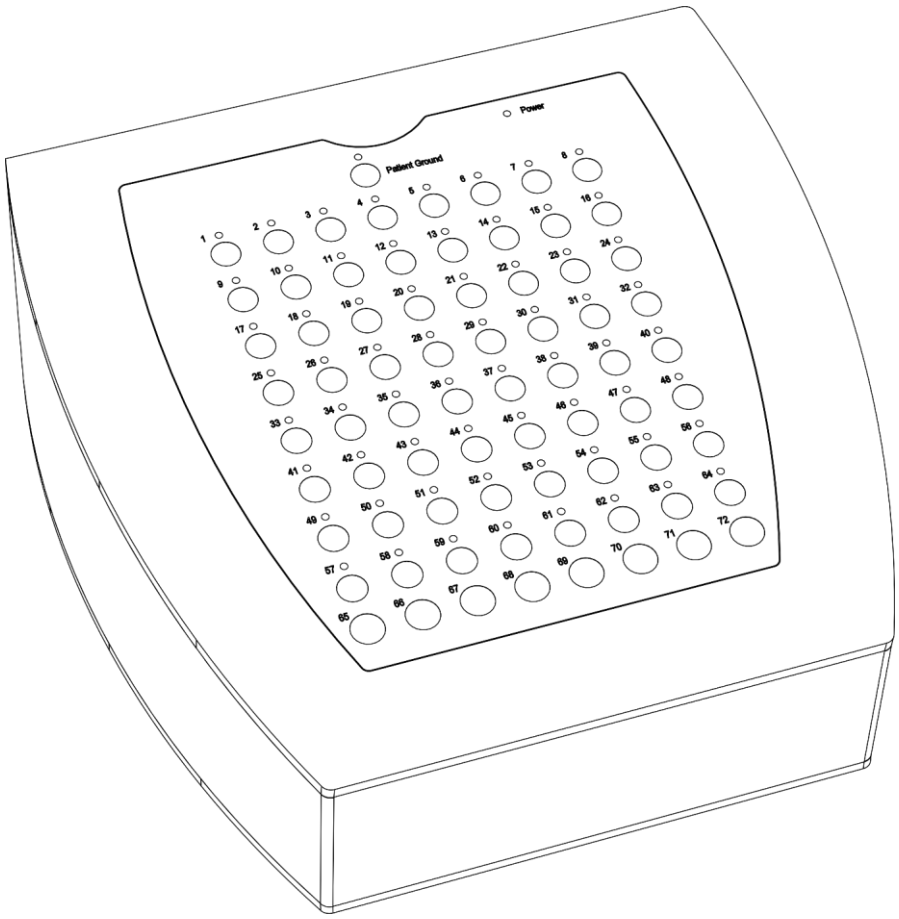
Refa

Technical Specifications



REVISION 4

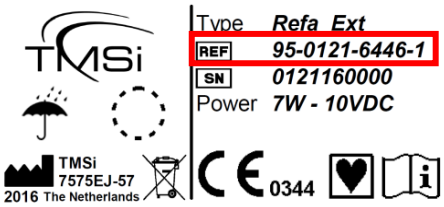
2017

Introduction

This document includes the technical specifications of the available configurations of the Refa device. This document is supplementary to the User Manual provided with the product. Refer to the User Manual for instructions for use of the device.

Use of this document

1. Locate the device label on your Refa device. The label can be found on the bottom of the device and looks like the picture depicted here:



2. Use the table of contents on the next pages to locate your device. The document is sorted on REF code that can be found on the label.

3. Click the correct device in the table of contents or go to the designated page number to find the device's technical specifications.

Contents

95-0108-324-3, Refa8-24e 2048Hz

Type	**Refa8-24e**
REF code	95-0108-324-3

Unipolar ExG inputs (EEG, ECG, EOG, EMG etc):

Number	24
RMS Noise	< 1 µV (@ lowest sample frequency)
Gain	20 x
Input signal difference	-150 mV to +150 mV (@ 0 V common signal)
Input common mode range	-2 V to +2 V (@ 0 V differential signal)
Input impedance	> 100 MΩ
CMRR	> 90 dB
Connector	safety din per channel and subD37 female connector per 32 channels

Digital input

Input turn-on current	2 mA @ 3 V input, max. input = 5 V
Isolation	> 4000 V, by means of optocoupler (H11L1)
Connector	8 bit via DB25 female, shared first bit via BNC female

Sampling:

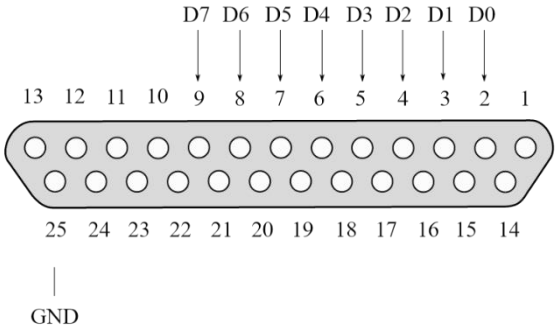
Number of channels	24 channels simultaneously
Resolution	22 bits, ExG 0.0715 µV per bit
Sample frequency	2048 Hz, 1024 Hz, 512 Hz, 256 Hz, 128 Hz

Channel list:

nr	name	Function		resolution	range
1	A1	Unipolar input 1		0.0715 µV	-150 mV to +150 mV
2	C3	Unipolar input 2		0.0715 µV	-150 mV to +150 mV
3	P3	Unipolar input 3		0.0715 µV	-150 mV to +150 mV
4	Cz	Unipolar input 4		0.0715 µV	-150 mV to +150 mV
5	Oz	Unipolar input 5		0.0715 µV	-150 mV to +150 mV
6	C4	Unipolar input 6		0.0715 µV	-150 mV to +150 mV
7	T6	Unipolar input 7		0.0715 µV	-150 mV to +150 mV
8	A2	Unipolar input 8		0.0715 µV	-150 mV to +150 mV
9	T3	Unipolar input 9		0.0715 µV	-150 mV to +150 mV
10	T5	Unipolar input 10		0.0715 µV	-150 mV to +150 mV
11	O1	Unipolar input 11		0.0715 µV	-150 mV to +150 mV
12	Pz	Unipolar input 12		0.0715 µV	-150 mV to +150 mV
13	O2	Unipolar input 13		0.0715 µV	-150 mV to +150 mV
14	P4	Unipolar input 14		0.0715 µV	-150 mV to +150 mV
15	F8	Unipolar input 15		0.0715 µV	-150 mV to +150 mV
16	T4	Unipolar input 16		0.0715 µV	-150 mV to +150 mV
17	F7	Unipolar input 17		0.0715 µV	-150 mV to +150 mV
18	Fp1	Unipolar input 18		0.0715 µV	-150 mV to +150 mV
19	F3	Unipolar input 19		0.0715 µV	-150 mV to +150 mV
20	Fz	Unipolar input 20		0.0715 µV	-150 mV to +150 mV
21	Fpz	Unipolar input 21		0.0715 µV	-150 mV to +150 mV
22	Fp2	Unipolar input 22		0.0715 µV	-150 mV to +150 mV
23	F4	Unipolar input 23		0.0715 µV	-150 mV to +150 mV
24	X0	Unipolar input 24		0.0715 µV	-150 mV to +150 mV
25	Digi	Digital channel (bits)		1 (bit)	
		0	Digital input bit 0		
		1	Digital input bit 1		
		2	Digital input bit 2		
		3	Digital input bit 3		
		4	Digital input bit 4		
		5	Digital input bit 5		
		6	Digital input bit 6		
		7	Digital input bit 7 (MSB)		
		8	always 1		
		9-13	Sawtooth test signal		
		14-31	reserved		

Digital input DB25 connector

Pin	Input
2	bit 0 (parallel to BNC connector in software)
3	bit 1
4	bit 2
5	bit 3
6	bit 4
7	bit 5
8	bit 6
9	bit 7 (MSB)
25	common ground



Headcap connector

This table describes the relation between signal channel numbers and headcap connector pin numbers.

DB37 pin number	Channel number
1	-
20	1
2	2
21	3
3	4
22	5
4	6
23	7
5	8
24	9
6	10
25	11
7	12
26	13
8	14
27	15
9	16
28	17
10	18
29	19
11	20
30	21
12	22
31	23
13	24
32	Pat. GND
14	-
33	-
15	-
34	-
16	-
35	-
17	-
36	-
18	-
37	-
19	-

95-0108-332-6, Refa8-32e 2048Hz

Type	**Refa8-32e**
REF code	95-0108-332-6

Unipolar ExG inputs (EEG, ECG, EOG, EMG etc):

Number	32
RMS Noise	< 1 µV (@ lowest sample frequency)
Gain	20 x
Input signal difference	-150 mV to +150 mV (@ 0 V common signal)
Input common mode range	-2 V to +2 V (@ 0 V differential signal)
Input impedance	> 100 MΩ
CMRR	> 90 dB
Connector	safety din per channel and subD37 female connector per 32 channels

Digital input

Input turn-on current	2 mA @ 3 V input, max. input = 5 V
Isolation	> 4000 V, by means of optocoupler (H11L1)
Connector	8 bit via DB25 female, shared first bit via BNC female

Sampling:

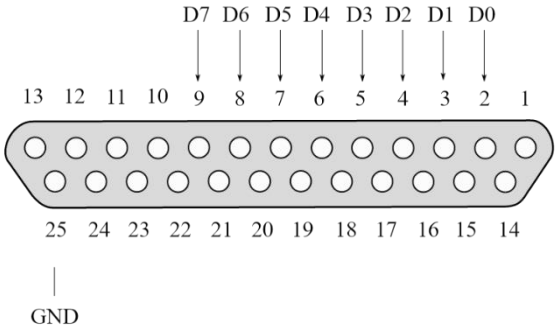
Number of channels	32 channels simultaneously
Resolution	22 bits, ExG 0.0715 µV per bit
Sample frequency	2048 Hz, 1024 Hz, 512 Hz, 256 Hz, 128 Hz

Channel list:

nr	name	function		resolution	range
1	A1	Unipolar input 1		0.0715 µV	-150 mV to +150 mV
2	C3	Unipolar input 2		0.0715 µV	-150 mV to +150 mV
3	P3	Unipolar input 3		0.0715 µV	-150 mV to +150 mV
4	Cz	Unipolar input 4		0.0715 µV	-150 mV to +150 mV
5	Oz	Unipolar input 5		0.0715 µV	-150 mV to +150 mV
6	C4	Unipolar input 6		0.0715 µV	-150 mV to +150 mV
7	T6	Unipolar input 7		0.0715 µV	-150 mV to +150 mV
8	A2	Unipolar input 8		0.0715 µV	-150 mV to +150 mV
9	T3	Unipolar input 9		0.0715 µV	-150 mV to +150 mV
10	T5	Unipolar input 10		0.0715 µV	-150 mV to +150 mV
11	O1	Unipolar input 11		0.0715 µV	-150 mV to +150 mV
12	Pz	Unipolar input 12		0.0715 µV	-150 mV to +150 mV
13	O2	Unipolar input 13		0.0715 µV	-150 mV to +150 mV
14	P4	Unipolar input 14		0.0715 µV	-150 mV to +150 mV
15	F8	Unipolar input 15		0.0715 µV	-150 mV to +150 mV
16	T4	Unipolar input 16		0.0715 µV	-150 mV to +150 mV
17	F7	Unipolar input 17		0.0715 µV	-150 mV to +150 mV
18	Fp1	Unipolar input 18		0.0715 µV	-150 mV to +150 mV
19	F3	Unipolar input 19		0.0715 µV	-150 mV to +150 mV
20	Fz	Unipolar input 20		0.0715 µV	-150 mV to +150 mV
21	Fpz	Unipolar input 21		0.0715 µV	-150 mV to +150 mV
22	Fp2	Unipolar input 22		0.0715 µV	-150 mV to +150 mV
23	F4	Unipolar input 23		0.0715 µV	-150 mV to +150 mV
24	X0	Unipolar input 24		0.0715 µV	-150 mV to +150 mV
25	X1	Unipolar input 25		0.0715 µV	-150 mV to +150 mV
26	X2	Unipolar input 26		0.0715 µV	-150 mV to +150 mV
27	X3	Unipolar input 27		0.0715 µV	-150 mV to +150 mV
28	X4	Unipolar input 28		0.0715 µV	-150 mV to +150 mV
29	X5	Unipolar input 29		0.0715 µV	-150 mV to +150 mV
30	X6	Unipolar input 30		0.0715 µV	-150 mV to +150 mV
31	X7	Unipolar input 31		0.0715 µV	-150 mV to +150 mV
32	X8	Unipolar input 32		0.0715 µV	-150 mV to +150 mV
33	Digi	Digital channel (bits)		1 (bit)	
		0	Digital input bit 0		
		1	Digital input bit 1		
		2	Digital input bit 2		
		3	Digital input bit 3		
		4	Digital input bit 4		
		5	Digital input bit 5		
		6	Digital input bit 6		
		7	Digital input bit 7 (MSB)		
		8	always 1		
		9-13	Sawtooth test signal		
		14-31	reserved		

Digital input DB25 connector

Pin	Input
2	bit 0 (parallel to BNC connector in software)
3	bit 1
4	bit 2
5	bit 3
6	bit 4
7	bit 5
8	bit 6
9	bit 7 (MSB)
25	common ground



Headcap connector

This table describes the relation between signal channel numbers and headcap connector pin numbers.

DB37 pin number	Channel number
1	-
20	1
2	2
21	3
3	4
22	5
4	6
23	7
5	8
24	9
6	10
25	11
7	12
26	13
8	14
27	15
9	16
28	17
10	18
29	19
11	20
30	21
12	22
31	23
13	24
32	25
14	26
33	27
15	28
34	29
16	30
35	31
17	32
36	Pat. GND
18	-
37	-
19	-

95-0108-332-12, Refa8-32e 2048Hz

Type	**Refa8-32e**
REF code	95-0108-332-12

Unipolar ExG inputs (EEG, ECG, EOG, EMG etc):

Number	32
RMS Noise	< 1 µV (@ lowest sample frequency)
Gain	20 x
Input signal difference	-150 mV to +150 mV (@ 0 V common signal)
Input common mode range	-2 V to +2 V (@ 0 V differential signal)
Input impedance	> 100 MΩ
CMRR	> 90 dB
Connector	safety din per channel and subD37 female connector per 32 channels

Digital input

Input turn-on current	2 mA @ 3 V input, max. input = 5 V
Isolation	> 4000 V, by means of optocoupler (H11L1)
Connector	8 bit via DB25 female, shared first bit via BNC female

Sampling:

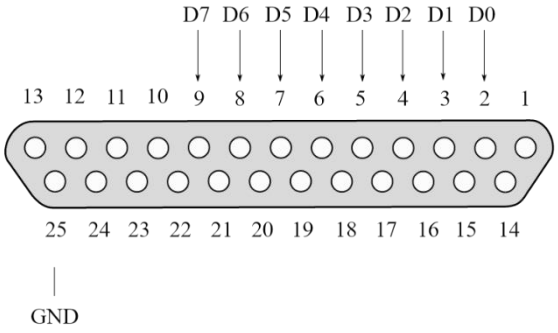
Number of channels	32 channels simultaneously
Resolution	22 bits, ExG 0.0715 µV per bit
Sample frequency	2048 Hz, 1024 Hz, 512 Hz, 256 Hz, 128 Hz

Channel list:

nr	name	function		resolution	range
1	A1	Unipolar input 1		0.0715 µV	-150 mV to +150 mV
2	C3	Unipolar input 2		0.0715 µV	-150 mV to +150 mV
3	F3	Unipolar input 3		0.0715 µV	-150 mV to +150 mV
4	Cz	Unipolar input 4		0.0715 µV	-150 mV to +150 mV
5	Fpz	Unipolar input 5		0.0715 µV	-150 mV to +150 mV
6	C4	Unipolar input 6		0.0715 µV	-150 mV to +150 mV
7	F8	Unipolar input 7		0.0715 µV	-150 mV to +150 mV
8	A2	Unipolar input 8		0.0715 µV	-150 mV to +150 mV
9	T3	Unipolar input 9		0.0715 µV	-150 mV to +150 mV
10	F7	Unipolar input 10		0.0715 µV	-150 mV to +150 mV
11	Fp1	Unipolar input 11		0.0715 µV	-150 mV to +150 mV
12	Fz	Unipolar input 12		0.0715 µV	-150 mV to +150 mV
13	Fp2	Unipolar input 13		0.0715 µV	-150 mV to +150 mV
14	F4	Unipolar input 14		0.0715 µV	-150 mV to +150 mV
15	T6	Unipolar input 15		0.0715 µV	-150 mV to +150 mV
16	T4	Unipolar input 16		0.0715 µV	-150 mV to +150 mV
17	T5	Unipolar input 17		0.0715 µV	-150 mV to +150 mV
18	O1	Unipolar input 18		0.0715 µV	-150 mV to +150 mV
19	P3	Unipolar input 19		0.0715 µV	-150 mV to +150 mV
20	Pz	Unipolar input 20		0.0715 µV	-150 mV to +150 mV
21	Oz	Unipolar input 21		0.0715 µV	-150 mV to +150 mV
22	O2	Unipolar input 22		0.0715 µV	-150 mV to +150 mV
23	P4	Unipolar input 23		0.0715 µV	-150 mV to +150 mV
24	X0	Unipolar input 24		0.0715 µV	-150 mV to +150 mV
25	X1	Unipolar input 25		0.0715 µV	-150 mV to +150 mV
26	X2	Unipolar input 26		0.0715 µV	-150 mV to +150 mV
27	X3	Unipolar input 27		0.0715 µV	-150 mV to +150 mV
28	X4	Unipolar input 28		0.0715 µV	-150 mV to +150 mV
29	X5	Unipolar input 29		0.0715 µV	-150 mV to +150 mV
30	X6	Unipolar input 30		0.0715 µV	-150 mV to +150 mV
31	X7	Unipolar input 31		0.0715 µV	-150 mV to +150 mV
32	X8	Unipolar input 32		0.0715 µV	-150 mV to +150 mV
33	Digi	Digital channel (bits)		1 (bit)	
		0	Digital input bit 0		
		1	Digital input bit 1		
		2	Digital input bit 2		
		3	Digital input bit 3		
		4	Digital input bit 4		
		5	Digital input bit 5		
		6	Digital input bit 6		
		7	Digital input bit 7 (MSB)		
		8	always 1		
		9-13	Sawtooth test signal		
		14-31	reserved		

Digital input DB25 connector

Pin	Input
2	bit 0 (parallel to BNC connector in software)
3	bit 1
4	bit 2
5	bit 3
6	bit 4
7	bit 5
8	bit 6
9	bit 7 (MSB)
25	common ground



Headcap connector

This table describes the relation between signal channel numbers and headcap connector pin numbers.

