

10MHz frequency source

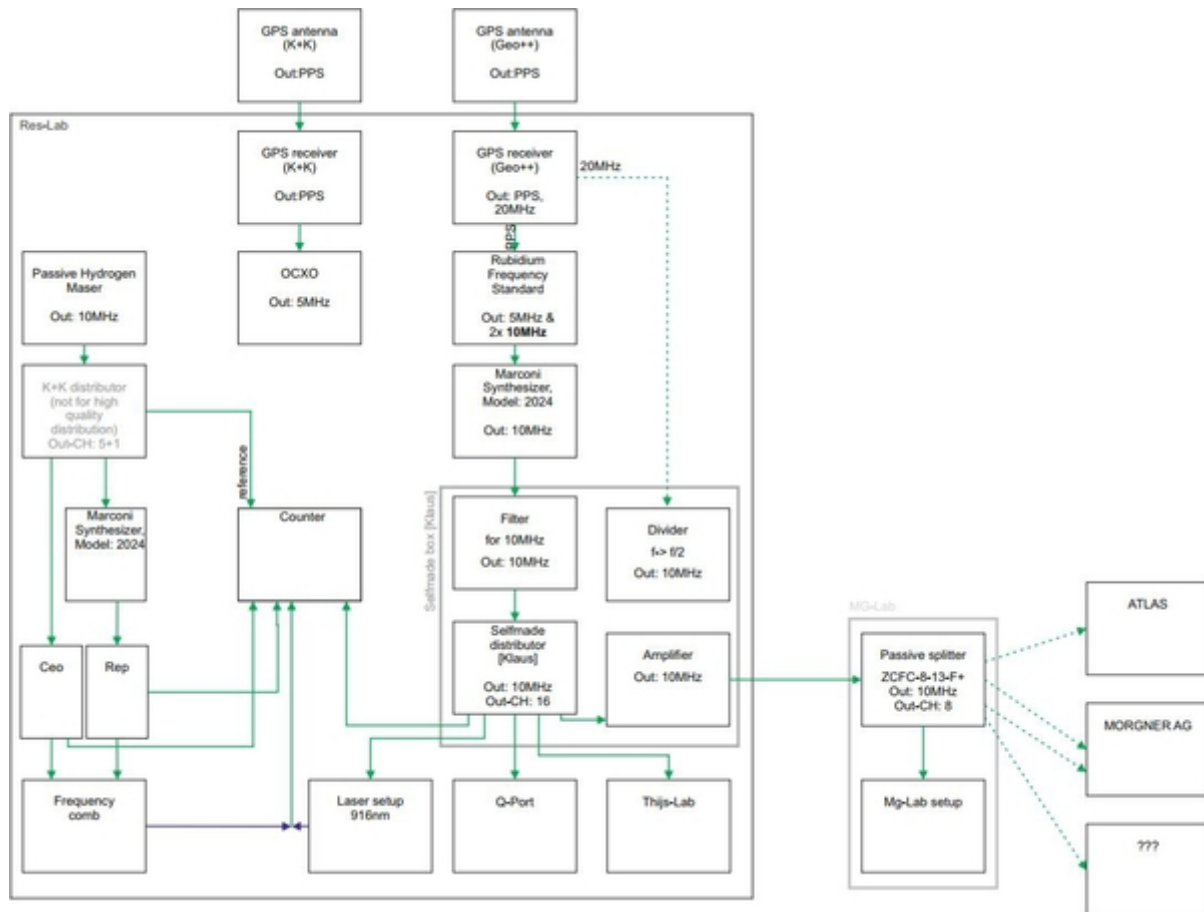
Possible sources

All sources exist in ResLab.

