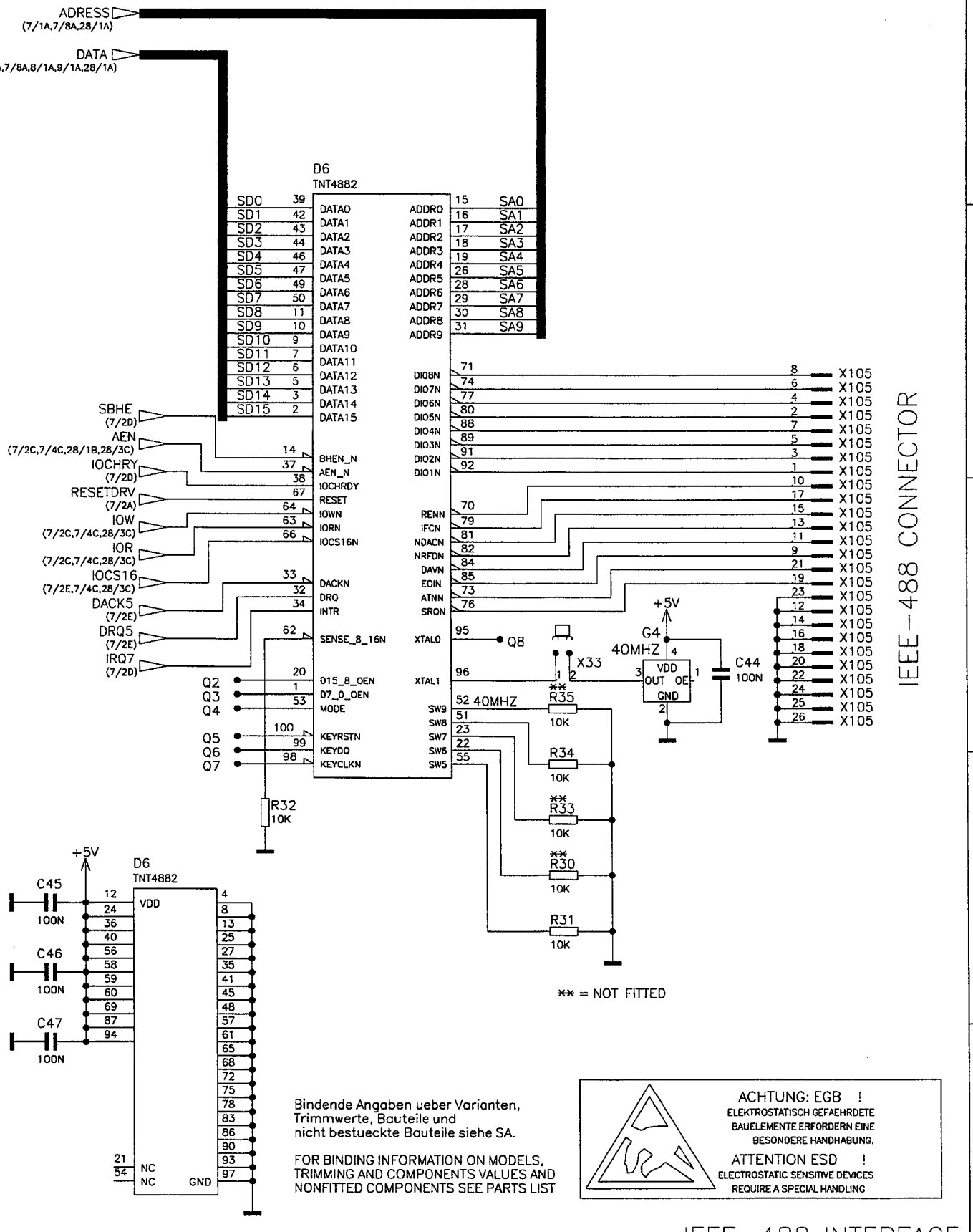
BENENNUNG: IQ ANALOG/DIGITAL UNIT
IQ ANALOG/DIGITAL UNIT
TOP/DIGITAL_UNIT_4/DIGITAL_UNIT.4

ROHDE&SCHWARZ

ZEICHN.-NR. 1110.2532.01 S

BLATT-NR. 10 +

ZU GERAET AMIQ | REG.I.V. 1110.2003 | ERSTE Z. 1110.2003.01



06.06				1GPK	DATUM	NAME	BENENNUNG
				BEARB.		SR	IQ ANALOG/DIGITAL UNIT
				GEPR.		SR	IQ ANALOG/DIGITAL UNIT
				NORM			TOP/DIGITAL_UNIT_4/DIGITAL_UNIT.5
				PLOTT	00-09-06	SCHWAIGE	
				ROHDE&SCHWARZ			ZEICHN.-NR. 1110.2532.01 S
							BLATT-NR. 11 +
AEND. IND.	AENDERUNGS-MITTEILUNG	DATUM	NAME	ZU GERAET AMIQ			REG.I.V. 1110.2003 ERSTE Z. 1110.2003.01

IDATA (9/8A)
SRCLK4 (9/7B,10/3D)
I_DAC_CLK (10/8A)
R74 10K
R79 10K
R758 150
**C667 1P
D32 74ABT574D
D33 74ABT574D
TI15 TI14 TI13 TI12 TI11 TI10 TI9 TI8
TI7 TI6 TI5 TI4 TI3 TI2 TI1 TI0
R495 R496 R497 R498 R499 R500 R506 R505
R504 R503 R502 R507 R501 R508
51
C198 C197 C196 C195 C194 C193 C199 C200
C201 C202 C203 C204 C205 C206
10P
R426 0
C243 1P
P9
D52 HI5741BIB
D50 AD9764AR
D13_MSB D12 D11 D10 D9 D8 D7 D6 D5 D4 D3 D2 D1 D0_LSB
N.C. SLEEP REFLO REFIO FS_ADJ COMP1 IOUT_B COMP2 IOUT_A CLK
REF_OUT CTRL_OUT CTRL_IN R_SET IOUT IOUT CLK
-1,20V I_AMPL_ADJ1 (26/4A)
+1,20V I_AMPL_ADJ2 (26/4A)
C383 100N -5V-IDAC
R332 887 0.1%
R394 0
C207 15P
C208 18P
C384 100N +5V-IDAC
C396 100N
C397 100N
R482 2K 0.1%
R395 150 0.1%
R396 0
R402 475 0.1%
R403 475 0.1%
R405 301 0.1%
R404 301 0.1%
R763 0
R764 0
**R762 0
**R761 0
R544 C298 100K 1P
R423 150 0.1%
C133 100N
R152 R151 75 0.1%
C265 1P
R150 R149 75 0.1%
C297 1P
R422 150 0.1%
N46 MAX4108ESA
C135 100N
R294 51.1
C301 1P
P22
R545 C299 100K 1P
R424 150 0.1%
C139 100N
R156 R155 75 0.1%
C266 1P
R153 R154 75 0.1%
C300 1P
R425 150 0.1%
N47 MAX4108ESA
C140 100N
I_OFFSET_ADJ1 (26/4B)
R133 3.01K 0.1%
C676 22P
R781 909
R427 301 0.1%
R490 301 0.1%
C625 100N
C624 100N
N13 MAX4108ESA
max +/-1V
R295 100 0.1%
R296 100 0.1%
R570 10K 0.1%
**R571 10K 0.1%
C97 10N
X14 X14 X14 X14
I_DAC_OUT (13/1B)
X5 SMB-ST
DIAG_IDAC (27/2B)
D83 LT1117CS
IN OUT ADJ/COM
R654 39 1W
+12VA
C600 10U 25V
R683 100
R684 301
C606 47U 10V
+5VDAC
N50 UA7905UC
R686 R685 5.6 1W
-12VA
C601 10U 25V
C607 47U 10V
-5VDAC
N52 UA7805UC
R666 R665 5.6 1W
C598 10U 25V
C604 47U 10V
+5VI
N32 UA7905UC
R660 R659 5.6 1W
C599 10U 25V
C605 47U 10V
+5V
C398 100N
L22 2.2U
D33 74ABT574D
D32 74ABT574D
C63 100N
C62 100N
L15 L17 L16 L87 625R(Z)
L18 L19 L88 625R(Z)
C246 47U 10V
C247 47U 10V
C385 C387 C386 C388 C389 100N
DVCC AVEE DGND AGND ARTN
D52 HI5741BIB
D50 AD9764AR
L20 2.2U
C390 C248 C392 C395 100N
47U 10V
N46 MAX4108ESA
N47 MAX4108ESA
N13 MAX4108ESA
C391 C249 C393 C394 100N
L21 2.2U
-5VI

I-CHANNEL DAC

** = NOT FITTED

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AEND. IND.	AENDERUNGS-MITTEILUNG	DATUM	NAME
06.06			

	DATUM	NAME
1GPK		
BEARB.		SR
GEPR.		SR
NORM		
PLOTT	00-09-06	SCHWAIGE

ROHDE&SCHWARZ

ZU GERAET AMIQ

BENENNUNG
IQ ANALOG/DIGITAL UNIT
IQ ANALOG/DIGITAL UNIT
TOP/ANALOG_UNIT_5/ANALOG_UNIT.1

ZEICHN.-NR. 1110.2532.01 S

BLATT-NR. 12 +

REG.I.V. 1110.2003

ERSTE Z. 1110.2003.01

FOLIEN DIESE SEITE BEHALTEN WIR UNS ALLE RECHTE VOR

I_FILT_EXT_OUT
R698 0
X12 SMB-ST
R576 10K
I_FILT_SENSE1 (25/2A)
C211 10P
R577 100K
K21
I_DAC_OUT (12/8C)
K22

C241
C190
L79
C376
L9
C189

I_FILT_EXT_IN
R699 0
X11 SMB-ST
R575 10K
I_FILT_SENSE2 (25/2C)
C210 10P
R574 100K
K25
R306 100 0.1%
R305 100 0.1%

C629 100N
N16 MAX4108ESA
C628 100N
max +/- 1V
R430 150 0.1%
R428 150 0.1%
R304 100 0.1%
R303 100 0.1%
R572 10K 0.1%
DIAG_IFILT_EXT (27/2B)
C98 10N
R573 10K 0.1%
K26
K27
I_FILT_OUT (14/1B)

FILTER 1
fg = 25MHz

C315 1P
C213 4.7P
R103 475 0.1%
C190 3-10P-1P
R408 475 0.1%
C680 2.2P
C314 2.7P
R410 301 0.1%
R411 301 0.1%
X15 SMB-ST
R309 100 0.1%
R310 100 0.1%
R458 301 0.1%
R457 301 0.1%
X13 SMB-ST
C308 3.3P L1 330NH
C267 15P L2 330NH
C74 10P L3 330NH
C278 100N
R259 121
C160 100N
N17 MAX4108ESA
C143 100N
R82 1.5K
R350 137 0.1%
C556 82P
C75 4.7P
C163 100N
N18 MAX4108ESA
C151 100N
C189 10P-1P
L4 330NH
L79 389NH
R299 100 0.1%
R300 100 0.1%
L52 5.6U
K28
X9 SMB-ST
K23
C292 47P
C212 10P
C368 150P
C309 1P
C369 150P
C310 1P
C293 47P
C313 1P
R308 100 0.1%
R307 100 0.1%

C241 70P5-5P5
R409 475 0.1%
C305 1P
R104 475 0.1%
C70 33P
R102 27.4K 0.1%
C209 10P
R456 301 0.1%
R455 301 0.1%
R406 475 0.1%
R106 475 0.1%
C126 8.2P
R407 475 0.1%
R298 100 0.1%
R297 100 0.1%
X6 SMB-ST
R558 619
C277 100N
C168 100N
R301 100 0.1%
R302 100 0.1%
K29

FILTER 2
fg = 2,5MHz

X8 SMB-ST
R400 825 0.1%
C360 10P L11 15UH
C87 27P L12 15UH
C273 18P L77 12UH
C276 100N
R632 33.2
C171 100N
N15 MAX4108ESA
C156 100N
R623 18.2K
R134 887 0.1%
C376 18P-2P
C589 100P
C93 10P
C155 100N
L9 33U
K24
R109 234 0.1%
C586 120P
C306 1P
C366 150P
C90 180P
C367 150P
C89 180P
C585 120P
C303 1P
R108 234 0.1%

+5VI
L94 2.2U
C261 47U 10V
C262 47U 10V
L93 2.2U
-5VI
+5V-IF
C404 100N L27 2.2U
C406 100N L29 2.2U
C410 100N L33 2.2U
C399 100N L23 2.2U
C408 100N L31 2.2U
N18 MAX4108ESA
N17 MAX4108ESA
N14 MAX4108ESA
N15 MAX4108ESA
N16 MAX4108ESA
L26 2.2U
L28 2.2U
L32 2.2U
L24 2.2U
L30 2.2U
C403 100N
C405 100N
C409 100N
C400 100N
C407 100N

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** = NOT FITTED

I-CHANNEL FILTER

06.06				1GPK	DATUM	NAME	BENENNUNG
				BEARB.		SR	IQ ANALOG/DIGITAL UNIT
				GEPR.		SR	IQ ANALOG/DIGITAL UNIT
				NORM			
				PLOTT	00-09-06	SCHWAIGE	TOP/ANALOG_UNIT_5/ANALOG_UNIT.2
AEND. IND.	AENDERUNGS-MITTEILUNG	DATUM	NAME	ROHDE&SCHWARZ			ZEICHN.-NR. 1110.2532.01 S BLATT-NR. 13 +
				ZU GERAET AMIQ			REG.I.V. 1110.2003 ERSTE Z. 1110.2003.01

I-OUTPUT AMPLIFIER

P57

P58

OUTPUT AMPLIFIER

+5V-IPA

V47 SM6T6V8A

V23 BAS216

V24 BAS216

V46 SM6T6V8A

-5V-IPA

I_FILT_OUT (13/8B)

K30

N20 MAX4108ESA

R434 150 0.1%

C280 100N

C279 100N

K31

R644 100K

R344 100K 0.1%

R643 100K

R783 3.92K

C678 10P

R334 10

R642 100K

VAR GAIN AMPLIFIER

R312 100 0.1%

R311 100 0.1%

D56 AD835

R433 max +/- 2V

150 0.1%

C637 100N

C542 1N

C319 1P

I_OFFSET_ADJ2 (26/4D)

R469 10K

P56 EPRESS-L68

C543 1N

R546 1.21K

R431 150 0.1%

C318 1P

R633 5.11K

R432 118 0.1%

C638 100N

N21 MAX4108ESA

R579 10K 0.1%

DIAG_IAMPL_VAR (27/2B)

** R578 10K 0.1%

C99 10N

I_AMPL_VAR (26/4C)

R470 1K

R547 4.7K

P57

ATTENUATOR

0dB

20dB

40dB

R269 200 0.1%

R268 200 0.1%

R267 200 0.1%

R266 200 0.1%

K32

K33

K34

K35

K36

K37

R435 150 0.1%

R461 301 0.1%

R351 221 0.1%

R560 274 0.1%

R637 100K

R692 100K

R338 240 0.1%

R337 240 0.1%

R336 240 0.1%

R561 274 0.1%

R112 30.1K

R354 221 0.1%

R353 221 0.1%

R352 221 0.1%

R355 221 0.1%

R452 12.1K

I_OUT_DIAG (14/6C)

I_OUTPUT

I_OUTPUT

R275 10K

R274 10K

C214 1P

I_OUT_SENSE (24/2D)

R710 2.43K 0.1%

R286 1K 0.1%

N55 OP297GS

R694 10K 0.1%

C237 10N

DIAG_IPA_HF (27/2C)

I_OUT_DIAG (14/8A)

R239 100

C612 100N

V66 HSMS2805

R690 10K

R696 100K

C616 1N

R754 20K

R581 10K 0.1%

DIAG_IPA (27/2C)

** R580 10K 0.1%

C100 10N

+2.5V (14/4E,14/4F,14/5E)

R590 10K 0.1%

R589 10K 0.1%

R645 100

C544 1N

R650 100

C547 1N

R591 10K 0.1%

R588 10K 0.1%

D34 74LVC86DB

R168 10K

P58

DIAG_I/Q_PHASE (27/2C)

C103 10N

Q_OUT_DIAG (17/5D,17/8A)

R584 1K

R585 10

+2.5V (14/4F,14/5E,14/7D)

REF2.5V (27/4C,27/8D)

N54 NE5534D

C102 22P

C101 100N

+2.5V (14/4E,14/4F,14/7D)

R170 10K

D34 74LVC86DB

R169 10K

L35 2.2U

L36 2.2U

+5VI

-5VI

C250 47U 10V

C251 47U 10V

C412 100N

C413 100N

C415 100N

C411 100N

C414 100N

C416 100N

D56 AD835

N20 MAX4108ESA

N21 MAX4108ESA

+5V-IPA

-5V-IPA

C240 100N

+5VA

N54 NE5534D

+2.5V (14/4E,14/5E,14/7D)

D34 74LVC86DB

C419 100N

Bindende Angaben ueber Varianten, Trimmwerte, Bauteile und nicht bestueckte Bauteile siehe SA.