DB37 pin number	Channel number
1	-
20	1
2	2
21	3
3	4
22	5
4	6
23	7
5	8
24	9
6	10
25	11
7	12
26	13
8	14
27	15
9	16
28	17
10	18
29	19
11	20
30	21
12	22
31	23
13	24
32	25
14	26
33	27
15	28
34	29
16	30
35	31
17	32
36	Pat. GND
18	-
37	-
19	-

95-0120-1440-1, Refa8-8e4b4a 20000Hz

Type	**Refa8-8e4b4a**
REF code	95-0120-1440-1

Unipolar ExG inputs (EEG, ECG, EOG, EMG etc):

Number	8
RMS Noise	< 1 µV (@ lowest sample frequency)
Gain	26.55 x
Input signal difference	-150 mV to +150 mV (@ 0 V common signal)
Input common mode range	-2 V to +2 V (@ 0 V differential signal)
Input impedance	> 100 MΩ
CMRR	> 90 dB
Connector	micro coax, active shielding

Bipolar ExG inputs (ECG, EOG, EMG etc):

Number	4
RMS Noise	< 1 µV (@ lowest sample frequency)
Gain	26.55 x
Input signal difference	-150 mV to +150 mV (@ 0 V common signal) (no positive overflow)
Input common mode range	-2 V to +2 V (@ 0 V differential signal)
Input impedance	> 100 MΩ
CMRR	> 90 dB
Connector	4 pin plastic connector, active shielding

AUX inputs:

Number	4
RMS Noise	< 20 µV (@ lowest sample frequency)
Gain	1 x
Input signal difference	-3 V to +3 V (@ 0 V common signal)
Input common mode range	-4 V to +4 V (@ 0 V differential signal)
Input impedance	> 100 MΩ
CMRR	> 70 dB
Output voltage	+5 V & -5 V, max. 20 mA for all channels together
Connector	5 pin plastic connector

Digital input

Input turn-on current	2 mA @ 3 V input, max. input = 5 V
Isolation	> 4000 V, by means of optocoupler (H11L1)
Connector	8 bit via DB25 female, shared first bit via BNC female

Sampling:

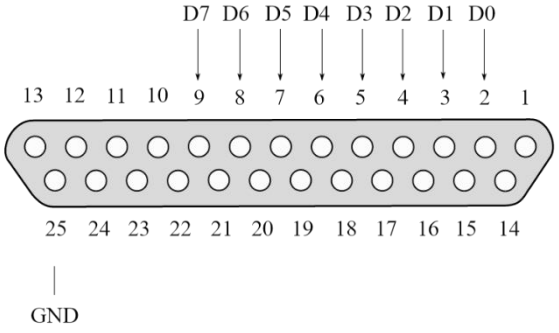
Number of channels	16 channels simultaneously
Resolution	24 bits, ExG & BIP 0.01839 µV per bit, AUX 0.48828 µV per bit
Sample frequency	20000 Hz, 10000 Hz, 5000 Hz, 2500 Hz, 1250 Hz

Channel list:

nr	name	function		resolution	range
1	ExG1	Unipolar input 1		0.01839 µV	-150 mV to +150 mV
2	ExG2	Unipolar input 2		0.01839 µV	-150 mV to +150 mV
3	ExG3	Unipolar input 3		0.01839 µV	-150 mV to +150 mV
4	ExG4	Unipolar input 4		0.01839 µV	-150 mV to +150 mV
5	ExG5	Unipolar input 5		0.01839 µV	-150 mV to +150 mV
6	ExG6	Unipolar input 6		0.01839 µV	-150 mV to +150 mV
7	ExG7	Unipolar input 7		0.01839 µV	-150 mV to +150 mV
8	ExG8	Unipolar input 8		0.01839 µV	-150 mV to +150 mV
9	BIP9	Bipolar input 9		0.01839 µV	-150 mV to +150 mV
10	BIP10	Bipolar input 10		0.01839 µV	-150 mV to +150 mV
11	BIP11	Bipolar input 11		0.01839 µV	-150 mV to +150 mV
12	BIP12	Bipolar input 12		0.01839 µV	-150 mV to +150 mV
13	AUX13	Auxiliary input 13		0.48828 µV	-3 V to +3 V
14	AUX14	Auxiliary input 14		0.48828 µV	-3 V to +3 V
15	AUX15	Auxiliary input 15		0.48828 µV	-3 V to +3 V
16	AUX16	Auxiliary input 16		0.48828 µV	-3 V to +3 V
17	Digi	Digital channel (bits)		1 (bit)	0 to 255
		0	Digital input bit 0		
		1	Digital input bit 1		
		2	Digital input bit 2		
		3	Digital input bit 3		
		4	Digital input bit 4		
		5	Digital input bit 5		
		6	Digital input bit 6		
		7	Digital input bit 7 (MSB)		
		8-15	reserved		
18	Saw	Sawtooth test signal (bits)		1 (bit)	0 to 32767

Digital input DB25 connector

Pin	Input
2	bit 0 (parallel to BNC connector in software)
3	bit 1
4	bit 2
5	bit 3
6	bit 4
7	bit 5
8	bit 6
9	bit 7 (MSB)
25	common ground



95-0120-2000-0, Refa8-16e 20000Hz

Type	**Refa8-16e**
REF code	95-0120-2000-0

Unipolar ExG inputs (EEG, ECG, EOG, EMG etc):

Number	16
RMS Noise	< 1 µV (@ lowest sample frequency)
Gain	26.55 x
Input signal difference	-150 mV to +150 mV (@ 0 V common signal)
Input common mode range	-2 V to +2 V (@ 0 V differential signal)
Input impedance	> 100 MΩ
CMRR	> 90 dB
Connectors	active shielded micro coax per channel subD37 female unshielded per 32 channels

Digital input

Input turn-on current	2 mA @ 3 V input, max. input = 5 V
Isolation	> 4000 V, by means of optocoupler (H11L1)
Connector	8 bit via DB25 female, shared first bit via BNC female

Sampling:

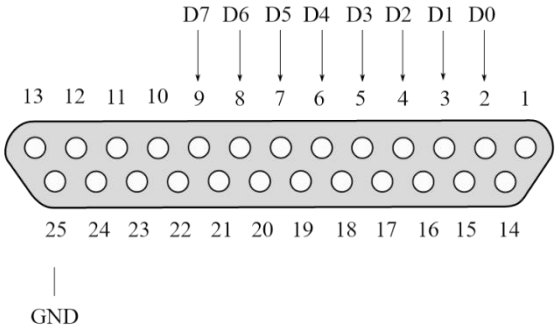
Number of channels	16 channels simultaneously
Resolution	24 bits, ExG 18.39 nV per bit
Sample frequency	20000 Hz, 10000 Hz, 5000 Hz, 2500 Hz, 1250 Hz

Channel list:

nr	name	function		resolution	range
1	ExG1	Unipolar input 1		0.01839 µV	-150 mV to +150 mV
2	ExG2	Unipolar input 2		0.01839 µV	-150 mV to +150 mV
3	ExG3	Unipolar input 3		0.01839 µV	-150 mV to +150 mV
4	ExG4	Unipolar input 4		0.01839 µV	-150 mV to +150 mV
5	ExG5	Unipolar input 5		0.01839 µV	-150 mV to +150 mV
6	ExG6	Unipolar input 6		0.01839 µV	-150 mV to +150 mV
7	ExG7	Unipolar input 7		0.01839 µV	-150 mV to +150 mV
8	ExG8	Unipolar input 8		0.01839 µV	-150 mV to +150 mV
9	ExG9	Unipolar input 9		0.01839 µV	-150 mV to +150 mV
10	ExG10	Unipolar input 10		0.01839 µV	-150 mV to +150 mV
11	ExG11	Unipolar input 11		0.01839 µV	-150 mV to +150 mV
12	ExG12	Unipolar input 12		0.01839 µV	-150 mV to +150 mV
13	ExG13	Unipolar input 13		0.01839 µV	-150 mV to +150 mV
14	ExG14	Unipolar input 14		0.01839 µV	-150 mV to +150 mV
15	ExG15	Unipolar input 15		0.01839 µV	-150 mV to +150 mV
16	ExG16	Unipolar input 16		0.01839 µV	-150 mV to +150 mV
17	Digi	Digital channel (bits)		1 (bit)	0 to 255
		0	Digital input bit 0		
		1	Digital input bit 1		
		2	Digital input bit 2		
		3	Digital input bit 3		
		4	Digital input bit 4		
		5	Digital input bit 5		
		6	Digital input bit 6		
		7	Digital input bit 7 (MSB)		
		8-15	reserved		
18	Saw	Sawtooth test signal (bits)		1 (bit)	0 to 32767

Digital input DB25 connector

Pin	Input
2	bit 0 (parallel to BNC connector in software)
3	bit 1
4	bit 2
5	bit 3
6	bit 4
7	bit 5
8	bit 6
9	bit 7 (MSB)
25	common ground



Headcap connector

This table describes the relation between signal channel numbers and headcap connector pin numbers.

DB37 pin number	Channel number
1	-
20	1
2	2
21	3
3	4
22	5
4	6
23	7
5	8
24	9
6	10
25	11
7	12
26	13
8	14
27	15
9	16
28	-
10	-
29	-
11	-
30	-
12	-
31	-
13	-
32	-
14	-
33	-
15	-
34	-
16	-
35	-
17	-
36	Pat. GND
18	-
37	-
19	-

95-0120-2000-1, Refa8-16e 20000Hz

Type	**Refa8-16e**
REF code	95-0120-2000-1

Unipolar ExG inputs (EEG, ECG, EOG, EMG etc):

Number	16
RMS Noise	< 1 µV (@ lowest sample frequency)
Gain	26.55 x
Input signal difference	-150 mV to +150 mV (@ 0 V common signal)
Input common mode range	-2 V to +2 V (@ 0 V differential signal)
Input impedance	> 100 MΩ
CMRR	> 90 dB
Connectors	active shielded micro coax per channel subD37 female unshielded per 32 channels

Digital input

Input turn-on current	2 mA @ 3 V input, max. input = 5 V
Isolation	> 4000 V, by means of optocoupler (H11L1)
Connector	8 bit via DB25 female, shared first bit via BNC female

Sampling:

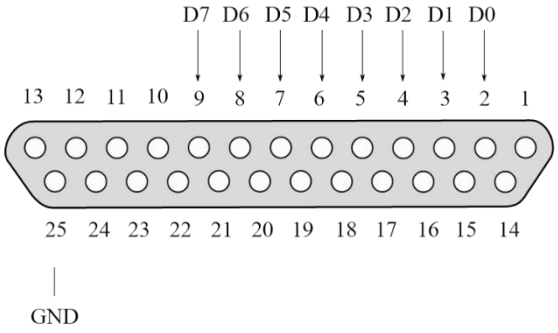
Number of channels	16 channels simultaneously
Resolution	24 bits, ExG 18.39 nV per bit
Sample frequency	20000 Hz, 10000 Hz, 5000 Hz, 2500 Hz, 1250 Hz

Channel list:

nr	name	function		resolution	range
1	ExG1	Unipolar input 1		0.01839 µV	-150 mV to +150 mV
2	ExG2	Unipolar input 2		0.01839 µV	-150 mV to +150 mV
3	ExG3	Unipolar input 3		0.01839 µV	-150 mV to +150 mV
4	ExG4	Unipolar input 4		0.01839 µV	-150 mV to +150 mV
5	ExG5	Unipolar input 5		0.01839 µV	-150 mV to +150 mV
6	ExG6	Unipolar input 6		0.01839 µV	-150 mV to +150 mV
7	ExG7	Unipolar input 7		0.01839 µV	-150 mV to +150 mV
8	ExG8	Unipolar input 8		0.01839 µV	-150 mV to +150 mV
9	ExG9	Unipolar input 9		0.01839 µV	-150 mV to +150 mV
10	ExG10	Unipolar input 10		0.01839 µV	-150 mV to +150 mV
11	ExG11	Unipolar input 11		0.01839 µV	-150 mV to +150 mV
12	ExG12	Unipolar input 12		0.01839 µV	-150 mV to +150 mV
13	ExG13	Unipolar input 13		0.01839 µV	-150 mV to +150 mV
14	ExG14	Unipolar input 14		0.01839 µV	-150 mV to +150 mV
15	ExG15	Unipolar input 15		0.01839 µV	-150 mV to +150 mV
16	ExG16	Unipolar input 16		0.01839 µV	-150 mV to +150 mV
17	Digi	Digital channel (bits)		1 (bit)	0 to 255
		0	Digital input bit 0		
		1	Digital input bit 1		
		2	Digital input bit 2		
		3	Digital input bit 3		
		4	Digital input bit 4		
		5	Digital input bit 5		
		6	Digital input bit 6		
		7	Digital input bit 7 (MSB)		
		8-15	reserved		
18	Saw	Sawtooth test signal (bits)		1 (bit)	0 to 32767

Digital input DB25 connector

Pin	Input
2	bit 0 (parallel to BNC connector in software)
3	bit 1
4	bit 2
5	bit 3
6	bit 4
7	bit 5
8	bit 6
9	bit 7 (MSB)
25	common ground



Headcap connector

This table describes the relation between signal channel numbers and headcap connector pin numbers.

DB37 pin number	Channel number
1	-
20	1
2	2
21	3
3	4
22	5
4	6
23	7
5	8
24	9
6	10
25	11
7	12
26	13
8	14
27	15
9	16
28	-
10	-
29	-
11	-
30	-
12	-
31	-
13	-
32	-
14	-
33	-
15	-
34	-
16	-
35	-
17	-
36	Pat. GND
18	-
37	-
19	-

95-0120-4006-0, Refa8-32e 2048Hz

Type	**Refa8-32e**
REF code	95-0120-4006-0

Unipolar ExG inputs (EEG, ECG, EOG, EMG etc):

Number	32
RMS Noise	< 1 µV (@ lowest sample frequency)
Gain	26.55 x
Input signal difference	-150 mV to +150 mV (@ 0 V common signal)
Input common mode range	-2 V to +2 V (@ 0 V differential signal)
Input impedance	> 100 MΩ
CMRR	> 90 dB
Connectors	active shielded micro coax per channel subD37 female unshielded per 32 channels

Digital input

Input turn-on current	2 mA @ 3 V input, max. input = 5 V
Isolation	> 4000 V, by means of optocoupler (H11L1)
Connector	8 bit via DB25 female, shared first bit via BNC female

Sampling:

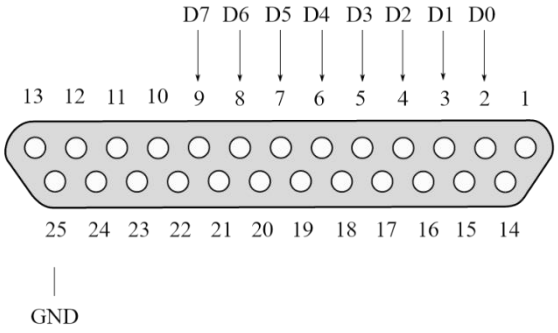
Number of channels	32 channels simultaneously
Resolution	24 bits, ExG 18.39 nV per bit
Sample frequency	2048 Hz, 1024 Hz, 512 Hz, 256 Hz, 128 Hz

Channel list:

nr	name	function		resolution	range
1	ExG1	Unipolar input 1		0.01839 µV	-150 mV to +150 mV
2	ExG2	Unipolar input 2		0.01839 µV	-150 mV to +150 mV
3	ExG3	Unipolar input 3		0.01839 µV	-150 mV to +150 mV
4	ExG4	Unipolar input 4		0.01839 µV	-150 mV to +150 mV
5	ExG5	Unipolar input 5		0.01839 µV	-150 mV to +150 mV
6	ExG6	Unipolar input 6		0.01839 µV	-150 mV to +150 mV
7	ExG7	Unipolar input 7		0.01839 µV	-150 mV to +150 mV
8	ExG8	Unipolar input 8		0.01839 µV	-150 mV to +150 mV
9	ExG9	Unipolar input 9		0.01839 µV	-150 mV to +150 mV
10	ExG10	Unipolar input 10		0.01839 µV	-150 mV to +150 mV
11	ExG11	Unipolar input 11		0.01839 µV	-150 mV to +150 mV
12	ExG12	Unipolar input 12		0.01839 µV	-150 mV to +150 mV
13	ExG13	Unipolar input 13		0.01839 µV	-150 mV to +150 mV
14	ExG14	Unipolar input 14		0.01839 µV	-150 mV to +150 mV
15	ExG15	Unipolar input 15		0.01839 µV	-150 mV to +150 mV
16	ExG16	Unipolar input 16		0.01839 µV	-150 mV to +150 mV
17	ExG17	Unipolar input 17		0.01839 µV	-150 mV to +150 mV
18	ExG18	Unipolar input 18		0.01839 µV	-150 mV to +150 mV
19	ExG19	Unipolar input 19		0.01839 µV	-150 mV to +150 mV
20	ExG20	Unipolar input 20		0.01839 µV	-150 mV to +150 mV
21	ExG21	Unipolar input 21		0.01839 µV	-150 mV to +150 mV
22	ExG22	Unipolar input 22		0.01839 µV	-150 mV to +150 mV
23	ExG23	Unipolar input 23		0.01839 µV	-150 mV to +150 mV
24	ExG24	Unipolar input 24		0.01839 µV	-150 mV to +150 mV
25	ExG25	Unipolar input 25		0.01839 µV	-150 mV to +150 mV
26	ExG26	Unipolar input 26		0.01839 µV	-150 mV to +150 mV
27	ExG27	Unipolar input 27		0.01839 µV	-150 mV to +150 mV
28	ExG28	Unipolar input 28		0.01839 µV	-150 mV to +150 mV
29	ExG29	Unipolar input 29		0.01839 µV	-150 mV to +150 mV
30	ExG30	Unipolar input 30		0.01839 µV	-150 mV to +150 mV
31	ExG31	Unipolar input 31		0.01839 µV	-150 mV to +150 mV
32	ExG32	Unipolar input 32		0.01839 µV	-150 mV to +150 mV
33	Digi	Digital channel (bits)		1 (bit)	0 to 255
		0	Digital input bit 0		
		1	Digital input bit 1		
		2	Digital input bit 2		
		3	Digital input bit 3		
		4	Digital input bit 4		
		5	Digital input bit 5		
		6	Digital input bit 6		
		7	Digital input bit 7 (MSB)		
		8-15	reserved		
34	Saw	Sawtooth test signal (bits)		1 (bit)	0 to 32767

Digital input DB25 connector

Pin	Input
2	bit 0 (parallel to BNC connector in software)
3	bit 1
4	bit 2
5	bit 3
6	bit 4
7	bit 5
8	bit 6
9	bit 7 (MSB)
25	common ground



Headcap connector

This table describes the relation between signal channel numbers and headcap connector pin numbers.

DB37 pin number	Channel number
1	-
20	1
2	2
21	3
3	4
22	5
4	6
23	7
5	8
24	9
6	10
25	11
7	12
26	13
8	14
27	15
9	16
28	17
10	18
29	19
11	20
30	21
12	22
31	23
13	24
32	25
14	26
33	27
15	28
34	29
16	30
35	31
17	32
36	Pat. GND
18	-
37	-
19	-

95-0120-4006-1, Refa8-32e 2048Hz

Type	**Refa8-32e**
REF code	95-0120-4006-1

Unipolar ExG inputs (EEG, ECG, EOG, EMG etc):

Number	32
RMS Noise	< 1 µV (@ lowest sample frequency)
Gain	26.55 x
Input signal difference	-150 mV to +150 mV (@ 0 V common signal)
Input common mode range	-2 V to +2 V (@ 0 V differential signal)
Input impedance	> 100 MΩ
CMRR	> 90 dB
Connectors	active shielded micro coax per channel subD37 female unshielded per 32 channels

Digital input

Input turn-on current	2 mA @ 3 V input, max. input = 5 V
Isolation	> 4000 V, by means of optocoupler (H11L1)
Connector	8 bit via DB25 female, shared first bit via BNC female

Sampling:

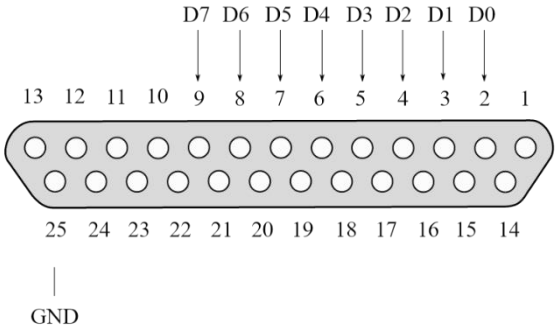
Number of channels	32 channels simultaneously
Resolution	24 bits, ExG 18.39 nV per bit
Sample frequency	2048 Hz, 1024 Hz, 512 Hz, 256 Hz, 128 Hz

Channel list:

nr	name	function		resolution	range
1	ExG1	Unipolar input 1		0.01839 µV	-150 mV to +150 mV
2	ExG2	Unipolar input 2		0.01839 µV	-150 mV to +150 mV
3	ExG3	Unipolar input 3		0.01839 µV	-150 mV to +150 mV
4	ExG4	Unipolar input 4		0.01839 µV	-150 mV to +150 mV
5	ExG5	Unipolar input 5		0.01839 µV	-150 mV to +150 mV
6	ExG6	Unipolar input 6		0.01839 µV	-150 mV to +150 mV
7	ExG7	Unipolar input 7		0.01839 µV	-150 mV to +150 mV
8	ExG8	Unipolar input 8		0.01839 µV	-150 mV to +150 mV
9	ExG9	Unipolar input 9		0.01839 µV	-150 mV to +150 mV
10	ExG10	Unipolar input 10		0.01839 µV	-150 mV to +150 mV
11	ExG11	Unipolar input 11		0.01839 µV	-150 mV to +150 mV
12	ExG12	Unipolar input 12		0.01839 µV	-150 mV to +150 mV
13	ExG13	Unipolar input 13		0.01839 µV	-150 mV to +150 mV
14	ExG14	Unipolar input 14		0.01839 µV	-150 mV to +150 mV
15	ExG15	Unipolar input 15		0.01839 µV	-150 mV to +150 mV
16	ExG16	Unipolar input 16		0.01839 µV	-150 mV to +150 mV
17	ExG17	Unipolar input 17		0.01839 µV	-150 mV to +150 mV
18	ExG18	Unipolar input 18		0.01839 µV	-150 mV to +150 mV
19	ExG19	Unipolar input 19		0.01839 µV	-150 mV to +150 mV
20	ExG20	Unipolar input 20		0.01839 µV	-150 mV to +150 mV
21	ExG21	Unipolar input 21		0.01839 µV	-150 mV to +150 mV
22	ExG22	Unipolar input 22		0.01839 µV	-150 mV to +150 mV
23	ExG23	Unipolar input 23		0.01839 µV	-150 mV to +150 mV
24	ExG24	Unipolar input 24		0.01839 µV	-150 mV to +150 mV
25	ExG25	Unipolar input 25		0.01839 µV	-150 mV to +150 mV
26	ExG26	Unipolar input 26		0.01839 µV	-150 mV to +150 mV
27	ExG27	Unipolar input 27		0.01839 µV	-150 mV to +150 mV
28	ExG28	Unipolar input 28		0.01839 µV	-150 mV to +150 mV
29	ExG29	Unipolar input 29		0.01839 µV	-150 mV to +150 mV
30	ExG30	Unipolar input 30		0.01839 µV	-150 mV to +150 mV
31	ExG31	Unipolar input 31		0.01839 µV	-150 mV to +150 mV
32	ExG32	Unipolar input 32		0.01839 µV	-150 mV to +150 mV
33	Digi	Digital channel (bits)		1 (bit)	0 to 255
		0	Digital input bit 0		
		1	Digital input bit 1		
		2	Digital input bit 2		
		3	Digital input bit 3		
		4	Digital input bit 4		
		5	Digital input bit 5		
		6	Digital input bit 6		
		7	Digital input bit 7 (MSB)		
		8-15	reserved		
34	Saw	Sawtooth test signal (bits)		1 (bit)	0 to 32767

Digital input DB25 connector

Pin	Input
2	bit 0 (parallel to BNC connector in software)
3	bit 1
4	bit 2
5	bit 3
6	bit 4
7	bit 5
8	bit 6
9	bit 7 (MSB)
25	common ground



Headcap connector

This table describes the relation between signal channel numbers and headcap connector pin numbers.