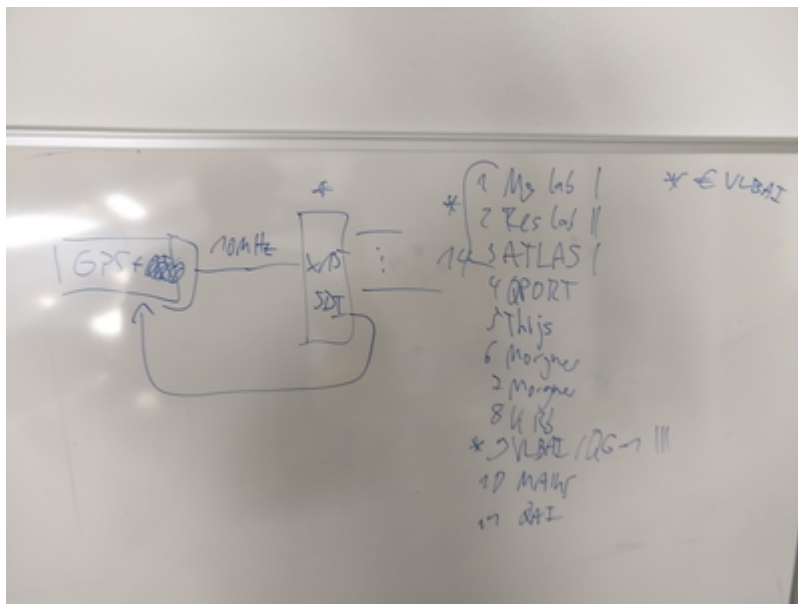
1. [Passive Hydrogen Maser](#)
2. [OCXO](#)
 1. OXCO 5 MHz
 2. OXCO 10 MHz (broken)
3. [Rubidium Frequency Standard](#)
 1. [GPS receiver](#)
 2. [Marconi Synthesizer](#), Model: 2024
 3. Selfmade distributor [Klaus]
 4. K+K distributor (not for high quality distribution)
 5. HighTec Fiber ???
1. CSAC Chip für stabile 10MHz Referenz

Current Setup [30.05.2017]

Current 10MHz setup.pdf



Future Setup



- Ansprechpartner für Löcher in der Uni: Miehlbradt, Marion (Tel.: 2258)
 - Raumpläne IQO
 - 10_MHz_Verlegung_IQ_08_2017
 - Schadstoffuntersuchungsbericht
- : Negativ auf Aspest von Firma Wessling!

Experiment Ansprechperson Experiment Ansprechperson Kabelverlegung	Raumnummer	Number of cables [new =  , old =		Number of distributors (Number of outputs)	Cable length + "Lab cable Length" [m]	Holes [Number, size, place]	Notes
		 Mean cable Lab cable					

Experiment Ansprechperson Experiment Ansprechperson Kabelverlegung	Raumnummer	Number of cables [new =  , old =  1 Mean cable Lab cable 2 [					Number of distributors (Number of outputs)	Cable length + "Lab cable Length" [m]	Holes [Number, size, place]	Notes
ResLab S. Sauer S. Sauer	D215	 1 16 [2 (16)					1 (OXCO-Mean distributor) + 1 (Mean distributor - Reslab distributor) + 16*5	1, Ø=?, Reslab-Q-Port	-	

Experiment Ansprechperson Experiment Ansprechperson Kabelverlegung	Raumnummer	Number of cables [new =  , old = ] Mean cable Lab cable 1 + ? {					Number of distributors (Number of outputs)	Cable length + "Lab cable Length" [m]	Holes [Number, size, place]	Notes
										
KRb J. Peise A. Igel	E311						1 (16)	25(Reslab - Mg-Lab) + 20(Mg-Lab) + 60(Mg-Lab-KRB)	-	* KRB_10MHz_Kabel_08_2017 * Die Durchführungen sind alle groß genug, nur auf höhe des Elektroniklabors liegen die Kabel in der Nähe von Heizungsrohren. * Im Flur befindet sich ein offener Kabelkanal.

		Number of cables [new =  , old =				
Experiment Ansprechperson Experiment Ansprechperson Kabelverlegung	Raumnummer	 Mean cable Lab cable 1 + ? [	Number of distributors (Number of outputs)	Cable length + "Lab cable Length" [m]	Holes [Number, size, place]	Notes
QAI,EPR J. Peise C. Pür	D313 → D315	]	1 (16)	25 (Reslab - Mg-Lab) + 20(Mg-Lab) + 25(Mg-Lab-QAI) + 25(QAI-EPR)	-	-