FOR BINDING INFORMATION ON MODELS, TRIMMING AND COMPONENTS VALUES AND NONFITTED COMPONENTS SEE PARTS LIST

** = NOT FITTED

ACHTUNG: EGB !
ELEKTROSTATISCH GEFAEHRDETE BAUELEMENTE ERFORDERN EINE BESONDERE HANDHABUNG.
ATTENTION ESD !
ELECTROSTATIC SENSITIVE DEVICES REQUIRE A SPECIAL HANDLING

AEND. IND.	AENDERUNGS-MITTEILUNG	DATUM	NAME
06.06			

	DATUM	NAME
1GPK		
BEARB.		SR
GEPR.		SR
NORM		
PLOTT	00-09-06	SCHWAIGE

BENENNUNG

IQ ANALOG/DIGITAL UNIT

IQ ANALOG/DIGITAL UNIT

TOP/ANALOG_UNIT_5/ANALOG_UNIT.3

ROHDE&SCHWARZ

ZEICHN.-NR. 1110.2532.01 S

BLATT-NR. 14 +

ZU GERAET AMIQ

REG.I.V. 1110.2003

ERSTE Z. 1110.2003.01

QDATA (8/8A,9/8C)
SRCLK3 (8/7C,10/3D)
Q_DAC_CLK (10/8A)

D30 74ABT574D
D31 74ABT574D
D51 AD9764AR
D53 HI5741BIB

-1,20V Q_AMPL_ADJ1 (26/8A)
+1,20V Q_AMPL_ADJ2 (26/8A)
-5V-QDAC
+5V-QDAC
Q_OFFSET_ADJ1 (26/8B)
Q_DAC_OUT (16/18)
DIAG_QDAC (27/28)

N48 MAX4108ESA
N49 MAX4108ESA
N23 MAX4108ESA
N53 UA7805UC
N51 UA7905UC

max +/-1V

+5V
+5VQ
-5VQ
+5VDAC
-5VDAC
+12VA
-12VA

X16 SMB-ST
X22

** = NOT FITTED

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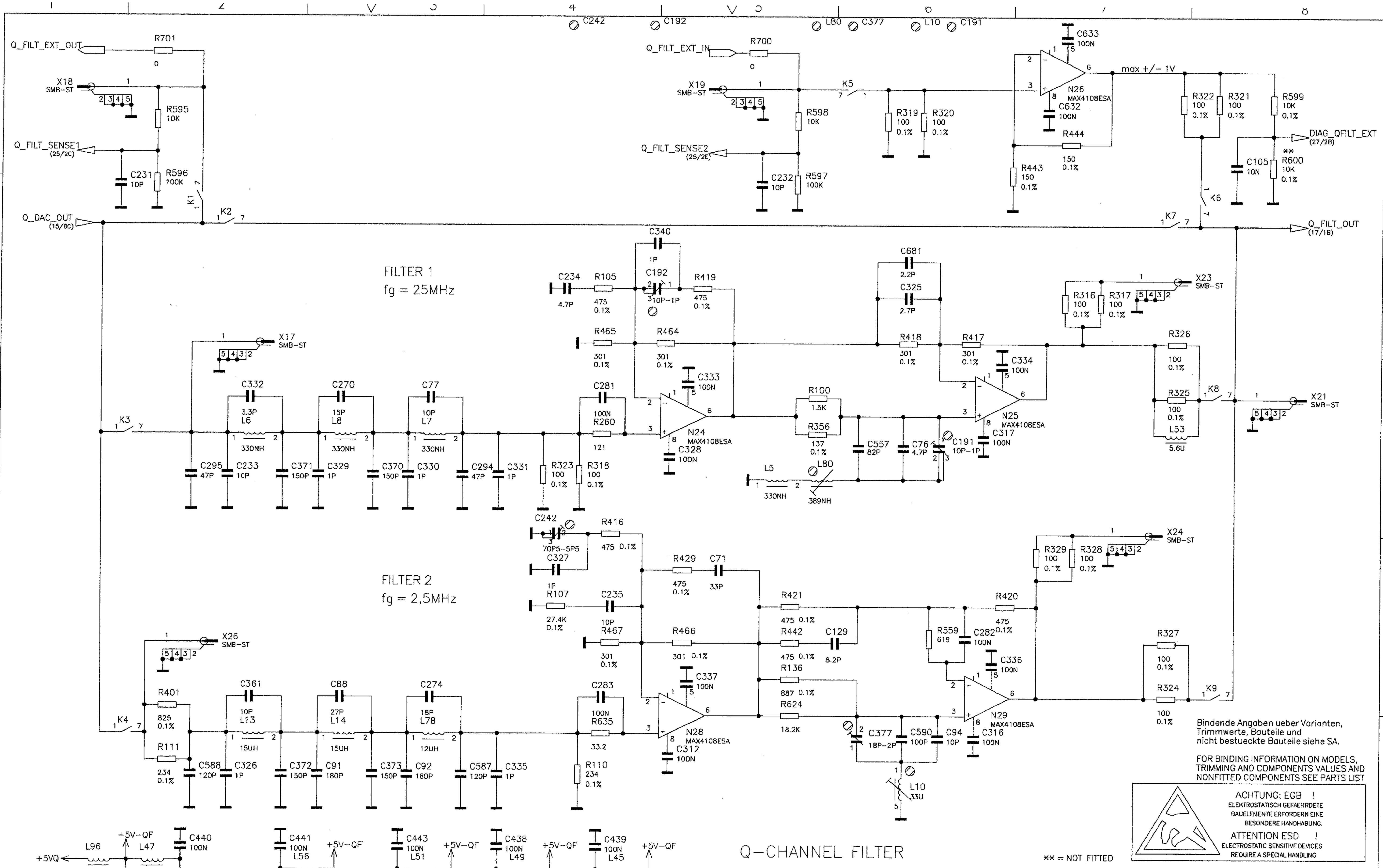
ELECTROSTATIC SENSITIVE DEVICES REQUIRE A SPECIAL HANDLING

Q-CHANNEL DAC

06.06				1GPK	DATUM	NAME	BENENNUNG
				BEARB.		SR	IQ ANALOG/DIGITAL UNIT
				GEPR.		SR	IQ ANALOG/DIGITAL UNIT
				NORM			TOP/ANALOG_UNIT_5/ANALOG_UNIT.4
				PLOTT	00-09-06	SCHWAIGE	
AEND. IND.	AENDERUNGS-MITTEILUNG	DATUM	NAME	ROHDE&SCHWARZ			ZEICHN.-NR. 1110.2532.01 S
				ZU GERAET AMIQ			REG.I.V. 1110.2003 ERSTE Z. 1110.2003.01

BLATT-NR. 15 +



Bindende Angaben ueber Varianten, Trimmwerte, Bauteile und nicht bestueckte Bauteile siehe SA.

FOR BINDING INFORMATION ON MODELS, TRIMMING AND COMPONENTS VALUES AND NONFITTED COMPONENTS SEE PARTS LIST

ACHTUNG: EGB !
ELEKTROSTATISCH GEFAEHRDETE BAUELEMENTE ERFORDERN EINE BESONDERE HANDHABUNG.

ATTENTION ESD !
ELECTROSTATIC SENSITIVE DEVICES REQUIRE A SPECIAL HANDLING

Q-CHANNEL FILTER

** = NOT FITTED

06.06		1GPK	DATUM	NAME	BENENNUNG
		BEARB.		SR	IQ ANALOG/DIGITAL UNIT
		GEPR.		SR	IQ ANALOG/DIGITAL UNIT
		NORM			
		PLOTT	00-09-06	SCHWAIGE	TOP/ANALOG_UNIT_5/ANALOG_UNIT.5
		ROHDE&SCHWARZ			ZEICHN.-NR. 1110.2532.01 S — BLATT-NR. 16 +
AEND. IND.	AENDERUNGS-MITTEILUNG	DATUM	NAME	ZU GERAET AMIQ	REG.I.V. 1110.2003 — ERSTE Z. 1110.2003.01

OUTPUT AMPLIFIER

P73

+5V-QPA

V49 SM6T6V8A

V26 BAS216

R448 150 0.1%

C338 100N

N31 MAX4108ESA

C339 100N

V25 BAS216

V48 SM6T6V8A

-5V-QPA

0dB

R271 200 0.1%

R272 200 0.1%

R273 200 0.1%

R270 200 0.1%

K12

K13

ATTENUATOR

20dB

40dB

K14

K15

K16

K17

R449 150 0.1%

R468 301 0.1%

R357 221 0.1%

R563 274 0.1%

R638 100K

R693 100K

Q_FILT_OUT (16/8B)

K10

K11

R335 10

R649 100K

R651 100K

R346 100K 0.1%

R648 100K

R784 3.92K

C679 10P

R339 240 0.1%

R340 240 0.1%

R341 240 0.1%

R562 274 0.1%

R113 30.1K

R358 221 0.1%

R359 221 0.1%

R360 221 0.1%

R361 221 0.1%

R453 12.1K

R276 10K

R277 10K

C236 1P

Q_OUT_DIAG (14/6E,17/5D)

Q_OUTPUT

Q_OUT_SENSE (24/2B)

VAR GAIN AMPLIFIER

R331 100 0.1%

R330 100 0.1%

D57 AD835

C546 1N

C342 1P

R471 10K

Q_OFFSET_ADJ2 (26/8D)

P74

C545 1N

R550 1.21K

R445 150 0.1%

C341 1P

R634 5.11K

R446 118 0.1%

R447 150 0.1% max +/- 2V

C640 100N

N30 MAX4108ESA

C639 100N

R601 10K 0.1%

R602 10K 0.1% **

C106 10N

DIAG_QAMPL_VAR (27/2B)

R472 1K

Q_AMPL_VAR (26/8C)

P73

R551 4.7K

R742 2.43K 0.1%

R707 1K 0.1%

N55 OP297GS

R695 10K 0.1%

DIAG_QPA_HF (27/2C)

C238 10N

Q_OUT_DIAG (14/6E,17/8A)

R689 100

C615 100N

V66 HSMS2805

R691 10K

R697 100K

C617 1N

R755 20K

R604 10K 0.1%

DIAG_QPA (27/2C)

R603 10K 0.1% **

C107 10N

C256 47U 10V

C450 100N

C457 100N

C455 100N

L57 2.2U

+5VQ

+5V-QPA

D57 AD835

N31 MAX4108ESA

N30 MAX4108ESA

L58 2.2U

-5VQ

-5V-QPA

C257 47U 10V

C454 100N

C453 100N

C451 100N

C614 100N

+5VA

N55 OP297GS

-5VDAC

C613 100N

Bindende Angaben ueber Varianten, Trimmwerte, Bauteile und nicht bestueckte Bauteile siehe SA.

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** = NOT FITTED

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ELEKTROSTATISCH GEFAEHRDETE BAUELEMENTE ERFORDERN EINE BESONDERE HANDHABUNG.
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Q-OUTPUT AMPLIFIER

06.06				1GPK	DATUM	NAME	BENENNUNG
				BEARB.		SR	IQ ANALOG/DIGITAL UNIT
				GEPR.		SR	IQ ANALOG/DIGITAL UNIT
				NORM			TOP/ANALOG_UNIT_5/ANALOG_UNIT.6
				PLOTT	00-09-06	SCHWAIGE	
AEND. IND.	AENDERUNGS-MITTEILUNG	DATUM	NAME	ROHDE&SCHWARZ			ZEICHN.-NR. 1110.2532.01 S
				ZU GERAET AMIQ			REG.I.V. 1110.2003 ERSTE Z. 1110.2003.01

BLATT-NR. 17 +

FOLIE BILDE UNTEN LINKS BEHALTEN WIR UNS ALLE RECHTE VOR

REFERENCE OSCILLATOR

P76 P75

+5V-REF V68 SM6T6V8A

R125 100
C464 100N
R263 470
R192 10K
R639 15K
V10 BSV52
V13 BAV99
R705 470
R165 220
C549 10N
R709 22.1
R711 33.2
C120 10N

REFIN

REFIN

0,5...2Veff
Ri = 50 Ohm
(7...20dBm)

REF_OUT_SEL (19/5E) H=VTCXO 10MHz L=REF FEEDTHROUGH

D94 74HC14T D94 74HC14T

REF_IN_10 (19/1A)
R523 51

D59 74ABT125D

VTCXO_OUT1 (19/8A)

R636 33.2
R652 270
C378 390P
L65 1U
C374 680P
L66 1U
C379 390P
C548 10N

REFOUT

REFOUT

>0.5V eff
1,2Vpp
into 50 Ohm

R189 10K
R191 10K
C643 100N
C463 100N
R81 10K
R190 10K
R214 10K

D94 74HC14T D59 74ABT125D

+5V-REF +5VA

R193 10K
R126 100
R124 100
R123 100
R122 100
R121 100
R582 100
R188 10K
R187 10K
R186 10K
R185 10K

X4

WREN (7/5D)
IAIDI (7/5D)
IAIRD (7/5D)
IAIWR (7/5D)
IAICLK (7/5D)
IAIDO (7/5D)

D19 74HC14T D18 74HC14T

PWRON_RESET (22/5D,23/2B,23/2D,24/2A,27/8C)
SER1_DATA_IN (21/1E)
SER1_READ N.C.
STROBE1 (19/2D,21/4C,21/5D,22/2C,27/2C) (27/8C)
STROBE1_DAC (21/1D)
SER1_CLK (19/2D,21/1D,21/4A,22/2C,27/2C) (27/5B,27/8C)
A/D_DATA (27/5B)

X3

IGIDI (7/5D)
IGIRD (7/5D)
IGIWR (7/5D)
IGICLK (7/5D)
IGIDO (7/5D)

R586 100
R181 10K
R120 100
R184 10K
R119 100
R194 10K
R118 100
R183 10K
R117 100
R182 10K
R583 100

D27 74HC14T D28 74HC14T

SER2_DATA_IN (26/1A)
SER2_READ (18/7D)
STROBE2 (23/2D,24/2D)
STROBE2_DAC (26/1A,26/5A)
SER2_CLK (18/7D,23/2E,24/2E,26/1A,26/5A)
BOARD_ID_DATA

LAYOUT REV.	BOARD ID MOD02	MOD03	MOD04
-03-	91 hex	———	———
-05-	89 hex	———	———
-06-	———	99 hex	9B hex

BOARD ID

99 hex (MOD03)
9B hex (MOD04)

+5VA

R179 10K
R180 10K MOD04
R174 10K
R175 10K
R178 10K
R177 10K MOD03
R172 10K
R757 10K
R176 10K
R173 10K

10011001

D54 74HCT165T

SER2_CLK (18/6E,23/2E,24/2E,26/1A,26/5A)
SER2_READ (18/6D)
ATT_CNTRL_DATA (24/4E)
OPT_ID0 (27/8D)
OPT_ID1 (27/8D)

SRG8 C3/→ G1(SHIFT) C2(LOAD) 3D 2D 3D

L64 1U C285 100N C345 1U 10V
L63 1U C284 100N C344 1U 10V

+12VA +12V-REF -12VA -12V-REF

+12V-REF

R278 39 1W
N6 LT1117CS
C183 10U 25V
R704 301
R703 100
C346 1U 10V

+5V-REF

+5VA +5V

C462 C461 C458 C459 C460 100N

D18 74HC14T D19 74HC14T D27 74HC14T D28 74HC14T D54 74HCT165T

** = not fitted

SERIAL CONTROL INTERFACE

ACHTUNG: EGB !
ELEKTROSTATISCH GEFAEHRDETE BAUELEMENTE ERFORDERN EINE BESONDERE HANDHABUNG.
ATTENTION ESD !
ELECTROSTATIC SENSITIVE DEVICES REQUIRE A SPECIAL HANDLING

Bindende Angaben ueber Varianten, Trimmwerte, Bauteile und nicht bestueckte Bauteile siehe SA.

FOR BINDING INFORMATION ON MODELS, TRIMMING AND COMPONENTS VALUES AND NONFITTED COMPONENTS SEE PARTS LIST

AEND. IND.	AENDERUNGS-MITTEILUNG	DATUM	NAME
06.06			

	DATUM	NAME
1GPK		
BEARB.		SR
GEPR.		SR
NORM		
PLOTT	00-09-06	SCHWAIGE

BENENNUNG

IQ ANALOG/DIGITAL UNIT

IQ ANALOG/DIGITAL UNIT

TOP/ANALOG_UNIT_5/ANALOG_UNIT.7

ROHDE&SCHWARZ

ZEICHN.-NR. 1110.2532.01 S

BLATT-NR. 18 +

ZU GERAET AMIQ

REG.I.V. 1110.2003

ERSTE Z. 1110.2003.01

REFERENCE OSCILLATOR

P36 P80 P77 P78

+5V-REF
R210 10K
R211 10K
D35 74AC74M
REF_IN_10 (18/5A)
R209 10K
R208 10K
C111 10N
R196 10K
N11 TL072ACD
R362 330K
C245 22P
R363 330K
C3 220N
V58 BAV70
R566 274
D35 74AC74M
VTCXO_OUT2 (19/8B)
R207 10K
R206 10K
C108 10N
R195 10K
N11 25V TL072ACD
R127 100
D40 DG419DY
DIAG_VTCXO_TUNE (27/2B)
0...2,5V
C109 10N
V8 BAS216
R204 10K
R205 10K
P79 0...5V
R451 2.2K
C420 2.2U **
R587 10 **
C110 10N
V51 BZX284B5V1
+5V-REF
L91 47U
C558 4.7U 25V
B1 VCTXO 10MHZ
X34
D70 74HC14T
P78
D70 74HC14T
R526 51
VTCXO_OUT1 (18/5B)
D70 74HC14T
R525 51
VTCXO_OUT2 (19/1B)
D70 74HC14T
R524 51
REF_10MHZ
D55 74ACT125T
R594 51
X27 SMB-ST
SYN_REF (20/1A)
10 MHz
5 MHz
2.5 MHz
D36 74AC74M
R202 10K
+5V-REF
D70 74HC14T
R203 10K
D55 74ACT125T
D36 74AC74M
R201 10K
+5V-REF
D55 74ACT125T
D55 74ACT125T
R200 10K
D55 74ACT125T

+12V-REF
R364 10
C559 4.7U 25V
G7 REF02CS
R629 10K 0.1%
R473 10K 0.1%
C560 4.7U 25V
P36 +5V-REF
R630 20K 0.1%
-5V
C478 100N
REF-5V (21/1D)
N33 OP297GS
D74 DAC8143
VTCXO_TUNE
P77 0...5V
C78 12P
N33 OP297GS
D70 74HC14T
COUNTER_DATA (22/3E)
STROBE1 (27/8C) (18/3D,21/4C,21/5D,22/2C,27/2C)
SER1_CLK (27/5B,27/8C) (18/3E,21/1D,21/4A,22/2C,27/2C)
+5V-REF
R197 10K
D42 74HCT4094T
REF_OUT_SEL (18/1B)
REF10_SEL
SYN_REF_SEL0 (19/6E)
SYN_REF_SEL1 (19/6E)
SYN_CLK_SEL0 (22/2B)
SYN_CLK_SEL1 (22/2B)
SYN_CLK_SEL2 (22/2B)
REF10_DATA (21/4A)

+5V-REF
R198 10K
D68 74HCT138T
(19/5E) SYN_REF_SEL0
(19/5E) SYN_REF_SEL1
R199 10K

+12V-REF
R368 10
C468 100N
N33 OP297GS
C467 100N
R365 10
-12V-REF
C470 100N
D40 DG419DY
C476 100N
-12V-REF
+5V-REF
R367 10
C472 100N
N11 TL072ACD
C471 100N
R366 10
-12V-REF

+5V-REF
C477 100N D68 74HCT138T
C469 100N D35 74AC74M
C473 100N D36 74AC74M
C474 100N D55 74ACT125T
C475 100N D70 74HC14T
C465 100N D42 74HCT4094T
C466 100N D74 DAC8143

Bindende Angaben ueber Varianten, Trimmwerte, Bauteile und nicht bestueckte Bauteile siehe SA.

