

-Buffer D/A Converter-

Technical description

The buffer D/A converter is the interface between the RF section and digital section.

Some of the lines are fed via this module only to filter out interference- e.g., the +5 V, +18 V and 0 V power supplies, the AF signals AF 1 and AF 2, the AGC voltages and various control signals.

NOTE

The links LK 1, LK 2 and LK 4 must be used for the RX 1001 M / RX 5001. LK 3 stays open.

For control of the BFO, the VCOs and the PRESELECTOR, the storage flipflops (IC - B, C and D) form an interface between the processor and the driver chips (IC - E, F, G and J).

To drive the PRESELECTOR, the reference voltage, to which the motor must drive the servopotentiometer, must be generated. This voltage U_{REF} is formed in the D/A converter IC - M.

- RX MUTING

The microprocessor mutes the receiver by bringing the MUTE line to 0 V. The information L = LOW is contained in memory IC - D and is output via driver circuit IC G pin 16.

- Signals to PRESELECTOR

If a PRESELECTOR is fitted instead of the PROTECTOR, the microprocessor must switch not only the receiver MUTING and the 20 dB antenna attenuation but also the various filter ranges. The BUFFER D/A CONVERTER constitutes the interface to the processor for this purpose. The filter ranges are switched via the output memories and drivers IC - D and IC - G. The position of the filters (depth of tuning slugs in filter coils) is determined by an analog voltage of 5-10 V (U_{REF}) fed to the MOTOR CONTROL circuit of the preselector. The D/A CONVERTER generating this voltage is also accommodated on the BUFFER D/A CONVERTER board.

- Signal to FILTERBOARD

The microprocessor controls the selection of the filter bandwidths. To output this information, the microprocessor uses IC - O on the AUDIO BOARD. The signals then pass via the MOTHERBOARD to the BUFFER D/A CONVERTER board. The interface to the RF section is in each case actively LOW with an open collector.

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- Signals to VCO - A and VCO - B

The interface supplies only dynamic signals - i.e., input of frequencies to the VCO memories takes places in 4-bit parallel form and then in each case serially. Two static signals - 10 MHz and - 20 MHz are also required to select the VCOB oscillator (B 63 -73 MHz) or (73 - 83 MHz,) or (83 - 93 MHz).

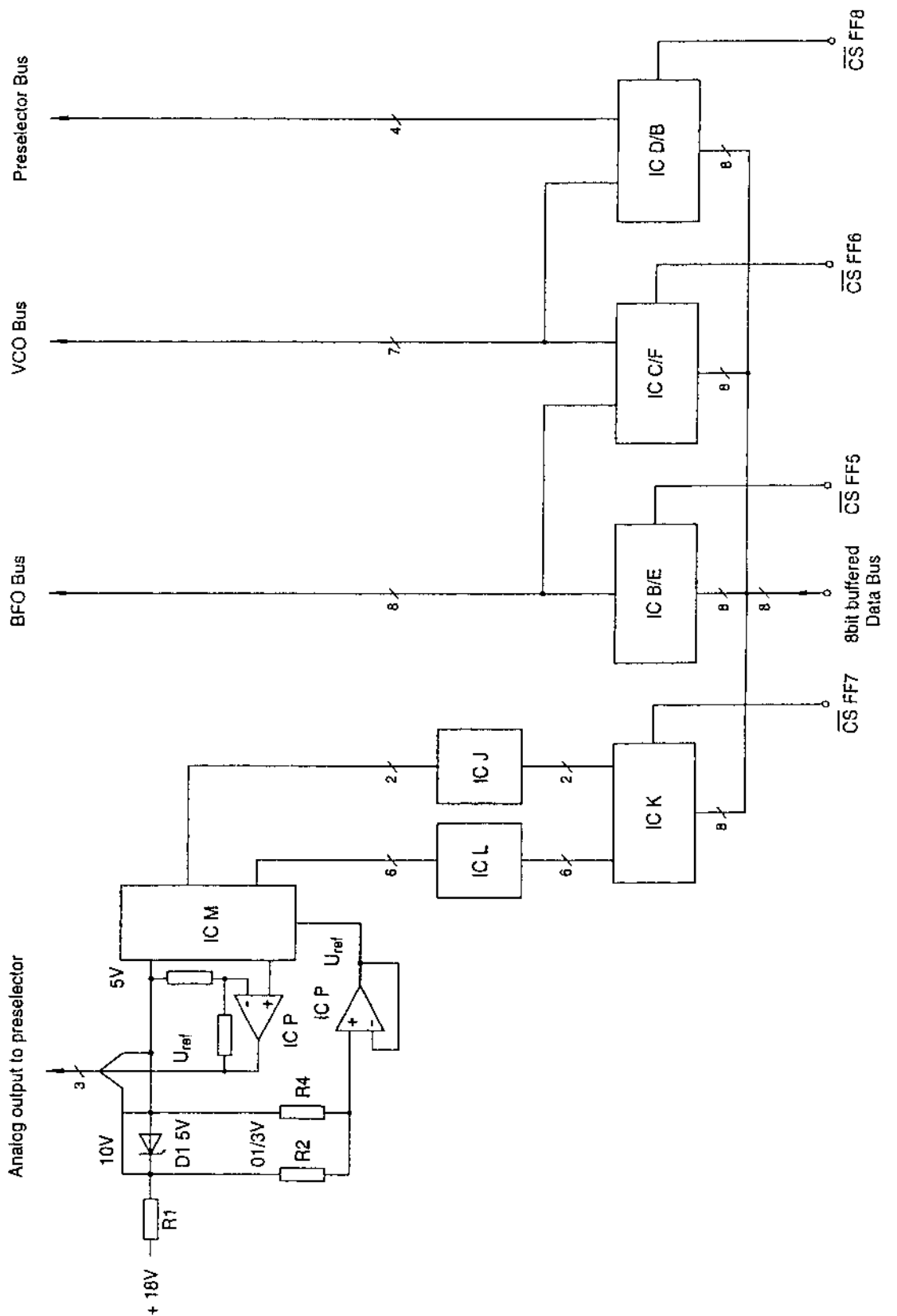
In addition to the 4-bit data lines, the processor also switches line P_{EA} (programmable Counter Enable) = High if VCO - A is to be loaded and P_{EB} if VCO - B is to receive data. The processor writes this data into memories IC - C and IC - D.

- Signal to BFO

Depending on mode, the BFO must supply various frequencies around 5 MHz - on USB for instance 5.000 MHz, on LSB for instance 4.9970MHz; on CW, the centre frequency of 4.9985 MHz can be varied by ± 5 kHz in 10 Hz steps.