Experiment Ansprechperson Experiment Ansprechperson Kabelverlegung	Raumnummer	Number of cables [new =  , old =  Mean cable Lab cable 1 + ? [	Number of distributors (Number of outputs)	Cable length + "Lab cable Length" [m]	Holes [Number, size, place]	Notes
ATLAS H. Albers H. Albers	D330		1 (16)	25(Reslab - Mg- Lab) + 25(Mg-Lab) + 50 (Mg-Lab- ATLAS) + 5(ATLAS-Lab)	?, Ø=10cm, ?	* ATLAS_10MHz_Habel_08_2017 * Gibt keine Information wie es über den Seminarraum verlegt ist → Neue Löcher bohren oder zusätzlicher Durchgang zu VLBAI

		Number of cables [new =  , old =				
Experiment Ansprechperson Experiment Ansprechperson Kabelverlegung	Raumnummer	] Mean cable Lab cable	Number of distributors (Number of outputs)	Cable length + "Lab cable Length" [m]	Holes [Number, size, place]	Notes
VLBAI E. Wodey ?	D323	] [	1 (16)	25(Reslab - Mg- Lab) + 25(Mg-Lab) + 20 (Mg-Lab- VLBAI) + 5 (VLBAI)	-	-

Experiment Ansprechperson Experiment Ansprechperson Kabelverlegung	Raumnummer	Number of cables [new =  , old = ] Mean cable Lab cable	Number of distributors (Number of outputs)	Cable length + "Lab cable Length" [m]	Holes [Number, size, place]	Notes
Quantengravi J. Mathias ?	D323		1 (16)	25(Reslab - Mg- Lab) + 25(Mg-Lab) + 20 (Mg-Lab- VLBAI) + 5 (VLBAI)	-	-

Experiment Ansprechperson Experiment Ansprechperson Kabelverlegung	Raumnummer	Number of cables [new =  , old =	Number of distributors (Number of outputs)	Cable length + "Lab cable Length" [m]	Holes [Number, size, place]	Notes
		 Mean cable Lab cable				
Q-Port S. Bode ?			-	-	-	Vorhandene Kabel ist verlegt, muss noch getestet werden

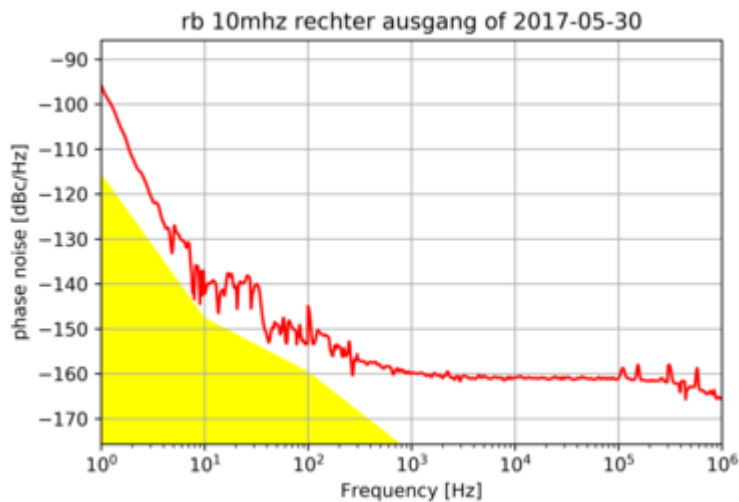
Experiment Ansprechperson Experiment Ansprechperson Kabelverlegung	Raumnummer	Number of cables [new =  , old =	Number of distributors (Number of outputs)	Cable length + "Lab cable Length" [m]	Holes [Number, size, place]	Notes
		 Mean cable Lab cable				
Lasus Thejs ?	D220		-	-	-	* Vorhandene Kabel ist verlegt, Aircell 7, muss noch getestet werden * Sein vorhandener Verteiler ist ein SRS FS710
Maius D. Becker		keine Antwort	keine Antwort	-	-	-
AG Morgner B. Kreipe		0	0	-	-	-
Gesamt			7 (16) 2 (min 8)	622		

To Do

1)