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ELEKTROSTATISCH GEFAEHRDETE BAUELEMENTE ERFORDERN EINE BESONDERE HANDHABUNG.
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** = NOT FITTED

REFERENCE LOOP

AEND. IND.	AENDERUNGS-MITTEILUNG	DATUM	NAME
06.06			

	DATUM	NAME
1GPK		
BEARB.		SR
GEPR.		SR
NORM		
PLOTT	00-09-06	SCHWAIGE

BENENNUNG
IQ ANALOG/DIGITAL UNIT
IQ ANALOG/DIGITAL UNIT
TOP/ANALOG_UNIT_5/ANALOG_UNIT.8

ROHDE&SCHWARZ

ZEICHN.-NR. 1110.2532.01 S

BLATT-NR. 19 +

ZU GERAET AMIQ | REG.I.V. 1110.2003 | ERSTE Z. 1110.2003.01

PHASEDETECTOR

LOOPFILTER

VOLTAGE CONTROLLED OSCILLATOR

CLOCK SYNTHESIZER

P82

P81

+5VSYN +5VSYN

R218 10K

R217 10K

SYN_REF (19/8B)

D37 74AC74M

DDS_CLK_OUT (21/8B)

D37 74AC74M

R348 9.09K

R475 1K

R216 10K

C113 1N

R347 9.09K

R476 1K

C112 1N

R219 10K

V59 BAV70

R567 274

N12 NE5534AD

C68 22P

P82 max +/- 5V

R677 10K

R454 470K

V81 BAV99

N5 LM78L12ACD

+24VSYN

C561 4.7U 35V

C562 4.7U 25V

C644 100N

DIAG_VCO (27/2B)

C114 10N

R474 1K

R349 9.09K

C552 33N

P81 0...18V

C348 2.2U

C375 1U

R543 1K

C479 100N

N27 NE5534AD

C69 22P

C550 100N

X28 X28

R265 470

C421 2.2U

R678 10

V11 BZX284B10

V69 BZX284B8V2

G8 100-200MHZ

VCO

VCC GND IN OUT GND

R114 100

R128 100

C553 2.2N

R130 100

VCO FREQUENCY

+2V	100MHz
+15V	200MHz

+12VSYN

C481 100N

R101 221

C480 100N

+2,8V

L70 1U

N3 MSA0386

C554 2.2N

R75 68

R687 100

R77 100

C662 2.2N

N2 MC12093

C663 100P

R264 470

V54 BFP183

R564 4.7K

C555 2.2N

C551 2.2N

SW1 SW2 SW3/SB

BCX71J V56

R220 10K

+5VSYN

PRESCALE_SEL1 (21/5C)

R224 10K

R223 10K

+5VSYN

BCX71J V55

PRESCALE_SEL0 (21/5C)

R212 10K

R213 10K

+5VSYN

PRESCALE		
SEL1	SEL0	N
0	0	2
0	1	4
1	0	4
1	1	8

+5VSYN

R129 100

C115 10N

L71 1U

R450 150

R222 6.8K

R527 51

D60 74ABT125D

R215 10K

R528 27.4

P31 50...100MHz

HIGH_CLK (22/2A)

D60 74ABT125D

R529 27.4

DDS_CLK (21/1A)

R657 10K

D60 74ABT125D

+5V-BUF

R655 10K

R536 10K

D60 74ABT125D

+5V-BUF

R656 10K

R221 10K

L69

+24VA

+24VSYN

C288 100N

1U

C289 100N

L68

+12VA

+12VSYN

C287 100N

1U

C596 4.7U 25V

L67

-12VA

-12VSYN

C286 100N

1U

C597 4.7U 25V

+24VSYN

R261 200

C184 10U 25V

V70 V45 BZX284B10

BZX284B10

C290 100N

N27 NE5534AD

C291 100N

V22 BZX284B6V8

C185 10U 25V

R131 200

-12VSYN

+12VSYN

R281 20

R280 20

N7 LM78L05ACM

C352 1U 10V

C351 1U 10V

+5VSYN

+12VSYN

C645 100N

N12 NE5534AD

C646 100N

-12VSYN

+5VSYN

N2 MC12093

C484 100N

+5VSYN

L72 1U

C353 1U 10V

D37 74AC74M

C485 100N

+5V-BUF

L73 1U

C350 1U 10V

D60 74ABT125D

C483 100N

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** = NOT FITTED

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ELEKTROSTATISCH GEFAEHRDETE BAUELEMENTE ERFORDERN EINE BESONDERE HANDHABUNG.
ATTENTION ESD !
ELECTROSTATIC SENSITIVE DEVICES REQUIRE A SPECIAL HANDLING

CLOCK-SYNTHESIZER

06.06				1GPK	DATUM	NAME	BENENNUNG
				BEARB.		SR	IQ ANALOG/DIGITAL UNIT
				GEPR.		SR	IQ ANALOG/DIGITAL UNIT
				NORM			
				PLOTT	00-09-06	SCHWAIGE	TOP/ANALOG_UNIT_5/ANALOG_UNIT.9
AEND. IND.	AENDERUNGS-MITTEILUNG	DATUM	NAME	ROHDE&SCHWARZ			ZEICHN.-NR. 1110.2532.01 S
				ZU GERAET AMIQ			REG.I.V. 1110.2003 ERSTE Z. 1110.2003.01

BLATT-NR. 20 +

DDS OSCILATOR

P26 P27 P28

DDS_CLK (20/8D) — R533 51 — D62 74ABT125D

+5VSYN — R236 10K — D38 74AC74M

R531 51 — D62 74ABT125D

+5VSYN — R228 10K — D38 74AC74M — R530 51 — D62 74ABT125D

R535 51 — P27 — DDS_CLK_IN

D62 74ABT125D — R227 10K

+5VSYN — R230 10K — D69 74HCT138T

DDS_CLK_SELO (21/5C)

DDS_CLK_SEL1 (21/5C)

R235 10K

DDS_CLK SELECT		
CLK-FREQUENCY	DDS_CLK SEL1	DDS_CLK SEL0
max 100 MHz	1	1
50 MHz	1	0
20 MHz	0	1
OFF	0	0

+5VSYN — R229 10K — D39 74HCT164T

SER1_CLK (27/5B,27/8C) (18/3E,19/2D,21/1D,22/2C,27/2C)

REF10_DATA (19/5E)

DDS_D0 DDS_D1 DDS_D2 DDS_D3 DDS_D4 DDS_D5 DDS_D6 DDS_D7

D73 AD9850BRS

DDS_WR (21/7D)

DDS_LOAD (21/5C)

DDS_RESET (21/5C)

+5V-DDS (21/6E,21/7E)

R532 51 — C591 100P — R232 10K — R233 10K

+5VSYN — R231 10K

STROBE1 (27/8C) (18/3D,19/2D,21/5D,22/2C,27/2C)

D43 74HCT4094T

DDS_LOAD (21/5B)
DDS_RESET (21/5B)
DDS_CLK_SELO (21/1C)
DDS_CLK_SEL1 (21/1C)
PRESCALE_SELO (20/5E)
PRESCALE_SEL1 (20/5D)
CLK_OUT_EN (22/5D)
DDS_WR_EN
DDS_DATA (27/2D)

R568 2.2K — C343 1P — T1 T1-1T — R1321 00

C275 27P — L74 1U — C362 220P

C365 56P — L75 1U — C272 330P

C178 68P — L76 1U — C364 220P

C363 220P — R262 100

R234 10K — C357 1U 10V

R534 51 — DDS_CLK_OUT (20/1B)

D95 74HCT08T

STROBE1 (18/3D,19/2D,21/4C,22/2C,27/2C)

DDS_WR (21/5B)

+5-COUNT — D100 DAC8143

REF-5V (19/3C)

STROBE1_DAC (18/3D)

SER1_CLK (27/5B,27/8C) (18/3E,19/2D,21/4A,22/2C,27/2C)

SER1_DATA_IN (18/3C)

C67 12P — N19 OP297GS — 0V...+5V

R688 10K 0.1% — P26 0V...+10V

R708 10K 0.1% — N19 OP297GS

SKEW_TUNE (6/1D,6/7C,10/5B)

SKEW_DATA (22/2C)

+12VSYN — R285 20 — R284 20 — N8 LM78L05ACM — +5V-DDS (21/5B,21/7E)

C356 1U 10V — C1872.2U 10V — L60 — C491 100N — C355 1U 10V

C494 100N — C492 100N — C493 100N — L59 2.2U — +5V-DDS (21/5B,21/6E)

D73 AD9850BRS — C354 1U 10V

+12VA — R679 10 — C482 100N — N19 OP297GS — C642 100N — R749 10 — -12VA

+5-COUNT — R680 10 — C647 100N — D100 DAC8143

+5VSYN — C486 100N — D38 74AC74M

+5VSYN — C487 100N — D62 74ABT125D

+5VSYN — C488 100N — D69 74HCT138T

+5VSYN — C489 100N — D39 74HCT164T

+5VSYN — C490 100N — D43 74HCT4094T

Bindende Angaben ueber Varianten, Trimmwerte, Bauteile und nicht bestueckte Bauteile siehe SA.

FOR BINDING INFORMATION ON MODELS, TRIMMING AND COMPONENTS VALUES AND NONFITTED COMPONENTS SEE PARTS LIST

ACHTUNG: EGB !
ELEKTROSTATISCH GEFAEHRDETE BAUELEMENTE ERFORDERN EINE BESONDERE HANDHABUNG.
ATTENTION ESD !
ELECTROSTATIC SENSITIVE DEVICES REQUIRE A SPECIAL HANDLING

DDS-DIVIDER CIRCUIT

** = NOT FITTED

AEND. IND.	AENDERUNGS-MITTEILUNG	DATUM	NAME
06.06			

	DATUM	NAME
1GPK		
BEARB.		SR
GEPR.		SR
NORM		
PLOTT	00-09-06	SCHWAIGE

BENENNUNG: IQ ANALOG/DIGITAL UNIT
IQ ANALOG/DIGITAL UNIT
TOP/ANALOG_UNIT_5/ANALOG_UNIT.10

ROHDE&SCHWARZ

ZEICHN.-NR. 1110.2532.01 S

BLATT-NR. 21 +

ZU GERAET AMIQ | REG.I.V. 1110.2003 | ERSTE Z. 1110.2003.01

FOLGENDE UNTERLAGEN BEHALTEN WIR UNS ALLE RECHTE VOR

Bindende Angaben ueber Varianten, Trimmwerte, Bauteile und nicht bestueckte Bauteile siehe SA.

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CLOCK_OUT BUFFER

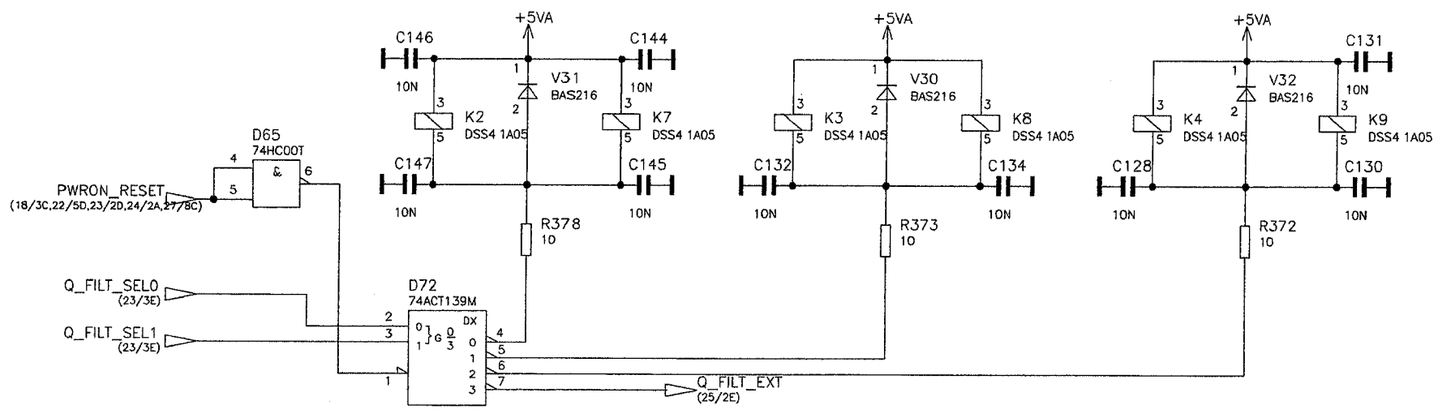
CLOCK IN/OUT

PROGRAMMABLE CLOCK COUNTER

** = NOT FITTED

06.06				1GPK	DATUM	NAME	BENENNUNG	
				BEARB.		SR	IQ ANALOG/DIGITAL UNIT	
				GEPR.		SR	IQ ANALOG/DIGITAL UNIT	
				NORM			TOP/ANALOG_UNIT_5/ANALOG_UNIT.11	
				PLOTT	00-09-06	SCHWAIGE		
AEND. IND.	AENDERUNGS-MITTEILUNG	DATUM	NAME	ROHDE&SCHWARZ			ZEICHN.-NR. 1110.2532.01 S	BLATT-NR. 22 +
				ZU GERAET AMIQ			REG.I.V. 1110.2003	ERSTE Z. 1110.2003.01

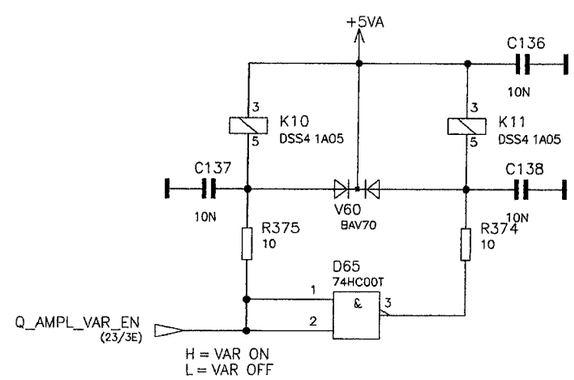
FILTER OFF

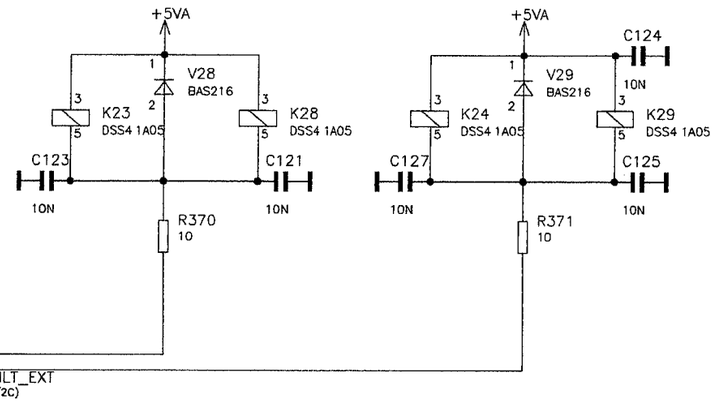


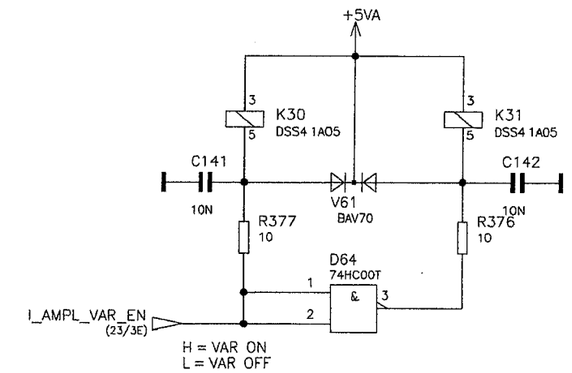
FILTER 1

FILTER 2

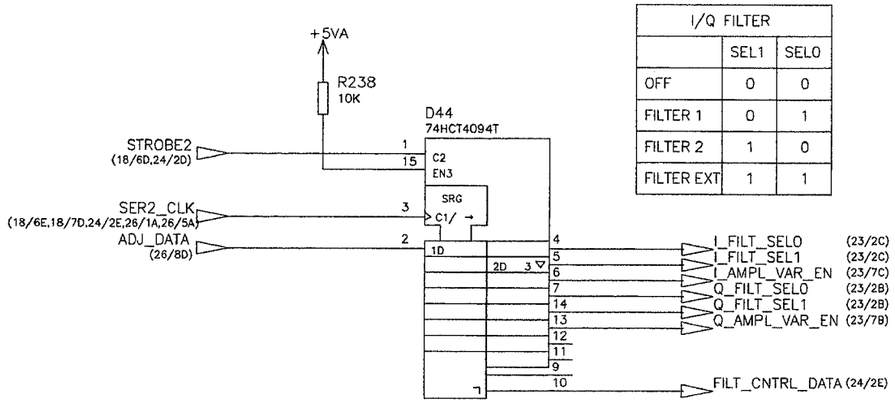
VAR AMPL

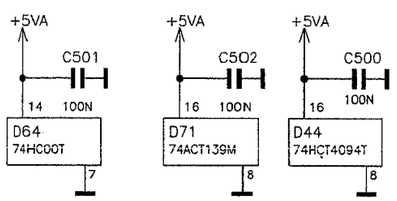






I/Q FILTER		
	SEL1	SEL0
OFF	0	0
FILTER 1	0	1
FILTER 2	1	0
FILTER EXT	1	1





FILTER CONTROL

** = NOT FITTED

Bindende Angaben ueber Varianten, Trimmwerte, Bauteile und nicht bestueckte Bauteile siehe SA.