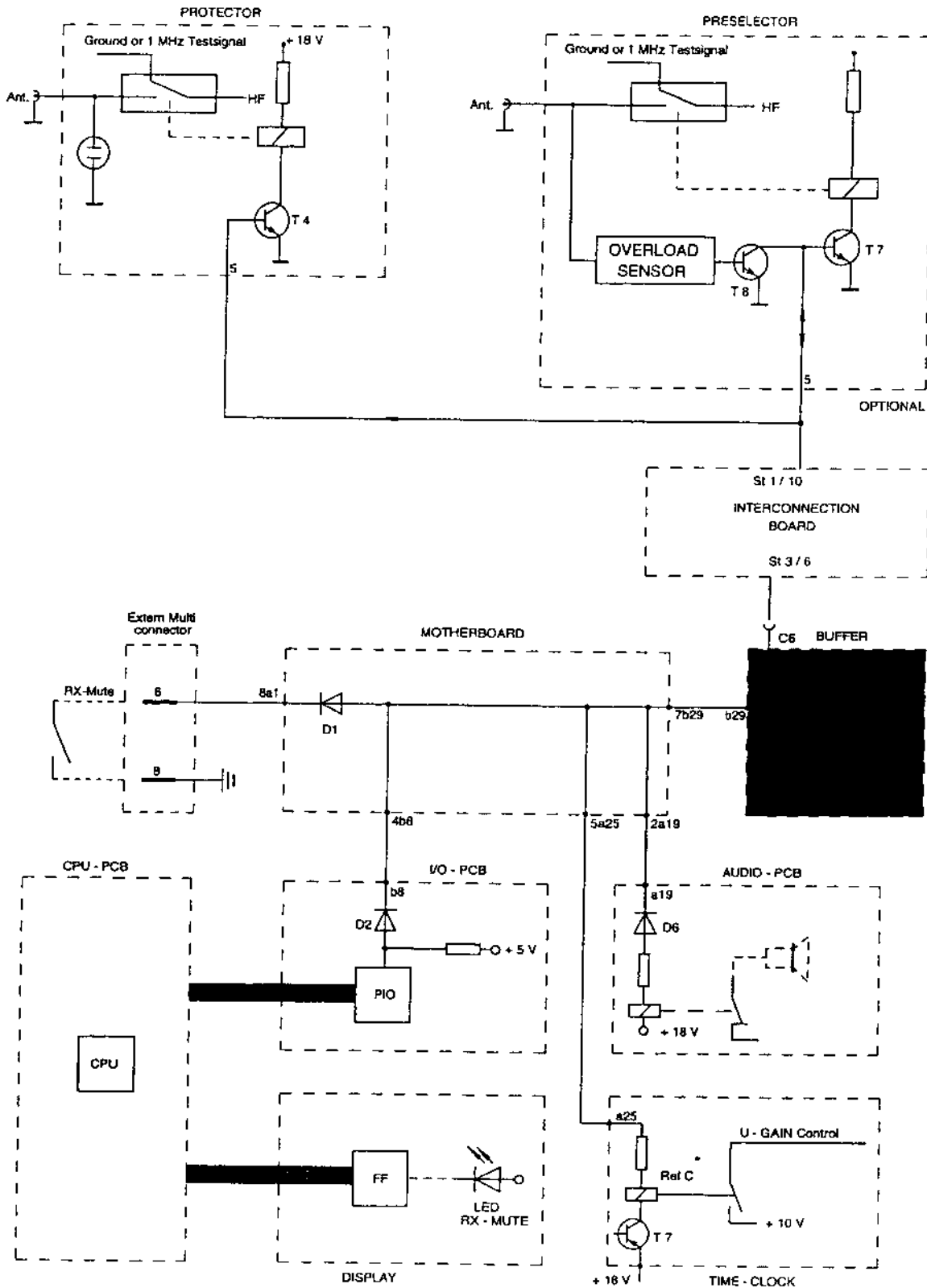
For this reason, the processor must send this frequency information to the PLL IC on the BFO PCB. The processor supplies the data via IC - E and F on the BUFFER D/A CONVERTER board to the BFO.

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Blockdiagram Buffer D/A Converter

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* REL C is disengaged during BITE TEST

Mute Interconnections

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Test and alignment instructions

Required: Circuit diagram BUFFER D/A CONVERTER - Hagenuk
Drawing No. 97 Sa C 2.155.34
DVM, power supply, signal generator (TTL level)
oscilloscope

Test configuration: The BUFFER D/A CONVERTER module is removed.
Connect power supply to plug ST B pin1 0 V
plug ST B pin 2 +18V
plug ST A pin 31 + 5 V

Checking current consumption

Specified current consumption: at 5 V = 30 mA \pm 6 mA
at 18 V = 70 mA \pm 10 mA

Testing IC-8

Connect together plug A pins 9 up to 16 and feed in low-frequency TTL pulses at this point. Connect plug B pin 5 CS FF5 to 0 V.

Test values:

Functional test: These signals can be measured with the oscilloscope at the outputs of IC - E; connect the output to be measured via a 1 kOhm resistor to +5 V.

NOTE

IC - C and IC - D should be tested in the same way.

Testing the D/A converter

Use a floating DVM (not connected to earth or equipment earth).

Measure voltage U_{POT} between plug ST C pin 37 and ST C pin 3.

Test values:

U_{POT} should be 5,1 V \pm 1 %.

Connect plug ST B pin 8 CS FF7 to 0 V and apply HIGH level to inputs D0 to D7 plug ST A pins 9-16.

Measure voltage U_{REF}

Test values:

U_{REF} should be 0 mV \pm 10 mV; reference; U_{POT} +5 V

Connect inputs D0 to D7 to LOW level.

Test values:

Specified values of U_{REF} : see table; tolerance \pm 10 mV

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Connect inputs D0 to D7 HIGH level and then connect individual data lines to LOW level (see table).

Test values:

Specified value of U_{REF} : see table; tolerance ± 10 mV

In relationship to the actual measured value of U_{POT} , find a few significant values U_{REF} in the table below.
If values are not being met, re-evaluate R SOT parallel to R5. Refer also to circuit diagram 97 Sa 2.155.30

U/POT (mV) (socket C, Pin 37 with reference to C, Pin 3)											
	5050	5060	5070	5080	5090	5100	5110	5120	5130	5140	5150
D0-D7 H	00,00	00,00	00,00	00,00	00,00	00,00	00,00	00,00	00,00	00,00	00,00
D0 L	19,73	19,76	19,80	19,84	19,88	19,92	19,96	20,00	20,04	20,08	20,12
D1 L	39,45	39,53	39,61	39,69	39,76	39,84	39,92	40,00	40,08	40,16	40,23
D2 L	78,91	79,06	79,22	79,37	79,53	79,69	79,84	80,00	80,16	80,31	80,47
D3 L	157,8	158,1	158,4	158,7	159,1	159,4	159,7	160,0	160,3	160,6	160,9
D4 L	315,6	316,2	316,9	317,5	318,1	318,7	319,4	320,0	320,6	321,2	321,9
D5 L	631,2	632,5	633,7	635,0	636,2	637,5	638,7	640,0	641,2	642,5	643,7
D6 L	1262	1265	1267	1270	1272	1275	1277	1280	1282	1285	1287
D7 L	2525	2530	2535	2540	2545	2550	2555	2560	2565	2570	2575
D0-D7 L	5030	5040	5050	5060	5070	5080	5090	5100	5110	5120	5130
U/REF (mV) (socket C, Pin 36 with reference to C, Pin 3)											

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In the following list find all 255 possible D/A-converter input variables in HEX versus the corresponding analog output voltage.

Please note, that the digital input variables D0 ... D7 of the Buffer D/A Converter PCB are generated by inverting the respective HEX value in this Table