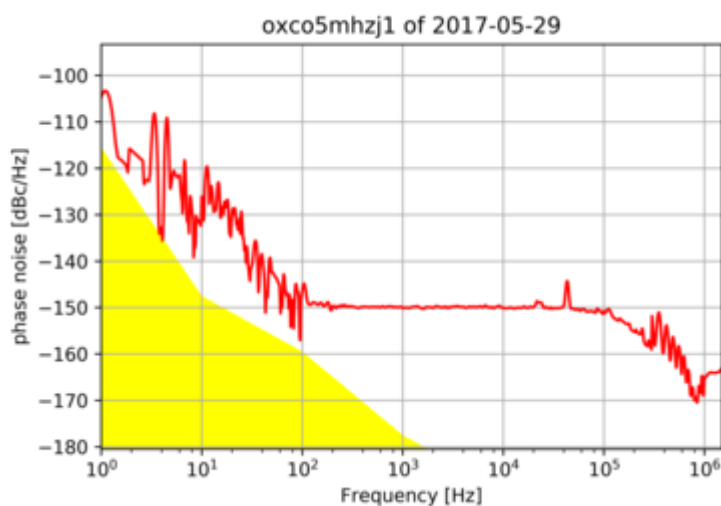
- ☐ FSWP-8 refernced to Maser
- ☐ FSWP-8 running 1 day ahead of measurement
- ☐ Measure: 100mHz-10MHz PN Rb-clock

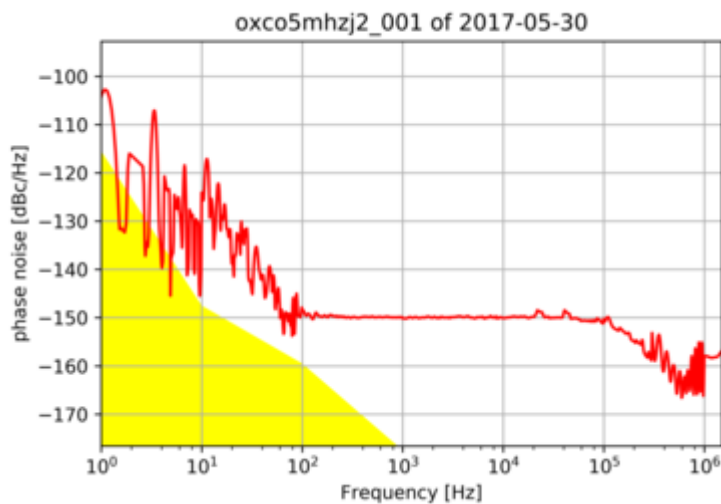
- “GPS →” Rb-10Mhz [right Output] → BNC cable → BNC-I-connector → BNC-SMA-conneccotor → long cable → PNA



- ☐ Measure: "- -" OCXO

- Channel J1 and J2: OCXO → short cable → SMA-I-connector → long cable → PNA

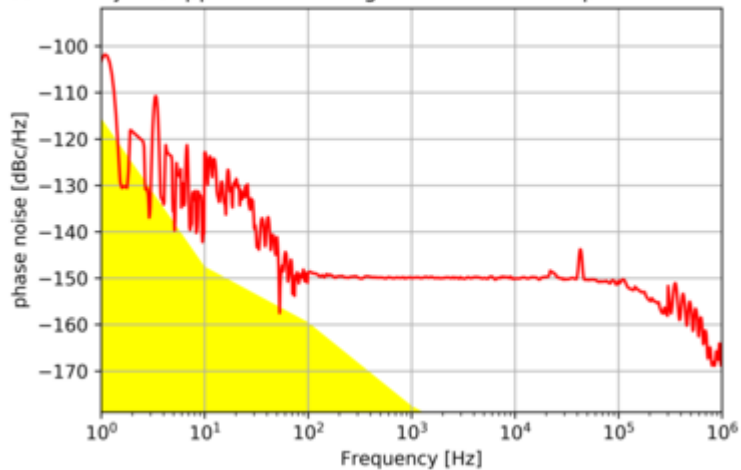




□ Measure: -"- -"- OCXO 5MHzx2 (passive)

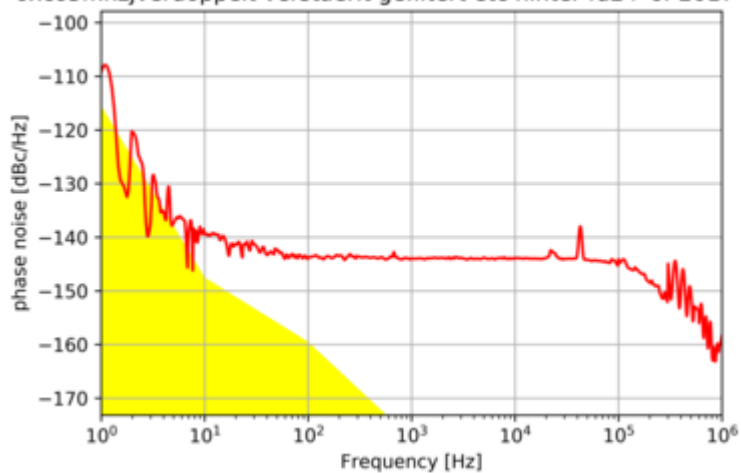
- J1 → short cable → SMA-BNC-connector → TP [6MHz] → long cable → PNA