DB37 pin number	Channel number
1	-
20	1
2	2
21	3
3	4
22	5
4	6
23	7
5	8
24	9
6	10
25	11
7	12
26	13
8	14
27	15
9	16
28	17
10	18
29	19
11	20
30	21
12	22
31	23
13	24
32	25
14	26
33	27
15	28
34	29
16	30
35	31
17	32
36	Pat. GND
18	-
37	-
19	-

95-0120-4442-0, Refa8-32e4b4a 10000Hz

Type	**Refa8-32e4b4a**
REF code	95-0120-4442-0

Unipolar ExG inputs (EEG, ECG, EOG, EMG etc):

Number	32
RMS Noise	< 1 µV (@ lowest sample frequency)
Gain	26.55 x
Input signal difference	-150 mV to +150 mV (@ 0 V common signal)
Input common mode range	-2 V to +2 V (@ 0 V differential signal)
Input impedance	> 100 MΩ
CMRR	> 90 dB
Connectors	active shielded micro coax per channel subD37 female unshielded per 32 channels

Bipolar ExG inputs (ECG, EOG, EMG etc):

Number	4
RMS Noise	< 1 µV (@ lowest sample frequency)
Gain	26.55 x
Input signal difference	-150 mV to +150 mV (@ 0 V common signal) (no positive overflow)
Input common mode range	-2 V to +2 V (@ 0 V differential signal)
Input impedance	> 100 MΩ
CMRR	> 90 dB
Connector	4 pin plastic connector, active shielding

AUX inputs:

Number	4
RMS Noise	< 20 µV (@ lowest sample frequency)
Gain	1 x
Input signal difference	-3 V to +3 V (@ 0 V common signal)
Input common mode range	-4 V to +4 V (@ 0 V differential signal)
Input impedance	> 100 MΩ
CMRR	> 70 dB
Output voltage	+5 V & -5 V, max. 20 mA for all channels together
Connector	5 pin plastic connector

Digital input

Input turn-on current	2 mA @ 3 V input, max. input = 5 V
Isolation	> 4000 V, by means of optocoupler (H11L1)
Connector	8 bit via DB25 female, shared first bit via BNC female

Sampling:

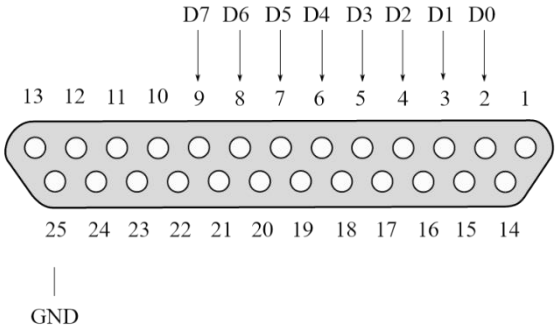
Number of channels	40 channels simultaneously
Resolution	24 bits, ExG & BIP 0.01839 µV per bit, AUX 0.48828 µV per bit
Sample frequency	10000 Hz, 5000 Hz, 2500 Hz, 1250 Hz, 625 Hz

Channel list:

nr	name	function		resolution	range
1	ExG1	Unipolar input 1		0.01839 µV	-150 mV to +150 mV
2	ExG2	Unipolar input 2		0.01839 µV	-150 mV to +150 mV
3	ExG3	Unipolar input 3		0.01839 µV	-150 mV to +150 mV
4	ExG4	Unipolar input 4		0.01839 µV	-150 mV to +150 mV
5	ExG5	Unipolar input 5		0.01839 µV	-150 mV to +150 mV
6	ExG6	Unipolar input 6		0.01839 µV	-150 mV to +150 mV
7	ExG7	Unipolar input 7		0.01839 µV	-150 mV to +150 mV
8	ExG8	Unipolar input 8		0.01839 µV	-150 mV to +150 mV
9	ExG9	Unipolar input 9		0.01839 µV	-150 mV to +150 mV
10	ExG10	Unipolar input 10		0.01839 µV	-150 mV to +150 mV
11	ExG11	Unipolar input 11		0.01839 µV	-150 mV to +150 mV
12	ExG12	Unipolar input 12		0.01839 µV	-150 mV to +150 mV
13	ExG13	Unipolar input 13		0.01839 µV	-150 mV to +150 mV
14	ExG14	Unipolar input 14		0.01839 µV	-150 mV to +150 mV
15	ExG15	Unipolar input 15		0.01839 µV	-150 mV to +150 mV
16	ExG16	Unipolar input 16		0.01839 µV	-150 mV to +150 mV
17	ExG17	Unipolar input 17		0.01839 µV	-150 mV to +150 mV
18	ExG18	Unipolar input 18		0.01839 µV	-150 mV to +150 mV
19	ExG19	Unipolar input 19		0.01839 µV	-150 mV to +150 mV
20	ExG20	Unipolar input 20		0.01839 µV	-150 mV to +150 mV
21	ExG21	Unipolar input 21		0.01839 µV	-150 mV to +150 mV
22	ExG22	Unipolar input 22		0.01839 µV	-150 mV to +150 mV
23	ExG23	Unipolar input 23		0.01839 µV	-150 mV to +150 mV
24	ExG24	Unipolar input 24		0.01839 µV	-150 mV to +150 mV
25	ExG25	Unipolar input 25		0.01839 µV	-150 mV to +150 mV
26	ExG26	Unipolar input 26		0.01839 µV	-150 mV to +150 mV
27	ExG27	Unipolar input 27		0.01839 µV	-150 mV to +150 mV
28	ExG28	Unipolar input 28		0.01839 µV	-150 mV to +150 mV
29	ExG29	Unipolar input 29		0.01839 µV	-150 mV to +150 mV
30	ExG30	Unipolar input 30		0.01839 µV	-150 mV to +150 mV
31	ExG31	Unipolar input 31		0.01839 µV	-150 mV to +150 mV
32	ExG32	Unipolar input 32		0.01839 µV	-150 mV to +150 mV
33	BIP33	Bipolar input 33		0.01839 µV	-150 mV to +150 mV
34	BIP34	Bipolar input 34		0.01839 µV	-150 mV to +150 mV
35	BIP35	Bipolar input 35		0.01839 µV	-150 mV to +150 mV
36	BIP36	Bipolar input 36		0.01839 µV	-150 mV to +150 mV
37	AUX37	Auxiliary input 37		0.48828 µV	-3 V to +3 V
38	AUX38	Auxiliary input 38		0.48828 µV	-3 V to +3 V
39	AUX39	Auxiliary input 39		0.48828 µV	-3 V to +3 V
40	AUX40	Auxiliary input 40		0.48828 µV	-3 V to +3 V
41	Digi	Digital channel (bits)		1 (bit)	0 to 255
		0	Digital input bit 0		
		1	Digital input bit 1		
		2	Digital input bit 2		
		3	Digital input bit 3		
		4	Digital input bit 4		
		5	Digital input bit 5		
		6	Digital input bit 6		
		7	Digital input bit 7 (MSB)		
		8-15	reserved		
42	Saw	Sawtooth test signal (bits)		1 (bit)	0 to 32767

Digital input DB25 connector

Pin	Input
2	bit 0 (parallel to BNC connector in software)
3	bit 1
4	bit 2
5	bit 3
6	bit 4
7	bit 5
8	bit 6
9	bit 7 (MSB)
25	common ground



Headcap connector

This table describes the relation between signal channel numbers and headcap connector pin numbers.

DB37 pin number	Channel number
1	-
20	1
2	2
21	3
3	4
22	5
4	6
23	7
5	8
24	9
6	10
25	11
7	12
26	13
8	14
27	15
9	16
28	17
10	18
29	19
11	20
30	21
12	22
31	23
13	24
32	25
14	26
33	27
15	28
34	29
16	30
35	31
17	32
36	Pat. GND
18	-
37	-
19	-

95-0120-4444-0, Refa8-32e4b4a 4000Hz

Type	**Refa8-32e4b4a**
REF code	95-0120-4444-0

Unipolar ExG inputs (EEG, ECG, EOG, EMG etc):

Number	32
RMS Noise	< 1 µV (@ lowest sample frequency)
Gain	26.55 x
Input signal difference	-150 mV to +150 mV (@ 0 V common signal)
Input common mode range	-2 V to +2 V (@ 0 V differential signal)
Input impedance	> 100 MΩ
CMRR	> 90 dB
Connectors	active shielded micro coax per channel subD37 female unshielded per 32 channels

Bipolar ExG inputs (ECG, EOG, EMG etc):

Number	4
RMS Noise	< 1 µV (@ lowest sample frequency)
Gain	26.55 x
Input signal difference	-150 mV to +150 mV (@ 0 V common signal) (no positive overflow)
Input common mode range	-2 V to +2 V (@ 0 V differential signal)
Input impedance	> 100 MΩ
CMRR	> 90 dB
Connector	4 pin plastic connector, active shielding

AUX inputs:

Number	4
RMS Noise	< 20 µV (@ lowest sample frequency)
Gain	1 x
Input signal difference	-3 V to +3 V (@ 0 V common signal)
Input common mode range	-4 V to +4 V (@ 0 V differential signal)
Input impedance	> 100 MΩ
CMRR	> 70 dB
Output voltage	+5 V & -5 V, max. 20 mA for all channels together
Connector	5 pin plastic connector

Digital input

Input turn-on current	2 mA @ 3 V input, max. input = 5 V
Isolation	> 4000 V, by means of optocoupler (H11L1)
Connector	8 bit via DB25 female, shared first bit via BNC female

Sampling:

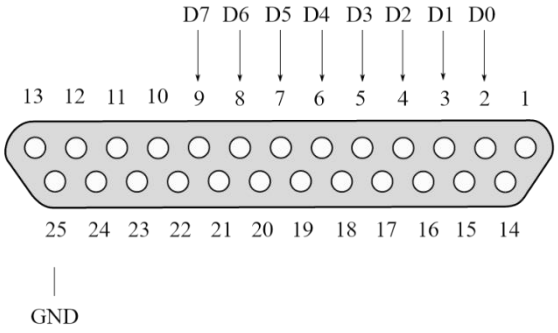
Number of channels	40 channels simultaneously
Resolution	24 bits, ExG & BIP 0.01839 µV per bit, AUX 0.48828 µV per bit
Sample frequency	4000 Hz, 2000 Hz, 1000 Hz, 500 Hz, 250 Hz

Channel list:

nr	name	function		resolution	range
1	ExG1	Unipolar input 1		0.01839 µV	-150 mV to +150 mV
2	ExG2	Unipolar input 2		0.01839 µV	-150 mV to +150 mV
3	ExG3	Unipolar input 3		0.01839 µV	-150 mV to +150 mV
4	ExG4	Unipolar input 4		0.01839 µV	-150 mV to +150 mV
5	ExG5	Unipolar input 5		0.01839 µV	-150 mV to +150 mV
6	ExG6	Unipolar input 6		0.01839 µV	-150 mV to +150 mV
7	ExG7	Unipolar input 7		0.01839 µV	-150 mV to +150 mV
8	ExG8	Unipolar input 8		0.01839 µV	-150 mV to +150 mV
9	ExG9	Unipolar input 9		0.01839 µV	-150 mV to +150 mV
10	ExG10	Unipolar input 10		0.01839 µV	-150 mV to +150 mV
11	ExG11	Unipolar input 11		0.01839 µV	-150 mV to +150 mV
12	ExG12	Unipolar input 12		0.01839 µV	-150 mV to +150 mV
13	ExG13	Unipolar input 13		0.01839 µV	-150 mV to +150 mV
14	ExG14	Unipolar input 14		0.01839 µV	-150 mV to +150 mV
15	ExG15	Unipolar input 15		0.01839 µV	-150 mV to +150 mV
16	ExG16	Unipolar input 16		0.01839 µV	-150 mV to +150 mV
17	ExG17	Unipolar input 17		0.01839 µV	-150 mV to +150 mV
18	ExG18	Unipolar input 18		0.01839 µV	-150 mV to +150 mV
19	ExG19	Unipolar input 19		0.01839 µV	-150 mV to +150 mV
20	ExG20	Unipolar input 20		0.01839 µV	-150 mV to +150 mV
21	ExG21	Unipolar input 21		0.01839 µV	-150 mV to +150 mV
22	ExG22	Unipolar input 22		0.01839 µV	-150 mV to +150 mV
23	ExG23	Unipolar input 23		0.01839 µV	-150 mV to +150 mV
24	ExG24	Unipolar input 24		0.01839 µV	-150 mV to +150 mV
25	ExG25	Unipolar input 25		0.01839 µV	-150 mV to +150 mV
26	ExG26	Unipolar input 26		0.01839 µV	-150 mV to +150 mV
27	ExG27	Unipolar input 27		0.01839 µV	-150 mV to +150 mV
28	ExG28	Unipolar input 28		0.01839 µV	-150 mV to +150 mV
29	ExG29	Unipolar input 29		0.01839 µV	-150 mV to +150 mV
30	ExG30	Unipolar input 30		0.01839 µV	-150 mV to +150 mV
31	ExG31	Unipolar input 31		0.01839 µV	-150 mV to +150 mV
32	ExG32	Unipolar input 32		0.01839 µV	-150 mV to +150 mV
33	BIP33	Bipolar input 33		0.01839 µV	-150 mV to +150 mV
34	BIP34	Bipolar input 34		0.01839 µV	-150 mV to +150 mV
35	BIP35	Bipolar input 35		0.01839 µV	-150 mV to +150 mV
36	BIP36	Bipolar input 36		0.01839 µV	-150 mV to +150 mV
37	AUX37	Auxiliary input 37		0.48828 µV	-3 V to +3 V
38	AUX38	Auxiliary input 38		0.48828 µV	-3 V to +3 V
39	AUX39	Auxiliary input 39		0.48828 µV	-3 V to +3 V
40	AUX40	Auxiliary input 40		0.48828 µV	-3 V to +3 V
41	Digi	Digital channel (bits)		1 (bit)	0 to 255
		0	Digital input bit 0		
		1	Digital input bit 1		
		2	Digital input bit 2		
		3	Digital input bit 3		
		4	Digital input bit 4		
		5	Digital input bit 5		
		6	Digital input bit 6		
		7	Digital input bit 7 (MSB)		
		8-15	reserved		
42	Saw	Sawtooth test signal (bits)		1 (bit)	0 to 32767

Digital input DB25 connector

Pin	Input
2	bit 0 (parallel to BNC connector in software)
3	bit 1
4	bit 2
5	bit 3
6	bit 4
7	bit 5
8	bit 6
9	bit 7 (MSB)
25	common ground



Headcap connector

This table describes the relation between signal channel numbers and headcap connector pin numbers.

DB37 pin number	Channel number
1	-
20	1
2	2
21	3
3	4
22	5
4	6
23	7
5	8
24	9
6	10
25	11
7	12
26	13
8	14
27	15
9	16
28	17
10	18
29	19
11	20
30	21
12	22
31	23
13	24
32	25
14	26
33	27
15	28
34	29
16	30
35	31
17	32
36	Pat. GND
18	-
37	-
19	-

95-0120-4446-0, Refa8-32e4b4a 2048Hz

Type	**Refa8-32e4b4a**
REF code	95-0120-4446-0

Unipolar ExG inputs (EEG, ECG, EOG, EMG etc):

Number	32
RMS Noise	< 1 µV (@ lowest sample frequency)
Gain	26.55 x
Input signal difference	-150 mV to +150 mV (@ 0 V common signal)
Input common mode range	-2 V to +2 V (@ 0 V differential signal)
Input impedance	> 100 MΩ
CMRR	> 90 dB
Connectors	active shielded micro coax per channel subD37 female unshielded per 32 channels

Bipolar ExG inputs (ECG, EOG, EMG etc):

Number	4
RMS Noise	< 1 µV (@ lowest sample frequency)
Gain	26.55 x
Input signal difference	-150 mV to +150 mV (@ 0 V common signal) (no positive overflow)
Input common mode range	-2 V to +2 V (@ 0 V differential signal)
Input impedance	> 100 MΩ
CMRR	> 90 dB
Connector	4 pin plastic connector, active shielding

AUX inputs:

Number	4
RMS Noise	< 20 µV (@ lowest sample frequency)
Gain	1 x
Input signal difference	-3 V to +3 V (@ 0 V common signal)
Input common mode range	-4 V to +4 V (@ 0 V differential signal)
Input impedance	> 100 MΩ
CMRR	> 70 dB
Output voltage	+5 V & -5 V, max. 20 mA for all channels together
Connector	5 pin plastic connector

Digital input

Input turn-on current	2 mA @ 3 V input, max. input = 5 V
Isolation	> 4000 V, by means of optocoupler (H11L1)
Connector	8 bit via DB25 female, shared first bit via BNC female

Sampling:

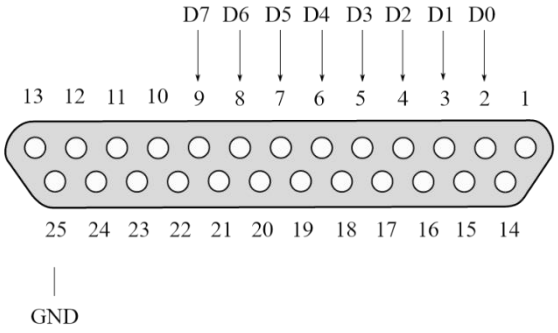
Number of channels	40 channels simultaneously
Resolution	24 bits, ExG & BIP 0.01839 µV per bit, AUX 0.48828 µV per bit
Sample frequency	2048 Hz, 1024 Hz, 512 Hz, 256 Hz, 128 Hz

Channel list

nr	name	function		resolution	range
1	ExG1	Unipolar input 1		0.01839 µV	-150 mV to +150 mV
2	ExG2	Unipolar input 2		0.01839 µV	-150 mV to +150 mV
3	ExG3	Unipolar input 3		0.01839 µV	-150 mV to +150 mV
4	ExG4	Unipolar input 4		0.01839 µV	-150 mV to +150 mV
5	ExG5	Unipolar input 5		0.01839 µV	-150 mV to +150 mV
6	ExG6	Unipolar input 6		0.01839 µV	-150 mV to +150 mV
7	ExG7	Unipolar input 7		0.01839 µV	-150 mV to +150 mV
8	ExG8	Unipolar input 8		0.01839 µV	-150 mV to +150 mV
9	ExG9	Unipolar input 9		0.01839 µV	-150 mV to +150 mV
10	ExG10	Unipolar input 10		0.01839 µV	-150 mV to +150 mV
11	ExG11	Unipolar input 11		0.01839 µV	-150 mV to +150 mV
12	ExG12	Unipolar input 12		0.01839 µV	-150 mV to +150 mV
13	ExG13	Unipolar input 13		0.01839 µV	-150 mV to +150 mV
14	ExG14	Unipolar input 14		0.01839 µV	-150 mV to +150 mV
15	ExG15	Unipolar input 15		0.01839 µV	-150 mV to +150 mV
16	ExG16	Unipolar input 16		0.01839 µV	-150 mV to +150 mV
17	ExG17	Unipolar input 17		0.01839 µV	-150 mV to +150 mV
18	ExG18	Unipolar input 18		0.01839 µV	-150 mV to +150 mV
19	ExG19	Unipolar input 19		0.01839 µV	-150 mV to +150 mV
20	ExG20	Unipolar input 20		0.01839 µV	-150 mV to +150 mV
21	ExG21	Unipolar input 21		0.01839 µV	-150 mV to +150 mV
22	ExG22	Unipolar input 22		0.01839 µV	-150 mV to +150 mV
23	ExG23	Unipolar input 23		0.01839 µV	-150 mV to +150 mV
24	ExG24	Unipolar input 24		0.01839 µV	-150 mV to +150 mV
25	ExG25	Unipolar input 25		0.01839 µV	-150 mV to +150 mV
26	ExG26	Unipolar input 26		0.01839 µV	-150 mV to +150 mV
27	ExG27	Unipolar input 27		0.01839 µV	-150 mV to +150 mV
28	ExG28	Unipolar input 28		0.01839 µV	-150 mV to +150 mV
29	ExG29	Unipolar input 29		0.01839 µV	-150 mV to +150 mV
30	ExG30	Unipolar input 30		0.01839 µV	-150 mV to +150 mV
31	ExG31	Unipolar input 31		0.01839 µV	-150 mV to +150 mV
32	ExG32	Unipolar input 32		0.01839 µV	-150 mV to +150 mV
33	BIP33	Bipolar input 33		0.01839 µV	-150 mV to +150 mV
34	BIP34	Bipolar input 34		0.01839 µV	-150 mV to +150 mV
35	BIP35	Bipolar input 35		0.01839 µV	-150 mV to +150 mV
36	BIP36	Bipolar input 36		0.01839 µV	-150 mV to +150 mV
37	AUX37	Auxiliary input 37		0.48828 µV	-3 V to +3 V
38	AUX38	Auxiliary input 38		0.48828 µV	-3 V to +3 V
39	AUX39	Auxiliary input 39		0.48828 µV	-3 V to +3 V
40	AUX40	Auxiliary input 40		0.48828 µV	-3 V to +3 V
41	Digi	Digital channel (bits)		1 (bit)	0 to 255
		0	Digital input bit 0		
		1	Digital input bit 1		
		2	Digital input bit 2		
		3	Digital input bit 3		
		4	Digital input bit 4		
		5	Digital input bit 5		
		6	Digital input bit 6		
		7	Digital input bit 7 (MSB)		
		8-15	reserved		
42	Saw	Sawtooth test signal (bits)		1 (bit)	0 to 32767

Digital input DB25 connector

Pin	Input
2	bit 0 (parallel to BNC connector in software)
3	bit 1
4	bit 2
5	bit 3
6	bit 4
7	bit 5
8	bit 6
9	bit 7 (MSB)
25	common ground



Headcap connector

This table describes the relation between signal channel numbers and headcap connector pin numbers.