HEX:	Uref:	HEX:	Uref:	HEX:	Uref:	HEX:	Uref:	HEX:	Uref:
00	0 mV								
01	20 mV	34	1040 mV	67	2060 mV	9A	3080 mV	CD	4100 mV
02	40 mV	35	1060 mV	68	2080 mV	9B	3100 mV	CE	4120 mV
03	60 mV	36	1080 mV	69	2100 mV	9C	3120 mV	CF	4140 mV
04	80 mV	37	1100 mV	6A	2120 mV	9D	3140 mV	D0	4160 mV
05	100 mV	38	1120 mV	6B	2140 mV	9E	3160 mV	D1	4180 mV
06	120 mV	39	1140 mV	6C	2160 mV	9F	3180 mV	D2	4200 mV
07	140 mV	3A	1160 mV	6D	2180 mV	A0	3200 mV	D3	4220 mV
08	160 mV	3B	1180 mV	6E	2200 mV	A1	3220 mV	D4	4240 mV
09	180 mV	3C	1200 mV	6F	2220 mV	A2	3240 mV	D5	4260 mV
0A	200 mV	3D	1220 mV	70	2240 mV	A3	3260 mV	D6	4280 mV
0B	220 mV	3E	1240 mV	71	2260 mV	A4	3280 mV	D7	4300 mV
0C	240 mV	3F	1260 mV	72	2280 mV	A5	3300 mV	D8	4320 mV
0D	260 mV	40	1280 mV	73	2300 mV	A6	3320 mV	D9	4340 mV
0E	280 mV	41	1300 mV	74	2320 mV	A7	3340 mV	DA	4360 mV
0F	300 mV	42	1320 mV	75	2340 mV	A8	3360 mV	DB	4380 mV
10	320 mV	43	1340 mV	76	2360 mV	A9	3380 mV	DC	4400 mV
11	340 mV	44	1360 mV	77	2380 mV	AA	3400 mV	DD	4420 mV
12	360 mV	45	1380 mV	78	2400 mV	AB	3420 mV	DE	4440 mV
13	380 mV	46	1400 mV	79	2420 mV	AC	3440 mV	DF	4460 mV
14	400 mV	47	1420 mV	7A	2440 mV	AD	3460 mV	E0	4480 mV
15	420 mV	48	1440 mV	7B	2460 mV	AE	3480 mV	E1	4500 mV
16	440 mV	49	1460 mV	7C	2480 mV	AF	3500 mV	E2	4520 mV
17	460 mV	4A	1480 mV	7D	2500 mV	B0	3520 mV	E3	4540 mV
18	480 mV	4B	1500 mV	7E	2520 mV	B1	3540 mV	E4	4560 mV
19	500 mV	4C	1520 mV	7F	2540 mV	B2	3560 mV	E5	4580 mV
1A	520 mV	4D	1540 mV	80	2560 mV	B3	3580 mV	E6	4600 mV
1B	540 mV	4E	1560 mV	81	2580 mV	B4	3600 mV	E7	4620 mV
1C	560 mV	4F	1580 mV	82	2600 mV	B5	3620 mV	E8	4640 mV
1D	580 mV	50	1600 mV	83	2620 mV	B6	3640 mV	E9	4660 mV
1E	600 mV	51	1620 mV	84	2640 mV	B7	3660 mV	EA	4680 mV
1F	620 mV	52	1640 mV	85	2660 mV	B8	3680 mV	EB	4700 mV
20	640 mV	53	1660 mV	86	2680 mV	B9	3700 mV	EC	4720 mV
21	660 mV	54	1680 mV	87	2700 mV	BA	3720 mV	ED	4740 mV
22	680 mV	55	1700 mV	88	2720 mV	BB	3740 mV	EE	4760 mV
23	700 mV	56	1720 mV	89	2740 mV	BC	3760 mV	EF	4780 mV
24	720 mV	57	1740 mV	8A	2760 mV	BD	3780 mV	FO	4800 mV
25	740 mV	58	1760 mV	8B	2780 mV	BE	3800 mV	F1	4820 mV
26	760 mV	59	1780 mV	8C	2800 mV	BF	3820 mV	F2	4840 mV
27	780 mV	5A	1800 mV	8D	2820 mV	C0	3840 mV	F3	4860 mV
28	800 mV	5B	1820 mV	8E	2840 mV	C1	3860 mV	F4	4880 mV
29	820 mV	5C	1840 mV	8F	2860 mV	C2	3880 mV	F5	4900 mV
2A	840 mV	5D	1860 mV	90	2880 mV	C3	3900 mV	F6	4920 mV
2B	860 mV	5E	1880 mV	91	2900 mV	C4	3920 mV	F7	4940 mV
2C	880 mV	5F	1900 mV	92	2920 mV	C5	3940 mV	F8	4960 mV
2D	900 mV	60	1920 mV	93	2940 mV	C6	3960 mV	F9	4980 mV
2E	920 mV	61	1940 mV	94	2960 mV	C7	3980 mV	FA	5000 mV
2F	940 mV	62	1960 mV	95	2980 mV	C8	4000 mV	FB	5020 mV
30	960 mV	63	1980 mV	96	3000 mV	C9	4020 mV	FC	5040 mV
31	980 mV	64	2000 mV	97	3020 mV	CA	4040 mV	FD	5060 mV
32	1000 mV	65	2020 mV	98	3040 mV	CB	4060 mV	FE	5080 mV
33	1020 mV	66	2040 mV	99	3060 mV	CC	4080 mV	FF	5100 mV

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Frequencies versus Buffer D/A-converter data Bus input, versus output voltage U_{REF}

Frequency to frequency MHz	MHz	Data Bus	U_{REF} mV	Frequency to frequency MHz	MHz	Data Bus	U_{REF} mV
00.00	01.60	FA	100	01.99		BD	1320
01.61		F7	160	02.00		BC	1340
01.62		F5	200	02.01		BB	1360
01.63		F2	260	02.02		BA	1380
01.64		F0	300	02.03		B9	1400
01.65		ED	360	02.04		B8	1420
01.66		EB	400	02.05		B7	1440
01.67		EA	420	02.06		B6	1460
01.68		E8	460	02.07		B5	1480
01.69		E6	500	02.08		B4	1500
01.70		E4	540	02.09		B3	1520
01.71		E2	580	02.10		B2	1540
01.72		E1	600	02.11		B1	1560
01.73		DF	640	02.12		B0	1580
01.74		DD	680	02.13	02.14	AF	1600
01.75		DC	700	02.15		AE	1620
01.76		DA	740	02.16		AD	1640
01.77		D9	760	02.17		AC	1660
01.78		D7	800	02.18		AB	1680
01.79		D6	820	02.19		AA	1700
01.80		D4	860	02.20		A9	1720
01.81		D3	880	02.21		A8	1740
01.82		D1	920	02.22	02.23	A7	1760
01.83		D0	940	02.24		A6	1780
01.84		CF	960	02.25		A5	1800
01.85		CD	1000	02.26		A4	1820
01.86		CC	1020	02.27		A3	1840
01.87		CB	1040	02.28	02.29	A2	1860
01.88		CA	1060	02.30		A1	1880
01.89		C9	1080	02.31		A0	1900
01.90		C7	1120	02.32		9F	1920
01.91		C6	1140	02.33	02.34	9E	1940
01.92		C5	1160	02.35		9D	1960
01.93		C4	1180	02.36		9C	1980
01.94		C3	1200	02.37	02.38	9B	2000
01.95		C2	1220	02.39		9A	2020
01.96		C0	1260	02.40		99	2040
01.97		BF	1280	02.41	02.42	98	2060
01.98		BE	1300	02.43		97	2080

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Frequencies versus Buffer DA-converter data Bus input, versus output voltage U_{REF}