oxco5mhzjverdoppelt verstaerlt gefiltert etc hinter tp6mhz of 2017-05-30



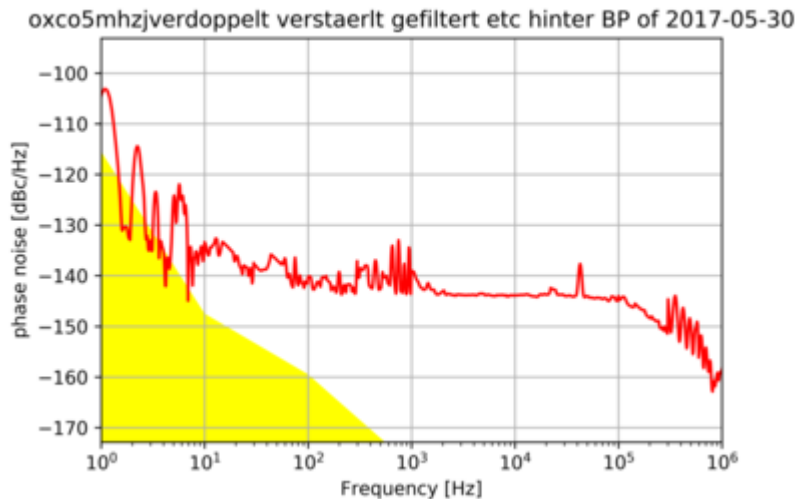
- J1 → short cable → SMA-BNC-connector → TP [6MHz] → Doubler [FD-2+] → BNC-SMA-connector → long cable → PNA

oxco5mhzjverdoppelt verstaerlt gefiltert etc hinter fd2+ of 2017-05-30

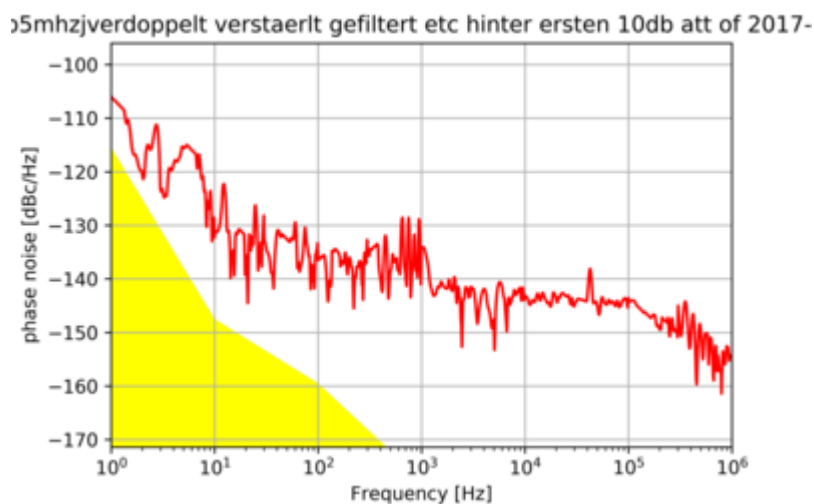


- J1 → short cable → SMA-BNC-connector → TP [6MHz] → Doubler [FD-2+] → BNC-SMA-connector → long cable → PNA