Channel number	DB37 pin number
-	1
1	20
2	2
3	21
4	3
5	22
6	4
7	23
8	5
9	24
10	6
11	25
12	7
13	26
14	8
15	27
16	9
17	28
18	10
19	29
20	11
21	30
22	12
23	31
24	13
25	32
26	14
27	33
28	15
29	34
30	16
31	35
32	17
Pat. GND	36
-	18
-	37
-	19

95-0120-4446-1, Refa8-32e4b4a 2048Hz

Type	**Refa8-32e4b4a**
REF code	95-0120-4446-1

Unipolar ExG inputs (EEG, ECG, EOG, EMG etc):

Number	32
RMS Noise	< 1 µV (@ lowest sample frequency)
Gain	26.55 x
Input signal difference	-150 mV to +150 mV (@ 0 V common signal)
Input common mode range	-2 V to +2 V (@ 0 V differential signal)
Input impedance	> 100 MΩ
CMRR	> 90 dB
Connectors	active shielded micro coax per channel subD37 female unshielded per 32 channels

Bipolar ExG inputs (ECG, EOG, EMG etc):

Number	4
RMS Noise	< 1 µV (@ lowest sample frequency)
Gain	26.55 x
Input signal difference	-150 mV to +150 mV (@ 0 V common signal) (no positive overflow)
Input common mode range	-2 V to +2 V (@ 0 V differential signal)
Input impedance	> 100 MΩ
CMRR	> 90 dB
Connector	4 pin plastic connector, active shielding

AUX inputs:

Number	4
RMS Noise	< 20 µV (@ lowest sample frequency)
Gain	1 x
Input signal difference	-3 V to +3 V (@ 0 V common signal)
Input common mode range	-4 V to +4 V (@ 0 V differential signal)
Input impedance	> 100 MΩ
CMRR	> 70 dB
Output voltage	+5 V & -5 V, max. 20 mA for all channels together
Connector	5 pin plastic connector

Digital input

Input turn-on current	2 mA @ 3 V input, max. input = 5 V
Isolation	> 4000 V, by means of optocoupler (H11L1)
Connector	8 bit via DB25 female, shared first bit via BNC female

Sampling:

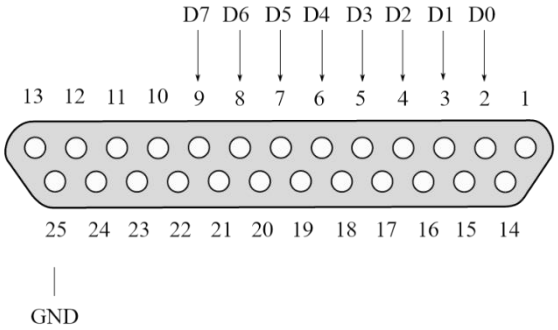
Number of channels	40 channels simultaneously
Resolution	24 bits, ExG & BIP 0.01839 µV per bit, AUX 0.48828 µV per bit
Sample frequency	2048 Hz, 1024 Hz, 512 Hz, 256 Hz, 128 Hz

Channel list:

nr	name	function		resolution	range
1	ExG1	Unipolar input 1		0.01839 µV	-150 mV to +150 mV
2	ExG2	Unipolar input 2		0.01839 µV	-150 mV to +150 mV
3	ExG3	Unipolar input 3		0.01839 µV	-150 mV to +150 mV
4	ExG4	Unipolar input 4		0.01839 µV	-150 mV to +150 mV
5	ExG5	Unipolar input 5		0.01839 µV	-150 mV to +150 mV
6	ExG6	Unipolar input 6		0.01839 µV	-150 mV to +150 mV
7	ExG7	Unipolar input 7		0.01839 µV	-150 mV to +150 mV
8	ExG8	Unipolar input 8		0.01839 µV	-150 mV to +150 mV
9	ExG9	Unipolar input 9		0.01839 µV	-150 mV to +150 mV
10	ExG10	Unipolar input 10		0.01839 µV	-150 mV to +150 mV
11	ExG11	Unipolar input 11		0.01839 µV	-150 mV to +150 mV
12	ExG12	Unipolar input 12		0.01839 µV	-150 mV to +150 mV
13	ExG13	Unipolar input 13		0.01839 µV	-150 mV to +150 mV
14	ExG14	Unipolar input 14		0.01839 µV	-150 mV to +150 mV
15	ExG15	Unipolar input 15		0.01839 µV	-150 mV to +150 mV
16	ExG16	Unipolar input 16		0.01839 µV	-150 mV to +150 mV
17	ExG17	Unipolar input 17		0.01839 µV	-150 mV to +150 mV
18	ExG18	Unipolar input 18		0.01839 µV	-150 mV to +150 mV
19	ExG19	Unipolar input 19		0.01839 µV	-150 mV to +150 mV
20	ExG20	Unipolar input 20		0.01839 µV	-150 mV to +150 mV
21	ExG21	Unipolar input 21		0.01839 µV	-150 mV to +150 mV
22	ExG22	Unipolar input 22		0.01839 µV	-150 mV to +150 mV
23	ExG23	Unipolar input 23		0.01839 µV	-150 mV to +150 mV
24	ExG24	Unipolar input 24		0.01839 µV	-150 mV to +150 mV
25	ExG25	Unipolar input 25		0.01839 µV	-150 mV to +150 mV
26	ExG26	Unipolar input 26		0.01839 µV	-150 mV to +150 mV
27	ExG27	Unipolar input 27		0.01839 µV	-150 mV to +150 mV
28	ExG28	Unipolar input 28		0.01839 µV	-150 mV to +150 mV
29	ExG29	Unipolar input 29		0.01839 µV	-150 mV to +150 mV
30	ExG30	Unipolar input 30		0.01839 µV	-150 mV to +150 mV
31	ExG31	Unipolar input 31		0.01839 µV	-150 mV to +150 mV
32	ExG32	Unipolar input 32		0.01839 µV	-150 mV to +150 mV
33	BIP33	Bipolar input 33		0.01839 µV	-150 mV to +150 mV
34	BIP34	Bipolar input 34		0.01839 µV	-150 mV to +150 mV
35	BIP35	Bipolar input 35		0.01839 µV	-150 mV to +150 mV
36	BIP36	Bipolar input 36		0.01839 µV	-150 mV to +150 mV
37	AUX37	Auxiliary input 37		0.48828 µV	-3 V to +3 V
38	AUX38	Auxiliary input 38		0.48828 µV	-3 V to +3 V
39	AUX39	Auxiliary input 39		0.48828 µV	-3 V to +3 V
40	AUX40	Auxiliary input 40		0.48828 µV	-3 V to +3 V
41	Digi	Digital channel (bits)		1 (bit)	0 to 255
		0	Digital input bit 0		
		1	Digital input bit 1		
		2	Digital input bit 2		
		3	Digital input bit 3		
		4	Digital input bit 4		
		5	Digital input bit 5		
		6	Digital input bit 6		
		7	Digital input bit 7 (MSB)		
		8-15	reserved		
42	Saw	Sawtooth test signal (bits)		1 (bit)	0 to 32767

Digital input DB25 connector

Pin	Input
2	bit 0 (parallel to BNC connector in software)
3	bit 1
4	bit 2
5	bit 3
6	bit 4
7	bit 5
8	bit 6
9	bit 7 (MSB)
25	common ground



Headcap connector

This table describes the relation between signal channel numbers and headcap connector pin numbers.

DB37 pin number	Channel number
1	-
20	1
2	2
21	3
3	4
22	5
4	6
23	7
5	8
24	9
6	10
25	11
7	12
26	13
8	14
27	15
9	16
28	17
10	18
29	19
11	20
30	21
12	22
31	23
13	24
32	25
14	26
33	27
15	28
34	29
16	30
35	31
17	32
36	Pat. GND
18	-
37	-
19	-

95-0120-4446-2, Refa8-32e4b4a 2048Hz

Type	**Refa8-32e4b4a 3.8x gain**
REF code	95-0120-4446-2

Unipolar ExG inputs (EEG, ECG, EOG, EMG etc):

Number	32
RMS Noise	< 3 μV (@ lowest sample frequency)
Gain	3.8 x
Input signal difference	-1.05 V to +1.05 V (@ 0 V common signal)
Input common mode range	-2 V to +2 V (@ 0 V differential signal)
Input impedance	> 100 MΩ
CMRR	> 80 dB
Connectors	active shielded micro coax per channel subD37 female unshielded per 32 channels

Bipolar ExG inputs (ECG, EOG, EMG etc):

Number	4
RMS Noise	< 1 μV (@ lowest sample frequency)
Gain	26.55 x
Input signal difference	-150 mV to +150 mV (@ 0 V common signal) (no positive overflow)
Input common mode range	-2 V to +2 V (@ 0 V differential signal)
Input impedance	> 100 MΩ
CMRR	> 90 dB
Connector	4 pin plastic connector, active shielding

AUX inputs:

Number	4
RMS Noise	< 20 μV (@ lowest sample frequency)
Gain	1 x
Input signal difference	-3 V to +3 V (@ 0 V common signal)
Input common mode range	-4 V to +4 V (@ 0 V differential signal)
Input impedance	> 100 MΩ
CMRR	> 70 dB
Output voltage	+5 V & -5 V, max. 20 mA for all channels together
Connector	5 pin plastic connector

Digital input

Input	turn-on current = 2 mA @ 3 V input, max. input = 5 V
Isolation	> 4000 V, by means of optocoupler (H11L1)
Connector	8 bit via DB25 female, shared first bit via BNC female

Sampling:

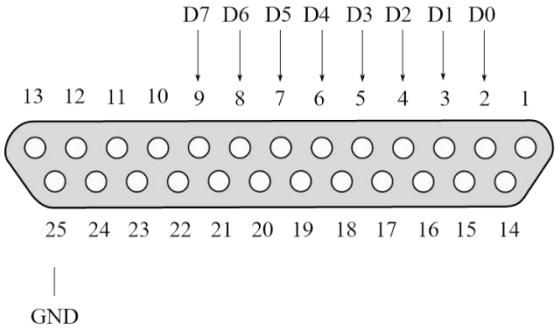
Number of channels	40 channels simultaneously
Resolution	24 bits, ExG 128.73nV per bit, BIP 18.39 nV per bit,
AUX 0.48828 μV per bit	
Sample frequency	2048 Hz, 1024 Hz, 512 Hz, 256 Hz, 128 Hz

Channel list:

nr	name	function		resolution	range
1	ExG1	Unipolar input 1		0.12873 µV	-1.05 V to +1.05 V
2	ExG2	Unipolar input 2		0.12873 µV	-1.05 V to +1.05 V
3	ExG3	Unipolar input 3		0.12873 µV	-1.05 V to +1.05 V
4	ExG4	Unipolar input 4		0.12873 µV	-1.05 V to +1.05 V
5	ExG5	Unipolar input 5		0.12873 µV	-1.05 V to +1.05 V
6	ExG6	Unipolar input 6		0.12873 µV	-1.05 V to +1.05 V
7	ExG7	Unipolar input 7		0.12873 µV	-1.05 V to +1.05 V
8	ExG8	Unipolar input 8		0.12873 µV	-1.05 V to +1.05 V
9	ExG9	Unipolar input 9		0.12873 µV	-1.05 V to +1.05 V
10	ExG10	Unipolar input 10		0.12873 µV	-1.05 V to +1.05 V
11	ExG11	Unipolar input 11		0.12873 µV	-1.05 V to +1.05 V
12	ExG12	Unipolar input 12		0.12873 µV	-1.05 V to +1.05 V
13	ExG13	Unipolar input 13		0.12873 µV	-1.05 V to +1.05 V
14	ExG14	Unipolar input 14		0.12873 µV	-1.05 V to +1.05 V
15	ExG15	Unipolar input 15		0.12873 µV	-1.05 V to +1.05 V
16	ExG16	Unipolar input 16		0.12873 µV	-1.05 V to +1.05 V
17	ExG17	Unipolar input 17		0.12873 µV	-1.05 V to +1.05 V
18	ExG18	Unipolar input 18		0.12873 µV	-1.05 V to +1.05 V
19	ExG19	Unipolar input 19		0.12873 µV	-1.05 V to +1.05 V
20	ExG20	Unipolar input 20		0.12873 µV	-1.05 V to +1.05 V
21	ExG21	Unipolar input 21		0.12873 µV	-1.05 V to +1.05 V
22	ExG22	Unipolar input 22		0.12873 µV	-1.05 V to +1.05 V
23	ExG23	Unipolar input 23		0.12873 µV	-1.05 V to +1.05 V
24	ExG24	Unipolar input 24		0.12873 µV	-1.05 V to +1.05 V
25	ExG25	Unipolar input 25		0.12873 µV	-1.05 V to +1.05 V
26	ExG26	Unipolar input 26		0.12873 µV	-1.05 V to +1.05 V
27	ExG27	Unipolar input 27		0.12873 µV	-1.05 V to +1.05 V
28	ExG28	Unipolar input 28		0.12873 µV	-1.05 V to +1.05 V
29	ExG29	Unipolar input 29		0.12873 µV	-1.05 V to +1.05 V
30	ExG30	Unipolar input 30		0.12873 µV	-1.05 V to +1.05 V
31	ExG31	Unipolar input 31		0.12873 µV	-1.05 V to +1.05 V
32	ExG32	Unipolar input 32		0.12873 µV	-1.05 V to +1.05 V
33	BIP33	Bipolar input 33		0.01839 µV	-150 mV to +150 mV
34	BIP34	Bipolar input 34		0.01839 µV	-150 mV to +150 mV
35	BIP35	Bipolar input 35		0.01839 µV	-150 mV to +150 mV
36	BIP36	Bipolar input 36		0.01839 µV	-150 mV to +150 mV
37	AUX37	Auxiliary input 37		0.48828 µV	-3 V to +3 V
38	AUX38	Auxiliary input 38		0.48828 µV	-3 V to +3 V
39	AUX39	Auxiliary input 39		0.48828 µV	-3 V to +3 V
40	AUX40	Auxiliary input 40		0.48828 µV	-3 V to +3 V
41	Digi	Digital channel (bits)		1 (bit)	0 to 255
		0	Digital input bit 0		
		1	Digital input bit 1		
		2	Digital input bit 2		
		3	Digital input bit 3		
		4	Digital input bit 4		
		5	Digital input bit 5		
		6	Digital input bit 6		
		7	Digital input bit 7 (MSB)		
		8-15	reserved		
42	Saw	Sawtooth test signal (bits)		1 (bit)	0 to 32767

Digital input DB25 connector

Pin	Input
2	bit 0 (parallel to BNC connector in software)
3	bit 1
4	bit 2
5	bit 3
6	bit 4
7	bit 5
8	bit 6
9	bit 7 (MSB)
25	common ground



Headcap connector

This table describes the relation between signal channel numbers and headcap connector pin numbers.

DB37 pin number	Channel number
1	-
20	1
2	2
21	3
3	4
22	5
4	6
23	7
5	8
24	9
6	10
25	11
7	12
26	13
8	14
27	15
9	16
28	17
10	18
29	19
11	20
30	21
12	22
31	23
13	24
32	25
14	26
33	27
15	28
34	29
16	30
35	31
17	32
36	Pat. GND
18	-
37	-
19	-

95-0120-8444-0, Refa8-64e4b4a 4000Hz

Type	**Refa8-64e4b4a**
REF code	95-0120-8444-1

Unipolar ExG inputs (EEG, ECG, EOG, EMG etc):

Number	64
RMS Noise	< 1 µV (@ lowest sample frequency)
Gain	26.55 x
Input signal difference	-150 mV to +150 mV (@ 0 V common signal)
Input common mode range	-2 V to +2 V (@ 0 V differential signal)
Input impedance	> 100 MΩ
CMRR	> 90 dB
Connectors	active shielded micro coax per channel subD37 female unshielded per 32 channels

Bipolar ExG inputs (ECG, EOG, EMG etc):

Number	4
RMS Noise	< 1 µV (@ lowest sample frequency)
Gain	26.55 x
Input signal difference	-150 mV to +150 mV (@ 0 V common signal) (no positive overflow)
Input common mode range	-2 V to +2 V (@ 0 V differential signal)
Input impedance	> 100 MΩ
CMRR	> 90 dB
Connector	4 pin plastic connector, active shielding

AUX inputs:

Number	4
RMS Noise	< 20 µV (@ lowest sample frequency)
Gain	1 x
Input signal difference	-3 V to +3 V (@ 0 V common signal)
Input common mode range	-4 V to +4 V (@ 0 V differential signal)
Input impedance	> 100 MΩ
CMRR	> 70 dB
Output voltage	+5 V & -5 V, max. 20 mA for all channels together
Connector	5 pin plastic connector

Digital input

Input turn-on current	2 mA @ 3 V input, max. input = 5 V
Isolation	> 4000 V, by means of optocoupler (H11L1)
Connector	8 bit via DB25 female, shared first bit via BNC female

Sampling:

Number of channels	72 channels simultaneously
Resolution	24 bits, ExG & BIP 0.01839 µV per bit, AUX 0.48828 µV per bit
Sample frequency	4000 Hz, 2000 Hz, 1000 Hz, 500 Hz, 250 Hz

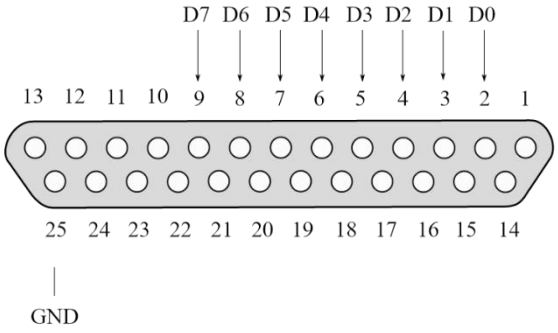
Channel list:

nr	name	function	resolution	range
1	ExG1	Unipolar input 1	0.01839 µV	-150 mV to +150 mV
2	ExG2	Unipolar input 2	0.01839 µV	-150 mV to +150 mV
3	ExG3	Unipolar input 3	0.01839 µV	-150 mV to +150 mV
4	ExG4	Unipolar input 4	0.01839 µV	-150 mV to +150 mV
5	ExG5	Unipolar input 5	0.01839 µV	-150 mV to +150 mV
6	ExG6	Unipolar input 6	0.01839 µV	-150 mV to +150 mV
7	ExG7	Unipolar input 7	0.01839 µV	-150 mV to +150 mV
8	ExG8	Unipolar input 8	0.01839 µV	-150 mV to +150 mV
9	ExG9	Unipolar input 9	0.01839 µV	-150 mV to +150 mV
10	ExG10	Unipolar input 10	0.01839 µV	-150 mV to +150 mV
11	ExG11	Unipolar input 11	0.01839 µV	-150 mV to +150 mV
12	ExG12	Unipolar input 12	0.01839 µV	-150 mV to +150 mV
13	ExG13	Unipolar input 13	0.01839 µV	-150 mV to +150 mV
14	ExG14	Unipolar input 14	0.01839 µV	-150 mV to +150 mV
15	ExG15	Unipolar input 15	0.01839 µV	-150 mV to +150 mV
16	ExG16	Unipolar input 16	0.01839 µV	-150 mV to +150 mV
17	ExG17	Unipolar input 17	0.01839 µV	-150 mV to +150 mV
18	ExG18	Unipolar input 18	0.01839 µV	-150 mV to +150 mV
19	ExG19	Unipolar input 19	0.01839 µV	-150 mV to +150 mV
20	ExG20	Unipolar input 20	0.01839 µV	-150 mV to +150 mV
21	ExG21	Unipolar input 21	0.01839 µV	-150 mV to +150 mV
22	ExG22	Unipolar input 22	0.01839 µV	-150 mV to +150 mV
23	ExG23	Unipolar input 23	0.01839 µV	-150 mV to +150 mV
24	ExG24	Unipolar input 24	0.01839 µV	-150 mV to +150 mV
25	ExG25	Unipolar input 25	0.01839 µV	-150 mV to +150 mV
26	ExG26	Unipolar input 26	0.01839 µV	-150 mV to +150 mV
27	ExG27	Unipolar input 27	0.01839 µV	-150 mV to +150 mV
28	ExG28	Unipolar input 28	0.01839 µV	-150 mV to +150 mV
29	ExG29	Unipolar input 29	0.01839 µV	-150 mV to +150 mV
30	ExG30	Unipolar input 30	0.01839 µV	-150 mV to +150 mV
31	ExG31	Unipolar input 31	0.01839 µV	-150 mV to +150 mV
32	ExG32	Unipolar input 32	0.01839 µV	-150 mV to +150 mV
33	ExG33	Unipolar input 33	0.01839 µV	-150 mV to +150 mV
34	ExG34	Unipolar input 34	0.01839 µV	-150 mV to +150 mV
35	ExG35	Unipolar input 35	0.01839 µV	-150 mV to +150 mV
36	ExG36	Unipolar input 36	0.01839 µV	-150 mV to +150 mV
37	ExG37	Unipolar input 37	0.01839 µV	-150 mV to +150 mV
38	ExG38	Unipolar input 38	0.01839 µV	-150 mV to +150 mV
39	ExG39	Unipolar input 39	0.01839 µV	-150 mV to +150 mV
40	ExG40	Unipolar input 40	0.01839 µV	-150 mV to +150 mV
41	ExG41	Unipolar input 41	0.01839 µV	-150 mV to +150 mV
42	ExG42	Unipolar input 42	0.01839 µV	-150 mV to +150 mV
43	ExG43	Unipolar input 43	0.01839 µV	-150 mV to +150 mV
44	ExG44	Unipolar input 44	0.01839 µV	-150 mV to +150 mV
45	ExG45	Unipolar input 45	0.01839 µV	-150 mV to +150 mV
46	ExG46	Unipolar input 46	0.01839 µV	-150 mV to +150 mV
47	ExG47	Unipolar input 47	0.01839 µV	-150 mV to +150 mV
48	ExG48	Unipolar input 48	0.01839 µV	-150 mV to +150 mV

nr	name	function		resolution	range
49	ExG49	Unipolar input 49		0.01839 µV	-150 mV to +150 mV
50	ExG50	Unipolar input 50		0.01839 µV	-150 mV to +150 mV
51	ExG51	Unipolar input 51		0.01839 µV	-150 mV to +150 mV
52	ExG52	Unipolar input 52		0.01839 µV	-150 mV to +150 mV
53	ExG53	Unipolar input 53		0.01839 µV	-150 mV to +150 mV
54	ExG54	Unipolar input 54		0.01839 µV	-150 mV to +150 mV
55	ExG55	Unipolar input 55		0.01839 µV	-150 mV to +150 mV
56	ExG56	Unipolar input 56		0.01839 µV	-150 mV to +150 mV
57	ExG57	Unipolar input 57		0.01839 µV	-150 mV to +150 mV
58	ExG58	Unipolar input 58		0.01839 µV	-150 mV to +150 mV
59	ExG59	Unipolar input 59		0.01839 µV	-150 mV to +150 mV
60	ExG60	Unipolar input 60		0.01839 µV	-150 mV to +150 mV
61	ExG61	Unipolar input 61		0.01839 µV	-150 mV to +150 mV
62	ExG62	Unipolar input 62		0.01839 µV	-150 mV to +150 mV
63	ExG63	Unipolar input 63		0.01839 µV	-150 mV to +150 mV
64	ExG64	Unipolar input 64		0.01839 µV	-150 mV to +150 mV
65	BIP65	Bipolar input 65		0.01839 µV	-150 mV to +150 mV
66	BIP66	Bipolar input 66		0.01839 µV	-150 mV to +150 mV
67	BIP67	Bipolar input 67		0.01839 µV	-150 mV to +150 mV
68	BIP68	Bipolar input 68		0.01839 µV	-150 mV to +150 mV
69	AUX69	Auxiliary input 69		0.48828 µV	-3 V to +3 V
70	AUX70	Auxiliary input 70		0.48828 µV	-3 V to +3 V
71	AUX71	Auxiliary input 71		0.48828 µV	-3 V to +3 V
72	AUX72	Auxiliary input 72		0.48828 µV	-3 V to +3 V
73	Digi	Digital channel (bits)		1 (bit)	0 to 255
		0	Digital input bit 0		
		1	Digital input bit 1		
		2	Digital input bit 2		
		3	Digital input bit 3		
		4	Digital input bit 4		
		5	Digital input bit 5		
		6	Digital input bit 6		
		7	Digital input bit 7 (MSB)		
		8-15	reserved		
74	Saw	Sawtooth test signal (bits)		1 (bit)	0 to 32767

Digital input DB25 connector

Pin	Input
2	bit 0 (parallel to BNC connector in software)
3	bit 1
4	bit 2
5	bit 3
6	bit 4
7	bit 5
8	bit 6
9	bit 7 (MSB)
25	common ground



Headcap connector

This table describes the relation between signal channel numbers and headcap connector pin numbers.