Frequency to frequency MHz	Frequency to frequency MHz	Data Bus U_{REF} mV	Frequency to frequency MHz	Frequency to frequency MHz	Data Bus U_{REF} mV		
02.44	02.45	96	2100	0306	03.07	6F	2880 mV
02.46		95	2120	03.08		6E	2900 mV
02.47		94	2140	03.09	03.10	6D	2920 mV
02.48	02.49	93	2160	03.11	03.12	6C	2940 mV
02.50		92	2180	03.13	03.14	6B	2960 mV
02.51	02.52	91	2200	03.15		6A	2980 mV
02.53		90	2220	03.16	03.17	69	3000 mV
02.54	02.55	8F	2240	03.18	03.19	68	3020 mV
02.56		8E	2260	03.20	03.21	67	3040 mV
02.57		8D	2280	03.22	03.22	66	3060 mV
02.58	02.59	8C	2300	03.24		65	3080 mV
02.60		8B	2320	03.25	03.26	64	3100 mV
02.61	02.62	8A	2340	03.27	03.28	63	3120 mV
02.63		89	2360	03.29	03.30	62	3140 mV
02.64	02.65	88	2380	03.31		61	3160 mV
02.66	02.67	87	2400	03.32	03.33	60	3180 mV
02.68		86	2420	03.34		5F	3200 mV
02.69	02.70	85	2440	03.35	03.36	5E	3220 mV
02.71		84	2460	03.37	03.38	5D	3240 mV
02.72	02.73	83	2480	03.39	03.40	5C	3260 mV
02.74		82	2500	03.41		5B	3280 mV
02.75	02.76	81	2520 mV	03.42	03.43	5A	3300 mV
02.77	02.78	80	2540 mV	03.44	03.45	59	3320 mV
02.79	02.80	7F	2560 mV	03.46		58	3340 mV
02.81		7E	2580 mV	03.47	03.48	57	3360 mV
02.82	02.83	7D	2600 mV	03.49		56	3380 mV
02.84	02.85	7C	2620 mV	03.50	03.51	55	3400 mV
02.86		7B	2640 mV	03.52		54	3420 mV
02.87	02.88	7A	2660 mV	03.53	03.54	53	3440 mV
02.89	02.90	79	2680 mV	03.55		52	3460 mV
02.91		78	2700 mV	03.56	03.57	51	3480 mV
02.92	02.93	77	2720 mV	03.58		50	3500 mV
02.94	02.95	76	2740 mV	03.59	03.60	4F	3520 mV
02.96		75	2760 mV	03.61		4E	3540 mV
02.97	02.98	74	2780 mV	03.62	03.63	4D	3560 mV
02.99	03.00	73	2800 mV	03.64		4C	3580 mV
03.01	03.02	72	2820 mV	03.65	03.66	4B	3600 mV
03.03		71	2840 mV	03.67		4A	3620 mV
03.04	03.05	70	2860 mV	03.68		49	3640 mV

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Frequencies versus Buffer DA-converter data Bus input, versus output voltage U_{REF}

Frequency to frequency MHz	Frequency to frequency MHz	Data Bus	U_{REF} mV	Frequency to Frequency MHz	Frequency to Frequency MHz	Data Bus	U_{REF} mV
03.69		48	3660 mV	04.18	04.19	9F	1920 mV
03.70	03.71	47	3680 mV	04.20	04.21	9D	1960 mV
03.72		46	3700 mV	04.22	04.23	9C	1980 mV
03.73		45	3720 mV	04.24	04.25	9B	2000 mV
03.74		44	3740 mV	04.26	04.27	9A	2020 mV
03.75		43	3760 mV	04.28	04.29	99	2040 mV
03.76		42	3780 mV	04.30	04.31	98	2060 mV
03.77		41	3800 mV	04.32	04.33	97	2080 mV
03.78		40	3820 mV	04.34	04.35	96	2100 mV
03.79		3F	3840 mV	04.36	04.37	95	2120 mV
03.80		3E	3860 mV	04.38	04.39	94	2140 mV
03.81		3D	3880 mV	04.40	04.41	93	2160 mV
03.82		3C	3900 mV	04.42	04.43	92	2180 mV
03.83		3B	3920 mV	04.44	04.45	91	2200 mV
03.84		3A	3940 mV	04.46	04.47	90	2220 mV
03.85		39	3960 mV	04.48	04.49	8F	2240 mV
03.86		37	4000 mV	04.50	04.53	8E	2260 mV
03.87		36	4020 mV	04.54	04.55	8D	2280 mV
03.88		34	4060 mV	04.56	04.57	8C	2300 mV
03.89		33	4080 mV	04.58	04.59	8B	2320 mV
03.90		31	4120 mV	04.60	04.63	8A	2340 mV
03.91		2F	4160 mV	04.64	04.65	89	2360 mV
03.92		2D	4200 mV	04.66	04.67	88	2380 mV
03.93		2A	4260 mV	04.68	04.71	87	2400 mV
03.94		2B	4300 mV	04.72	04.73	86	2420 mV
03.95		24	4380 mV	04.74	04.77	85	2440 mV
03.96		20	4460 mV	04.78	04.79	84	2460 mV
03.97		1B	4560 mV	04.80	04.83	83	2480 mV
03.98		13	4720 mV	04.84	04.87	82	2500 mV
03.99		07	4960 mV	04.88	04.89	81	2520 mV
04.00	04.01	AD	1640 mV	04.90	04.93	80	2540 mV
04.02	04.03	AB	1680 mV	04.94	04.95	7F	2560 mV
04.04	04.05	A9	1720 mV	04.95	04.99	7E	2580 mV
04.06	04.07	A7	1760 mV	05.00	05.03	7D	2600 mV
04.08	04.09	A6	1780 mV	05.04	05.07	7C	2620 mV
04.10	04.11	A4	1820 mV	05.08	05.09	7B	2640 mV
04.12	04.13	A3	1840 mV	05.10	05.13	7A	2660 mV
04.14	04.15	A1	1880 mV	05.14	05.17	79	2680 mV
04.16	04.17	A0	1900 mV	05.18	05.21	79	2700 mV

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Frequency to frequency MHz	Frequency to frequency MHz	Data Bus	U_{REF} mV	Frequency to frequency MHz	Frequency to frequency MHz	Data Bus	U_{REF} mV
05.22	05.25	77	2720 mV	06.90	06.93	50	3500 mV
05.26	05.29	76	2740 mV	06.94	06.97	4F	3520 mV
05.30	05.33	75	2760 mV	06.98	07.03	4E	3540 mV
05.34	05.37	74	2780 mV	07.04	07.05	4D	3560 mV
05.38	05.41	73	2800 mV	07.06	07.09	4C	3580 mV
05.42	05.45	72	2820 mV	07.10	07.13	4B	3600 mV
05.46	05.49	71	2840 mV	07.14	07.17	4A	3620 mV
05.50	05.53	70	2860 mV	07.18	07.21	49	3640 mV
05.54	05.57	6F	2880 mV	07.22	07.25	48	3660 mV
05.58	05.61	6E	2900 mV	07.26	07.27	47	3680 mV
05.62	05.65	6D	2920 mV	07.28	07.31	46	3700 mV
05.66	05.69	6C	2940 mV	07.32	07.35	45	3720 mV
05.70	05.73	6B	2960 mV	07.36	07.37	44	3740 mV
05.74	05.77	6A	2980 mV	07.38	07.41	43	3760 mV
05.78	05.83	69	3000 mV	07.42	07.43	42	3780 mV
05.84	05.87	68	3020 mV	07.44	07.45	41	3800 mV
05.88	05.91	67	3040 mV	07.46	07.49	40	3820 mV
05.92	05.95	66	3060 mV	07.50	07.51	3F	3840 mV
05.96	06.01	65	3080 mV	07.52	07.53	3E	3860 mV
06.02	06.05	64	3100 mV	07.54	07.55	3D	3880 mV
06.06	06.09	63	3120 mV	07.56	07.59	3C	3900 mV
06.10	06.15	62	3140 mV	07.60	07.61	3B	3920 mV
06.16	06.19	61	3160 mV	07.62	07.63	3A	3940 mV
06.20	06.23	60	3180 mV	07.64	07.65	39	3960 mV
06.24	06.27	5F	3200 mV	07.66	07.67	38	3980 mV
06.28	06.33	5E	3220 mV	07.68	07.69	36	4020 mV
06.34	06.37	5D	3240 mV	07.70	07.71	35	4040 mV
06.38	06.41	5C	3260 mV	07.72	07.73	34	4060 mV
06.42	06.45	5B	3280 mV	07.74	07.75	32	4100 mV
06.46	06.51	5A	3300 mV	07.76	07.77	30	4140 mV
06.52	06.55	59	3320 mV	07.78	07.79	2F	4160 mV
06.56	06.59	58	3340 mV	07.80	07.91	2D	4200 mV
06.60	06.63	57	3360 mV	07.82	07.83	2B	4240 mV
06.64	06.69	56	3380 mV	07.84	07.85	29	4280 mV
06.70	06.73	55	3400 mV	07.86	07.87	26	4340 mV
06.74	06.77	54	3420 mV	07.88	07.89	23	4400 mV
06.78	06.81	53	3440 mV	07.90	07.91	20	4460 mV
06.82	06.85	52	3460 mV	07.92	07.93	1B	4560 mV
06.86	06.69	51	3480 mV	07.94	07.95	15	4680 mV