BP [SBP-10.7+] → long cable → PNA

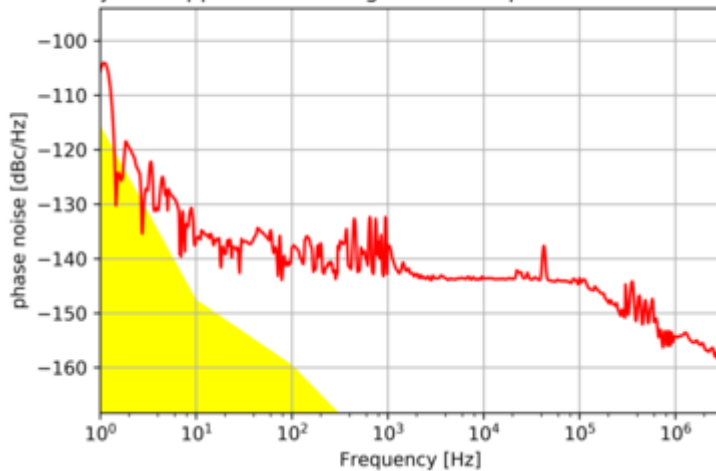


- J1 → short cable → SMA-BNC-connector → TP [6MHz] → Doubler [FD-2+] → BNC-SMA-connector → BP [SBP-10.7+] → BNC-SMA-connector → Att. [10dB] → BNC-SMA-connector → long cable → PNA

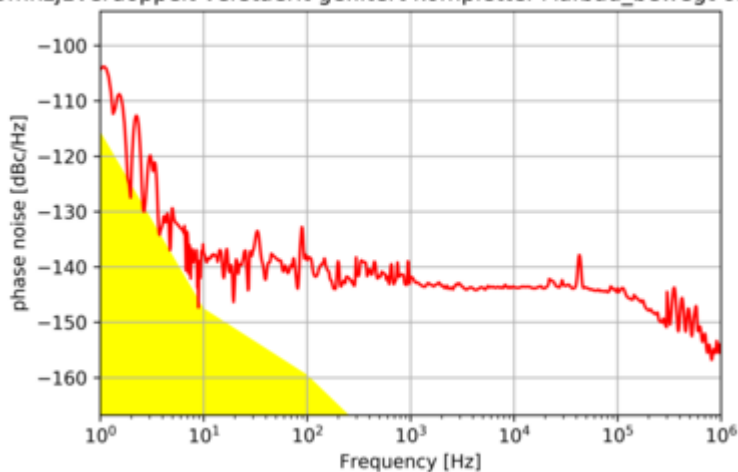


- Overall setup: J1 → short cable → SMA-BNC-connector → TP [6MHz] → Doubler [FD-2+] → BNC-SMA-connector → BP [SBP-10.7+] → BNC-SMA-connector → Att. [10dB] → short BNC-cable → Amplifier [ZFL-500LN-BNC+] → LP [BLP-15] → Att. [20dB] → Att. [3dB] → BNC-SMA-connector → long SMA cable → PNA

xco5mhzj1verdoppelt verstaerlt gefiltert kompletter Aufbau of 2017-05.



5mhzj1verdoppelt verstaerlt gefiltert kompletter Aufbau_bewegt of 2017



☐ Measure: -"- -"- OCXO 5MHzx2 (DDS?)

- Currently not possible.

2)

☐ Propagate K+K manuals

3)

☐ Repair K+K box

4)

☐ Compare PN Marconi vs. ampifiers (which?)

5)

☐ Compare Specs Timetech & Spectra dynamics -> (PN, Channel/Channel isolation, Groundloops, min input power @ 10MHz)

Distibution

- Timetech distributor:
 - Gibt es für Eco (Isolation: 120dB bei 10MHz / only BNC) und High Performance (Isolation: 150dB / only SMA)
 - ECO Variante: Timetech distributor_datasheet
 - High Variante: Timetech distributor_datasheet

- Spectra dynamics distributor: [HPDA-15RMi](#)