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AEND. IND.	AENDERUNGS-MITTEILUNG	DATUM	NAME
06.06			

	DATUM	NAME
1GPK		
BEARB.		SR
GEPR.		SR
NORM		
PLOTT	00-09-06	SCHWAIGE

TOP/ANALOG_UNIT_5/ANALOG_UNIT.12

BENENNUNG
IQ ANALOG/DIGITAL UNIT
IQ ANALOG/DIGITAL UNIT

ROHDE&SCHWARZ

ZEICHN.-NR. 1110.2532.01 S

BLATT-NR. 23 +

ZU GERAET AMIQ

REG.I.V. 1110.2003

ERSTE Z. 1110.2003.01

OUTPUT OVERVOLTAGE PROTECTION

PWRON_RESET
(18/3C,22/5D,23/2B,23/2D,21/8C)

Q_OUT_SENSE (17/8C)
I_OUT_SENSE (14/8C)

V15 BAV99
V16 BAV99
+5VA
-5VDAC

U1 LM339D

R144 1.62K
R143 1.62K
R484 2K
R485 2K
R138 200K
R137 200K
V34 BAS216
V33 BAS216
C566 1U 10V
C563 1U 10V

R243 10K
R242 10K
R244 10K
R241 10K
C565 1U 10V
C564 1U 10V

R240 10K
D45 74HCT4094T
STROBE2 (18/6D,23/2D)
SER2_CLK (18/6E,18/7D,23/2E,26/1A,26/5A)
FILT_CNTRL_DATA (23/3E)

I_ATT_SEL0 (24/4C)
I_ATT_SEL1 (24/4C)
Q_ATT_SEL0 (24/4A)
Q_ATT_SEL1 (24/4B)
I_OUT_EN (24/4C)
Q_OUT_EN (24/4D)
DIG_OUT_EN
ATT_CNTRL_DATA (18/7D)

I/Q OUTPUT ATTENUATOR		
	SEL1	SEL0
0dB	0	0
20dB	0	1
40dB	1	0
RESERVED (OFF)	1	1

Q_ATT_SEL0 (24/4E)
Q_ATT_SEL1 (24/4E)
I_ATT_SEL0 (24/4E)
I_ATT_SEL1 (24/4E)
I_OUT_EN (24/4E)
Q_OUT_EN (24/4E)
I_DIAG_EN (27/3D)
Q_DIAG_EN (27/3D)

D72 74ACT139M
D71 74ACT139M
D65 74HC00T
D64 74HC00T
D86 74ACT125T

0dB
K12 DSS4 1A05
K13 DSS4 1A05
C161 10N
C162 10N
R386 10
R385 10
V65 BAV70

20dB 40dB
K14 DSS4 1A05
K15 DSS4 1A05
C159 10N
C158 10N
C157 10N
R383 10
R384 10
V64 BAV70

0dB
K32 DSS4 1A05
K33 DSS4 1A05
C148 10N
C150 10N
C149 10N
R379 10
R380 10
V62 BAV70

20dB 40dB
K34 DSS4 1A05
K35 DSS4 1A05
C152 10N
C153 10N
C154 10N
R382 10
R381 10
V63 BAV70

R345 10
C634 10N
R343 10
C239 10N
R569 10
C636 10N
R565 10
C635 10N
V67 BAS216
K17 DSS4 1A05
V57 BAS216
K37 DSS4 1A05
V80 BAS216
K16 DSS4 1A05
V79 BAS216
K36 DSS4 1A05

R171 10K

C641 100N
C503 100N
C506 100N
C507 100N
C505 100N
C504 100N
U1 LM339D

Bindende Angaben ueber Varianten,
Trimmwerte, Bauteile und
nicht bestueckte Bauteile siehe SA.

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TRIMMING AND COMPONENTS VALUES AND
NONFITTED COMPONENTS SEE PARTS LIST

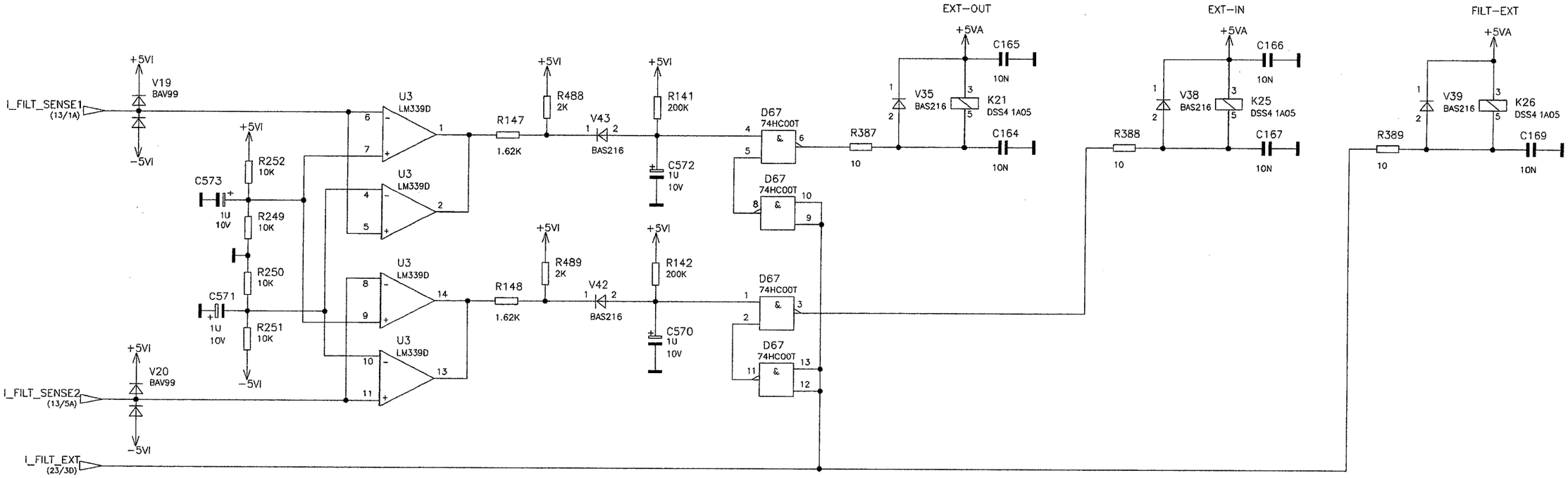
ACHTUNG: EGB !
ELEKTROSTATISCH GEFAEHRDETE
BAUELEMENTE ERFORDERN EINE
BESONDERE HANDHABUNG.
ATTENTION ESD !
ELECTROSTATIC SENSITIVE DEVICES
REQUIRE A SPECIAL HANDLING

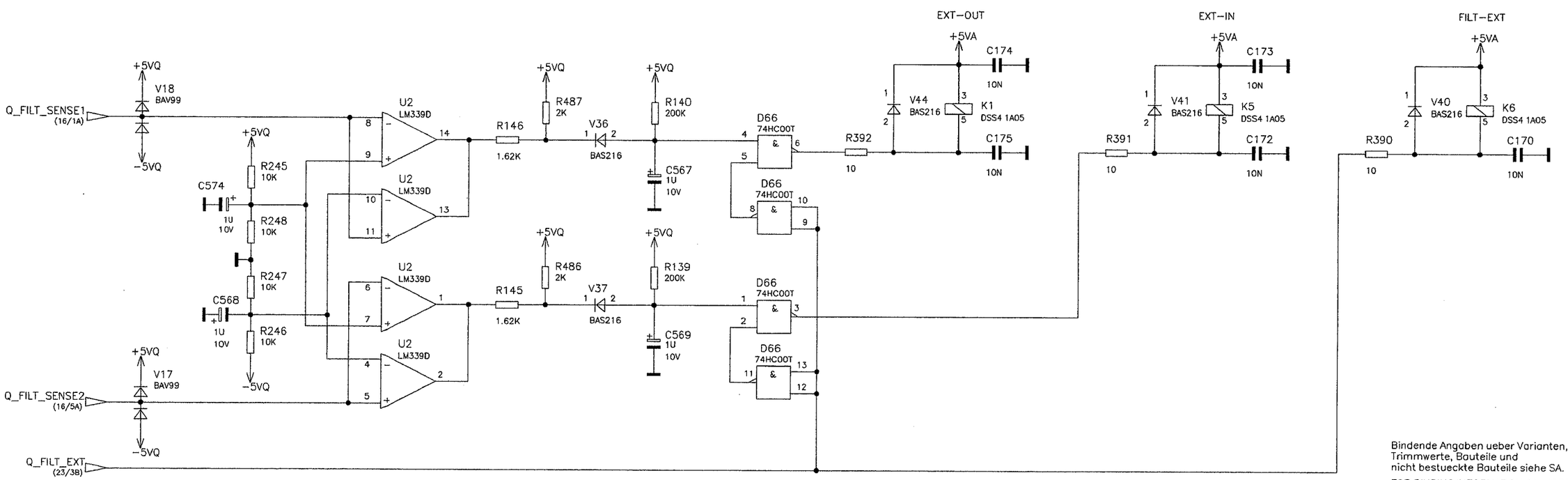
** = NOT FITTED

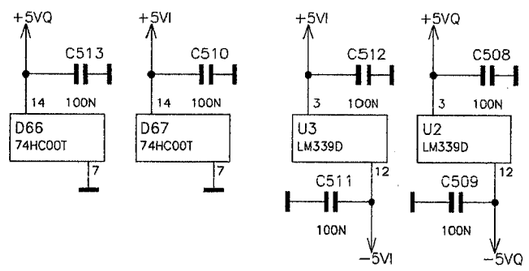
OUTPUT AND ATTENUATOR CONTROL

06.06					1GPK	DATUM	NAME	BENENNUNG
					BEARB.		SR	IQ ANALOG/DIGITAL UNIT
					GEPR.		SR	IQ ANALOG/DIGITAL UNIT
					NORM			TOP/ANALOG_UNIT_5/ANALOG_UNIT.13
					PLOTT	00-09-06	SCHWAIGE	
AEND. IND.	AENDERUNGS-MITTEILUNG	DATUM	NAME		ROHDE&SCHWARZ			ZEICHN.-NR. 1110.2532.01 S
					ZU GERAET AMIQ			REG.I.V. 1110.2003 ERSTE Z. 1110.2003.01

BLATT-NR. 24 +







** = NOT FITTED

ACHTUNG: EGB !
ELEKTROSTATISCH GEFAEHRDETE BAUELEMENTE ERFORDERN EINE BESONDERE HANDHABUNG.
ATTENTION ESD !
ELECTROSTATIC SENSITIVE DEVICES REQUIRE A SPECIAL HANDLING

Bindende Angaben ueber Varianten, Trimmwerte, Bauteile und nicht bestueckte Bauteile siehe SA.

FOR BINDING INFORMATION ON MODELS, TRIMMING AND COMPONENTS VALUES AND NONFITTED COMPONENTS SEE PARTS LIST

EXT−FILTER IN/OUT PROTECTION

AEND. IND.	AENDERUNGS−MITTEILUNG	DATUM	NAME
06.06			

	DATUM	NAME
1GPK		
BEARB.		SR
GEPR.		SR
NORM		
PLOTT	00−09−06	SCHWAIGE

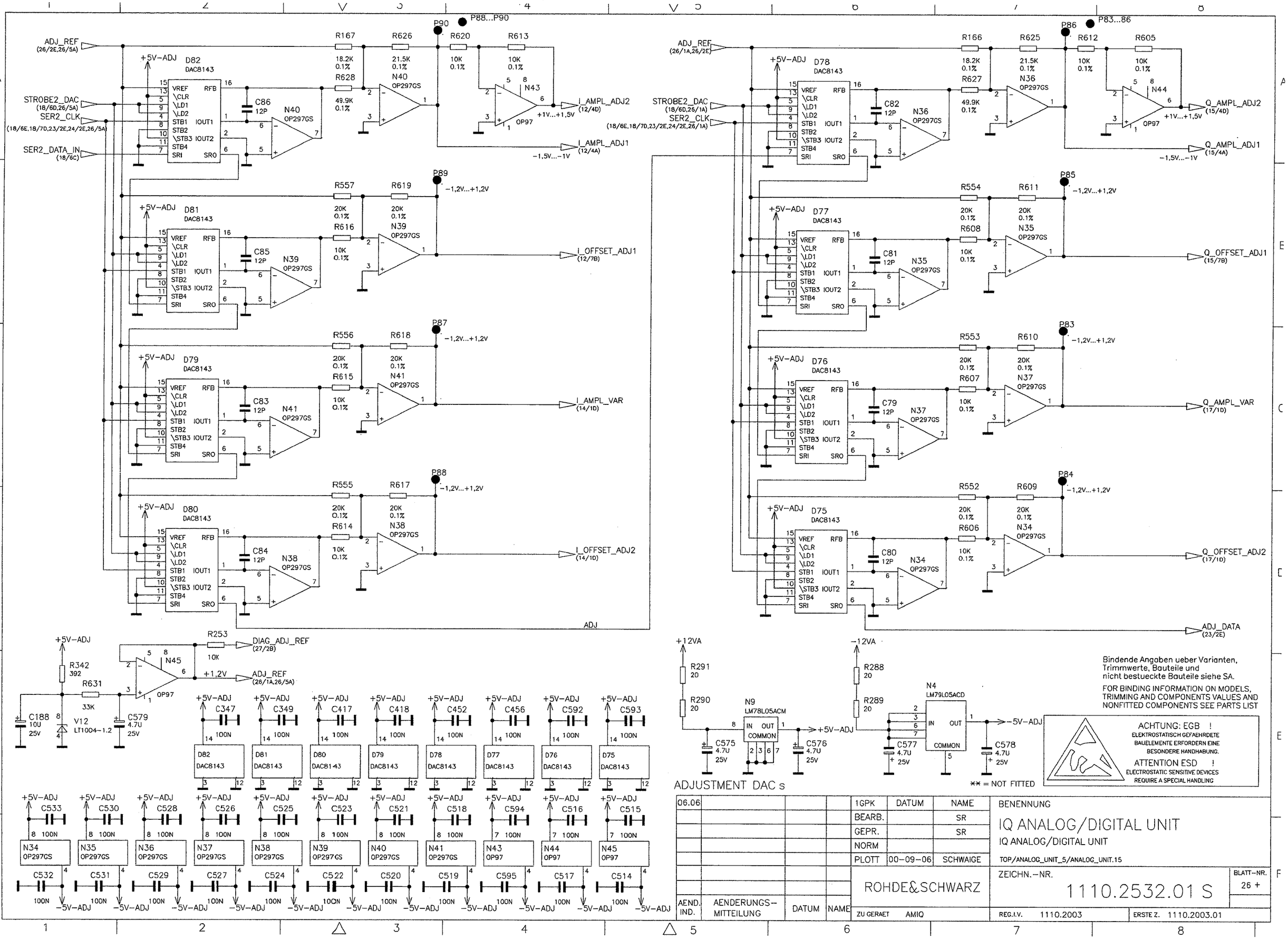
BENENNUNG
IQ ANALOG/DIGITAL UNIT
IQ ANALOG/DIGITAL UNIT
TOP/ANALOG_UNIT_5/ANALOG_UNIT.14

ROHDE&SCHWARZ

ZEICHN.−NR. 1110.2532.01 S

BLATT−NR. 25 +

ZU GERAET AMIQ | REG.I.V. 1110.2003 | ERSTE Z. 1110.2003.01



ADJUSTMENT DAC s

Bindende Angaben ueber Varianten, Trimmwerte, Bauteile und nicht bestueckte Bauteile siehe SA.

FOR BINDING INFORMATION ON MODELS, TRIMMING AND COMPONENTS VALUES AND NONFITTED COMPONENTS SEE PARTS LIST

** = NOT FITTED

ACHTUNG: EGB !
ELEKTROSTATISCH GEFAEHRDETE BAUELEMENTE ERFORDERN EINE BESONDERE HANDHABUNG.

ATTENTION ESD !
ELECTROSTATIC SENSITIVE DEVICES REQUIRE A SPECIAL HANDLING

06.06				1GPK	DATUM	NAME	BENENNUNG
				BEARB.		SR	IQ ANALOG/DIGITAL UNIT
				GEPR.		SR	IQ ANALOG/DIGITAL UNIT
				NORM			TOP/ANALOG_UNIT_5/ANALOG_UNIT.15
				PLOTT	00-09-06	SCHWAIGE	
AEND. IND.	AENDERUNGS-MITTEILUNG	DATUM	NAME	ROHDE&SCHWARZ			ZEICHN.-NR. 1110.2532.01 S
				ZU GERAET AMIQ			REG.I.V. 1110.2003 ERSTE Z. 1110.2003.01

BLATT-NR. 26 +

P92 P93 P32

D49 DG408DY — MUXDX
D48 DG408DY — MUXDX
D29 74HC14T
D46 74HCT4094T
D58 CS5507AS
N22 AD780
V52 BZX284B2V7
V53 BZX284B2V7
V21 BAV99
B2 32,768KHZ

DIAG_A/D_REF (27/5C)
DIAG_ADJ_REF (26/2D)
DIAG_VTCXO_TUNE (19/4A)
DIAG_VCO (20/3B)
DIAG_IDAC (12/8D)
DIAG_QDAC (15/8D)
DIAG_IFILT_EXT (13/8A)
DIAG_QFILT_EXT (16/8A)
DIAG_IAMPL_VAR (14/4D)
DIAG_QAMPL_VAR (17/4D)
DIAG_IPA (14/8D)
DIAG_IPA_HF (14/8C)
DIAG_QPA (17/8D)
DIAG_QPA_HF (17/8D)
DIAG_I/Q_PHASE (14/8E)
DIAG_SEL0
DIAG_SEL1
DIAG_SEL2
DIAG_SEL3

R254 10K
R256 10K
R258 10K
R257 10K
R255 10K
R480 1K
R479 1K
R478 1K
R481 10K
R622 10K 0.1%
R621 10K 0.1%
R702 10K
C535 100N
C536 100N
C611 100N
C610 100N
C259 47U 10V
C260 47U 10V
C176 10N
C122 100N
C540 100N
C539 100N
C541 100N
C538 100N
C537 100N
C580 4.7U 25V
C581 4.7U 25V
C534 100N
L61 2.2U
L62 2.2U
R393 10

+5VA
-5VDAC
2.5V
REF2.5V (14/3E,27/8D)
A/D_CAL (27/3D)
A/D_CONV (27/3D)
SER1_CLK (18/3E,19/2D,21/1D,21/4A,22/2C) (27/2C,27/8C)
A/D_DATA (18/3E)
DIAG_A/D_REF (27/2A)
STROBE1 (27/8C) (18/3D,19/2D,21/4C,21/5D,22/2C)
DDS_DATA (21/5C)
A/D_CONV (27/4C)
A/D_CAL (27/4C)
I_DIAG_EN (24/4D)
Q_DIAG_EN (24/4D)
DATA1_OUT (27/8C)

DIAGNOSE CHANNEL CONTROL (DIAG_)

DIAG No.	MEASUREMENT	SEL3	SEL2	SEL1	SEL0	I_DIAG EN	Q_DIAG EN
0	GROUND REFERENCE	0	0	0	0		
1	Uref A/D CONVERTER	0	0	0	1		
2	Uref ADJ-DACs	0	0	1	0		
3	10MHz VTCXO VOLTAGE	0	0	1	1		
4	VCO CONTROL VOLTAGE	0	1	0	0		
5	IDAC-OUTPUT	0	1	0	1		
6	QDAC-OUTPUT	0	1	1	0		
7	EXT - IFILTER	0	1	1	1		
8	EXT - QFILTER	1	0	0	0		
9	I-AMPL-VARIATION	1	0	0	1		
10	Q-AMPL-VARIATION	1	0	1	0		
11	I-OUTPUT	1	0	1	1	1	
12	I-HF AMPL	1	1	0	0	1	
13	Q-OUTPUT	1	1	0	1		1
14	Q-HF AMPL	1	1	1	0		1
15	I/Q PHASE	1	1	1	1	1	1

OPTION CONNECTOR

SER1_CLK (27/2C,27/5B) (18/3E,19/2D,21/1D,21/4A,22/2C)
+5VA
STROBE1 (27/2C) (18/3D,19/2D,21/4C,21/5D,22/2C)
DATA1_OUT (27/3D)
PWRON_RESET (18/3C,22/5D,23/2B,23/2D,24/2A)
REF2.5V (14/3E,27/4C)
OPT_ID0 (18/7D)
OPT_ID1 (18/7E)
-12VA
+12VA
X25

Bindende Angaben ueber Varianten, Trimmwerte, Bauteile und nicht bestueckte Bauteile siehe SA.