-Buffer D/A Converter-

Frequencies versus Buffer D/A-converter data Bus input, versus output voltage U_{REF}

Frequency to frequency MHz	frequency MHz	Data Bus	U_{REF} mV	Frequency to frequency MHz	frequency MHz	Data Bus	U_{REF} mV
07.96	07.97	0C	4860 mV	10.00	10.04	9C	1980 mV
07.98	07.99	03	5040 mV	10.05	10.09	9B	2000 mV
08.00	08.04	E6	500 mV	10.10	10.19	9A	2020 mV
08.05	08.09	E1	600 mV	10.20	10.24	99	2040 mV
08.10	08.14	DD	680 mV	10.25	10.29	98	2060 mV
08.15	08.19	D9	760 mV	10.30	10.39	97	2080 mV
08.20	08.24	D5	840 mV	10.40	10.44	96	2100 mV
08.25	08.29	D2	900 mV	10.45	10.49	95	2120 mV
08.30	08.34	CF	960 mV	10.50	10.59	94	2140 mV
08.35	08.39	CC	1020 mV	10.60	10.64	93	2160 mV
08.40	08.44	C9	1080 mV	10.65	10.74	92	2180 mV
08.45	08.49	C6	1140 mV	10.75	10.79	91	2200 mV
08.50	08.54	C4	1180 mV	10.80	10.89	90	2220 mV
08.55	08.59	C2	1220 mV	10.90	10.94	8F	2240 mV
08.60	08.64	C0	1260 mV	10.95	11.04	8E	2260 mV
08.65	08.69	BD	1320 mV	11.05	11.09	8D	2280 mV
08.70	08.74	BB	1360 mV	11.10	11.19	8C	2300 mV
08.75	08.79	BA	1380 mV	11.20	11.24	8B	2320 mV
08.80	08.84	B8	1420 mV	11.25	11.34	8A	2340 mV
08.85	08.94	B5	1480 mV	11.35	11.44	89	2360 mV
08.95	08.99	B3	1520 mV	11.45	11.49	88	2380 mV
09.00	09.04	B2	1540 mV	11.50	11.59	87	2400 mV
09.05	09.09	B0	1580 mV	11.60	11.69	86	2420 mV
09.10	09.14	AF	1600 mV	11.70	11.74	85	2440 mV
09.15	09.19	AD	1640 mV	11.75	11.84	84	2460 mV
09.20	09.24	AC	1660 mV	11.85	11.94	83	2480 mV
09.25	09.29	AB	1680 mV	11.95	12.04	82	2500 mV
09.30	09.34	AA	1700 mV	12.05	12.14	81	2520 mV
09.35	09.59	A9	1720 mV	12.15	12.19	80	2540 mV
09.40	09.44	A7	1760 mV	12.20	12.29	7F	2560 mV
09.45	09.49	A6	1780 mV	12.30	12.39	7E	2580 mV
09.50	09.54	A5	1800 mV	12.40	12.49	7D	2600 mV
09.55	09.59	A4	1820 mV	12.50	12.59	7C	2620 mV
09.60	09.64	A3	1840 mV	12.60	12.69	7B	2640 mV
09.65	09.69	A2	1860 mV	12.70	12.79	7A	2660 mV
09.70	09.79	A1	1880 mV	12.80	12.89	79	2680 mV
09.80	09.84	A0	1900 mV	12.90	12.99	78	2700 mV
09.85	09.89	9F	1920 mV	13.00	13.09	77	2720 mV
09.90	09.94	9E	1940 mV	13.10	13.19	76	2740 mV
0995	09.99	9D	1960 mV				

-Buffer D/A Converter-

Frequencies versus Buffer D/A-converter data Bus input, versus output voltage U_{REF}

Frequency to frequency MHz		Data Bus	U_{REF} mV	Frequency to frequency MHz		Data Bus	U_{REF} mV
13.20	13.29	75	2760 mV	16.25	16.29	4D	3560 mV
13.30	13.39	74	2780 mV	16.30	16.34	4C	3580 mV
13.40	13.44	73	2800 mV	16.35	16.39	4A	3620 mV
13.45	13.54	72	2820 mV	16.40	16.44	49	3640 mV
13.55	13.64	71	2840 mV	16.45	16.49	47	3680 mV
13.65	13.74	70	2860 mV	16.50	16.54	45	3720 mV
13.75	13.84	6F	2880 mV	16.55	16.59	43	3760 mV
13.85	13.94	6E	2900 mV	16.60	16.64	41	3800 mV
13.95	14.04	6D	2920 mV	16.65	16.69	3E	3860 mV
14.05	14.14	6C	2940 mV	16.70	16.74	3B	3920 mV
14.15	14.19	6B	2960 mV	16.75	16.79	37	4000 mV
14.20	14.29	6A	2980 mV	16.80	16.84	33	4080 mV
14.30	14.39	69	3000 mV	16.85	16.89	2D	4200 mV
14.40	14.49	68	3020 mV	16.90	16.94	23	4400 mV
14.50	14.59	67	3040 mV	16.95	16.99	14	4700 mV
14.60	14.69	66	3060 mV	17.00	17.09	FA	100 mV
14.70	14.74	65	3080 mV	17.10	17.19	F7	160 mV
14.75	14.84	64	3100 mV	17.20	17.29	F5	200 mV
14.85	14.94	63	3120 mV	17.30	17.39	F4	240 mV
14.95	14.99	62	3140 mV	17.40	17.49	F1	280 mV
15.00	15.09	61	3160 mV	17.50	17.59	EF	320 mV
15.10	15.19	60	3180 mV	17.60	17.69	ED	360 mV
15.20	15.24	5F	3200 mV	17.70	17.79	EB	400 mV
15.25	15.34	5E	3220 mV	17.80	17.89	E9	440 mV
15.35	15.39	5D	3240 mV	17.90	17.99	E7	480 mV
15.40	15.49	5C	3260 mV	18.00	18.09	E5	520 mV
15.50	15.54	5B	3280 mV	18.10	18.19	E3	560 mV
15.55	15.59	5A	3300 mV	18.20	18.29	E1	600 mV
15.60	15.69	59	3320 mV	18.30	18.39	DF	640 mV
15.70	15.74	58	3340 mV	18.40	18.49	DD	680 mV
15.75	15.79	57	3360 mV	18.50	18.59	DB	720 mV
15.80	15.84	56	3380 mV	18.60	18.69	DA	740 mV
15.85	15.89	55	3400 mV	18.70	18.79	D8	780 mV
15.90	15.94	54	3420 mV	18.80	18.89	D6	820 mV
15.95	15.99	53	3440 mV	18.90	18.99	D4	860 mV
16.00	16.09	52	3460 mV	19.00	19.09	D3	880 mV
16.10	16.14	50	3500 mV	19.10	19.19	D1	920 mV
16.15	16.19	4F	3520 mV	19.20	19.29	CF	960 mV
16.20	16.24	4E	3540 mV	19.30	19.39	CD	1000 mV