Datasheet_HPDA-15RMi

Feature	TimeTech [Eco-Version]										Spectra dynamics HPDA-15RMi																																																																																																			
Phase Noise [dBc]	@ 10MHz 1Hz -148 10Hz -160 100Hz -165 1000Hz -166 10000Hz -166										@ <hi #ed1c24>???</hi> MHz 1Hz -155 (max -150) 10Hz -165 (max-160) 1000Hz -170 (max 168) 10000Hz -171 (max -170)																																																																																																			
Channel/Channel isolation [dB]	<table><tr><td colspan="2"></td><td colspan="3">5 MHz</td><td colspan="3">10 MHz</td><td colspan="3">100 MHz</td></tr><tr><td colspan="2">Np clipping below</td><td colspan="3">+12 dBm</td><td colspan="3">+12 dBm</td><td colspan="3">+12 dBm</td></tr><tr><td colspan="2">Reverse Isolation [dB]</td><td colspan="3">> 140 (145 typ.)</td><td colspan="3">> 120 (128 typ.)</td><td colspan="3">> 110 (118 typ.)</td></tr><tr><td colspan="2">Output / Output Isolation [dB]</td><td colspan="3">> 100 (108 typ.)</td><td colspan="3">> 90 (100 typ.)</td><td colspan="3">> 75 (83 typ.)</td></tr><tr><td colspan="2">Ch-A / Ch-B Isolation [dB]</td><td colspan="3">> 110 (117 typ.)</td><td colspan="3">> 100 (110 typ.)</td><td colspan="3">> 90 (98 typ.)</td></tr><tr><td colspan="2">Harmonics [dBc]</td><td colspan="3">+10 dBm input</td><td colspan="3">-76 -76 -80</td><td colspan="3">-70 -57 -65</td></tr><tr><td colspan="2">(1st, 2nd, 3rd)</td><td colspan="3">+13 dBm input</td><td colspan="3">-73 -69 -82</td><td colspan="3">-65 -55 -65</td></tr><tr><td colspan="2"></td><td colspan="3"></td><td colspan="3"></td><td colspan="3">-44 -46 -60</td></tr><tr><td colspan="2"></td><td colspan="3"></td><td colspan="3"></td><td colspan="3">-42 -40 -55</td></tr></table>												5 MHz			10 MHz			100 MHz			Np clipping below		+12 dBm			+12 dBm			+12 dBm			Reverse Isolation [dB]		> 140 (145 typ.)			> 120 (128 typ.)			> 110 (118 typ.)			Output / Output Isolation [dB]		> 100 (108 typ.)			> 90 (100 typ.)			> 75 (83 typ.)			Ch-A / Ch-B Isolation [dB]		> 110 (117 typ.)			> 100 (110 typ.)			> 90 (98 typ.)			Harmonics [dBc]		+10 dBm input			-76 -76 -80			-70 -57 -65			(1 st , 2 nd , 3 rd)		+13 dBm input			-73 -69 -82			-65 -55 -65											-44 -46 -60											-42 -40 -55			Out-out: 130 (min 130)\\Out-in: 140 (min 145)
		5 MHz			10 MHz			100 MHz																																																																																																						
Np clipping below		+12 dBm			+12 dBm			+12 dBm																																																																																																						
Reverse Isolation [dB]		> 140 (145 typ.)			> 120 (128 typ.)			> 110 (118 typ.)																																																																																																						
Output / Output Isolation [dB]		> 100 (108 typ.)			> 90 (100 typ.)			> 75 (83 typ.)																																																																																																						
Ch-A / Ch-B Isolation [dB]		> 110 (117 typ.)			> 100 (110 typ.)			> 90 (98 typ.)																																																																																																						
Harmonics [dBc]		+10 dBm input			-76 -76 -80			-70 -57 -65																																																																																																						
(1 st , 2 nd , 3 rd)		+13 dBm input			-73 -69 -82			-65 -55 -65																																																																																																						
								-44 -46 -60																																																																																																						
								-42 -40 -55																																																																																																						
Groundloops	<hi #ed1c24>???</hi>										<hi #ed1c24>???</hi>																																																																																																			
RF-Bandwidth [MHz]	5 to 100 MHz sine wave useable from 100kHz to 200 MHz										+/- 1 dB 0.5-65 (min 1-50)																																																																																																			
Input Level [dBm]	Input level working: +6 to +17 (+14 dBm @ 100 MHz) Input level nominal: +13										1 dB compression 18 (min 17) @ <hi #ed1c24>???</hi> MHz																																																																																																			
Output Level [dBm]	<hi #ed1c24>???</hi>										+18 @ <hi #ed1c24>???</hi> MHz																																																																																																			
Gain [dB]	Gain: 0 (+0.15/-0.1 dB, 1 - 100 MHz, +0.15 to -0.5 dB @ 200 MHz) Gain variation: < 0.1, output vs. output										@5MHz 0.2 (max 0.5)																																																																																																			
Impedance [Ω]	Input: 50, nominal Output: 50, nominal										Input: 50 Output: 50																																																																																																			
Return loss [dB]	Input: >45 @5MHz and 10 MHz, >30 @100 MHz Output: >50 @5MHz and 10 MHz, >30 (typ -35) @ 100 MHz										Input(S11): -35 (max -30) Output(S22): -35 (max -30)																																																																																																			
Distortion [dBc]	<hi #ed1c24>???</hi>										+13 dBm: -48 (max -45) +17 dBm: -42 (max -40)																																																																																																			
Temp. Delay Coefficient	+15...+30°C 1K pp with maximum slopes 0.5K/h										0-50°C 1.2 (max 1.5) [ps/°C]																																																																																																			
Connectors	only BNC <hi #ed1c24>???</hi>										SMA for input and output																																																																																																			
Power connectors	Power Consumption (all outputs loaded): AC: < 0.2 A Priority on AC supply input DC: < 0.9 A, Stand-By: < 50 mA DC is used as back-up supply Supply voltage AC: 100 to 240 V AC, 50/60 Hz, LED indicating AC voltage Supply voltage DC: 18 to 36 V DC, DC isolated, LED indicating DC voltage 2 redundant DC power input connectors, automatic switchover										AC Operation: 100-240 VAC, 47-63Hz DC Operation: 12-36 VDC- Available for some models																																																																																																			
Number of Outputs	16 or 15										5-15																																																																																																			
Number of Inputs	1 or 2										1-3																																																																																																			