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** = NOT FITTED

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ELEKTROSTATISCH GEFAEHRDETE BAUELEMENTE ERFORDERN EINE BESONDERE HANDHABUNG.
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DIAGNOSE CIRCUIT

AEND. IND.	AENDERUNGS-MITTEILUNG	DATUM	NAME
06.06			

1GPK	DATUM	NAME
BEARB.		SR
GEPR.		SR
NORM		
PLOTT	00-09-06	SCHWAIGE

BENENNUNG
IQ ANALOG/DIGITAL UNIT
IQ ANALOG/DIGITAL UNIT
TOP/ANALOG_UNIT_5/ANALOG_UNIT.16

ROHDE&SCHWARZ

ZEICHN.-NR. 1110.2532.01 S
BLATT-NR. 27 +

ZU GERAET AMIQ
REG.I.V. 1110.2003
ERSTE Z. 1110.2003.01

P5,P7,P8

P6

DATA (7/1A,7/8A,8/1A,9/1A,11/1A)

ADRESS (7/1A,7/8A,11/1A)

AEN (7/2C,7/4C,11/1B,28/3C)

D4 EPF10K10TC-4

SD0 108 D0 … SD15 102 D15

SA0 124 A0 … SA15 135 A15

ATP1 100 … ATP10 89

DSUB1 83 DSUB1 … DSUB4 80 DSUB4

TI1 62 … TI4 65

TQ1 41 … TQ4 44

ACK 8 SD0

N.C 9 10 11 13 14 17 18 37 38 39 46 47 48 49 51 54 59 60 67 68 69 70 72 73 78 79 86 87 88 107 36 12 56

CS 143
NCS 144
NCE 106
NSTATUS 35
CONFDONE 2
CEO 3

IOWR 142
IORD 141
IOCS16 140
NCONFIG 74

IRQ10 136
IRQ11 137
AEN 138
RFR 7

SEOCLK 125
CLK100 55

RESERV1 19 … RESERV13 33
MSEL0 77
MSEL1 76

TDI 105
TMS 34
TCK 1
TDO 4

D5 74HCT688T

COMP
G1
P
Q
1P=Q
#394-397

R40 10K
R39 10K
R38 10K
R37 10K
R36 10K
R42 10K
R44 10K
R43 10K
R46 10K
R97 1K
R98 1K
R45 10K

SA2 3 … SA9 18

X38 4
X38 3
X38 1

(7/2C,7/4C,11/1C) IOW
(7/2C,7/4C,11/1C) IOR
(7/2C,7/4C,11/1C) IOCS16
(7/2A,7/4C,7/8C) DIGRESET

(7/2E,7/4C) IRQ10
(7/2E,7/4C) IRQ11
(7/2C,7/4C,11/1B,28/1B) AEN
(7/2C,7/4C) REFRESH

RESERV (7/3D,7/8C)

BER_CLK (10/4C) X7 SMB-ST

R48 10K
R47 10K

X32 … BOUNDARY SCAN … X32

TOP VIEW

ACHTUNG: EGB !
ELEKTROSTATISCH GEFAEHRDETE BAUELEMENTE ERFORDERN EINE BESONDERE HANDHABUNG.
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G3 100MHZ
Q9
C55 100N

C49 100N … C53 100N
C48 100N … C52 100N
VCCIO
VCCINT
GND

L82 1U
C381 100N

C30 100N
C39 100N
C54 100N
C622 100N
C623 100N

D15 74ABT125D
D25 74ABT125D
D5 74HCT688T
D9 74LVT574DB
D85 74ABT125D

** = NOT FITTED

MARKER_CLK (10/4C)

D9 74LVT574DB

R734 10K

MARKER1 … MARKER8

TRIGOUT0 … TRIGOUT7

TRIGOUT (9/8C)

R99 1K

BER_OUT_1
BER_OUT_2
BER_OUT_EN1
BER_OUT_EN2

PROG5
PROG7
PROG8
PROG9
PROG10
PROG1
PROG2
PROG3
PROG4
PROG5
PROG8
SEQ_TDI
SEQ_TMS
SEQ_TCK
SEQ_TDO

BER CIRCUIT

D3 74LVT14DB

V6 BAV99
V7 BAV99
V77 BAV99
V78 BAV99
V2 BAV99
V3 BAV99
V5 BAV99
V4 BAV99

R71 221
R70 221
R69 221
R68 221
R739 22.1
R740 22.1
R58 22.1
R59 22.1
R61 22.1
R60 22.1
R737 10K
R738 10K
R57 10K
R63 10K
R65 10K
R64 10K

REAR PANNEL 9-DSUB
X106

X100 MARKER_1
X101 MARKER_2
X102 MARKER_3 (OUTPUT_Q)
X103 MARKER_4 (OUTPUT_I)
X133 FROM X112 OUTPUT_Q
X134 FROM X111 OUTPUT_I

X123 X123
X124 X124

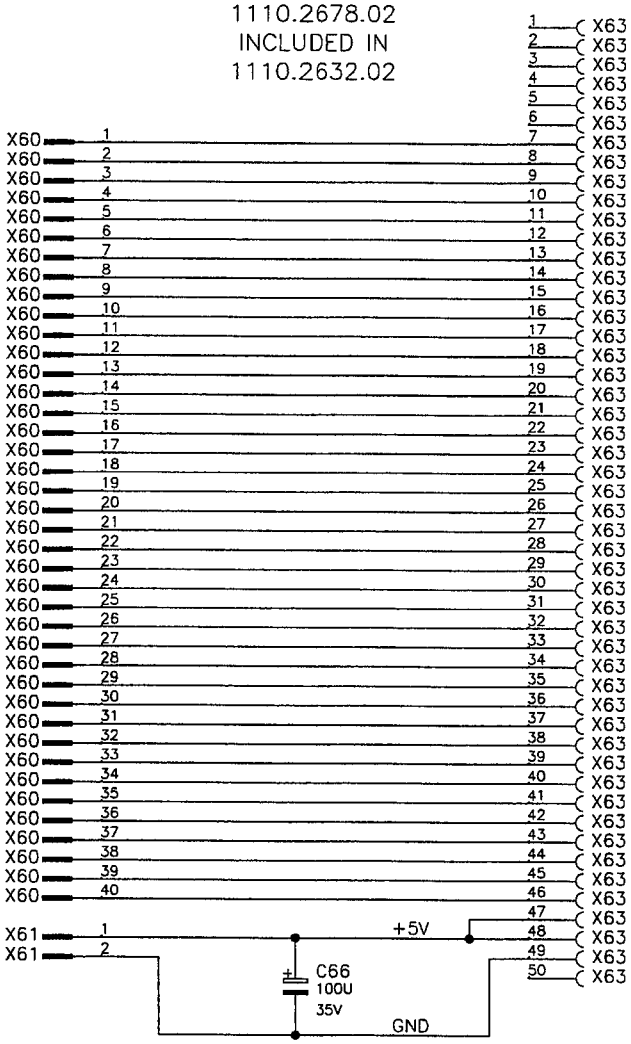
BSCAN (7/8E)

06.06				1GPK	DATUM	NAME	BENENNUNG
				BEARB.		SR	IQ ANALOG/DIGITAL UNIT
				GEPR.		SR	IQ ANALOG/DIGITAL UNIT
				NORM			TOP/BER_UNIT_6/BER_UNIT.1
				PLOTT	00-09-06	SCHWAIGE	
AEND. IND.	AENDERUNGS-MITTEILUNG	DATUM	NAME	ROHDE&SCHWARZ			ZEICHN.-NR. 1110.2532.01 S
				ZU GERAET AMIQ			REG.I.V. 1110.2003 ERSTE Z. 1110.2003.01

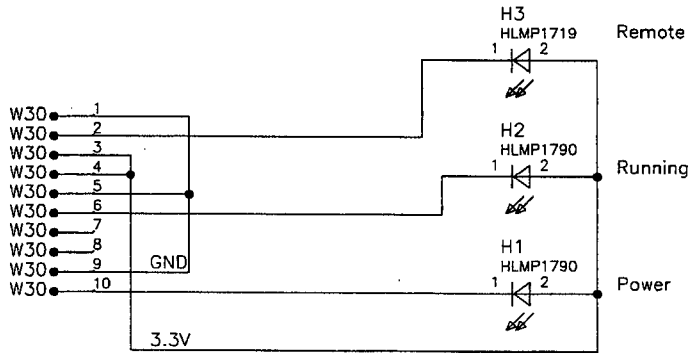
BLATT-NR. 28 +

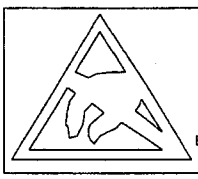
DIESE BLATT-UNTERLAGE BEHALTEN WIR UNS ALLE RECHTE VOR

HDD ADAPTER
1110.2678.02
INCLUDED IN
1110.2632.02



LED BOARD
1110.2661.02
INCLUDED IN
1110.2632.02

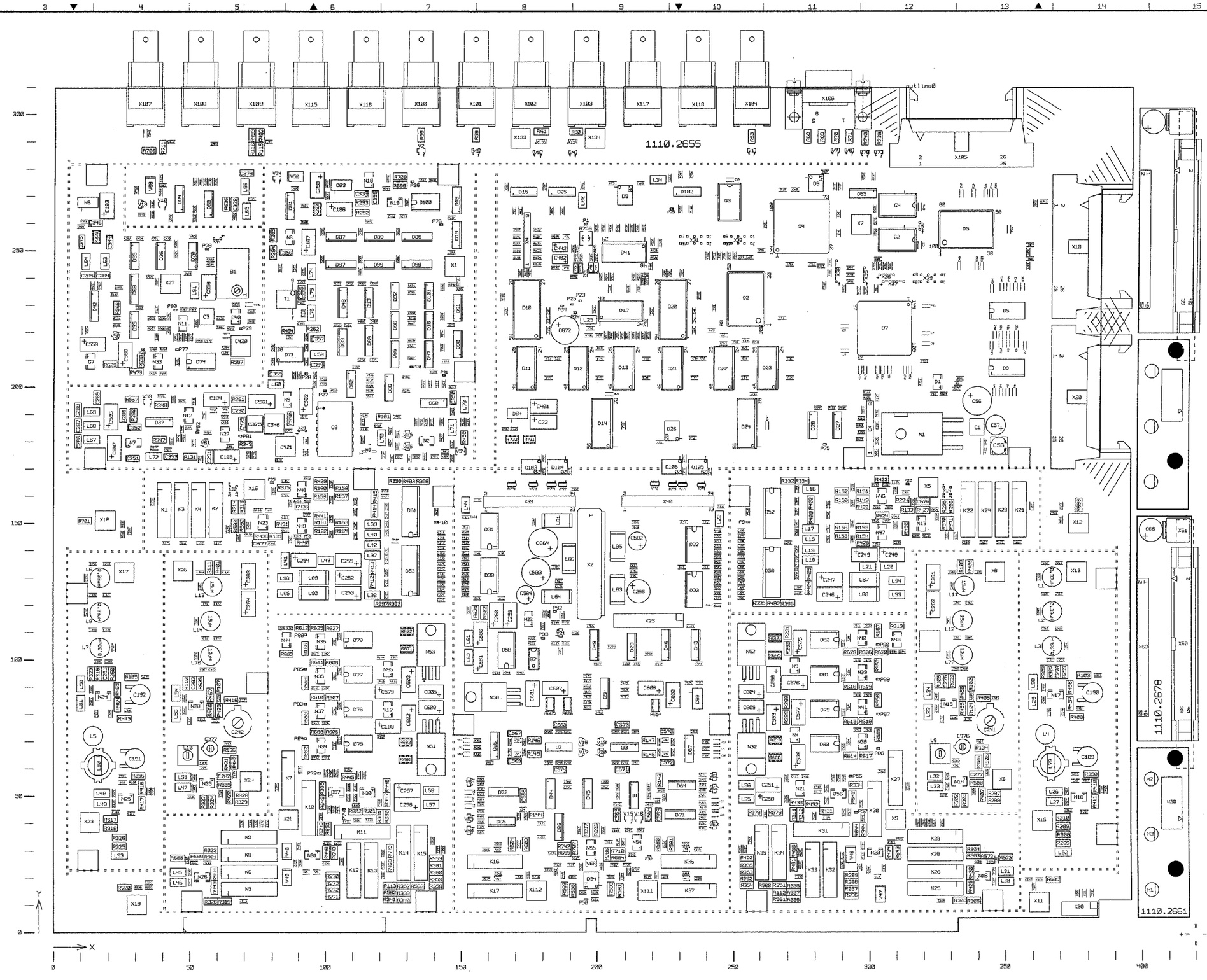




ACHTUNG: EGB !
ELEKTROSTATISCH GEFAEHRDETE BAUELEMENTE ERFORDERN EINE BESONDERE HANDHABUNG.

ATTENTION ESD !
ELECTROSTATIC SENSITIVE DEVICES REQUIRE A SPECIAL HANDLING

06.06				1GPK	DATUM	NAME	BENENNUNG
				BEARB.		SR	IQ ANALOG/DIGITAL UNIT
				GEPR.		SR	IQ ANALOG/DIGITAL UNIT
				NORM			TOP/ANALOG_UNIT_5/ANALOG_UNIT.17
				PLOTT	00-09-06	SCHWAIGE	
				ROHDE&SCHWARZ			ZEICHN.-NR. 1110.2532.01 S
AEND. IND.	AENDERUNGS-MITTEILUNG	DATUM	NAME				BLATT-NR. 29 -
				ZU GERAET AMIQ		REG.I.V. 1110.2003	ERSTE Z. 1110.2003.01



DARSTELLUNG SEITE B
VIEW ON SIDE B

ACHTUNG: ESD!
ELEKTROSTATISCH GEFÄHRDETE BAUELEMENTE ERFORDERN EINE BESONDERE HANDHABUNG.
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SIEHENDE ANGABEN ÜBER WARTWERTH, TRIMMWERTE, BAUTEILWERTE UND NICHT BESTÜCKTE BAUTEILE SIEHE SA.

FOR STANDING INFORMATION ON MODELS, TRIMMING AND COMPONENTS VALUES AND NONFITTED COMPONENTS SEE PARTS LIST.