-Buffer D/A Converter-

Frequencies versus Buffer D/A-converter data Bus input, versus output voltage U_{REF}

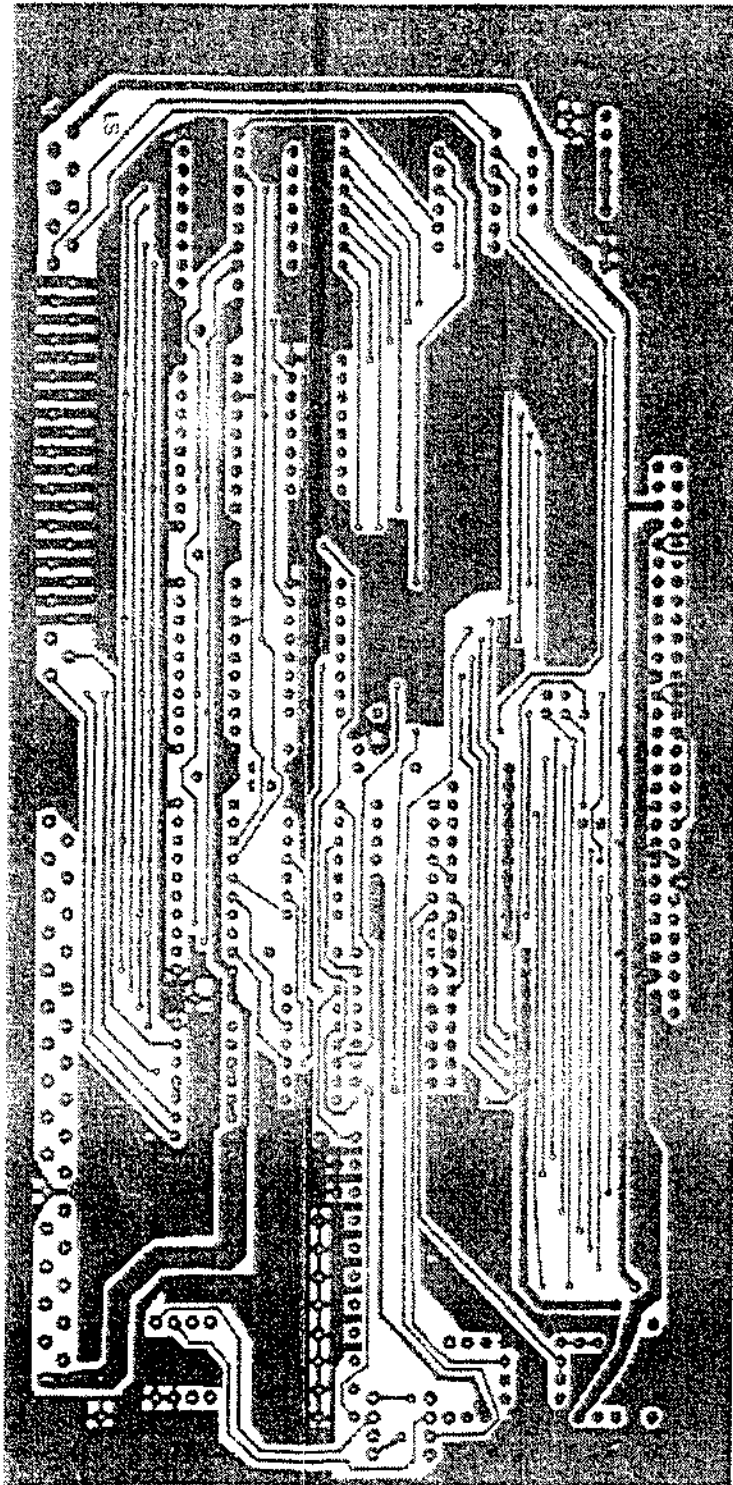
Frequency to frequency MHz	Frequency to frequency MHz	Data Bus	U_{REF} mV	Frequency to frequency MHz	Frequency to frequency MHz	Data Bus	U_{REF} mV
19.40	19.49	CC	1020 mV	23.30	23.39	94	2140 mV
19.50	19.59	CA	1060 mV	23.40	23.49	93	2160 mV
19.60	19.69	C9	1080 mV	23.50	23.59	91	2200 mV
19.70	19.79	C7	1120 mV	23.60	23.69	90	2220 mV
19.80	19.89	C5	1160 mV	23.70	23.79	8F	2240 mV
19.90	19.99	C4	1180 mV	23.80	23.89	8E	2260 mV
20.00	20.09	C2	1220 mV	23.90	23.99	8C	2300 mV
20.10	20.19	C1	1240 mV	24.00	24.09	8B	2320 mV
20.20	20.29	BF	1280 mV	24.10	24.19	8A	2340 mV
20.30	20.39	BE	1300 mV	24.20	24.29	89	2360 mV
20.40	20.49	BC	1340 mV	24.30	24.39	87	2400 mV
20.50	20.59	BA	1380 mV	24.40	24.49	86	2420 mV
20.60	20.69	B9	1440 mV	24.50	24.59	85	2440 mV
20.70	20.79	B8	1420 mV	24.60	24.69	83	2480 mV
20.80	20.89	B6	1460 mV	24.70	24.79	82	2500 mV
20.90	20.99	B5	1480 mV	24.80	24.89	81	2520 mV
21.00	21.09	B3	1520 mV	24.90	24.99	80	2540 mV
21.10	21.19	B2	1540 mV	25.00	25.09	7E	2580 mV
21.20	21.29	B0	1580 mV	25.10	25.19	7D	2600 mV
21.30	21.39	AF	1600 mV	25.20	25.29	7C	2620 mV
21.40	21.49	AE	1620 mV	25.20	25.39	7B	2640 mV
21.50	21.59	AC	1660 mV	25.40	25.49	79	2680 mV
21.60	21.69	AB	1680 mV	25.50	25.59	78	2700 mV
21.70	21.79	A9	1720 mV	25.60	25.69	77	2720 mV
21.80	21.89	A8	1740 mV	25.70	25.79	75	2760 mV
21.90	21.99	A7	1760 mV	25.80	25.89	74	2780 mV
22.00	22.09	A5	1800 mV	25.90	25.99	73	2800 mV
22.10	22.19	A4	1820 mV	26.00	26.09	71	2840 mV
22.20	22.29	A3	1840 mV	26.10	26.19	70	2860 mV
22.30	22.39	A1	1880 mV	26.20	26.29	6F	2880 mV
22.40	22.49	A0	1900 mV	26.30	26.39	6E	2900 mV
22.50	22.59	9F	1920 mV	26.40	26.49	6C	2940 mV
22.60	22.69	9D	1960 mV	26.50	26.59	6B	2960 mV
22.70	22.79	9C	1980 mV	26.60	26.69	69	3000 mV
22.80	22.89	9B	2000 mV	26.70	26.79	68	3020 mV
22.90	22.99	99	2040 mV	26.80	26.89	67	3040 mV
23.00	23.09	98	2060 mV	26.90	26.99	65	3080 mV
23.10	23.19	97	2080 mV	27.00	27.09	64	3100 mV
23.20	23.29	95	2120 mV	27.10	27.19	62	3140 mV