DB37 pin number	First Connector Channel number	Second Connector Channel number
1	-	-
20	1	33
2	2	34
21	3	35
3	4	36
22	5	37
4	6	38
23	7	39
5	8	40
24	9	41
6	10	42
25	11	43
7	12	44
26	13	45
8	14	46
27	15	47
9	16	48
28	17	49
10	18	50
29	19	51
11	20	52
30	21	53
12	22	54
31	23	55
13	24	56
32	25	57
14	26	58
33	27	59
15	28	60
34	29	61
16	30	62
35	31	63
17	32	64
36	Pat. GND	Pat. GND
18	-	-
37	-	-
19	-	-

95-0120-8444-1, Refa8-64e4b4a 4000Hz

Type	**Refa8-64e4b4a**
REF code	95-0120-8444-1

Unipolar ExG inputs (EEG, ECG, EOG, EMG etc):

Number	64
RMS Noise	< 1 µV (@ lowest sample frequency)
Gain	26.55 x
Input signal difference	-150 mV to +150 mV (@ 0 V common signal)
Input common mode range	-2 V to +2 V (@ 0 V differential signal)
Input impedance	> 100 MΩ
CMRR	> 90 dB
Connectors	active shielded micro coax per channel subD37 female unshielded per 32 channels

Bipolar ExG inputs (ECG, EOG, EMG etc):

Number	4
RMS Noise	< 1 µV (@ lowest sample frequency)
Gain	26.55 x
Input signal difference	-150 mV to +150 mV (@ 0 V common signal) (no positive overflow)
Input common mode range	-2 V to +2 V (@ 0 V differential signal)
Input impedance	> 100 MΩ
CMRR	> 90 dB
Connector	4 pin plastic connector, active shielding

AUX inputs:

Number	4
RMS Noise	< 20 µV (@ lowest sample frequency)
Gain	1 x
Input signal difference	-3 V to +3 V (@ 0 V common signal)
Input common mode range	-4 V to +4 V (@ 0 V differential signal)
Input impedance	> 100 MΩ
CMRR	> 70 dB
Output voltage	+5 V & -5 V, max. 20 mA for all channels together
Connector	5 pin plastic connector

Digital input

Input turn-on current	2 mA @ 3 V input, max. input = 5 V
Isolation	> 4000 V, by means of optocoupler (H11L1)
Connector	8 bit via DB25 female, shared first bit via BNC female

Sampling:

Number of channels	72 channels simultaneously
Resolution	24 bits, ExG & BIP 0.01839 µV per bit, AUX 0.48828 µV per bit
Sample frequency	4000 Hz, 2000 Hz, 1000 Hz, 500 Hz, 250 Hz

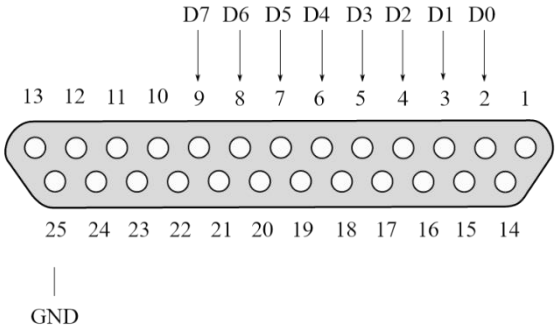
Channel list:

nr	name	function	resolution	range
1	ExG1	Unipolar input 1	0.01839 µV	-150 mV to +150 mV
2	ExG2	Unipolar input 2	0.01839 µV	-150 mV to +150 mV
3	ExG3	Unipolar input 3	0.01839 µV	-150 mV to +150 mV
4	ExG4	Unipolar input 4	0.01839 µV	-150 mV to +150 mV
5	ExG5	Unipolar input 5	0.01839 µV	-150 mV to +150 mV
6	ExG6	Unipolar input 6	0.01839 µV	-150 mV to +150 mV
7	ExG7	Unipolar input 7	0.01839 µV	-150 mV to +150 mV
8	ExG8	Unipolar input 8	0.01839 µV	-150 mV to +150 mV
9	ExG9	Unipolar input 9	0.01839 µV	-150 mV to +150 mV
10	ExG10	Unipolar input 10	0.01839 µV	-150 mV to +150 mV
11	ExG11	Unipolar input 11	0.01839 µV	-150 mV to +150 mV
12	ExG12	Unipolar input 12	0.01839 µV	-150 mV to +150 mV
13	ExG13	Unipolar input 13	0.01839 µV	-150 mV to +150 mV
14	ExG14	Unipolar input 14	0.01839 µV	-150 mV to +150 mV
15	ExG15	Unipolar input 15	0.01839 µV	-150 mV to +150 mV
16	ExG16	Unipolar input 16	0.01839 µV	-150 mV to +150 mV
17	ExG17	Unipolar input 17	0.01839 µV	-150 mV to +150 mV
18	ExG18	Unipolar input 18	0.01839 µV	-150 mV to +150 mV
19	ExG19	Unipolar input 19	0.01839 µV	-150 mV to +150 mV
20	ExG20	Unipolar input 20	0.01839 µV	-150 mV to +150 mV
21	ExG21	Unipolar input 21	0.01839 µV	-150 mV to +150 mV
22	ExG22	Unipolar input 22	0.01839 µV	-150 mV to +150 mV
23	ExG23	Unipolar input 23	0.01839 µV	-150 mV to +150 mV
24	ExG24	Unipolar input 24	0.01839 µV	-150 mV to +150 mV
25	ExG25	Unipolar input 25	0.01839 µV	-150 mV to +150 mV
26	ExG26	Unipolar input 26	0.01839 µV	-150 mV to +150 mV
27	ExG27	Unipolar input 27	0.01839 µV	-150 mV to +150 mV
28	ExG28	Unipolar input 28	0.01839 µV	-150 mV to +150 mV
29	ExG29	Unipolar input 29	0.01839 µV	-150 mV to +150 mV
30	ExG30	Unipolar input 30	0.01839 µV	-150 mV to +150 mV
31	ExG31	Unipolar input 31	0.01839 µV	-150 mV to +150 mV
32	ExG32	Unipolar input 32	0.01839 µV	-150 mV to +150 mV
33	ExG33	Unipolar input 33	0.01839 µV	-150 mV to +150 mV
34	ExG34	Unipolar input 34	0.01839 µV	-150 mV to +150 mV
35	ExG35	Unipolar input 35	0.01839 µV	-150 mV to +150 mV
36	ExG36	Unipolar input 36	0.01839 µV	-150 mV to +150 mV
37	ExG37	Unipolar input 37	0.01839 µV	-150 mV to +150 mV
38	ExG38	Unipolar input 38	0.01839 µV	-150 mV to +150 mV
39	ExG39	Unipolar input 39	0.01839 µV	-150 mV to +150 mV
40	ExG40	Unipolar input 40	0.01839 µV	-150 mV to +150 mV
41	ExG41	Unipolar input 41	0.01839 µV	-150 mV to +150 mV
42	ExG42	Unipolar input 42	0.01839 µV	-150 mV to +150 mV
43	ExG43	Unipolar input 43	0.01839 µV	-150 mV to +150 mV
44	ExG44	Unipolar input 44	0.01839 µV	-150 mV to +150 mV
45	ExG45	Unipolar input 45	0.01839 µV	-150 mV to +150 mV
46	ExG46	Unipolar input 46	0.01839 µV	-150 mV to +150 mV
47	ExG47	Unipolar input 47	0.01839 µV	-150 mV to +150 mV
48	ExG48	Unipolar input 48	0.01839 µV	-150 mV to +150 mV

nr	name	function		resolution	range
49	ExG49	Unipolar input 49		0.01839 µV	-150 mV to +150 mV
50	ExG50	Unipolar input 50		0.01839 µV	-150 mV to +150 mV
51	ExG51	Unipolar input 51		0.01839 µV	-150 mV to +150 mV
52	ExG52	Unipolar input 52		0.01839 µV	-150 mV to +150 mV
53	ExG53	Unipolar input 53		0.01839 µV	-150 mV to +150 mV
54	ExG54	Unipolar input 54		0.01839 µV	-150 mV to +150 mV
55	ExG55	Unipolar input 55		0.01839 µV	-150 mV to +150 mV
56	ExG56	Unipolar input 56		0.01839 µV	-150 mV to +150 mV
57	ExG57	Unipolar input 57		0.01839 µV	-150 mV to +150 mV
58	ExG58	Unipolar input 58		0.01839 µV	-150 mV to +150 mV
59	ExG59	Unipolar input 59		0.01839 µV	-150 mV to +150 mV
60	ExG60	Unipolar input 60		0.01839 µV	-150 mV to +150 mV
61	ExG61	Unipolar input 61		0.01839 µV	-150 mV to +150 mV
62	ExG62	Unipolar input 62		0.01839 µV	-150 mV to +150 mV
63	ExG63	Unipolar input 63		0.01839 µV	-150 mV to +150 mV
64	ExG64	Unipolar input 64		0.01839 µV	-150 mV to +150 mV
65	BIP65	Bipolar input 65		0.01839 µV	-150 mV to +150 mV
66	BIP66	Bipolar input 66		0.01839 µV	-150 mV to +150 mV
67	BIP67	Bipolar input 67		0.01839 µV	-150 mV to +150 mV
68	BIP68	Bipolar input 68		0.01839 µV	-150 mV to +150 mV
69	AUX69	Auxiliary input 69		0.48828 µV	-3 V to +3 V
70	AUX70	Auxiliary input 70		0.48828 µV	-3 V to +3 V
71	AUX71	Auxiliary input 71		0.48828 µV	-3 V to +3 V
72	AUX72	Auxiliary input 72		0.48828 µV	-3 V to +3 V
73	Digi	Digital channel (bits)		1 (bit)	0 to 255
		0	Digital input bit 0		
		1	Digital input bit 1		
		2	Digital input bit 2		
		3	Digital input bit 3		
		4	Digital input bit 4		
		5	Digital input bit 5		
		6	Digital input bit 6		
		7	Digital input bit 7 (MSB)		
		8-15	reserved		
74	Saw	Sawtooth test signal (bits)		1 (bit)	0 to 32767

Digital input DB25 connector

Pin	Input
2	bit 0 (parallel to BNC connector in software)
3	bit 1
4	bit 2
5	bit 3
6	bit 4
7	bit 5
8	bit 6
9	bit 7 (MSB)
25	common ground



Headcap connector

This table describes the relation between signal channel numbers and headcap connector pin numbers.

DB37 pin number	First Connector Channel number	Second Connector Channel number
1	-	-
20	1	33
2	2	34
21	3	35
3	4	36
22	5	37
4	6	38
23	7	39
5	8	40
24	9	41
6	10	42
25	11	43
7	12	44
26	13	45
8	14	46
27	15	47
9	16	48
28	17	49
10	18	50
29	19	51
11	20	52
30	21	53
12	22	54
31	23	55
13	24	56
32	25	57
14	26	58
33	27	59
15	28	60
34	29	61
16	30	62
35	31	63
17	32	64
36	Pat. GND	Pat. GND
18	-	-
37	-	-
19	-	-

95-0120-8446-0, Refa8-64e4b4a 2048Hz

Type	**Refa8-64e4b4a**
REF code	95-0120-8446-0

Unipolar ExG inputs (EEG, ECG, EOG, EMG etc):

Number	64
RMS Noise	< 1 µV (@ lowest sample frequency)
Gain	26.55 x
Input signal difference	-150 mV to +150 mV (@ 0 V common signal)
Input common mode range	-2 V to +2 V (@ 0 V differential signal)
Input impedance	> 100 MΩ
CMRR	> 90 dB
Connectors	active shielded micro coax per channel subD37 female unshielded per 32 channels

Bipolar ExG inputs (ECG, EOG, EMG etc):

Number	4
RMS Noise	< 1 µV (@ lowest sample frequency)
Gain	26.55 x
Input signal difference	-150 mV to +150 mV (@ 0 V common signal) (no positive overflow)
Input common mode range	-2 V to +2 V (@ 0 V differential signal)
Input impedance	> 100 MΩ
CMRR	> 90 dB
Connector	4 pin plastic connector, active shielding

AUX inputs:

Number	4
RMS Noise	< 20 µV (@ lowest sample frequency)
Gain	1 x
Input signal difference	-3 V to +3 V (@ 0 V common signal)
Input common mode range	-4 V to +4 V (@ 0 V differential signal)
Input impedance	> 100 MΩ
CMRR	> 70 dB
Output voltage	+5 V & -5 V, max. 20 mA for all channels together
Connector	5 pin plastic connector

Digital input

Input turn-on current	2 mA @ 3 V input, max. input = 5 V
Isolation	> 4000 V, by means of optocoupler (H11L1)
Connector	8 bit via DB25 female, shared first bit via BNC female

Sampling:

Number of channels	72 channels simultaneously
Resolution	24 bits, ExG & BIP 0.01839 µV per bit, AUX 0.48828 µV per bit
Sample frequency	2048 Hz, 1024 Hz, 512 Hz, 256 Hz, 128 Hz

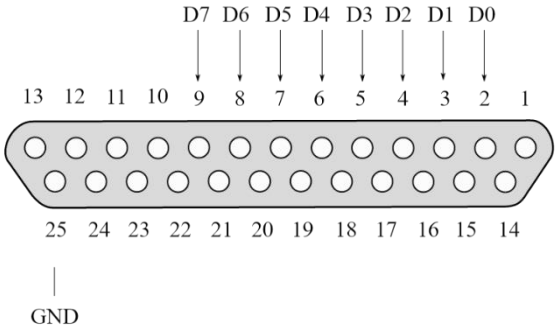
Channel list:

nr	name	function	resolution	range
1	ExG1	Unipolar input 1	0.01839 µV	-150 mV to +150 mV
2	ExG2	Unipolar input 2	0.01839 µV	-150 mV to +150 mV
3	ExG3	Unipolar input 3	0.01839 µV	-150 mV to +150 mV
4	ExG4	Unipolar input 4	0.01839 µV	-150 mV to +150 mV
5	ExG5	Unipolar input 5	0.01839 µV	-150 mV to +150 mV
6	ExG6	Unipolar input 6	0.01839 µV	-150 mV to +150 mV
7	ExG7	Unipolar input 7	0.01839 µV	-150 mV to +150 mV
8	ExG8	Unipolar input 8	0.01839 µV	-150 mV to +150 mV
9	ExG9	Unipolar input 9	0.01839 µV	-150 mV to +150 mV
10	ExG10	Unipolar input 10	0.01839 µV	-150 mV to +150 mV
11	ExG11	Unipolar input 11	0.01839 µV	-150 mV to +150 mV
12	ExG12	Unipolar input 12	0.01839 µV	-150 mV to +150 mV
13	ExG13	Unipolar input 13	0.01839 µV	-150 mV to +150 mV
14	ExG14	Unipolar input 14	0.01839 µV	-150 mV to +150 mV
15	ExG15	Unipolar input 15	0.01839 µV	-150 mV to +150 mV
16	ExG16	Unipolar input 16	0.01839 µV	-150 mV to +150 mV
17	ExG17	Unipolar input 17	0.01839 µV	-150 mV to +150 mV
18	ExG18	Unipolar input 18	0.01839 µV	-150 mV to +150 mV
19	ExG19	Unipolar input 19	0.01839 µV	-150 mV to +150 mV
20	ExG20	Unipolar input 20	0.01839 µV	-150 mV to +150 mV
21	ExG21	Unipolar input 21	0.01839 µV	-150 mV to +150 mV
22	ExG22	Unipolar input 22	0.01839 µV	-150 mV to +150 mV
23	ExG23	Unipolar input 23	0.01839 µV	-150 mV to +150 mV
24	ExG24	Unipolar input 24	0.01839 µV	-150 mV to +150 mV
25	ExG25	Unipolar input 25	0.01839 µV	-150 mV to +150 mV
26	ExG26	Unipolar input 26	0.01839 µV	-150 mV to +150 mV
27	ExG27	Unipolar input 27	0.01839 µV	-150 mV to +150 mV
28	ExG28	Unipolar input 28	0.01839 µV	-150 mV to +150 mV
29	ExG29	Unipolar input 29	0.01839 µV	-150 mV to +150 mV
30	ExG30	Unipolar input 30	0.01839 µV	-150 mV to +150 mV
31	ExG31	Unipolar input 31	0.01839 µV	-150 mV to +150 mV
32	ExG32	Unipolar input 32	0.01839 µV	-150 mV to +150 mV
33	ExG33	Unipolar input 33	0.01839 µV	-150 mV to +150 mV
34	ExG34	Unipolar input 34	0.01839 µV	-150 mV to +150 mV
35	ExG35	Unipolar input 35	0.01839 µV	-150 mV to +150 mV
36	ExG36	Unipolar input 36	0.01839 µV	-150 mV to +150 mV
37	ExG37	Unipolar input 37	0.01839 µV	-150 mV to +150 mV
38	ExG38	Unipolar input 38	0.01839 µV	-150 mV to +150 mV
39	ExG39	Unipolar input 39	0.01839 µV	-150 mV to +150 mV
40	ExG40	Unipolar input 40	0.01839 µV	-150 mV to +150 mV
41	ExG41	Unipolar input 41	0.01839 µV	-150 mV to +150 mV
42	ExG42	Unipolar input 42	0.01839 µV	-150 mV to +150 mV
43	ExG43	Unipolar input 43	0.01839 µV	-150 mV to +150 mV
44	ExG44	Unipolar input 44	0.01839 µV	-150 mV to +150 mV
45	ExG45	Unipolar input 45	0.01839 µV	-150 mV to +150 mV
46	ExG46	Unipolar input 46	0.01839 µV	-150 mV to +150 mV
47	ExG47	Unipolar input 47	0.01839 µV	-150 mV to +150 mV
48	ExG48	Unipolar input 48	0.01839 µV	-150 mV to +150 mV

nr	name	function		resolution	range
49	ExG49	Unipolar input 49		0.01839 µV	-150 mV to +150 mV
50	ExG50	Unipolar input 50		0.01839 µV	-150 mV to +150 mV
51	ExG51	Unipolar input 51		0.01839 µV	-150 mV to +150 mV
52	ExG52	Unipolar input 52		0.01839 µV	-150 mV to +150 mV
53	ExG53	Unipolar input 53		0.01839 µV	-150 mV to +150 mV
54	ExG54	Unipolar input 54		0.01839 µV	-150 mV to +150 mV
55	ExG55	Unipolar input 55		0.01839 µV	-150 mV to +150 mV
56	ExG56	Unipolar input 56		0.01839 µV	-150 mV to +150 mV
57	ExG57	Unipolar input 57		0.01839 µV	-150 mV to +150 mV
58	ExG58	Unipolar input 58		0.01839 µV	-150 mV to +150 mV
59	ExG59	Unipolar input 59		0.01839 µV	-150 mV to +150 mV
60	ExG60	Unipolar input 60		0.01839 µV	-150 mV to +150 mV
61	ExG61	Unipolar input 61		0.01839 µV	-150 mV to +150 mV
62	ExG62	Unipolar input 62		0.01839 µV	-150 mV to +150 mV
63	ExG63	Unipolar input 63		0.01839 µV	-150 mV to +150 mV
64	ExG64	Unipolar input 64		0.01839 µV	-150 mV to +150 mV
65	BIP65	Bipolar input 65		0.01839 µV	-150 mV to +150 mV
66	BIP66	Bipolar input 66		0.01839 µV	-150 mV to +150 mV
67	BIP67	Bipolar input 67		0.01839 µV	-150 mV to +150 mV
68	BIP68	Bipolar input 68		0.01839 µV	-150 mV to +150 mV
69	AUX69	Auxiliary input 69		0.48828 µV	-3 V to +3 V
70	AUX70	Auxiliary input 70		0.48828 µV	-3 V to +3 V
71	AUX71	Auxiliary input 71		0.48828 µV	-3 V to +3 V
72	AUX72	Auxiliary input 72		0.48828 µV	-3 V to +3 V
73	Digi	Digital channel (bits)		1 (bit)	0 to 255
		0	Digital input bit 0		
		1	Digital input bit 1		
		2	Digital input bit 2		
		3	Digital input bit 3		
		4	Digital input bit 4		
		5	Digital input bit 5		
		6	Digital input bit 6		
		7	Digital input bit 7 (MSB)		
		8-15	reserved		
74	Saw	Sawtooth test signal (bits)		1 (bit)	0 to 32767

Digital input DB25 connector

Pin	Input
2	bit 0 (parallel to BNC connector in software)
3	bit 1
4	bit 2
5	bit 3
6	bit 4
7	bit 5
8	bit 6
9	bit 7 (MSB)
25	common ground



Headcap connector

This table describes the relation between signal channel numbers and headcap connector pin numbers.