	IGPK	DATUM	NAME
	BEARB.		SR
	GEPR.		SR
	NORM		
	PLOTT	99-06-16	SCHWAIGE

BENENNUNG
IQ ANALOG/DIGITAL UNIT
IQ ANALOG/DIGITAL UNIT

ROHDE&SCHWARZ
ZU GERÄT AMIQ

ZEICHN.-NR.
1110.2532.01 D
BLATT NR. 1+
REG.I.V. 1110.2000 | ERSTE Z. 1110.2003

ÄND. IND. | ÄNDERUNGS-MITTEILUNG | DATUM | NAME

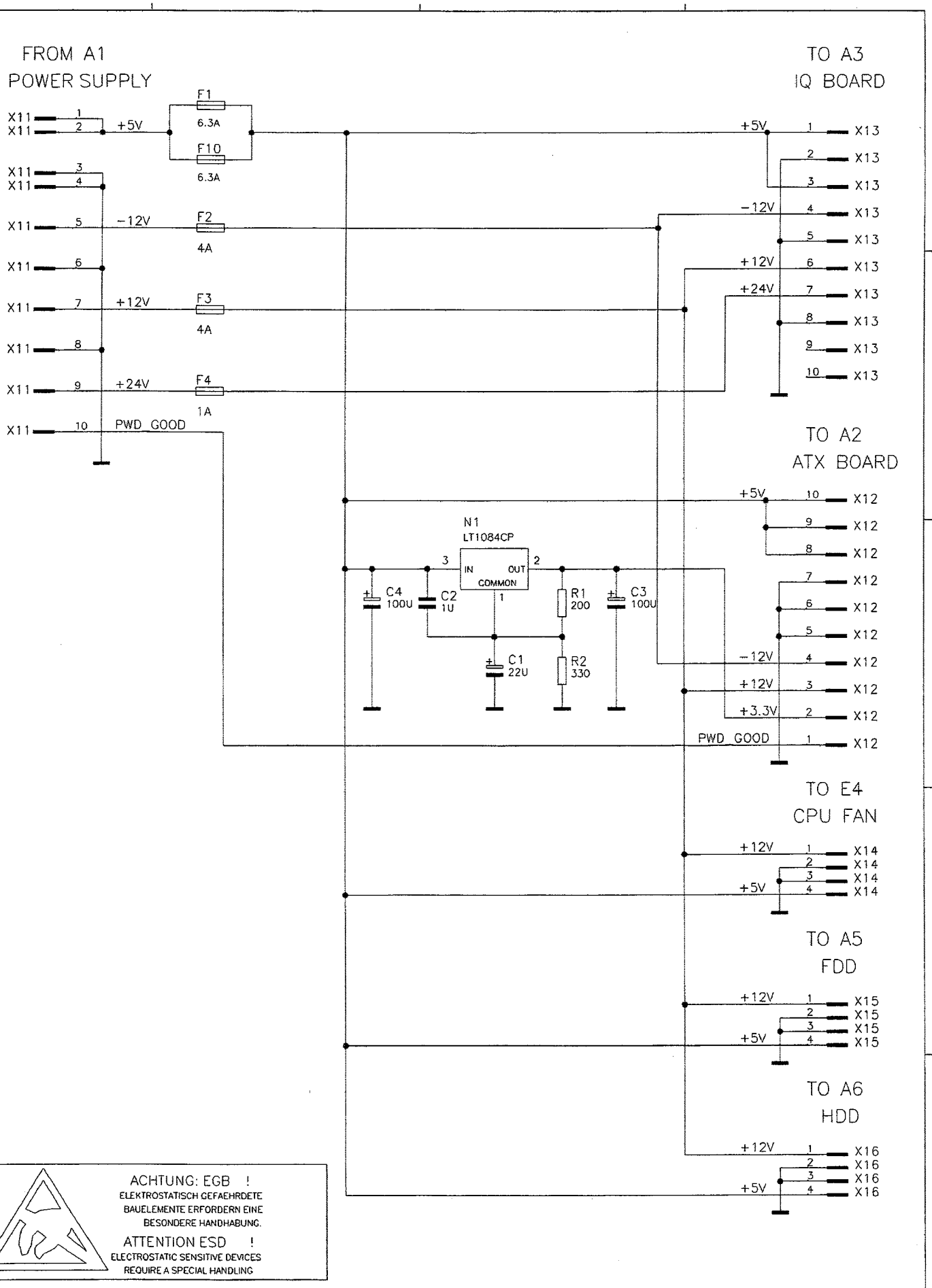
ROHDE&SCHWARZ

Circuit Documents

for Module

Power Board

1110.2732.02



02.02				1GPK	DATUM	NAME
				BEARB.		SR
				GEPR.		SR
				NORM		
				PLOTT	98-03-18	BAUR_A
AEND. IND.	AENDERUNGS-MITTEILUNG	DATUM	NAME	ZU GERAET AMIQ		

ROHDE&SCHWARZ

BENENNUNG
POWER_BOARD
POWER_BOARD
TOP/TOP.1

ZEICHN.-NR. 1110.2732.01 S

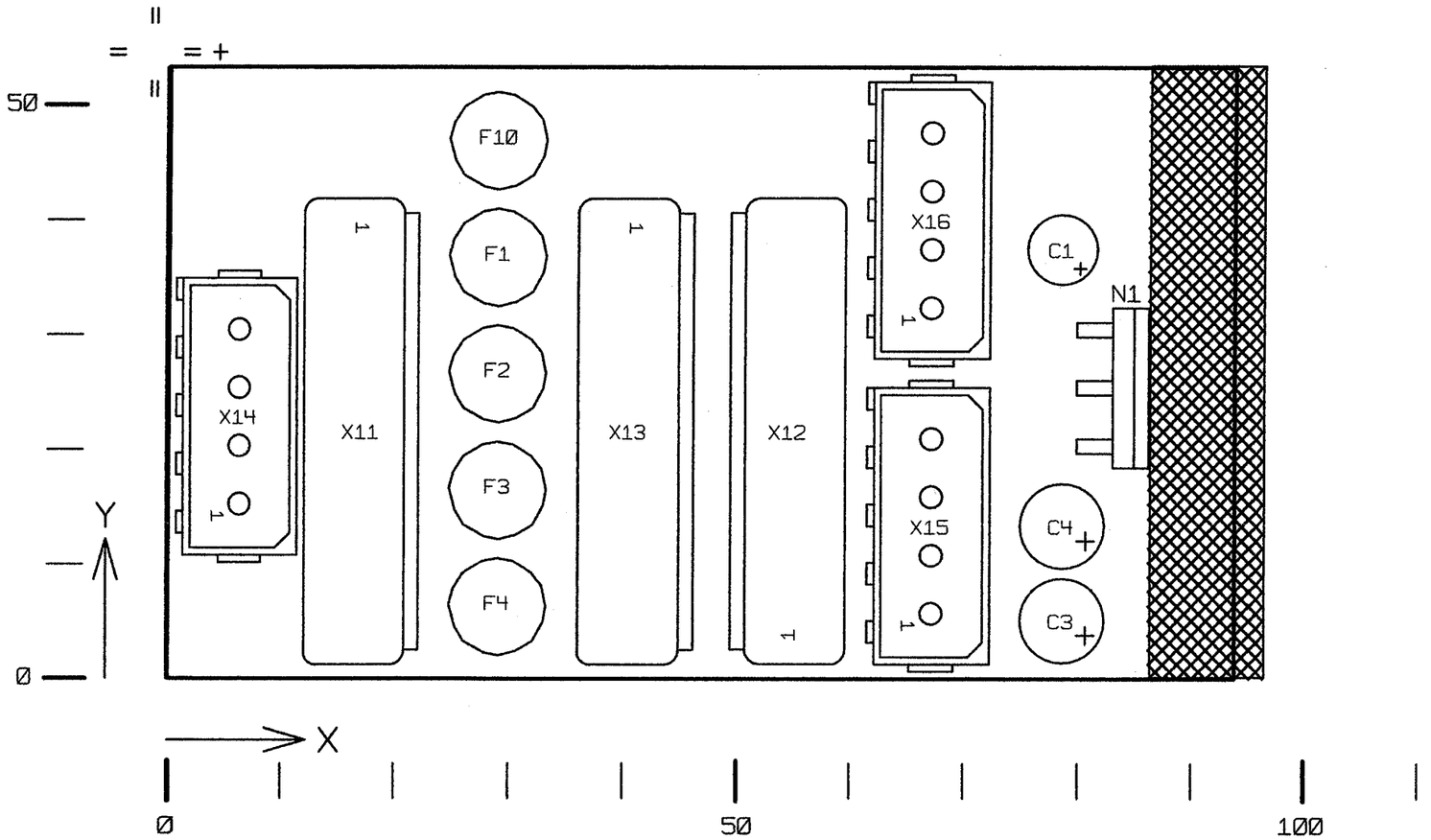
BLATT-NR. 1 -

REG.I.V. 1110.2003

ERSTE Z. 1110.2003.01

Kennz. Comp. No.	Benennung Designation	Sachnummer Stock No.	Hersteller Manufacturer	Bezeichnung Designation	enthalten in contained in
.	XX VARIANTENERKLAERUNG IDENTIFICATION OF MODELS				
C1	CE 22UF +-20% 50V RM2,5 ELECTROLYTIC CAPACITOR	CE 0008.7533.00	BEYSCHLAG	2222 116 71229	
C2	CC 1UF+-10% 50V X7R 2220 CERAMIC CAPACITOR	CC 0520.6873.00	KEMET	C2220C105K5RAC	
C3	CE 100UF +-20% 25V RM2.5 ELECTROLYTIC CAPACITOR	CE 0008.7891.00	PANASONIC	ECA-1EFG101I	
C4	CE 100UF +-20% 25V RM2.5 ELECTROLYTIC CAPACITOR	CE 0008.7891.00	PANASONIC	ECA-1EFG101I	
F1	SS SCHMELZS.T 6,3A TR5-T FUSE	SS 1052.4410.00	WICKMANN	19374 T6.3A	
F2	SS SCHMELZS.T 4A TR5-T FUSE TR5T 4A	SS 0815.8200.00	WICKMANN	372 T4A	
F3	SS SCHMELZS.T 4A TR5-T FUSE TR5T 4A	SS 0815.8200.00	WICKMANN	372 T4A	
F4	SS SCHMELZS.T 1A TR5-T FUSE TR5T 1A	SS 0815.8245.00	WICKMANN	372 T1A	
F10	SS SCHMELZS.T 6,3A TR5-T FUSE	SS 1052.4410.00	WICKMANN	19374 T6.3A	
N1	BO LT1084CP LD+ADJ5AVREGL IC VOLTAGE REGULATOR	2028.4955.00	LINEAR_TEC	LT1084CP	
R1	RG 200R +-1% TK100 0603 SMD RESISTOR EIA0603	1097.6386.00	PHILIPS_CO	RC 22 H	
R2	RG 330R +-1% TK100 0603 SMD RESISTOR EIA0603	0009.6960.00	ROEDERSTEI	D11 0603	
X11 ..13	FP STECKERLEISTE 10P.GER CONNECTOR 10POL.	FP 0815.7603.00	J_S_T_DEUT	B10P-VH-B	
X14 ..16	FP STIFTSOCKEL 4POL.GS CONNECTOR	0344.9612.00	AMP	P-N 3502 11-1	

1GPK 114 3PLU	Äl	Datum Date	Schaltteilliste für Parts list for	Sachnummer Stock No.	Blatt-Nr. Page
ROHDE&SCHWARZ	04	28.09.00	ED POWER BOARD POWER BOARD	1110.2732.01 SA	1-



DARSTELLUNG SEITE B
VIEW ON SIDE B

ACHTUNG: EGB!
ELEKTROSTATISCH GEFAEHRDETE BAUELEMENTE ERFORDERN EINE BESONDERE HANDHABUNG.
ATTENTION ESD!
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BINDENDE ANGABEN UEBER VARIANTEN, TRIMMWERTE, BAUTEILWERTE UND NICHT BESTUECKTE BAUTEILE SIEHE SA.

FOR BINDING INFORMATION ON MODELS, TRIMMING AND COMPONENTS VALUES AND NONFITTED COMPONENTS SEE PARTS LIST.

AEND. IND.	AENDERUNGS-MITTEILUNG	DATUM	NAME
02.01			

1GPK	DATUM	NAME
BEARB.		SR
GEPR.		SR
NORM		
PLOTT	97-12-01	SCHWAIGE

ROHDE&SCHWARZ
ZU GERAET AMIQ

BENENNUNG
POWER_BOARD
POWER_BOARD

ZEICHN.-NR.
1110.2732.01 D

BLATT-NR. 1+
V. BL.

REG.I.V. 1110.2003
ERSTE Z. 1110.2003

ROHDE&SCHWARZ

Circuit Documents

for Module

Differential Outputs

1110.3700.02

Kennz. Comp. No.	Benennung Designation	Sachnummer Stock No.	Hersteller Manufacturer	Bezeichnung Designation	enthalten in contained in
.	XX VARIANTENERKLAERUNG IDENTIFICATION OF MODELS VAR 02 = GRUNDAUSFUEHRUNG MOD 02 = BASIC MODEL				
A20	ED I/Q DIFF.OUTPUT BOARD I/Q DIFF.OUTPUT BOARD HIERZU STROML.1110.3768S SEE CIRC.DIAG.1110.3768S	1110.3768.02			1110.3722.00
W25	DY OPTION POWER CABLE	1122.2310.00			1110.3722.00
W111	DV I/Q DIFF. CABLE I/Q DIFF. CABLE	1110.3797.00			1110.3722.00
W112	DV I/Q DIFF. CABLE I/Q DIFF. CABLE	1110.3797.00			1110.3722.00

+5VA
V1 BAV99
I_SENSE (1/8B)
U1 LM339D
+2.5V
-5V-ADJ
-2.5V
R11 1.62K
R94 2K
R15 200K
V6 BAS216
C17 1U 10V
D2 74HC00T
D1 74ACT125T
K6_EN (1/3D)
R125 10
C94 10N
V13 BAS216
K6
K1/5_EN (1/3D)
PWRON_RESET (1/3C,2/3B,2/3D,3/4C)
R65 10
C96 10N
C79 10N
K5
V5 BAS216
K1

+5VA
V2 BAV99
I_SENSE (1/8D)
U1 LM339D
+2.5V
-5V-ADJ
-2.5V
R12 1.62K
R95 2K
R16 200K
V8 BAS216
C18 1U 10V
D2 74HC00T
I_EN (3/6A)
D1 74ACT125T
R66 10
C80 10N
V7 BAS216
K2
PWRON_RESET (1/3B,2/3B,2/3D,3/4C)

D8 74HC02T
I_EN (3/6A)
K1/5_EN (1/3B)
DIFF (3/6B)
K6_EN (1/3A)
D3 74HC02T
K8_EN (2/3A)
Q_EN (3/6A)
K3/7_EN (2/3B)

+5VA
C21 1U 10V
R30 10K
+2.5V
R29 10K
R27 10K
C22 1U 10V
-2.5V
R28 10K
-5V-ADJ

+5VA
C54 100N
U1 LM339D
C51 100N
-5V-ADJ
C56 100N
D1 74ACT125T
C55 100N
D2 74HC00T
C66 100N
D3 74HC02T
C92 100N
D8 74HC02T

D1 74ACT125T
R32 10K

ACHTUNG: EGB !
ELEKTROSTATISCH GEFAEHRDETE BAUELEMENTE ERFORDERN EINE BESONDERE HANDHABUNG.
ATTENTION ESD !
ELECTROSTATIC SENSITIVE DEVICES REQUIRE A SPECIAL HANDLING

+5VI
X111 SMB-ST
I_IN
K5
K6
K1
R129 15
R70 240 0.1%
R69 305 0.1%
C28 100N
OFFS1 (3/8A)
R55 39.2K
N1 MAX4108ESA
R59 75
C29 100N
C98 10P
R73 150 0.1%
R71 150 0.1%
C31 100N
R72 150 0.1%
N2 MAX4108ESA
R60 75
C32 100N
V15 BAS216
V16 BAS216
R35 200 0.1%
R36 200 0.1%
R37 200 0.1%
R38 200 0.1%
X1 I_OUT
R19 100K 0.1%
I_SENSE (1/1B)
R20 100K 0.1%
C9 10P
R79 75
R120 39.2K **

OFFS2 (3/8A)
R133 12.1K
R56 750
C35 100N
N3 MAX4108ESA
C36 100N
C100 6.8P
R74 150 0.1%
R75 150 0.1%
R78 100 0.1%
R77 511 0.1%
R80 20
OFF_I (3/8B)
R76 150 0.1%
C34 100N
N4 MAX4108ESA
R61 75
C33 100N
V18 BAS216
V17 BAS216
R40 200 0.1%
R39 200 0.1%
R41 200 0.1%
R42 200 0.1%
K2
X2 I_OUT
R22 100K 0.1%
I_SENSE (1/1C)
R21 100K 0.1%
C10 10P

+5VI
C49 100N
N1 MAX4108ESA
C50 100N
-5VI
C47 100N
N2 MAX4108ESA
C48 100N
C37 100N
N3 MAX4108ESA
C46 100N
C57 100N
N4 MAX4108ESA
C30 100N

02.02				1GPK	DATUM	NAME	BENENNUNG
				BEARB.		HM	I/Q DIFF.OUTPUT BOARD
				GEPR.		HM	
				NORM			
				PLOTT	98-08-19	HALLERME	TOP/TOP.1
				ROHDE&SCHWARZ			ZEICHN.-NR. 1110.3768.01 S
AEND. IND.	AENDERUNGS-MITTEILUNG	DATUM	NAME	ZU GERAET AMIQ-B2			REG.I.V. 1110.3700 ERSTE Z. 1110.3700.01

BLATT-NR. 1 +

UEBER DIESE UNTERLAGE
BEHALTEN WIR UNS ALLE RECHTE VOR

Q_SENSE (2/8B) +5VA V3 BAV99 +2.5V −5V−ADJ −2.5V U2 LM339D R13 1.62K R96 2K R17 200K V10 BAS216 C19 1U 10V D2 74HC00T D7 74ACT125T K8_EN (1/3E) K3/7_EN (1/3E) PWRON_RESET (1/3B,1/3C,2/3D,3/4C) R126 10 C95 10N V14 BAS216 K8 R67 10 C97 1N C81 10N K7 V9 BAS216 K3

Q_SENSE (2/8D) +5VA V4 BAV99 +2.5V −5V−ADJ −2.5V U2 LM339D R14 1.62K R97 2K R18 200K V11 BAS216 C20 1U 10V D2 74HC00T D7 74ACT125T Q_EN (3/6A) PWRON_RESET (1/3B,1/3C,2/3B,3/4C) R68 10 C82 10N V12 BAS216 K4

X112 SMB−ST Q_IN K7 R130 15 R92 240 0.1% R91 305 0.1% C99 10P C44 100N OFFS3 (3/8B) R58 39.2K N5 MAX4108ESA R64 75 C43 100N R87 75 R121 39.2K ** +5VQ V21 BAS216 K8 R90 150 0.1% R89 150 0.1% C45 100N R88 150 0.1% N6 MAX4108ESA R63 75 C42 100N V22 BAS216 −5VQ R44 200 0.1% R43 200 0.1% R45 200 0.1% R46 200 0.1% K3 R24 100K 0.1% R23 100K 0.1% C11 10P X3 Q_OUT Q_SENSE (2/1B)

N7 MAX4108ESA C41 100N C101 6.8P OFFS4 (3/8B) R134 12.1K R57 750 C38 100N R84 100 0.1% R85 511 0.1% R86 20 +5VQ V19 BAS216 R82 150 0.1% R81 150 0.1% C40 100N R83 150 0.1% OFF_Q (3/8D) N8 MAX4108ESA R62 75 C39 100N V20 BAS216 −5VQ R48 200 0.1% R47 200 0.1% R49 200 0.1% R50 200 0.1% K4 R26 100K 0.1% R25 100K 0.1% C12 10P X4 $\overline{Q}$_OUT $\overline{Q}$_SENSE (2/1C)

+5VQ C27 100N C25 100N C23 100N C58 100N N5 MAX4108ESA N6 MAX4108ESA N7 MAX4108ESA N8 MAX4108ESA C26 100N C24 100N C60 100N C59 100N −5VQ

+5VA C53 100N U2 LM339D C52 100N −5V−ADJ

+5VA C93 100N D7 74ACT125T R54 10K D7 74ACT125T

ACHTUNG: EGB !
ELEKTROSTATISCH GEFAEHRDETE BAUELEMENTE ERFORDERN EINE BESONDERE HANDHABUNG.
ATTENTION ESD !
ELECTROSTATIC SENSITIVE DEVICES REQUIRE A SPECIAL HANDLING