-Buffer D/A Converter-

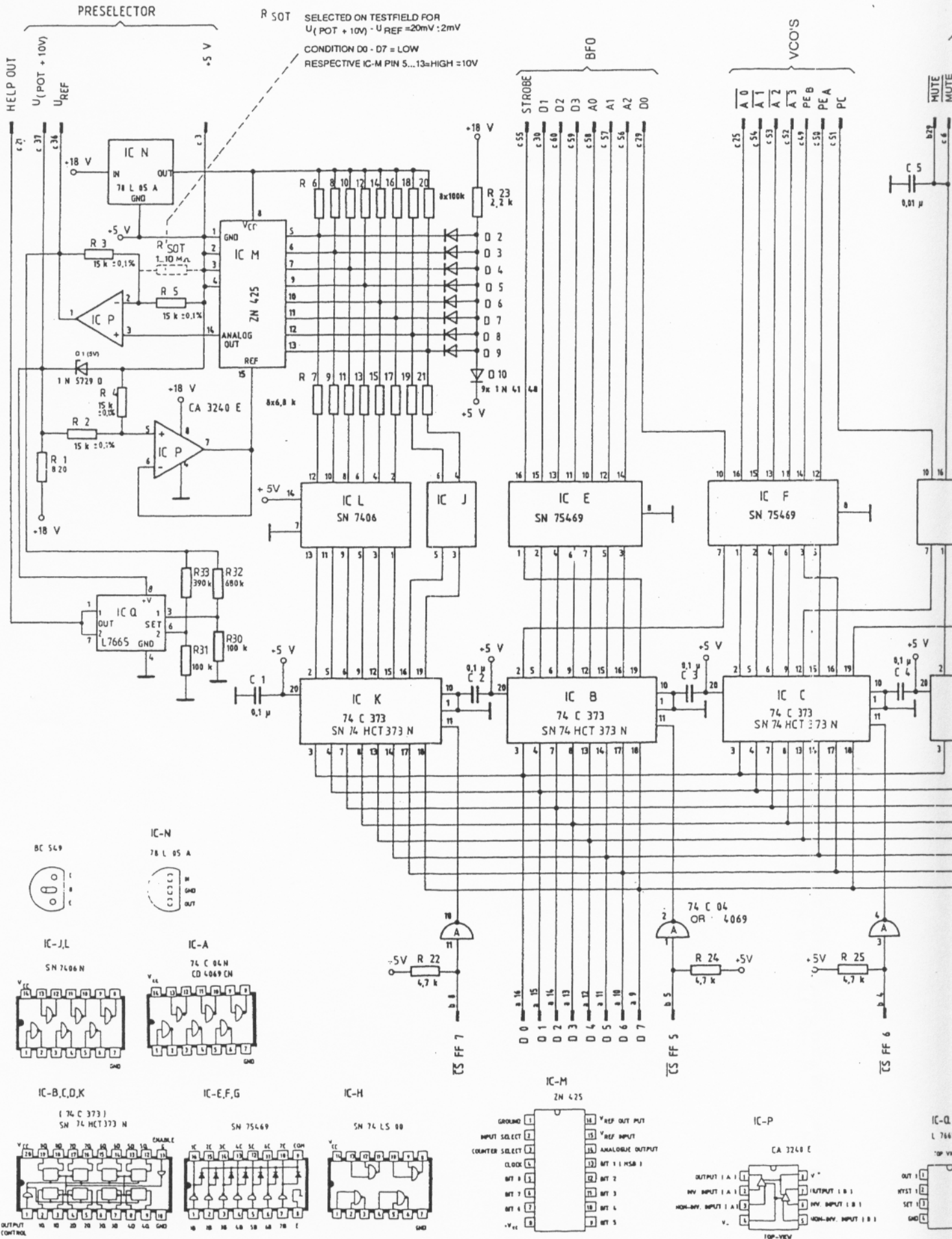
Frequencies versus Buffer D/A-converter data Bus input, versus output voltage U_{REF}

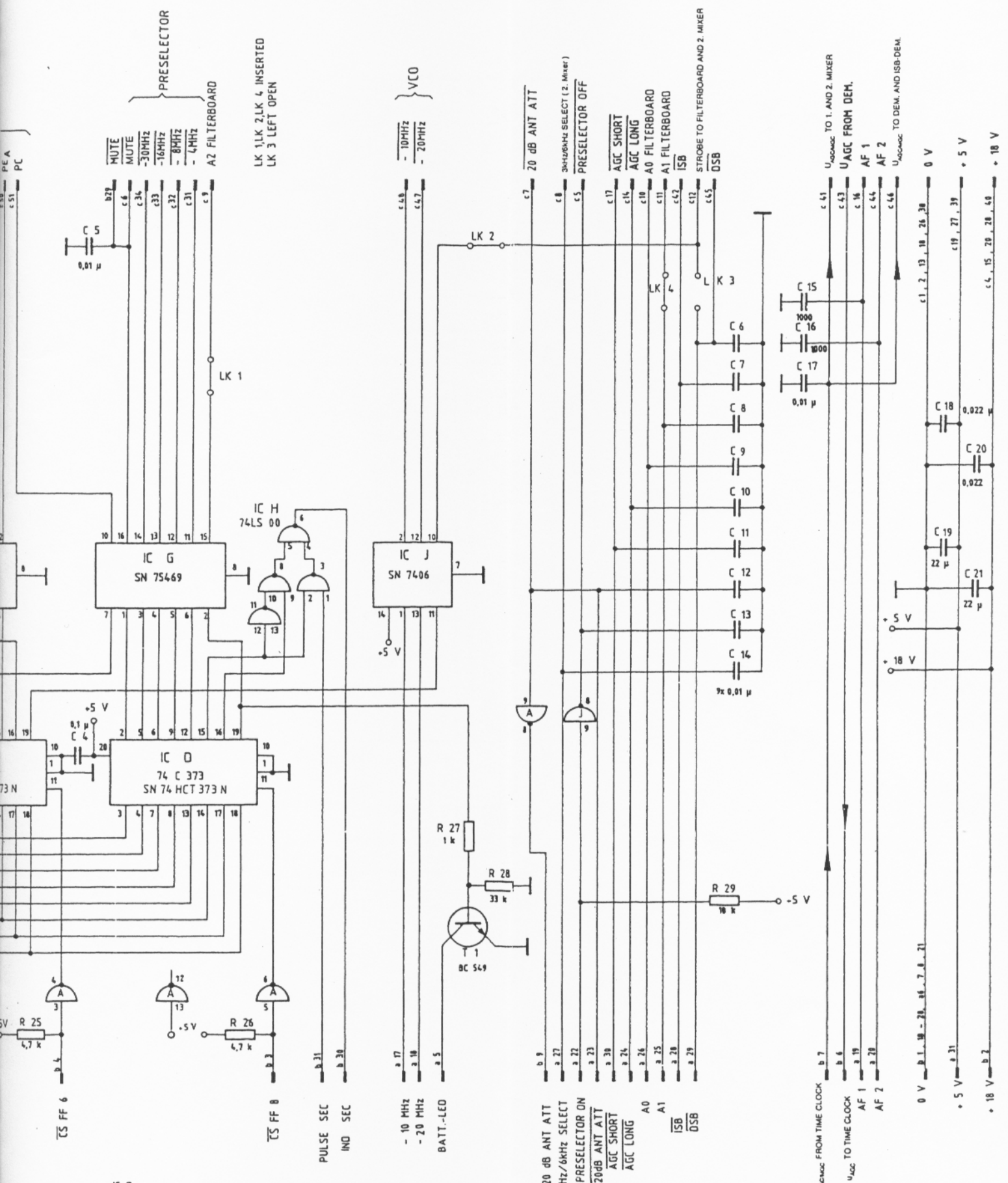
Frequency to frequency MHz	MHz	Data Bus	U_{REF} mV
27.20	27.29	61	3160 mV
27.30	27.39	5F	3200 mV
27.40	27.49	5E	3220 mV
27.50	27.59	5C	3260 mV
27.60	27.69	5B	3280 mV
27.70	27.79	59	3320 mV
27.80	27.89	58	3340 mV
27.90	27.99	56	3380 mV
28.00	28.09	54	3420 mV
28.10	28.19	53	3440 mV
28.20	28.29	51	3480 mV
28.30	28.39	4F	3520 mV
28.40	28.49	4D	3560 mV
28.50	28.59	4B	3600 mV
28.60	28.69	49	3640 mV
28.70	28.79	47	3680 mV
28.80	28.89	45	3720 mV
28.90	28.99	43	3760 mV
29.00	29.09	40	3820 mV
29.10	29.19	3D	3880 mV
29.20	29.29	3B	3920 mV
29.30	29.39	38	3980 mV
29.40	29.49	34	4060 mV
29.50	29.59	30	4140 mV
29.60	29.69	2B	4240 mV
29.70	29.79	24	4380 mV
29.80	29.89	1B	4560 mV
29.90	29.99	0A	4900 mV