DB37 pin number	First Connector Channel number	Second Connector Channel number
1	-	-
20	1	33
2	2	34
21	3	35
3	4	36
22	5	37
4	6	38
23	7	39
5	8	40
24	9	41
6	10	42
25	11	43
7	12	44
26	13	45
8	14	46
27	15	47
9	16	48
28	17	49
10	18	50
29	19	51
11	20	52
30	21	53
12	22	54
31	23	55
13	24	56
32	25	57
14	26	58
33	27	59
15	28	60
34	29	61
16	30	62
35	31	63
17	32	64
36	Pat. GND	Pat. GND
18	-	-
37	-	-
19	-	-

95-0120-8446-1, Refa8-64e4b4a 2048Hz

Type	**Refa8-64e4b4a**
REF code	95-0120-8446-1

Unipolar ExG inputs (EEG, ECG, EOG, EMG etc):

Number	64
RMS Noise	< 1 µV (@ lowest sample frequency)
Gain	26.55 x
Input signal difference	-150 mV to +150 mV (@ 0 V common signal)
Input common mode range	-2 V to +2 V (@ 0 V differential signal)
Input impedance	> 100 MΩ
CMRR	> 90 dB
Connectors	active shielded micro coax per channel subD37 female unshielded per 32 channels

Bipolar ExG inputs (ECG, EOG, EMG etc):

Number	4
RMS Noise	< 1 µV (@ lowest sample frequency)
Gain	26.55 x
Input signal difference	-150 mV to +150 mV (@ 0 V common signal) (no positive overflow)
Input common mode range	-2 V to +2 V (@ 0 V differential signal)
Input impedance	> 100 MΩ
CMRR	> 90 dB
Connector	4 pin plastic connector, active shielding

AUX inputs:

Number	4
RMS Noise	< 20 µV (@ lowest sample frequency)
Gain	1 x
Input signal difference	-3 V to +3 V (@ 0 V common signal)
Input common mode range	-4 V to +4 V (@ 0 V differential signal)
Input impedance	> 100 MΩ
CMRR	> 70 dB
Output voltage	+5 V & -5 V, max. 20 mA for all channels together
Connector	5 pin plastic connector

Digital input

Input turn-on current	2 mA @ 3 V input, max. input = 5 V
Isolation	> 4000 V, by means of optocoupler (H11L1)
Connector	8 bit via DB25 female, shared first bit via BNC female

Sampling:

Number of channels	72 channels simultaneously
Resolution	24 bits, ExG & BIP 0.01839 µV per bit, AUX 0.48828 µV per bit
Sample frequency	2048 Hz, 1024 Hz, 512 Hz, 256 Hz, 128 Hz

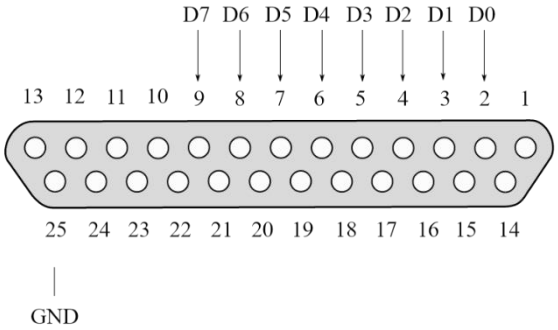
Channel list:

nr	name	function	resolution	range
1	ExG1	Unipolar input 1	0.01839 µV	-150 mV to +150 mV
2	ExG2	Unipolar input 2	0.01839 µV	-150 mV to +150 mV
3	ExG3	Unipolar input 3	0.01839 µV	-150 mV to +150 mV
4	ExG4	Unipolar input 4	0.01839 µV	-150 mV to +150 mV
5	ExG5	Unipolar input 5	0.01839 µV	-150 mV to +150 mV
6	ExG6	Unipolar input 6	0.01839 µV	-150 mV to +150 mV
7	ExG7	Unipolar input 7	0.01839 µV	-150 mV to +150 mV
8	ExG8	Unipolar input 8	0.01839 µV	-150 mV to +150 mV
9	ExG9	Unipolar input 9	0.01839 µV	-150 mV to +150 mV
10	ExG10	Unipolar input 10	0.01839 µV	-150 mV to +150 mV
11	ExG11	Unipolar input 11	0.01839 µV	-150 mV to +150 mV
12	ExG12	Unipolar input 12	0.01839 µV	-150 mV to +150 mV
13	ExG13	Unipolar input 13	0.01839 µV	-150 mV to +150 mV
14	ExG14	Unipolar input 14	0.01839 µV	-150 mV to +150 mV
15	ExG15	Unipolar input 15	0.01839 µV	-150 mV to +150 mV
16	ExG16	Unipolar input 16	0.01839 µV	-150 mV to +150 mV
17	ExG17	Unipolar input 17	0.01839 µV	-150 mV to +150 mV
18	ExG18	Unipolar input 18	0.01839 µV	-150 mV to +150 mV
19	ExG19	Unipolar input 19	0.01839 µV	-150 mV to +150 mV
20	ExG20	Unipolar input 20	0.01839 µV	-150 mV to +150 mV
21	ExG21	Unipolar input 21	0.01839 µV	-150 mV to +150 mV
22	ExG22	Unipolar input 22	0.01839 µV	-150 mV to +150 mV
23	ExG23	Unipolar input 23	0.01839 µV	-150 mV to +150 mV
24	ExG24	Unipolar input 24	0.01839 µV	-150 mV to +150 mV
25	ExG25	Unipolar input 25	0.01839 µV	-150 mV to +150 mV
26	ExG26	Unipolar input 26	0.01839 µV	-150 mV to +150 mV
27	ExG27	Unipolar input 27	0.01839 µV	-150 mV to +150 mV
28	ExG28	Unipolar input 28	0.01839 µV	-150 mV to +150 mV
29	ExG29	Unipolar input 29	0.01839 µV	-150 mV to +150 mV
30	ExG30	Unipolar input 30	0.01839 µV	-150 mV to +150 mV
31	ExG31	Unipolar input 31	0.01839 µV	-150 mV to +150 mV
32	ExG32	Unipolar input 32	0.01839 µV	-150 mV to +150 mV
33	ExG33	Unipolar input 33	0.01839 µV	-150 mV to +150 mV
34	ExG34	Unipolar input 34	0.01839 µV	-150 mV to +150 mV
35	ExG35	Unipolar input 35	0.01839 µV	-150 mV to +150 mV
36	ExG36	Unipolar input 36	0.01839 µV	-150 mV to +150 mV
37	ExG37	Unipolar input 37	0.01839 µV	-150 mV to +150 mV
38	ExG38	Unipolar input 38	0.01839 µV	-150 mV to +150 mV
39	ExG39	Unipolar input 39	0.01839 µV	-150 mV to +150 mV
40	ExG40	Unipolar input 40	0.01839 µV	-150 mV to +150 mV
41	ExG41	Unipolar input 41	0.01839 µV	-150 mV to +150 mV
42	ExG42	Unipolar input 42	0.01839 µV	-150 mV to +150 mV
43	ExG43	Unipolar input 43	0.01839 µV	-150 mV to +150 mV
44	ExG44	Unipolar input 44	0.01839 µV	-150 mV to +150 mV
45	ExG45	Unipolar input 45	0.01839 µV	-150 mV to +150 mV
46	ExG46	Unipolar input 46	0.01839 µV	-150 mV to +150 mV
47	ExG47	Unipolar input 47	0.01839 µV	-150 mV to +150 mV
48	ExG48	Unipolar input 48	0.01839 µV	-150 mV to +150 mV

nr	name	function		resolution	range
49	ExG49	Unipolar input 49		0.01839 µV	-150 mV to +150 mV
50	ExG50	Unipolar input 50		0.01839 µV	-150 mV to +150 mV
51	ExG51	Unipolar input 51		0.01839 µV	-150 mV to +150 mV
52	ExG52	Unipolar input 52		0.01839 µV	-150 mV to +150 mV
53	ExG53	Unipolar input 53		0.01839 µV	-150 mV to +150 mV
54	ExG54	Unipolar input 54		0.01839 µV	-150 mV to +150 mV
55	ExG55	Unipolar input 55		0.01839 µV	-150 mV to +150 mV
56	ExG56	Unipolar input 56		0.01839 µV	-150 mV to +150 mV
57	ExG57	Unipolar input 57		0.01839 µV	-150 mV to +150 mV
58	ExG58	Unipolar input 58		0.01839 µV	-150 mV to +150 mV
59	ExG59	Unipolar input 59		0.01839 µV	-150 mV to +150 mV
60	ExG60	Unipolar input 60		0.01839 µV	-150 mV to +150 mV
61	ExG61	Unipolar input 61		0.01839 µV	-150 mV to +150 mV
62	ExG62	Unipolar input 62		0.01839 µV	-150 mV to +150 mV
63	ExG63	Unipolar input 63		0.01839 µV	-150 mV to +150 mV
64	ExG64	Unipolar input 64		0.01839 µV	-150 mV to +150 mV
65	BIP65	Bipolar input 65		0.01839 µV	-150 mV to +150 mV
66	BIP66	Bipolar input 66		0.01839 µV	-150 mV to +150 mV
67	BIP67	Bipolar input 67		0.01839 µV	-150 mV to +150 mV
68	BIP68	Bipolar input 68		0.01839 µV	-150 mV to +150 mV
69	AUX69	Auxiliary input 69		0.48828 µV	-3 V to +3 V
70	AUX70	Auxiliary input 70		0.48828 µV	-3 V to +3 V
71	AUX71	Auxiliary input 71		0.48828 µV	-3 V to +3 V
72	AUX72	Auxiliary input 72		0.48828 µV	-3 V to +3 V
73	Digi	Digital channel (bits)		1 (bit)	0 to 255
		0	Digital input bit 0		
		1	Digital input bit 1		
		2	Digital input bit 2		
		3	Digital input bit 3		
		4	Digital input bit 4		
		5	Digital input bit 5		
		6	Digital input bit 6		
		7	Digital input bit 7 (MSB)		
		8-15	reserved		
74	Saw	Sawtooth test signal (bits)		1 (bit)	0 to 32767

Digital input DB25 connector

Pin	Input
2	bit 0 (parallel to BNC connector in software)
3	bit 1
4	bit 2
5	bit 3
6	bit 4
7	bit 5
8	bit 6
9	bit 7 (MSB)
25	common ground



Headcap connector

This table describes the relation between signal channel numbers and headcap connector pin numbers.

DB37 pin number	First Connector Channel number	Second Connector Channel number
1	-	-
20	1	33
2	2	34
21	3	35
3	4	36
22	5	37
4	6	38
23	7	39
5	8	40
24	9	41
6	10	42
25	11	43
7	12	44
26	13	45
8	14	46
27	15	47
9	16	48
28	17	49
10	18	50
29	19	51
11	20	52
30	21	53
12	22	54
31	23	55
13	24	56
32	25	57
14	26	58
33	27	59
15	28	60
34	29	61
16	30	62
35	31	63
17	32	64
36	Pat. GND	Pat. GND
18	-	-
37	-	-
19	-	-

95-0120-8446-2, Refa8-64e4b4a 2048Hz

Type	**Refa8-64e4b4a 3.8x gain**
REF code	95-0120-8446-2

Unipolar ExG inputs (EEG, ECG, EOG, EMG etc):

Number	64
RMS Noise	< 3 µV (@ lowest sample frequency)
Gain	3.8 x
Input signal difference	-1.05 V to +1.05 V (@ 0 V common signal)
Input common mode range	-2 V to +2 V (@ 0 V differential signal)
Input impedance	> 100 MΩ
CMRR	> 80 dB
Connectors	active shielded micro coax per channel subD37 female unshielded per 32 channels

Bipolar ExG inputs (ECG, EOG, EMG etc):

Number	4
RMS Noise	< 1 µV (@ lowest sample frequency)
Gain	26.55 x
Input signal difference	-150 mV to +150 mV (@ 0 V common signal) (no positive overflow)
Input common mode range	-2 V to +2 V (@ 0 V differential signal)
Input impedance	> 100 MΩ
CMRR	> 90 dB
Connector	4 pin plastic connector, active shielding

AUX inputs:

Number	4
RMS Noise	< 20 µV (@ lowest sample frequency)
Gain	1 x
Input signal difference	-3 V to +3 V (@ 0 V common signal)
Input common mode range	-4 V to +4 V (@ 0 V differential signal)
Input impedance	> 100 MΩ
CMRR	> 70 dB
Output voltage	+5 V & -5 V, max. 20 mA for all channels together
Connector	5 pin plastic connector

Digital input

Input turn-on current	2 mA @ 3 V input, max. input = 5 V
Isolation	> 4000 V, by means of optocoupler (H11L1)
Connector	8 bit via DB25 female, shared first bit via BNC female

Sampling:

Number of channels	72 channels simultaneously
Resolution	24 bits, ExG 0.12873 µV per bit, BIP 0.01839 µV per bit, AUX 0.48828 µV per bit
Sample frequency	2048 Hz, 1024 Hz, 512 Hz, 256 Hz, 128 Hz

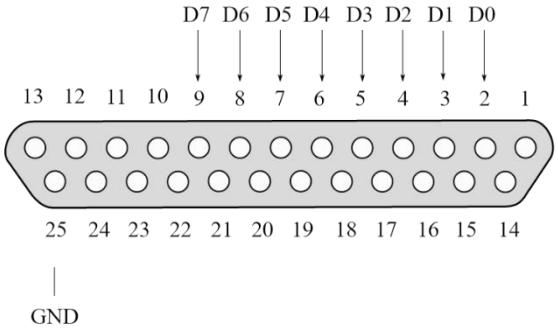
Channel list:

nr	name	function	resolution	range
1	ExG1	Unipolar input 1	0.12873 µV	-1.05 V to +1.05 V
2	ExG2	Unipolar input 2	0.12873 µV	-1.05 V to +1.05 V
3	ExG3	Unipolar input 3	0.12873 µV	-1.05 V to +1.05 V
4	ExG4	Unipolar input 4	0.12873 µV	-1.05 V to +1.05 V
5	ExG5	Unipolar input 5	0.12873 µV	-1.05 V to +1.05 V
6	ExG6	Unipolar input 6	0.12873 µV	-1.05 V to +1.05 V
7	ExG7	Unipolar input 7	0.12873 µV	-1.05 V to +1.05 V
8	ExG8	Unipolar input 8	0.12873 µV	-1.05 V to +1.05 V
9	ExG9	Unipolar input 9	0.12873 µV	-1.05 V to +1.05 V
10	ExG10	Unipolar input 10	0.12873 µV	-1.05 V to +1.05 V
11	ExG11	Unipolar input 11	0.12873 µV	-1.05 V to +1.05 V
12	ExG12	Unipolar input 12	0.12873 µV	-1.05 V to +1.05 V
13	ExG13	Unipolar input 13	0.12873 µV	-1.05 V to +1.05 V
14	ExG14	Unipolar input 14	0.12873 µV	-1.05 V to +1.05 V
15	ExG15	Unipolar input 15	0.12873 µV	-1.05 V to +1.05 V
16	ExG16	Unipolar input 16	0.12873 µV	-1.05 V to +1.05 V
17	ExG17	Unipolar input 17	0.12873 µV	-1.05 V to +1.05 V
18	ExG18	Unipolar input 18	0.12873 µV	-1.05 V to +1.05 V
19	ExG19	Unipolar input 19	0.12873 µV	-1.05 V to +1.05 V
20	ExG20	Unipolar input 20	0.12873 µV	-1.05 V to +1.05 V
21	ExG21	Unipolar input 21	0.12873 µV	-1.05 V to +1.05 V
22	ExG22	Unipolar input 22	0.12873 µV	-1.05 V to +1.05 V
23	ExG23	Unipolar input 23	0.12873 µV	-1.05 V to +1.05 V
24	ExG24	Unipolar input 24	0.12873 µV	-1.05 V to +1.05 V
25	ExG25	Unipolar input 25	0.12873 µV	-1.05 V to +1.05 V
26	ExG26	Unipolar input 26	0.12873 µV	-1.05 V to +1.05 V
27	ExG27	Unipolar input 27	0.12873 µV	-1.05 V to +1.05 V
28	ExG28	Unipolar input 28	0.12873 µV	-1.05 V to +1.05 V
29	ExG29	Unipolar input 29	0.12873 µV	-1.05 V to +1.05 V
30	ExG30	Unipolar input 30	0.12873 µV	-1.05 V to +1.05 V
31	ExG31	Unipolar input 31	0.12873 µV	-1.05 V to +1.05 V
32	ExG32	Unipolar input 32	0.12873 µV	-1.05 V to +1.05 V
33	ExG33	Unipolar input 33	0.12873 µV	-1.05 V to +1.05 V
34	ExG34	Unipolar input 34	0.12873 µV	-1.05 V to +1.05 V
35	ExG35	Unipolar input 35	0.12873 µV	-1.05 V to +1.05 V
36	ExG36	Unipolar input 36	0.12873 µV	-1.05 V to +1.05 V
37	ExG37	Unipolar input 37	0.12873 µV	-1.05 V to +1.05 V
38	ExG38	Unipolar input 38	0.12873 µV	-1.05 V to +1.05 V
39	ExG39	Unipolar input 39	0.12873 µV	-1.05 V to +1.05 V
40	ExG40	Unipolar input 40	0.12873 µV	-1.05 V to +1.05 V
41	ExG41	Unipolar input 41	0.12873 µV	-1.05 V to +1.05 V
42	ExG42	Unipolar input 42	0.12873 µV	-1.05 V to +1.05 V
43	ExG43	Unipolar input 43	0.12873 µV	-1.05 V to +1.05 V
44	ExG44	Unipolar input 44	0.12873 µV	-1.05 V to +1.05 V
45	ExG45	Unipolar input 45	0.12873 µV	-1.05 V to +1.05 V
46	ExG46	Unipolar input 46	0.12873 µV	-1.05 V to +1.05 V
47	ExG47	Unipolar input 47	0.12873 µV	-1.05 V to +1.05 V
48	ExG48	Unipolar input 48	0.12873 µV	-1.05 V to +1.05 V

nr	name	function		resolution	range
49	ExG49	Unipolar input 49		0.12873 µV	-1.05 V to +1.05 V
50	ExG50	Unipolar input 50		0.12873 µV	-1.05 V to +1.05 V
51	ExG51	Unipolar input 51		0.12873 µV	-1.05 V to +1.05 V
52	ExG52	Unipolar input 52		0.12873 µV	-1.05 V to +1.05 V
53	ExG53	Unipolar input 53		0.12873 µV	-1.05 V to +1.05 V
54	ExG54	Unipolar input 54		0.12873 µV	-1.05 V to +1.05 V
55	ExG55	Unipolar input 55		0.12873 µV	-1.05 V to +1.05 V
56	ExG56	Unipolar input 56		0.12873 µV	-1.05 V to +1.05 V
57	ExG57	Unipolar input 57		0.12873 µV	-1.05 V to +1.05 V
58	ExG58	Unipolar input 58		0.12873 µV	-1.05 V to +1.05 V
59	ExG59	Unipolar input 59		0.12873 µV	-1.05 V to +1.05 V
60	ExG60	Unipolar input 60		0.12873 µV	-1.05 V to +1.05 V
61	ExG61	Unipolar input 61		0.12873 µV	-1.05 V to +1.05 V
62	ExG62	Unipolar input 62		0.12873 µV	-1.05 V to +1.05 V
63	ExG63	Unipolar input 63		0.12873 µV	-1.05 V to +1.05 V
64	ExG64	Unipolar input 64		0.12873 µV	-1.05 V to +1.05 V
65	BIP65	Bipolar input 65		0.01839 µV	-150 mV to +150 mV
66	BIP66	Bipolar input 66		0.01839 µV	-150 mV to +150 mV
67	BIP67	Bipolar input 67		0.01839 µV	-150 mV to +150 mV
68	BIP68	Bipolar input 68		0.01839 µV	-150 mV to +150 mV
69	AUX69	Auxiliary input 69		0.48828 µV	-3 V to +3 V
70	AUX70	Auxiliary input 70		0.48828 µV	-3 V to +3 V
71	AUX71	Auxiliary input 71		0.48828 µV	-3 V to +3 V
72	AUX72	Auxiliary input 72		0.48828 µV	-3 V to +3 V
73	Digi	Digital channel (bits)		1 (bit)	0 to 255
		0	Digital input bit 0		
		1	Digital input bit 1		
		2	Digital input bit 2		
		3	Digital input bit 3		
		4	Digital input bit 4		
		5	Digital input bit 5		
		6	Digital input bit 6		
		7	Digital input bit 7 (MSB)		
		8-15	reserved		
74	Saw	Sawtooth test signal (bits)		1 (bit)	0 to 32767

Digital input DB25 connector

Pin	Input
2	bit 0 (parallel to BNC connector in software)
3	bit 1
4	bit 2
5	bit 3
6	bit 4
7	bit 5
8	bit 6
9	bit 7 (MSB)
25	common ground



Headcap connector

This table describes the relation between signal channel numbers and headcap connector pin numbers.