AEND. IND.	AENDERUNGS−MITTEILUNG	DATUM	NAME
02.02			

	DATUM	NAME
1GPK		
BEARB.		HM
GEPR.		HM
NORM		
PLOTT	98−08−19	HALLERME

BENENNUNG
I/Q DIFF.OUTPUT BOARD
TOP/TOP.2

ROHDE&SCHWARZ
ZEICHN.−NR. 1110.3768.01 S
BLATT−NR. 2 +
ZU GERAET AMIQ−B2
REG.I.V. 1110.3700
ERSTE Z. 1110.3700.01

N14 LM78L05ACM
R127 39 1W
C83 4.7U 25V
C84 4.7U 25V
+5V-ADJ

N30 LT1117CS
+12VA
R107 5,6 1W
R124 5,6 1W
C5 10U 25V
R33 301
R9 100
C14 47U 10V
V27 SM6T6V8A
+5VI

N31 LT1117CS
R122 5,6 1W
R123 5,6 1W
C6 10U 25V
R34 301
R10 100
C15 47U 10V
V29 SM6T6V8A
+5VQ

N13 LM79L05ACD
R128 39 1W
C85 4.7U 25V
C86 4.7U 25V
-5V-ADJ

N15 LT1175CSB
-12VA
R100 5,6 1W
R101 5,6 1W
R116 0
R117 0
C87 10U 25V
R104 150K
R98 47K
C89 47U 10V
V28 SM6T6V8A
-5VI

N16 LT1175CSB
R102 5,6 1W
R103 5,6 1W
R119 0
R118 0
C88 10U 25V
R105 150K
R99 47K
C90 47U 10V
V30 SM6T6V8A
-5VQ

+5VA
C67 100N
D4 74HCT4094T

+5VA
R106 10K
D4 74HCT4094T
C2 EN3
SRG C1/→
1D 2D 3D
I_EN (1/2D)
I_EN (1/3C)
Q_EN (1/2E)
Q_EN (2/3C)
DIFF (1/2D)

+5VA
C65 100N
C16 100U 35V
L2 625R(Z)

X25 connector
SER1_CLK R51 100 C74 1P
STROBE1 R52 100 C76 1P
DATA1_OUT R53 100 C91 1P
PWRON_RESET (1/3B,1/3C,2/3B,2/30)
R93 1K C3 10U 25V
OPT_ID0 R6 100
OPT_ID1 R7 100 N.F. +5VA
L3 625R(Z) C7 10U 25V C71 100N
C4 10U 25V C72 100N
L1 625R(Z) +12VA

D3 74HC02T

N12 OP97
C13 10P
R5 100
R8 100
C8 10U 25V
C70 100N

+5V-ADJ
D5 DAC8143
VREF RFB \CLR \LD1 \LD2 STB1 IOUT1 STB2 \STB3 IOUT2 STB4 SRI SRO
C1 12P
N10 OP297GS
R109 20K 0.1%
R108 20K 0.1%
R114 10K 0.1%
+5VI
V25 BC850B
P10
+-2,5V
C102 100N
R131 1K
V23 BC860B
-5VI
OFF_I (1/6C)

+5V-ADJ
D6 DAC8143
C2 12P
N11 OP297GS
R110 20K 0.1%
R111 20K 0.1%
R115 10K 0.1%
+5VQ
V26 BC850B
P11
+-2,5V
C103 100N
R132 1K
V24 BC860B
-5VQ
OFF_Q (2/6C)

N9 OP297GS
R31 5.11K 0.1%
R113 20K 0.1%
R112 20K 0.1%
R4 5K 2
R3 5K 2
R2 5K 2
R1 5K 2
OFFS1 (1/5B)
OFFS2 (1/5C)
OFFS3 (2/5B)
OFFS4 (2/5C)

+5V-ADJ
C68 100N
N12 OP97
C69 100N
-5V-ADJ

+5V-ADJ
C73 100N
D5 DAC8143
-5V-ADJ

+5V-ADJ
C75 100N
D6 DAC8143
-5V-ADJ

+5V-ADJ
C64 100N
N9 OP297GS
C63 100N
-5V-ADJ

+5V-ADJ
C77 100N
N10 OP297GS
C78 100N
-5V-ADJ

+5V-ADJ
C62 100N
N11 OP297GS
C61 100N
-5V-ADJ

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ELEKTROSTATISCH GEFAEHRDETE BAUELEMENTE ERFORDERN EINE BESONDERE HANDHABUNG.
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AEND. IND.	AENDERUNGS-MITTEILUNG	DATUM	NAME
02.02			

	DATUM	NAME
1GPK		
BEARB.		HM
GEPR.		HM
NORM		
PLOTT	98-08-19	HALLERME

ROHDE&SCHWARZ

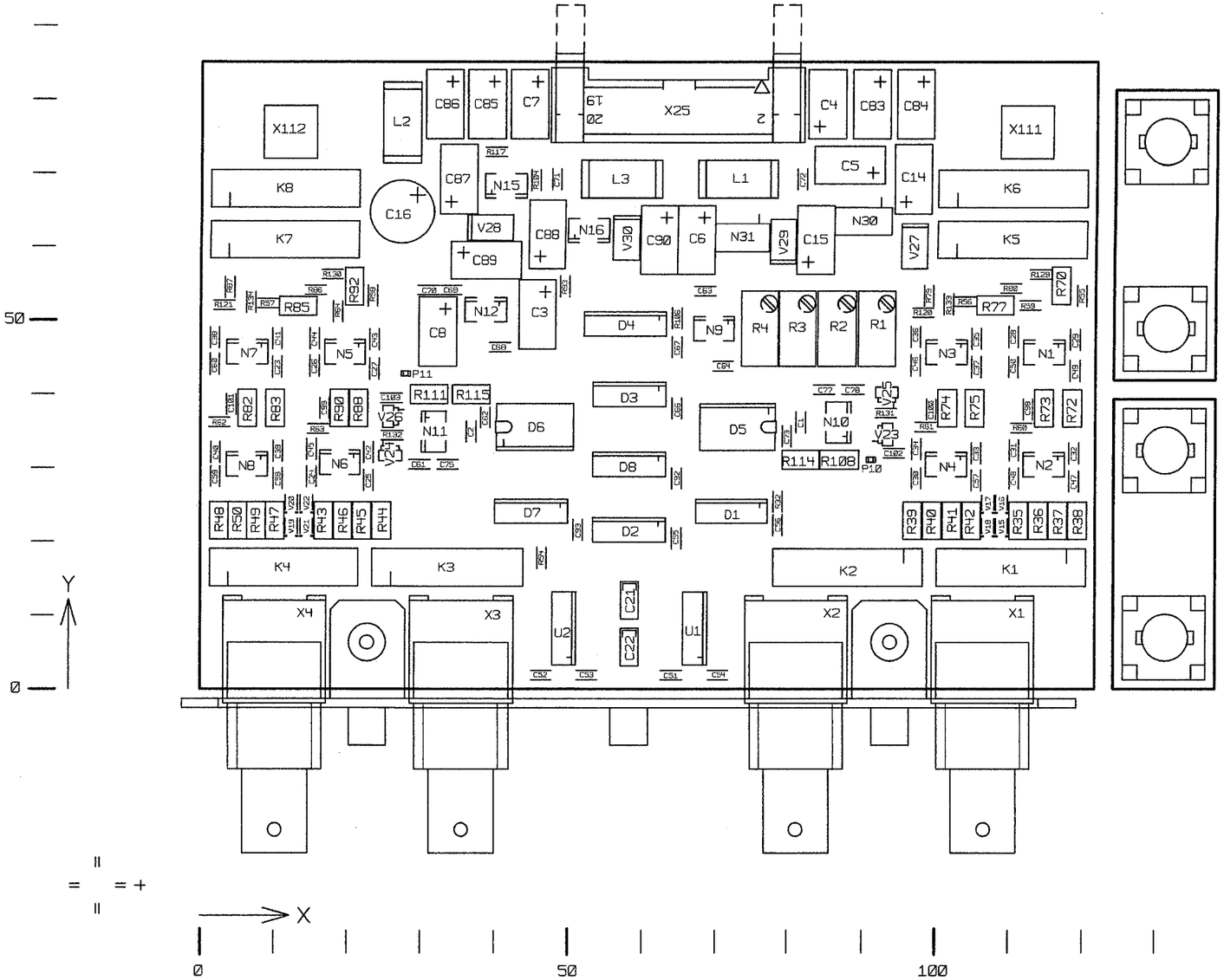
ZU GERAET AMIQ-B2

BENENNUNG
I/Q DIFF.OUTPUT BOARD
TOP/TOP.3

ZEICHN.-NR. 1110.3768.01 S

BLATT-NR. 3 -

REG.I.V. 1110.3700 ERSTE Z. 1110.3700.01



DARSTELLUNG SEITE B
VIEW ON SIDE B

ACHTUNG: EGB!
ELEKTROSTATISCH GEFAEHRDETE BAUELEMENTE ERFORDERN EINE BESONDERE HANDHABUNG.
ATTENTION ESD!
ELECTROSTATIC SENSITIVE DEVICES REQUIRE A SPECIAL HANDLING

BINDENDE ANGABEN UEBER VARIANTEN, TRIMMWERTE, BAUTEILWERTE UND NICHT BESTUECKTE BAUTEILE SIEHE SA.

FOR BINDING INFORMATION ON MODELS, TRIMMING AND COMPONENTS VALUES AND NONFITTED COMPONENTS SEE PARTS LIST.

AEND. IND.	AENDERUNGS-MITTEILUNG	DATUM	NAME
02.00			

	1GPK	DATUM	NAME
BEARB.			HM
GEPR.			HM
NORM			
PLOTT	98-07-13		HALLERME

ROHDE&SCHWARZ
ZU GERAET AMIQ-B2

BENENNUNG
I/Q DIFF.OUTPUT BOARD

ZEICHN.-NR.
1110.3768.01 D

BLATT-NR. 1+
V. BL.

REG.I.V. 1110.3700 | ERSTE Z. 1110.3700

ROHDE&SCHWARZ

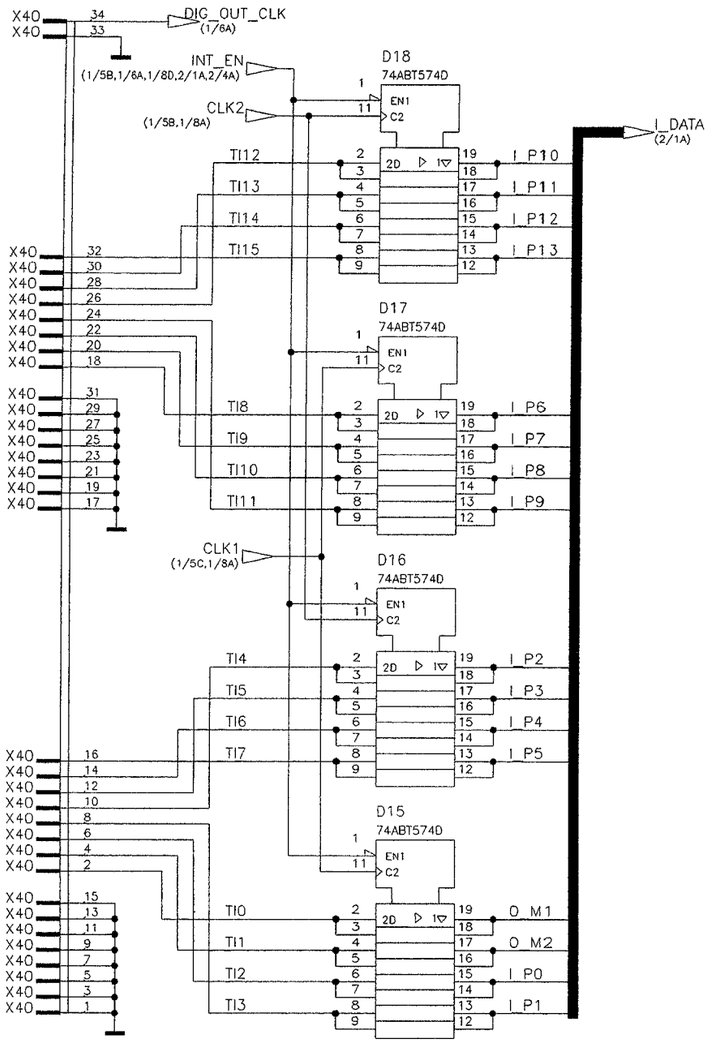
Circuit Documents

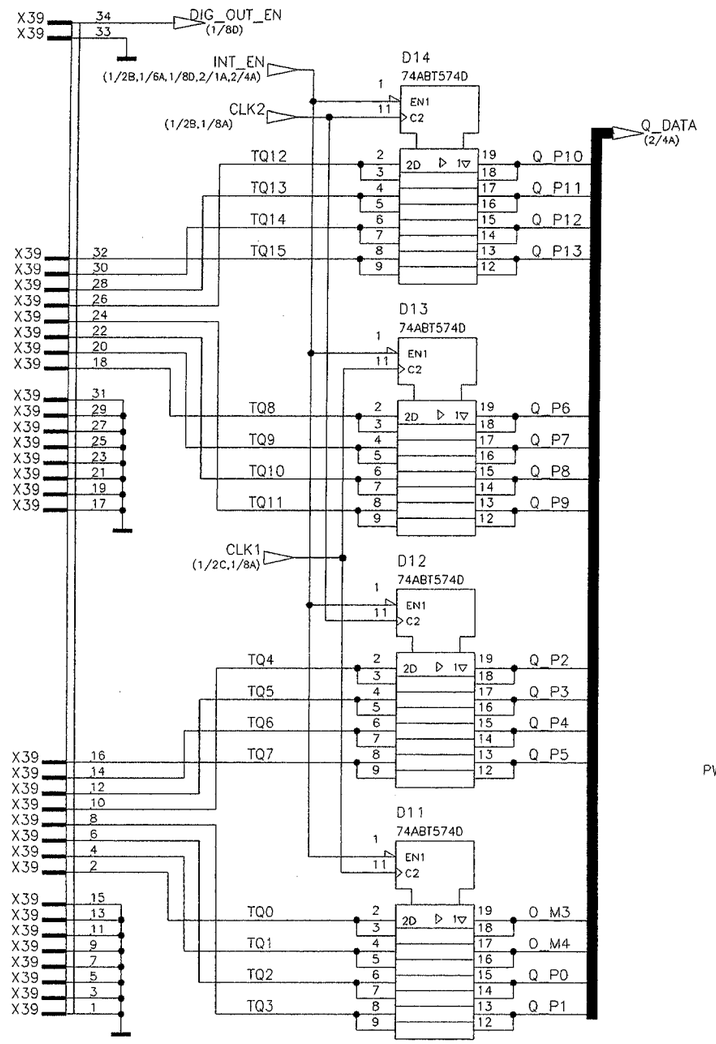
for Module

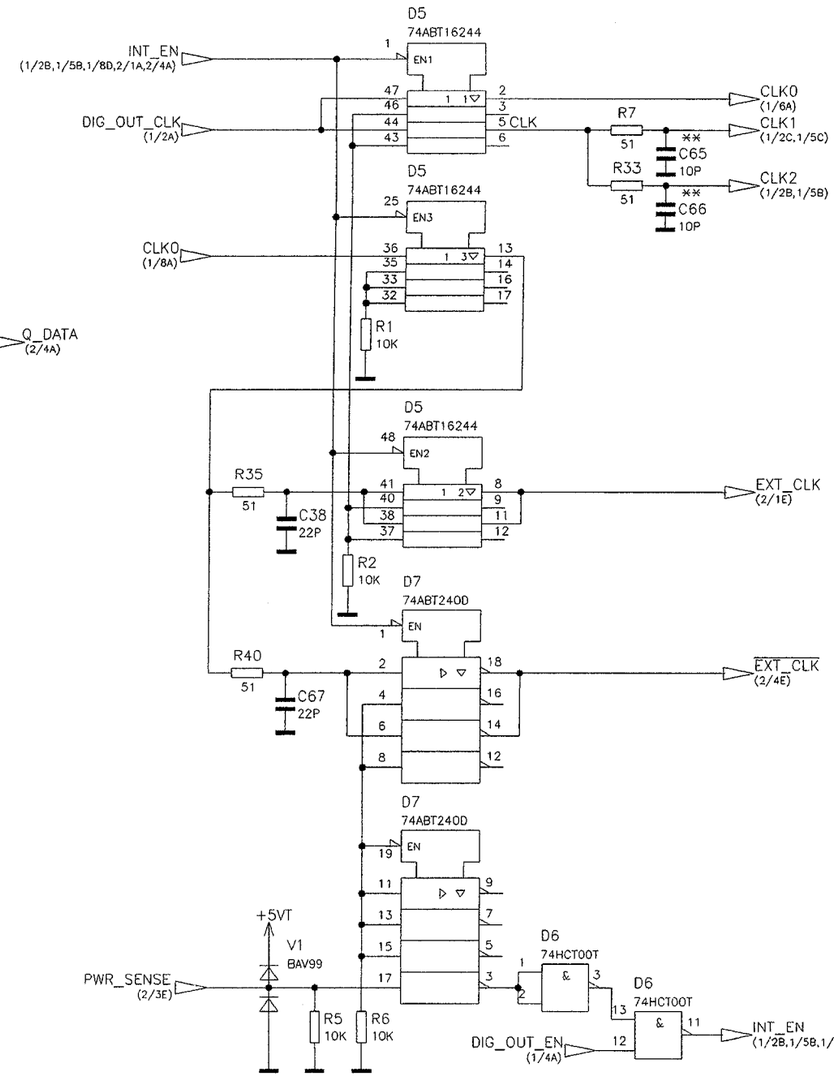
Digital I/O Outputs

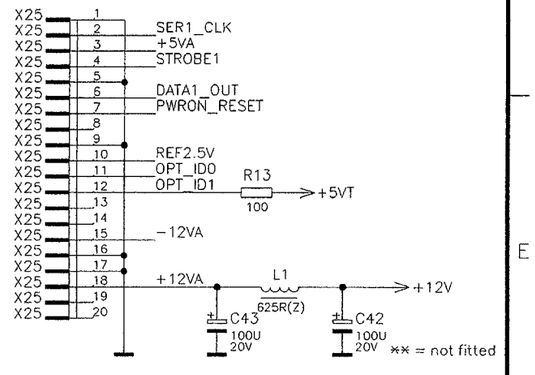
1122.2203.02

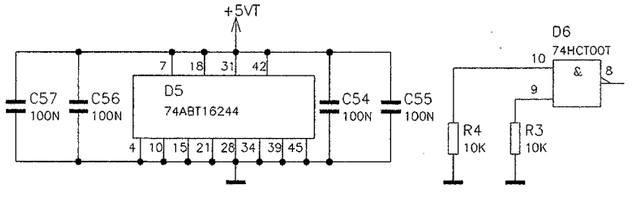
Kennz. Comp. No.	Benennung Designation	Sachnummer Stock No.	Hersteller Manufacturer	Bezeichnung Designation	enthalten in contained in
.	XX VARIANTENERKLAERUNG IDENTIFICATION OF MODELS VAR 02 = GRUNDAUSFUEHRUNG MOD 02 = BASIC MODEL				
A30	ED DIGITAL OUTPUT BOARD HIERZU STROML.1122.2203 S SEE CIRC.DIAG.1122.2203 S	1122.2203.02			1122.2126.00
W25	DY OPTION POWER CABLE	1122.2310.00			1122.2126.00
W39	DY Q DATA CABLE	1122.2303.00			1122.2126.00
W40	DY I DATA CABLE	1122.2290.00			1122.2126.00