see circuit diagram - BUFFER D/A CONVERTER 97 Sa 2.155.30



Printed Circuit Board
Buffer D/A Converter
97 C 2.155.30





PRESELECTOR

MUTE
MUTE
-30MHz
-16MHz
-8MHz
-4MHz

A2 FILTERBOARD

LK 1 LK 2, LK 4, INSERTED
LK 3 LEFT OPEN

VCO

-10MHz
-20MHz

20 dB ANT ATT
3kHz/6kHz SELECT (2. Mixer)
PRESELECTOR OFF
AGC SHORT
AGC LONG
A0 FILTERBOARD
A1 FILTERBOARD
ISB
STROBE TO FILTERBOARD AND 2. MIXER
DSB

U_{AGC(DC)} TO 1. AND 2. MIXER
U_{AGC} FROM DEM.
AF 1
AF 2
U_{AGC(DC)} TO DEM. AND ISB-DEM.

0 V
+ 5 V
+ 18 V

IC-Q
L 7665

Note: Pins a1, a2, a3 and a4 are not connected

Buffer D/A Converter
Circuit Diagram
97 Sa B 2.155.30

-Buffer D/A Converter-

Parts lists No.
97 Sa 2.155.30

Ident-No.	Mark	Electr. value	Identity	Manufacturer
Capacitors:				
1423.037	C1	0,1 μ F/63 V	MKS 2	WIMA
1423.037	C2	0,1 μ F/63 V	MKS 2	WIMA
1423.037	C3	0,1 μ F/63 V	MKS 2	WIMA
1423.037	C4	0,1 μ F/63 V	MKS 2	WIMA
1425.196	C5	0,01 μ F/63 V	MKS 2	WIMA
1425.196	C6	0,01 μ F/63 V	MKS 2	WIMA
1425.196	C7	0,01 μ F/63 V	MKS 2	WIMA
1425.196	C8	0,01 μ F/63 V	MKS 2	WIMA
1425.196	C9	0,01 μ F/63 V	MKS 2	WIMA
1425.196	C10	0,01 μ F/63 V	MKS 2	WIMA
1425.196	C11	0,01 μ F/63 V	MKS 2	WIMA
1425.196	C12	0,01 μ F/63 V	MKS 2	WIMA
1425.196	C13	0,01 μ F/63 V	MKS 2	WIMA
1425.196	C14	0,01 μ F/63 V	MKS 2	WIMA
0944.971	C15	1000 pF/63 V	EDPU/0,6 K2000	VALVO
0944.971	C16	1000 pF/63 V	EDPU/0,6 K2000	VALVO
1425.196	C17	0,01 μ F/63 V	MKS 2	WIMA
1116.207	C18	0,022 μ F/40 V	EDPU/0,6 K10000	VALVO
1401.343	C19	22 μ F/10 V	2222 122 54229	VALVO
1116.207	C20	0,022 μ F/40 V	EDPU/0,6 K10000	VALVO
1189.441	C21	22 μ F/35 V	ETQ 5	ROE

Diodes:

1326.929	D1	1 N 5729 D
0745.677	D2	1 N 4148
0745.677	D3	1 N 4148
0745.677	D4	L N 4148
0745.677	D5	1 N 4148
0745.677	D6	1 N 4148
0745.677	D7	1 N 4148
0745.677	D8	1 N 4148
0745.677	D9	1 N 4148
0745.677	D10	1 N 4148

Resistors:

0725.854	R1	820 5 % 1/4 W	DIN 44052
1524.259	R2	15 K 1/8 W \pm 0,1 %	DIN 44061 MK2/TK25 ROE
1524.259	R3	15 K 1/8 W \pm 0,1 %	DIN 44061 MK2/TK25 ROE

-Buffer D/A Converter-

Parts lists No.
97 Sa 2.155.30

Ident-No.	Mark	Electr. value	Identity	Manufacturer
1524.259	R4	15 K 1/8 W \pm 0,1 %	DIN 44061 MK2/TK25	ROE
1524.259	R5	15 K 1/8 W \pm 0,1 %	DIN 44061 MK2/TK25	ROE
0767.190	R6	100 K 5 % 1/8 W	DIN 44061	
0767.220	R7	6,8 K 5 % 1/8 W	DIN 44061	
0767.190	R8	100 K 5 % 1/8 W	DIN 44061	
0767.220	R9	6,8 K 5 % 1/8 W	DIN 44061	
0767.190	R10	100 K 5 % W	DIN 44061	
0767.220	R11	6,8 K 5 % 1/8 W	DIN 44061	
0767.190	R12	100 K 5 % 1/8 W	DIN 44061	
0767.220	R13	6,8 K 5 % 1/8 W	DIN 44052	
0767.190	R14	100 K 5 % 1/8 W	DIN 44052	
0767.220	R15	6,8 K 5 % 1/8 W	DIN 44052	
0767.190	R16	100 K 5 % 1/8 W	DIN 44052	
0767.220	R17	6,8 K 5 % 1/8 W	DIN 440S2	
0767.190	R18	100 K 5 % 1/8 W	DIN 44052	
0767.220	R19	6,8 K 5 % 1/8 W	DIN 44052	
0767.190	R20	100 K 5 % 1/8 W	DIN 44052	
0767.220	R21	6,8 K 5 % 1/8 W	DIN 44052	
0767.212	R22	4,7 K 5 % 1/8 W	DIN 44052	
0760.269	R23	2,2 K 5 % 1/4 W	DIN 44052	
0767.212	R24	4,7 K 5 % 1/8 W	DIN 44052	
0767.212	R25	4,7 K 5 % 1/8 W	DIN 44052	
0767.212	R26	4,7 K 5 % 1/8 W	DIN 44052	
0179.698	R27	1 K 5 % 1/8 W	DIN 44052	
0627.895	R28	33 K 5 % 1/8 W	DIN 44052	
0179.701	R29	10 K 5 % 1/8 W	DIN 44052	
0767.190	R30	100 K 5 % 1/8 W	DIN 44052	
0767.190	R31	100 K 5 % 1/8 W	DIN 44052	
0900.419	R32	680 K 5% 1/8 W	DIN 44052	

Integrated circuits:

1423.703	IC A	74 C 04
1427.393	IC B	74 C 373
1427.393	IC C	74 C 373
1427.393	IC D	74 C 373
1423.711	IC E	75 469
1423.711	IC F	75 469
1423.711	IC G	75 469
1090.895	IC H	74 LS 00
1076.051	IC J	74 06
1427.393	IC K	74 C 373

RX 1001 M / RX 5001
Part 4

Chapter 4-16

-Buffer D/A Converter-

Parts lists No.
97 Sa 2.155.30

Ident-No.	Mark	Electr. value	Identity	Manufacturer
1076.051	IC L		74 06	
1423.215	IC M		ZN 425 E - 8	FERRANTI
1427.083	IC N		78 L 05 A	
1427.156	IC P		CA 32 40 E	
1630.180	IC Q		ICL 7665 BC PA	INTERSIL

Transistors:

1291.033	T1		BC 549 B	
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