DB37 pin number	First Connector Channel number	Second Connector Channel number
1	-	-
20	1	33
2	2	34
21	3	35
3	4	36
22	5	37
4	6	38
23	7	39
5	8	40
24	9	41
6	10	42
25	11	43
7	12	44
26	13	45
8	14	46
27	15	47
9	16	48
28	17	49
10	18	50
29	19	51
11	20	52
30	21	53
12	22	54
31	23	55
13	24	56
32	25	57
14	26	58
33	27	59
15	28	60
34	29	61
16	30	62
35	31	63
17	32	64
36	Pat. GND	Pat. GND
18	-	-
37	-	-
19	-	-

95-0120-8447-0, Refa8-64e4b4a 2000Hz

Type	**Refa8-64e4b4a**
REF code	95-0120-8447-0

Unipolar ExG inputs (EEG, ECG, EOG, EMG etc):

Number	64
RMS Noise	< 1 µV (@ lowest sample frequency)
Gain	26.55 x
Input signal difference	-150 mV to +150 mV (@ 0 V common signal)
Input common mode range	-2 V to +2 V (@ 0 V differential signal)
Input impedance	> 100 MΩ
CMRR	> 90 dB
Connectors	active shielded micro coax per channel subD37 female unshielded per 32 channels

Bipolar ExG inputs (ECG, EOG, EMG etc):

Number	4
RMS Noise	< 1 µV (@ lowest sample frequency)
Gain	26.55 x
Input signal difference	-150 mV to +150 mV (@ 0 V common signal) (no positive overflow)
Input common mode range	-2 V to +2 V (@ 0 V differential signal)
Input impedance	> 100 MΩ
CMRR	> 90 dB
Connector	4 pin plastic connector, active shielding

AUX inputs:

Number	4
RMS Noise	< 20 µV (@ lowest sample frequency)
Gain	1 x
Input signal difference	-3 V to +3 V (@ 0 V common signal)
Input common mode range	-4 V to +4 V (@ 0 V differential signal)
Input impedance	> 100 MΩ
CMRR	> 70 dB
Output voltage	+5 V & -5 V, max. 20 mA for all channels together
Connector	5 pin plastic connector

Digital input

Input turn-on current	2 mA @ 3 V input, max. input = 5 V
Isolation	> 4000 V, by means of optocoupler (H11L1)
Connector	8 bit via DB25 female, shared first bit via BNC female

Sampling:

Number of channels	72 channels simultaneously
Resolution	24 bits, ExG & BIP 0.01839 µV per bit, AUX 0.48828 µV per bit
Sample frequency	2000 Hz, 1000 Hz, 500 Hz, 250 Hz, 125 Hz

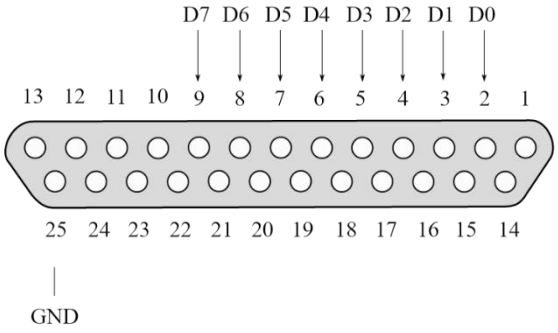
Channel list:

nr	name	function	resolution	range
1	ExG1	Unipolar input 1	0.01839 µV	-150 mV to +150 mV
2	ExG2	Unipolar input 2	0.01839 µV	-150 mV to +150 mV
3	ExG3	Unipolar input 3	0.01839 µV	-150 mV to +150 mV
4	ExG4	Unipolar input 4	0.01839 µV	-150 mV to +150 mV
5	ExG5	Unipolar input 5	0.01839 µV	-150 mV to +150 mV
6	ExG6	Unipolar input 6	0.01839 µV	-150 mV to +150 mV
7	ExG7	Unipolar input 7	0.01839 µV	-150 mV to +150 mV
8	ExG8	Unipolar input 8	0.01839 µV	-150 mV to +150 mV
9	ExG9	Unipolar input 9	0.01839 µV	-150 mV to +150 mV
10	ExG10	Unipolar input 10	0.01839 µV	-150 mV to +150 mV
11	ExG11	Unipolar input 11	0.01839 µV	-150 mV to +150 mV
12	ExG12	Unipolar input 12	0.01839 µV	-150 mV to +150 mV
13	ExG13	Unipolar input 13	0.01839 µV	-150 mV to +150 mV
14	ExG14	Unipolar input 14	0.01839 µV	-150 mV to +150 mV
15	ExG15	Unipolar input 15	0.01839 µV	-150 mV to +150 mV
16	ExG16	Unipolar input 16	0.01839 µV	-150 mV to +150 mV
17	ExG17	Unipolar input 17	0.01839 µV	-150 mV to +150 mV
18	ExG18	Unipolar input 18	0.01839 µV	-150 mV to +150 mV
19	ExG19	Unipolar input 19	0.01839 µV	-150 mV to +150 mV
20	ExG20	Unipolar input 20	0.01839 µV	-150 mV to +150 mV
21	ExG21	Unipolar input 21	0.01839 µV	-150 mV to +150 mV
22	ExG22	Unipolar input 22	0.01839 µV	-150 mV to +150 mV
23	ExG23	Unipolar input 23	0.01839 µV	-150 mV to +150 mV
24	ExG24	Unipolar input 24	0.01839 µV	-150 mV to +150 mV
25	ExG25	Unipolar input 25	0.01839 µV	-150 mV to +150 mV
26	ExG26	Unipolar input 26	0.01839 µV	-150 mV to +150 mV
27	ExG27	Unipolar input 27	0.01839 µV	-150 mV to +150 mV
28	ExG28	Unipolar input 28	0.01839 µV	-150 mV to +150 mV
29	ExG29	Unipolar input 29	0.01839 µV	-150 mV to +150 mV
30	ExG30	Unipolar input 30	0.01839 µV	-150 mV to +150 mV
31	ExG31	Unipolar input 31	0.01839 µV	-150 mV to +150 mV
32	ExG32	Unipolar input 32	0.01839 µV	-150 mV to +150 mV
33	ExG33	Unipolar input 33	0.01839 µV	-150 mV to +150 mV
34	ExG34	Unipolar input 34	0.01839 µV	-150 mV to +150 mV
35	ExG35	Unipolar input 35	0.01839 µV	-150 mV to +150 mV
36	ExG36	Unipolar input 36	0.01839 µV	-150 mV to +150 mV
37	ExG37	Unipolar input 37	0.01839 µV	-150 mV to +150 mV
38	ExG38	Unipolar input 38	0.01839 µV	-150 mV to +150 mV
39	ExG39	Unipolar input 39	0.01839 µV	-150 mV to +150 mV
40	ExG40	Unipolar input 40	0.01839 µV	-150 mV to +150 mV
41	ExG41	Unipolar input 41	0.01839 µV	-150 mV to +150 mV
42	ExG42	Unipolar input 42	0.01839 µV	-150 mV to +150 mV
43	ExG43	Unipolar input 43	0.01839 µV	-150 mV to +150 mV
44	ExG44	Unipolar input 44	0.01839 µV	-150 mV to +150 mV
45	ExG45	Unipolar input 45	0.01839 µV	-150 mV to +150 mV
46	ExG46	Unipolar input 46	0.01839 µV	-150 mV to +150 mV
47	ExG47	Unipolar input 47	0.01839 µV	-150 mV to +150 mV
48	ExG48	Unipolar input 48	0.01839 µV	-150 mV to +150 mV

nr	name	function		resolution	range
49	ExG49	Unipolar input 49		0.01839 µV	-150 mV to +150 mV
50	ExG50	Unipolar input 50		0.01839 µV	-150 mV to +150 mV
51	ExG51	Unipolar input 51		0.01839 µV	-150 mV to +150 mV
52	ExG52	Unipolar input 52		0.01839 µV	-150 mV to +150 mV
53	ExG53	Unipolar input 53		0.01839 µV	-150 mV to +150 mV
54	ExG54	Unipolar input 54		0.01839 µV	-150 mV to +150 mV
55	ExG55	Unipolar input 55		0.01839 µV	-150 mV to +150 mV
56	ExG56	Unipolar input 56		0.01839 µV	-150 mV to +150 mV
57	ExG57	Unipolar input 57		0.01839 µV	-150 mV to +150 mV
58	ExG58	Unipolar input 58		0.01839 µV	-150 mV to +150 mV
59	ExG59	Unipolar input 59		0.01839 µV	-150 mV to +150 mV
60	ExG60	Unipolar input 60		0.01839 µV	-150 mV to +150 mV
61	ExG61	Unipolar input 61		0.01839 µV	-150 mV to +150 mV
62	ExG62	Unipolar input 62		0.01839 µV	-150 mV to +150 mV
63	ExG63	Unipolar input 63		0.01839 µV	-150 mV to +150 mV
64	ExG64	Unipolar input 64		0.01839 µV	-150 mV to +150 mV
65	BIP65	Bipolar input 65		0.01839 µV	-150 mV to +150 mV
66	BIP66	Bipolar input 66		0.01839 µV	-150 mV to +150 mV
67	BIP67	Bipolar input 67		0.01839 µV	-150 mV to +150 mV
68	BIP68	Bipolar input 68		0.01839 µV	-150 mV to +150 mV
69	AUX69	Auxiliary input 69		0.48828 µV	-3 V to +3 V
70	AUX70	Auxiliary input 70		0.48828 µV	-3 V to +3 V
71	AUX71	Auxiliary input 71		0.48828 µV	-3 V to +3 V
72	AUX72	Auxiliary input 72		0.48828 µV	-3 V to +3 V
73	Digi	Digital channel (bits)		1 (bit)	0 to 255
		0	Digital input bit 0		
		1	Digital input bit 1		
		2	Digital input bit 2		
		3	Digital input bit 3		
		4	Digital input bit 4		
		5	Digital input bit 5		
		6	Digital input bit 6		
		7	Digital input bit 7 (MSB)		
		8-15	reserved		
74	Saw	Sawtooth test signal (bits)		1 (bit)	0 to 32767

Digital input DB25 connector

Pin	Input
2	bit 0 (parallel to BNC connector in software)
3	bit 1
4	bit 2
5	bit 3
6	bit 4
7	bit 5
8	bit 6
9	bit 7 (MSB)
25	common ground



Headcap connector

This table describes the relation between signal channel numbers and headcap connector pin numbers.

DB37 pin number	First Connector Channel number	Second Connector Channel number
1	-	-
20	1	33
2	2	34
21	3	35
3	4	36
22	5	37
4	6	38
23	7	39
5	8	40
24	9	41
6	10	42
25	11	43
7	12	44
26	13	45
8	14	46
27	15	47
9	16	48
28	17	49
10	18	50
29	19	51
11	20	52
30	21	53
12	22	54
31	23	55
13	24	56
32	25	57
14	26	58
33	27	59
15	28	60
34	29	61
16	30	62
35	31	63
17	32	64
36	Pat. GND	Pat. GND
18	-	-
37	-	-
19	-	-

95-0121-6446-0, Refa_Ext 128e4b4a 2048Hz

Type	**Refa_Ext-128e4b4a**
REF code	95-0121-6446-0

Unipolar ExG inputs (EEG, ECG, EOG, EMG etc):

Number	128
RMS Noise	< 1 µV (@ lowest sample frequency)
Gain	26.55 x
Input signal difference	-150 mV to +150 mV (@ 0 V common signal)
Input common mode range	-2 V to +2 V (@ 0 V differential signal)
Input impedance	> 100 MΩ
CMRR	> 90 dB
Connectors	active shielded micro coax per channel subD37 female unshielded per 32 channels

Bipolar ExG inputs (ECG, EOG, EMG etc):

Number	4
RMS Noise	< 1 µV (@ lowest sample frequency)
Gain	26.55 x
Input signal difference	-150 mV to +150 mV (@ 0 V common signal) (no positive overflow)
Input common mode range	-2 V to +2 V (@ 0 V differential signal)
Input impedance	> 100 MΩ
CMRR	> 90 dB
Connector	4 pin plastic connector, active shielding

AUX inputs:

Number	4
RMS Noise	< 20 µV (@ lowest sample frequency)
Gain	1 x
Input signal difference	-3 V to +3 V (@ 0 V common signal)
Input common mode range	-4 V to +4 V (@ 0 V differential signal)
Input impedance	> 100 MΩ
CMRR	> 70 dB
Output voltage	+5 V & -5 V, max. 20 mA for all channels together
Connector	5 pin plastic connector

Digital input

Input turn-on current	2 mA @ 3 V input, max. input = 5 V
Isolation	> 4000 V, by means of optocoupler (H11L1)
Connector	8 bit via DB25 female, shared first bit via BNC female

Sampling:

Number of channels	136 channels simultaneously
Resolution	24 bits, ExG & BIP 0.01839 µV per bit, AUX 0.48828 µV per bit
Sample frequency	2048 Hz, 1024 Hz, 512 Hz, 256 Hz, 128 Hz

Channel list:

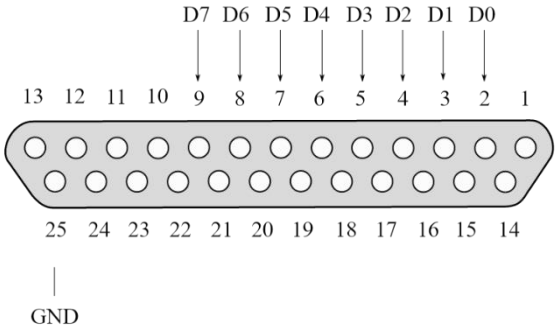
nr	name	Function	resolution	range
1	ExG1	Unipolar input 1	0.01839 µV	-150 mV to +150 mV
2	ExG2	Unipolar input 2	0.01839 µV	-150 mV to +150 mV
3	ExG3	Unipolar input 3	0.01839 µV	-150 mV to +150 mV
4	ExG4	Unipolar input 4	0.01839 µV	-150 mV to +150 mV
5	ExG5	Unipolar input 5	0.01839 µV	-150 mV to +150 mV
6	ExG6	Unipolar input 6	0.01839 µV	-150 mV to +150 mV
7	ExG7	Unipolar input 7	0.01839 µV	-150 mV to +150 mV
8	ExG8	Unipolar input 8	0.01839 µV	-150 mV to +150 mV
9	ExG9	Unipolar input 9	0.01839 µV	-150 mV to +150 mV
10	ExG10	Unipolar input 10	0.01839 µV	-150 mV to +150 mV
11	ExG11	Unipolar input 11	0.01839 µV	-150 mV to +150 mV
12	ExG12	Unipolar input 12	0.01839 µV	-150 mV to +150 mV
13	ExG13	Unipolar input 13	0.01839 µV	-150 mV to +150 mV
14	ExG14	Unipolar input 14	0.01839 µV	-150 mV to +150 mV
15	ExG15	Unipolar input 15	0.01839 µV	-150 mV to +150 mV
16	ExG16	Unipolar input 16	0.01839 µV	-150 mV to +150 mV
17	ExG17	Unipolar input 17	0.01839 µV	-150 mV to +150 mV
18	ExG18	Unipolar input 18	0.01839 µV	-150 mV to +150 mV
19	ExG19	Unipolar input 19	0.01839 µV	-150 mV to +150 mV
20	ExG20	Unipolar input 20	0.01839 µV	-150 mV to +150 mV
21	ExG21	Unipolar input 21	0.01839 µV	-150 mV to +150 mV
22	ExG22	Unipolar input 22	0.01839 µV	-150 mV to +150 mV
23	ExG23	Unipolar input 23	0.01839 µV	-150 mV to +150 mV
24	ExG24	Unipolar input 24	0.01839 µV	-150 mV to +150 mV
25	ExG25	Unipolar input 25	0.01839 µV	-150 mV to +150 mV
26	ExG26	Unipolar input 26	0.01839 µV	-150 mV to +150 mV
27	ExG27	Unipolar input 27	0.01839 µV	-150 mV to +150 mV
28	ExG28	Unipolar input 28	0.01839 µV	-150 mV to +150 mV
29	ExG29	Unipolar input 29	0.01839 µV	-150 mV to +150 mV
30	ExG30	Unipolar input 30	0.01839 µV	-150 mV to +150 mV
31	ExG31	Unipolar input 31	0.01839 µV	-150 mV to +150 mV
32	ExG32	Unipolar input 32	0.01839 µV	-150 mV to +150 mV
33	ExG33	Unipolar input 33	0.01839 µV	-150 mV to +150 mV
34	ExG34	Unipolar input 34	0.01839 µV	-150 mV to +150 mV
35	ExG35	Unipolar input 35	0.01839 µV	-150 mV to +150 mV
36	ExG36	Unipolar input 36	0.01839 µV	-150 mV to +150 mV
37	ExG37	Unipolar input 37	0.01839 µV	-150 mV to +150 mV
38	ExG38	Unipolar input 38	0.01839 µV	-150 mV to +150 mV
39	ExG39	Unipolar input 39	0.01839 µV	-150 mV to +150 mV
40	ExG40	Unipolar input 40	0.01839 µV	-150 mV to +150 mV
41	ExG41	Unipolar input 41	0.01839 µV	-150 mV to +150 mV
42	ExG42	Unipolar input 42	0.01839 µV	-150 mV to +150 mV
43	ExG43	Unipolar input 43	0.01839 µV	-150 mV to +150 mV
44	ExG44	Unipolar input 44	0.01839 µV	-150 mV to +150 mV
45	ExG45	Unipolar input 45	0.01839 µV	-150 mV to +150 mV
46	ExG46	Unipolar input 46	0.01839 µV	-150 mV to +150 mV
47	ExG47	Unipolar input 47	0.01839 µV	-150 mV to +150 mV
48	ExG48	Unipolar input 48	0.01839 µV	-150 mV to +150 mV
49	ExG49	Unipolar input 49	0.01839 µV	-150 mV to +150 mV
50	ExG50	Unipolar input 50	0.01839 µV	-150 mV to +150 mV
51	ExG51	Unipolar input 51	0.01839 µV	-150 mV to +150 mV
52	ExG52	Unipolar input 52	0.01839 µV	-150 mV to +150 mV
53	ExG53	Unipolar input 53	0.01839 µV	-150 mV to +150 mV

nr	name	Function	resolution	range
54	ExG54	Unipolar input 54	0.01839 µV	-150 mV to +150 mV
55	ExG55	Unipolar input 55	0.01839 µV	-150 mV to +150 mV
56	ExG56	Unipolar input 56	0.01839 µV	-150 mV to +150 mV
57	ExG57	Unipolar input 57	0.01839 µV	-150 mV to +150 mV
58	ExG58	Unipolar input 58	0.01839 µV	-150 mV to +150 mV
59	ExG59	Unipolar input 59	0.01839 µV	-150 mV to +150 mV
60	ExG60	Unipolar input 60	0.01839 µV	-150 mV to +150 mV
61	ExG61	Unipolar input 61	0.01839 µV	-150 mV to +150 mV
62	ExG62	Unipolar input 62	0.01839 µV	-150 mV to +150 mV
63	ExG63	Unipolar input 63	0.01839 µV	-150 mV to +150 mV
64	ExG64	Unipolar input 64	0.01839 µV	-150 mV to +150 mV
65	ExG65	Unipolar input 65	0.01839 µV	-150 mV to +150 mV
66	ExG66	Unipolar input 66	0.01839 µV	-150 mV to +150 mV
67	ExG67	Unipolar input 67	0.01839 µV	-150 mV to +150 mV
68	ExG68	Unipolar input 68	0.01839 µV	-150 mV to +150 mV
69	ExG69	Unipolar input 69	0.01839 µV	-150 mV to +150 mV
70	ExG70	Unipolar input 70	0.01839 µV	-150 mV to +150 mV
71	ExG71	Unipolar input 71	0.01839 µV	-150 mV to +150 mV
72	ExG72	Unipolar input 72	0.01839 µV	-150 mV to +150 mV
73	ExG73	Unipolar input 73	0.01839 µV	-150 mV to +150 mV
74	ExG74	Unipolar input 74	0.01839 µV	-150 mV to +150 mV
75	ExG75	Unipolar input 75	0.01839 µV	-150 mV to +150 mV
76	ExG76	Unipolar input 76	0.01839 µV	-150 mV to +150 mV
77	ExG77	Unipolar input 77	0.01839 µV	-150 mV to +150 mV
78	ExG78	Unipolar input 78	0.01839 µV	-150 mV to +150 mV
79	ExG79	Unipolar input 79	0.01839 µV	-150 mV to +150 mV
80	ExG80	Unipolar input 80	0.01839 µV	-150 mV to +150 mV
81	ExG81	Unipolar input 81	0.01839 µV	-150 mV to +150 mV
82	ExG82	Unipolar input 82	0.01839 µV	-150 mV to +150 mV
83	ExG83	Unipolar input 83	0.01839 µV	-150 mV to +150 mV
84	ExG84	Unipolar input 84	0.01839 µV	-150 mV to +150 mV
85	ExG85	Unipolar input 85	0.01839 µV	-150 mV to +150 mV
86	ExG86	Unipolar input 86	0.01839 µV	-150 mV to +150 mV
87	ExG87	Unipolar input 87	0.01839 µV	-150 mV to +150 mV
88	ExG88	Unipolar input 88	0.01839 µV	-150 mV to +150 mV
89	ExG89	Unipolar input 89	0.01839 µV	-150 mV to +150 mV
90	ExG90	Unipolar input 90	0.01839 µV	-150 mV to +150 mV
91	ExG91	Unipolar input 91	0.01839 µV	-150 mV to +150 mV
92	ExG92	Unipolar input 92	0.01839 µV	-150 mV to +150 mV
93	ExG93	Unipolar input 93	0.01839 µV	-150 mV to +150 mV
94	ExG94	Unipolar input 94	0.01839 µV	-150 mV to +150 mV
95	ExG95	Unipolar input 95	0.01839 µV	-150 mV to +150 mV
96	ExG96	Unipolar input 96	0.01839 µV	-150 mV to +150 mV
97	ExG97	Unipolar input 97	0.01839 µV	-150 mV to +150 mV
98	ExG98	Unipolar input 98	0.01839 µV	-150 mV to +150 mV
99	ExG99	Unipolar input 99	0.01839 µV	-150 mV to +150 mV
100	ExG100	Unipolar input 100	0.01839 µV	-150 mV to +150 mV
101	ExG101	Unipolar input 101	0.01839 µV	-150 mV to +150 mV
102	ExG102	Unipolar input 102	0.01839 µV	-150 mV to +150 mV
103	ExG103	Unipolar input 103	0.01839 µV	-150 mV to +150 mV
104	ExG104	Unipolar input 104	0.01839 µV	-150 mV to +150 mV
105	ExG105	Unipolar input 105	0.01839 µV	-150 mV to +150 mV
106	ExG106	Unipolar input 106	0.01839 µV	-150 mV to +150 mV
107	ExG107	Unipolar input 107	0.01839 µV	-150 mV to +150 mV