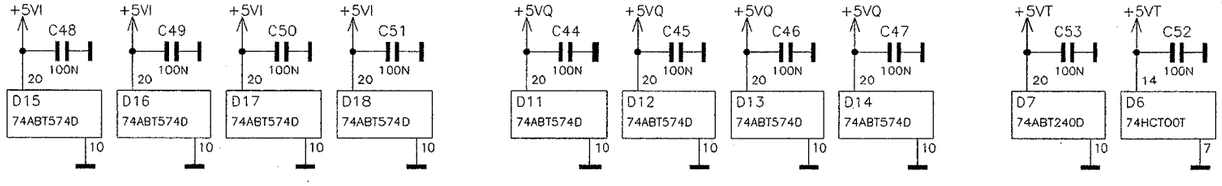












Bindende Angaben ueber Varianten, Trimmwerte, Bauteile und nicht bestueckte Bauteile siehe SA.
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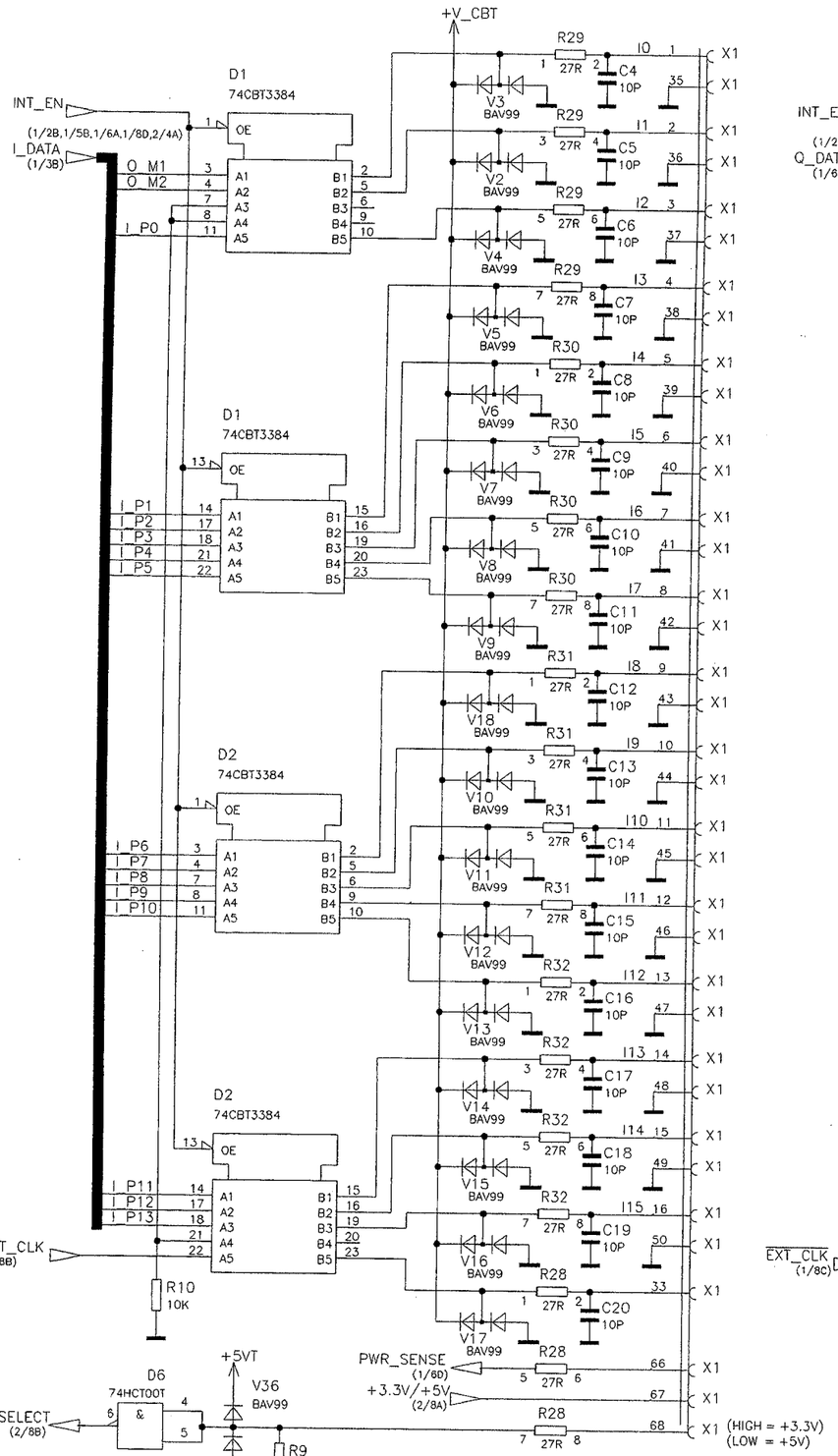
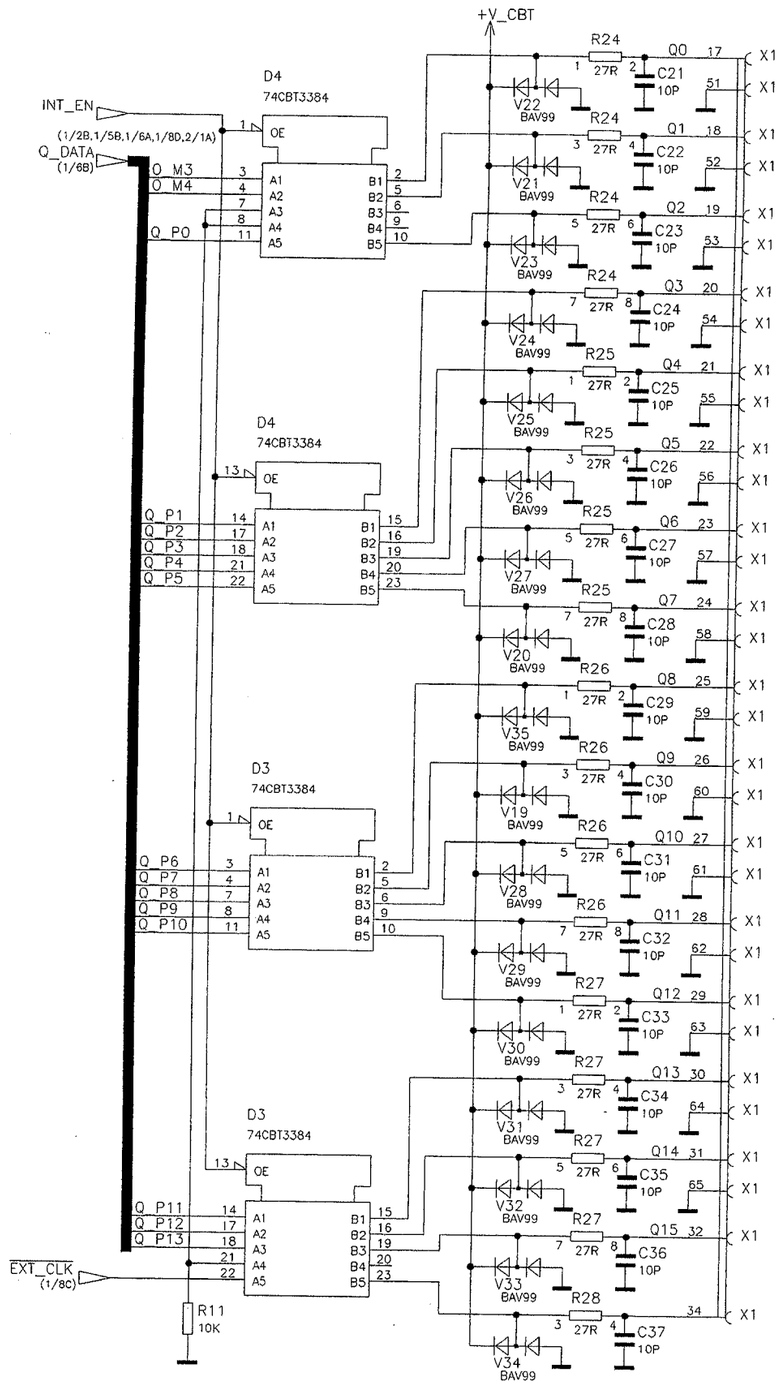
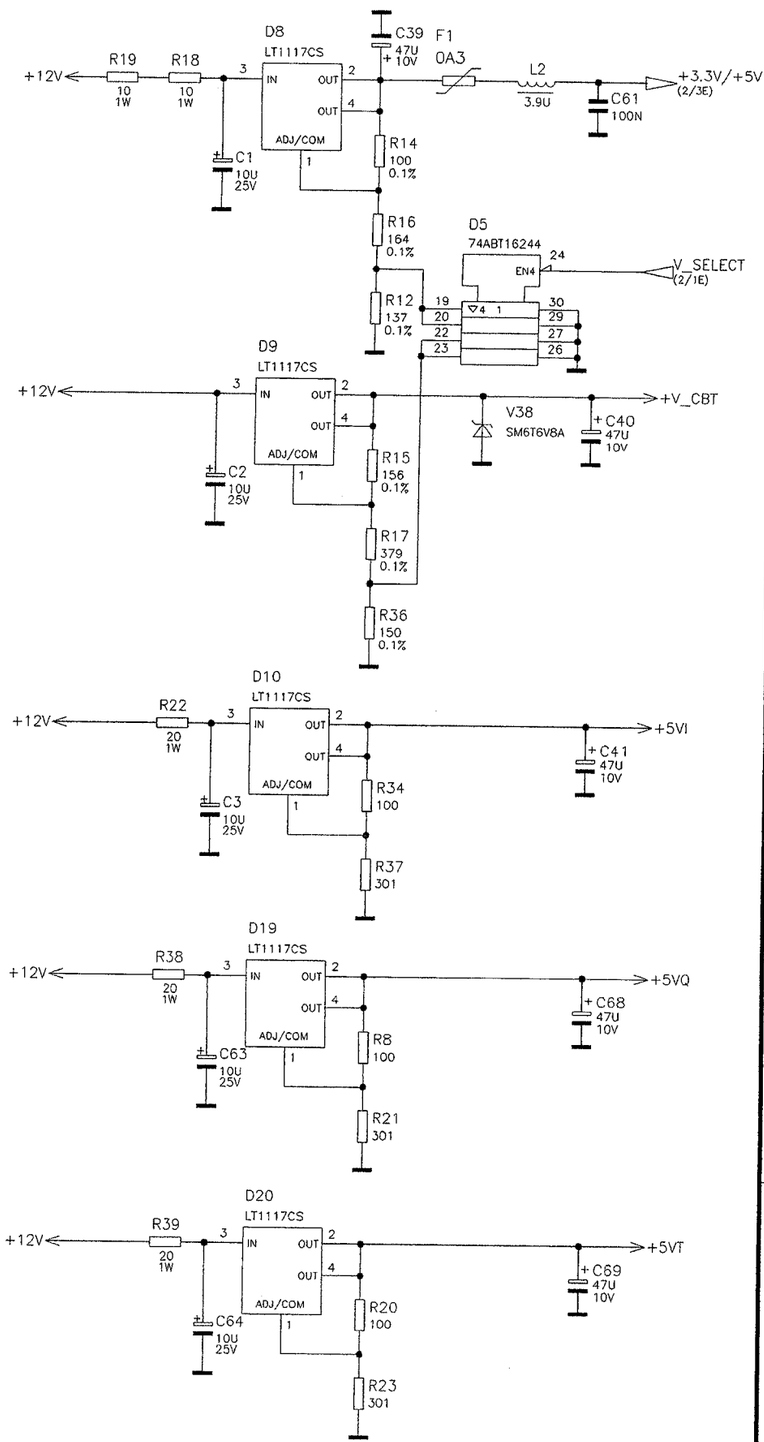
ROHDE&SCHWARZ	Benennung: / Designation: DIGITAL OUTPUT BOARD DIGITAL OUTPUT BOARD					Sprache: / Lang.: DE	Aei: / C.I.: 03.00	Blatt: / Sh.: 1+
Typ: / Type: AMIQ-B3	Datum: / Date: 99-07-21	Abteilung: / Dpt: 1GPK	Name: / Name: SCHWAIGE			Zeichn. Nr.: / Drawing No.: 1122.2203.01 S		
1. Z.: / used in: 1122.2103.01				TOP/TOP.1				







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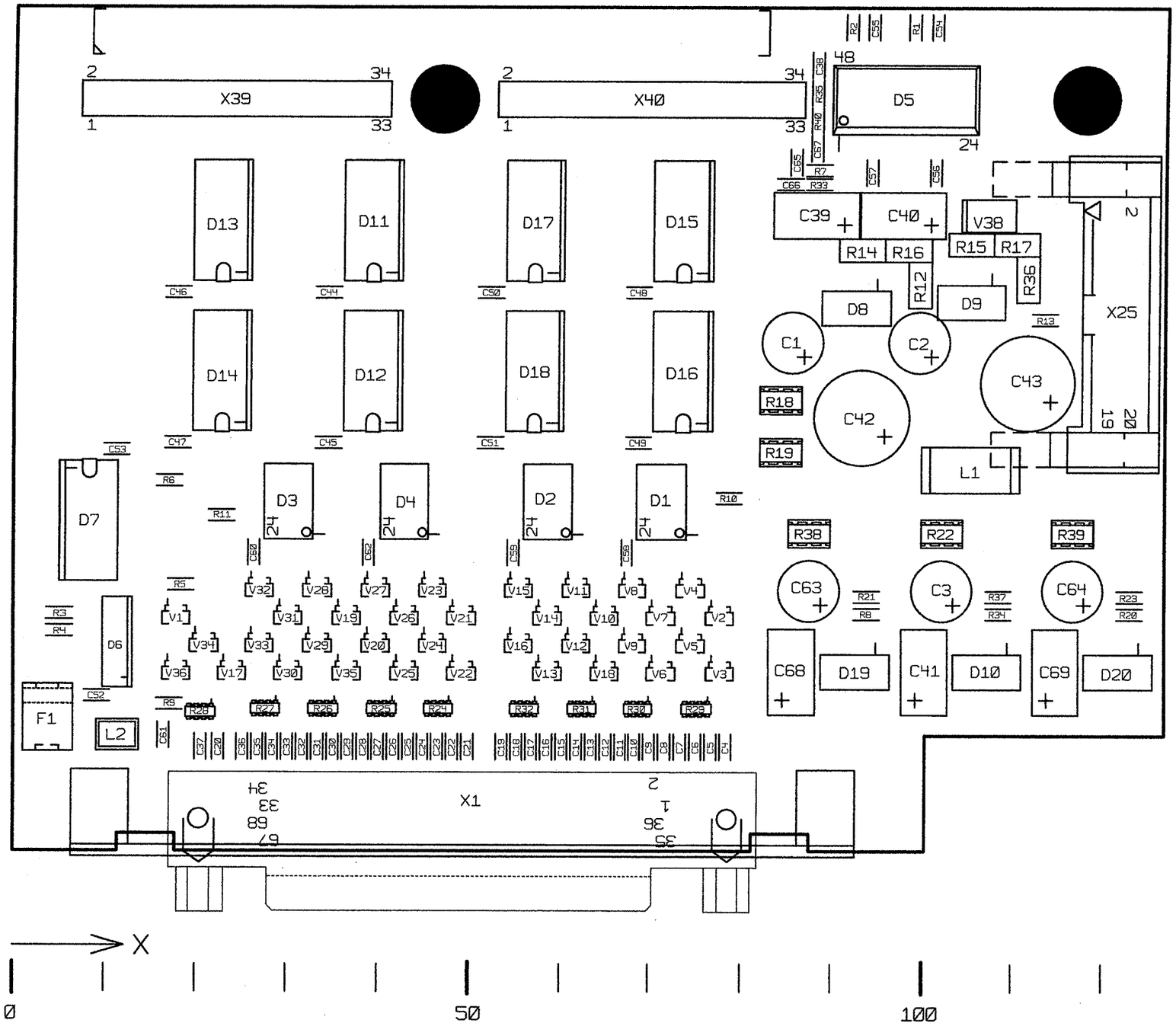
ROHDE&SCHWARZ	Benennung: / Designation: DIGITAL OUTPUT BOARD / DIGITAL OUTPUT BOARD			Sprache: / Lang.:	Aei: / C.I.:	Blatt: / Sh.:
				DE	03.00	2–
Typ: / Type: AMIQ–B3	Datum: / Date: 99–07–21	Abteilung: / Dpt: 1GPK	Name: / Name: SCHWAIGE	Zeichn. Nr.: / Drawing No.:		
1, 2.. used in: 1122.2103.01			TOP/TOP.2	1122.2203.01 S		



DARSTELLUNG SEITE B
VIEW ON SIDE B

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ROHDE&SCHWARZ	Benennung: / Designat.: DIGITAL OUTPUT BOARD / DIGITAL OUTPUT BOARD			Spr.:/Lang.: de	Aei:/C.I.: 03.00	Blatt:/Sh.: 1+
Typ: / Type: AMIQ-B3	Datum: / Date: 99-07-21	Abteilung: / Dept.: 1GPK	Name: / Name: SCHWAIGE	Zeichn.Nr.:/Drawing No.: 1122.2203.01 D		
1.Z.: / used in: 1122.2103						