Feature	TimeTech [Eco-Version]	Spectra dynamics HPDA-15Rmi
More	Noise figure	< 22.0 dB, (21 dB typ. 1 – 100 MHz)
	Group delay absolute, 1 – 100 MHz	4.7 ns $\pm$ 0.2 ns
	Group delay flatness, 1 – 100 MHz	< 0.1 ns pp
	Group delay variation, channel vs channel	< 0.1 ns
	Group delay variation versus temperature	< 6 ps / K

6)

☐ HiTec: where is to 10MHz RF

7)

☐ Cable, Connector choice

Which cables?

- Best choice (cost-effectiveness) < 150 MHz:
RG223 - Datasheet
[RG223 - conrad](#)
- Aircell 5 for > 100 MHz
 - Low attenuation for higher frequencies (also for 10MHz compared to RG223)
 - [Aircell 5 - Datasheet](#)
 - [Aircell 5 - conrad](#)
 - Kai-Martin-Quelle: [Aircell 5 - ssb](#)
- For high frequencies <10 GHz:
accuphasebrochure.pdf
- **Testing cable:**
 - Offenes Ende vermessen, dann sollte es Hochohmig sein
 - Auf einer Seite mit 50 Ohm verbinden und vermessen: 50 Ohm+Kabelwiderstand (<3-4 Ohm ist ok)
 - Wenn der Kabelwiderstand höher ist, dann wurden vermutlich beim Crimpen (Luft-)Übergangswiderstände erzeugt

Which connectors?

- BNC or SMA?

8)

☐ More cables for counter RF-Signals in the resLab?

9)

☐ Which mains filter and cold-device plug?

- PTB is using this model:

521062-21 HARTU

E-Mail-Antwort der Firma Hartu zu dem Model 521062-21 HARTU es handelt sich bei 521062-21 um ein 50/60 Hz Netzfilter. Die Sicherheitsnormen schreiben Luft- und Kriechstrecken und eine 100% Hochspannungsprüfung vor. Die Isolation der eingebauten Stromkompensierten Drossel wird über einen Trennsteg aus Kunststoff zwischen den Phasen und die Kernisolation sichergestellt. Es wird eine Hochspannungsprüfung zwischen den Phasen von 1,41kV/50Hz/2s durchgeführt. Gegen Erde wird mit 2KV/50Hz/2s geprüft.

Daten über die Isolation bei anderen Frequenzen liegen nicht vor.

Mor isolation between ports?

- Use: FTB-1-1*A26+
- Datasheet: [FTB-1-1*A26+](#)

OCXO

- Vibration isolation for the OXCO?
- Frequency double, how?

Filters

- 5MHz
- 10MHz

From:
<https://iqwiki.iqo.uni-hannover.de/> - IQwiki

Permanent link:
<https://iqwiki.iqo.uni-hannover.de/doku.php?id=groups:mg:10mhz&rev=1529484123>

Last update: **2018/06/20 08:42**