nr	name	Function		resolution	range
108	ExG108	Unipolar input 108		0.01839 µV	-150 mV to +150 mV
109	ExG109	Unipolar input 109		0.01839 µV	-150 mV to +150 mV
110	ExG110	Unipolar input 110		0.01839 µV	-150 mV to +150 mV
111	ExG111	Unipolar input 111		0.01839 µV	-150 mV to +150 mV
112	ExG112	Unipolar input 112		0.01839 µV	-150 mV to +150 mV
113	ExG113	Unipolar input 113		0.01839 µV	-150 mV to +150 mV
114	ExG114	Unipolar input 114		0.01839 µV	-150 mV to +150 mV
115	ExG115	Unipolar input 115		0.01839 µV	-150 mV to +150 mV
116	ExG116	Unipolar input 116		0.01839 µV	-150 mV to +150 mV
117	ExG117	Unipolar input 117		0.01839 µV	-150 mV to +150 mV
118	ExG118	Unipolar input 118		0.01839 µV	-150 mV to +150 mV
119	ExG119	Unipolar input 119		0.01839 µV	-150 mV to +150 mV
120	ExG120	Unipolar input 120		0.01839 µV	-150 mV to +150 mV
121	ExG121	Unipolar input 121		0.01839 µV	-150 mV to +150 mV
122	ExG122	Unipolar input 122		0.01839 µV	-150 mV to +150 mV
123	ExG123	Unipolar input 123		0.01839 µV	-150 mV to +150 mV
124	ExG124	Unipolar input 124		0.01839 µV	-150 mV to +150 mV
125	ExG125	Unipolar input 125		0.01839 µV	-150 mV to +150 mV
126	ExG126	Unipolar input 126		0.01839 µV	-150 mV to +150 mV
127	ExG127	Unipolar input 127		0.01839 µV	-150 mV to +150 mV
128	ExG128	Unipolar input 128		0.01839 µV	-150 mV to +150 mV
129	BIP129	Bipolar input 129		0.01839 µV	-150 mV to +150 mV
130	BIP130	Bipolar input 130		0.01839 µV	-150 mV to +150 mV
131	BIP131	Bipolar input 131		0.01839 µV	-150 mV to +150 mV
132	BIP132	Bipolar input 132		0.01839 µV	-150 mV to +150 mV
133	AUX133	Auxiliary input 133		0.48828 µV	-3 V to +3 V
134	AUX134	Auxiliary input 134		0.48828 µV	-3 V to +3 V
135	AUX135	Auxiliary input 135		0.48828 µV	-3 V to +3 V
136	AUX136	Auxiliary input 136		0.48828 µV	-3 V to +3 V
137	Digi	Digital channel (bits)		1 (bit)	0 to 255
		0	Digital input bit 0		
		1	Digital input bit 1		
		2	Digital input bit 2		
		3	Digital input bit 3		
		4	Digital input bit 4		
		5	Digital input bit 5		
		6	Digital input bit 6		
		7	Digital input bit 7 (MSB)		
		8-15	reserved		
138	Saw	Sawtooth test signal (bits)		1 (bit)	0 to 32767

Digital input DB25 connector

Pin	Input
2	bit 0 (parallel to BNC connector in software)
3	bit 1
4	bit 2
5	bit 3
6	bit 4
7	bit 5
8	bit 6
9	bit 7 (MSB)
25	common ground



Headcap connector

This table describes the relation between signal channel numbers and headcap connector pin numbers.

DB37 pin number	First Connector Channel number	Second Connector Channel number	Third Connector Channel number	Fourth Connector Channel number
1	-	-	-	-
20	1	33	65	97
2	2	34	66	98
21	3	35	67	99
3	4	36	68	100
22	5	37	69	101
4	6	38	70	102
23	7	39	71	103
5	8	40	72	104
24	9	41	73	105
6	10	42	74	106
25	11	43	75	107
7	12	44	76	108
26	13	45	77	109
8	14	46	78	110
27	15	47	79	111
9	16	48	80	112
28	17	49	81	113
10	18	50	82	114
29	19	51	83	115
11	20	52	84	116
30	21	53	85	117
12	22	54	86	118
31	23	55	87	119
13	24	56	88	120
32	25	57	89	121
14	26	58	90	122
33	27	59	91	123
15	28	60	92	124
34	29	61	93	125
16	30	62	94	126
35	31	63	95	127
17	32	64	96	128
36	Pat. GND	Pat. GND	Pat. GND	Pat. GND
18	-	-	-	-
37	-	-	-	-
19	-	-	-	-

95-0121-6446-1, Refa_Ext 128e4b4a 2048Hz

Type	**Refa_Ext-128e4b4a**
REF code	95-0121-6446-1

Unipolar ExG inputs (EEG, ECG, EOG, EMG etc):

Number	128
RMS Noise	< 1 µV (@ lowest sample frequency)
Gain	26.55 x
Input signal difference	-150 mV to +150 mV (@ 0 V common signal)
Input common mode range	-2 V to +2 V (@ 0 V differential signal)
Input impedance	> 100 MΩ
CMRR	> 90 dB
Connectors	active shielded micro coax per channel subD37 female unshielded per 32 channels

Bipolar ExG inputs (ECG, EOG, EMG etc):

Number	4
RMS Noise	< 1 µV (@ lowest sample frequency)
Gain	26.55 x
Input signal difference	-150 mV to +150 mV (@ 0 V common signal) (no positive overflow)
Input common mode range	-2 V to +2 V (@ 0 V differential signal)
Input impedance	> 100 MΩ
CMRR	> 90 dB
Connector	4 pin plastic connector, active shielding

AUX inputs:

Number	4
RMS Noise	< 20 µV (@ lowest sample frequency)
Gain	1 x
Input signal difference	-3 V to +3 V (@ 0 V common signal)
Input common mode range	-4 V to +4 V (@ 0 V differential signal)
Input impedance	> 100 MΩ
CMRR	> 70 dB
Output voltage	+5 V & -5 V, max. 20 mA for all channels together
Connector	5 pin plastic connector

Digital input

Input turn-on current	2 mA @ 3 V input, max. input = 5 V
Isolation	> 4000 V, by means of optocoupler (H11L1)
Connector	8 bit via DB25 female, shared first bit via BNC female

Sampling:

Number of channels	136 channels simultaneously
Resolution	24 bits, ExG & BIP 0.01839 µV per bit, AUX 0.48828 µV per bit
Sample frequency	2048 Hz, 1024 Hz, 512 Hz, 256 Hz, 128 Hz

Channel list:

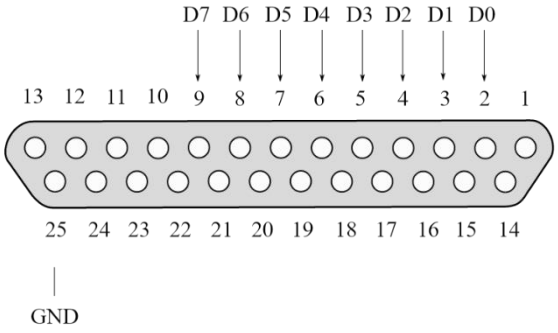
nr	name	Function	resolution	range
1	ExG1	Unipolar input 1	0.01839 µV	-150 mV to +150 mV
2	ExG2	Unipolar input 2	0.01839 µV	-150 mV to +150 mV
3	ExG3	Unipolar input 3	0.01839 µV	-150 mV to +150 mV
4	ExG4	Unipolar input 4	0.01839 µV	-150 mV to +150 mV
5	ExG5	Unipolar input 5	0.01839 µV	-150 mV to +150 mV
6	ExG6	Unipolar input 6	0.01839 µV	-150 mV to +150 mV
7	ExG7	Unipolar input 7	0.01839 µV	-150 mV to +150 mV
8	ExG8	Unipolar input 8	0.01839 µV	-150 mV to +150 mV
9	ExG9	Unipolar input 9	0.01839 µV	-150 mV to +150 mV
10	ExG10	Unipolar input 10	0.01839 µV	-150 mV to +150 mV
11	ExG11	Unipolar input 11	0.01839 µV	-150 mV to +150 mV
12	ExG12	Unipolar input 12	0.01839 µV	-150 mV to +150 mV
13	ExG13	Unipolar input 13	0.01839 µV	-150 mV to +150 mV
14	ExG14	Unipolar input 14	0.01839 µV	-150 mV to +150 mV
15	ExG15	Unipolar input 15	0.01839 µV	-150 mV to +150 mV
16	ExG16	Unipolar input 16	0.01839 µV	-150 mV to +150 mV
17	ExG17	Unipolar input 17	0.01839 µV	-150 mV to +150 mV
18	ExG18	Unipolar input 18	0.01839 µV	-150 mV to +150 mV
19	ExG19	Unipolar input 19	0.01839 µV	-150 mV to +150 mV
20	ExG20	Unipolar input 20	0.01839 µV	-150 mV to +150 mV
21	ExG21	Unipolar input 21	0.01839 µV	-150 mV to +150 mV
22	ExG22	Unipolar input 22	0.01839 µV	-150 mV to +150 mV
23	ExG23	Unipolar input 23	0.01839 µV	-150 mV to +150 mV
24	ExG24	Unipolar input 24	0.01839 µV	-150 mV to +150 mV
25	ExG25	Unipolar input 25	0.01839 µV	-150 mV to +150 mV
26	ExG26	Unipolar input 26	0.01839 µV	-150 mV to +150 mV
27	ExG27	Unipolar input 27	0.01839 µV	-150 mV to +150 mV
28	ExG28	Unipolar input 28	0.01839 µV	-150 mV to +150 mV
29	ExG29	Unipolar input 29	0.01839 µV	-150 mV to +150 mV
30	ExG30	Unipolar input 30	0.01839 µV	-150 mV to +150 mV
31	ExG31	Unipolar input 31	0.01839 µV	-150 mV to +150 mV
32	ExG32	Unipolar input 32	0.01839 µV	-150 mV to +150 mV
33	ExG33	Unipolar input 33	0.01839 µV	-150 mV to +150 mV
34	ExG34	Unipolar input 34	0.01839 µV	-150 mV to +150 mV
35	ExG35	Unipolar input 35	0.01839 µV	-150 mV to +150 mV
36	ExG36	Unipolar input 36	0.01839 µV	-150 mV to +150 mV
37	ExG37	Unipolar input 37	0.01839 µV	-150 mV to +150 mV
38	ExG38	Unipolar input 38	0.01839 µV	-150 mV to +150 mV
39	ExG39	Unipolar input 39	0.01839 µV	-150 mV to +150 mV
40	ExG40	Unipolar input 40	0.01839 µV	-150 mV to +150 mV
41	ExG41	Unipolar input 41	0.01839 µV	-150 mV to +150 mV
42	ExG42	Unipolar input 42	0.01839 µV	-150 mV to +150 mV
43	ExG43	Unipolar input 43	0.01839 µV	-150 mV to +150 mV
44	ExG44	Unipolar input 44	0.01839 µV	-150 mV to +150 mV
45	ExG45	Unipolar input 45	0.01839 µV	-150 mV to +150 mV
46	ExG46	Unipolar input 46	0.01839 µV	-150 mV to +150 mV
47	ExG47	Unipolar input 47	0.01839 µV	-150 mV to +150 mV
48	ExG48	Unipolar input 48	0.01839 µV	-150 mV to +150 mV
49	ExG49	Unipolar input 49	0.01839 µV	-150 mV to +150 mV
50	ExG50	Unipolar input 50	0.01839 µV	-150 mV to +150 mV
51	ExG51	Unipolar input 51	0.01839 µV	-150 mV to +150 mV
52	ExG52	Unipolar input 52	0.01839 µV	-150 mV to +150 mV
53	ExG53	Unipolar input 53	0.01839 µV	-150 mV to +150 mV

nr	name	Function	resolution	range
54	ExG54	Unipolar input 54	0.01839 µV	-150 mV to +150 mV
55	ExG55	Unipolar input 55	0.01839 µV	-150 mV to +150 mV
56	ExG56	Unipolar input 56	0.01839 µV	-150 mV to +150 mV
57	ExG57	Unipolar input 57	0.01839 µV	-150 mV to +150 mV
58	ExG58	Unipolar input 58	0.01839 µV	-150 mV to +150 mV
59	ExG59	Unipolar input 59	0.01839 µV	-150 mV to +150 mV
60	ExG60	Unipolar input 60	0.01839 µV	-150 mV to +150 mV
61	ExG61	Unipolar input 61	0.01839 µV	-150 mV to +150 mV
62	ExG62	Unipolar input 62	0.01839 µV	-150 mV to +150 mV
63	ExG63	Unipolar input 63	0.01839 µV	-150 mV to +150 mV
64	ExG64	Unipolar input 64	0.01839 µV	-150 mV to +150 mV
65	ExG65	Unipolar input 65	0.01839 µV	-150 mV to +150 mV
66	ExG66	Unipolar input 66	0.01839 µV	-150 mV to +150 mV
67	ExG67	Unipolar input 67	0.01839 µV	-150 mV to +150 mV
68	ExG68	Unipolar input 68	0.01839 µV	-150 mV to +150 mV
69	ExG69	Unipolar input 69	0.01839 µV	-150 mV to +150 mV
70	ExG70	Unipolar input 70	0.01839 µV	-150 mV to +150 mV
71	ExG71	Unipolar input 71	0.01839 µV	-150 mV to +150 mV
72	ExG72	Unipolar input 72	0.01839 µV	-150 mV to +150 mV
73	ExG73	Unipolar input 73	0.01839 µV	-150 mV to +150 mV
74	ExG74	Unipolar input 74	0.01839 µV	-150 mV to +150 mV
75	ExG75	Unipolar input 75	0.01839 µV	-150 mV to +150 mV
76	ExG76	Unipolar input 76	0.01839 µV	-150 mV to +150 mV
77	ExG77	Unipolar input 77	0.01839 µV	-150 mV to +150 mV
78	ExG78	Unipolar input 78	0.01839 µV	-150 mV to +150 mV
79	ExG79	Unipolar input 79	0.01839 µV	-150 mV to +150 mV
80	ExG80	Unipolar input 80	0.01839 µV	-150 mV to +150 mV
81	ExG81	Unipolar input 81	0.01839 µV	-150 mV to +150 mV
82	ExG82	Unipolar input 82	0.01839 µV	-150 mV to +150 mV
83	ExG83	Unipolar input 83	0.01839 µV	-150 mV to +150 mV
84	ExG84	Unipolar input 84	0.01839 µV	-150 mV to +150 mV
85	ExG85	Unipolar input 85	0.01839 µV	-150 mV to +150 mV
86	ExG86	Unipolar input 86	0.01839 µV	-150 mV to +150 mV
87	ExG87	Unipolar input 87	0.01839 µV	-150 mV to +150 mV
88	ExG88	Unipolar input 88	0.01839 µV	-150 mV to +150 mV
89	ExG89	Unipolar input 89	0.01839 µV	-150 mV to +150 mV
90	ExG90	Unipolar input 90	0.01839 µV	-150 mV to +150 mV
91	ExG91	Unipolar input 91	0.01839 µV	-150 mV to +150 mV
92	ExG92	Unipolar input 92	0.01839 µV	-150 mV to +150 mV
93	ExG93	Unipolar input 93	0.01839 µV	-150 mV to +150 mV
94	ExG94	Unipolar input 94	0.01839 µV	-150 mV to +150 mV
95	ExG95	Unipolar input 95	0.01839 µV	-150 mV to +150 mV
96	ExG96	Unipolar input 96	0.01839 µV	-150 mV to +150 mV
97	ExG97	Unipolar input 97	0.01839 µV	-150 mV to +150 mV
98	ExG98	Unipolar input 98	0.01839 µV	-150 mV to +150 mV
99	ExG99	Unipolar input 99	0.01839 µV	-150 mV to +150 mV
100	ExG100	Unipolar input 100	0.01839 µV	-150 mV to +150 mV
101	ExG101	Unipolar input 101	0.01839 µV	-150 mV to +150 mV
102	ExG102	Unipolar input 102	0.01839 µV	-150 mV to +150 mV
103	ExG103	Unipolar input 103	0.01839 µV	-150 mV to +150 mV
104	ExG104	Unipolar input 104	0.01839 µV	-150 mV to +150 mV
105	ExG105	Unipolar input 105	0.01839 µV	-150 mV to +150 mV
106	ExG106	Unipolar input 106	0.01839 µV	-150 mV to +150 mV
107	ExG107	Unipolar input 107	0.01839 µV	-150 mV to +150 mV

nr	name	Function		resolution	range
108	ExG108	Unipolar input 108		0.01839 µV	-150 mV to +150 mV
109	ExG109	Unipolar input 109		0.01839 µV	-150 mV to +150 mV
110	ExG110	Unipolar input 110		0.01839 µV	-150 mV to +150 mV
111	ExG111	Unipolar input 111		0.01839 µV	-150 mV to +150 mV
112	ExG112	Unipolar input 112		0.01839 µV	-150 mV to +150 mV
113	ExG113	Unipolar input 113		0.01839 µV	-150 mV to +150 mV
114	ExG114	Unipolar input 114		0.01839 µV	-150 mV to +150 mV
115	ExG115	Unipolar input 115		0.01839 µV	-150 mV to +150 mV
116	ExG116	Unipolar input 116		0.01839 µV	-150 mV to +150 mV
117	ExG117	Unipolar input 117		0.01839 µV	-150 mV to +150 mV
118	ExG118	Unipolar input 118		0.01839 µV	-150 mV to +150 mV
119	ExG119	Unipolar input 119		0.01839 µV	-150 mV to +150 mV
120	ExG120	Unipolar input 120		0.01839 µV	-150 mV to +150 mV
121	ExG121	Unipolar input 121		0.01839 µV	-150 mV to +150 mV
122	ExG122	Unipolar input 122		0.01839 µV	-150 mV to +150 mV
123	ExG123	Unipolar input 123		0.01839 µV	-150 mV to +150 mV
124	ExG124	Unipolar input 124		0.01839 µV	-150 mV to +150 mV
125	ExG125	Unipolar input 125		0.01839 µV	-150 mV to +150 mV
126	ExG126	Unipolar input 126		0.01839 µV	-150 mV to +150 mV
127	ExG127	Unipolar input 127		0.01839 µV	-150 mV to +150 mV
128	ExG128	Unipolar input 128		0.01839 µV	-150 mV to +150 mV
129	BIP129	Bipolar input 129		0.01839 µV	-150 mV to +150 mV
130	BIP130	Bipolar input 130		0.01839 µV	-150 mV to +150 mV
131	BIP131	Bipolar input 131		0.01839 µV	-150 mV to +150 mV
132	BIP132	Bipolar input 132		0.01839 µV	-150 mV to +150 mV
133	AUX133	Auxiliary input 133		0.48828 µV	-3 V to +3 V
134	AUX134	Auxiliary input 134		0.48828 µV	-3 V to +3 V
135	AUX135	Auxiliary input 135		0.48828 µV	-3 V to +3 V
136	AUX136	Auxiliary input 136		0.48828 µV	-3 V to +3 V
137	Digi	Digital channel (bits)		1 (bit)	0 to 255
		0	Digital input bit 0		
		1	Digital input bit 1		
		2	Digital input bit 2		
		3	Digital input bit 3		
		4	Digital input bit 4		
		5	Digital input bit 5		
		6	Digital input bit 6		
		7	Digital input bit 7 (MSB)		
		8-15	reserved		
138	Saw	Sawtooth test signal (bits)		1 (bit)	0 to 32767

Digital input DB25 connector

Pin	Input
2	bit 0 (parallel to BNC connector in software)
3	bit 1
4	bit 2
5	bit 3
6	bit 4
7	bit 5
8	bit 6
9	bit 7 (MSB)
25	common ground



Headcap connector

This table describes the relation between signal channel numbers and headcap connector pin numbers.

DB37 pin number	First Connector Channel number	Second Connector Channel number	Third Connector Channel number	Fourth Connector Channel number
1	-	-	-	-
20	1	33	65	97
2	2	34	66	98
21	3	35	67	99
3	4	36	68	100
22	5	37	69	101
4	6	38	70	102
23	7	39	71	103
5	8	40	72	104
24	9	41	73	105
6	10	42	74	106
25	11	43	75	107
7	12	44	76	108
26	13	45	77	109
8	14	46	78	110
27	15	47	79	111
9	16	48	80	112
28	17	49	81	113
10	18	50	82	114
29	19	51	83	115
11	20	52	84	116
30	21	53	85	117
12	22	54	86	118
31	23	55	87	119
13	24	56	88	120
32	25	57	89	121
14	26	58	90	122
33	27	59	91	123
15	28	60	92	124
34	29	61	93	125
16	30	62	94	126
35	31	63	95	127
17	32	64	96	128
36	Pat. GND	Pat. GND	Pat. GND	Pat. GND
18	-	-	-	-
37	-	-	-	-
19	-	-	-	-

95-0121-6447-0, Refa_Ext 128e4b4a 2000Hz

Type	**Refa_Ext-128e4b4a**
REF code	95-0121-6447-0

Unipolar ExG inputs (EEG, ECG, EOG, EMG etc):

Number	128
RMS Noise	< 1 µV (@ lowest sample frequency)
Gain	26.55 x
Input signal difference	-150 mV to +150 mV (@ 0 V common signal)
Input common mode range	-2 V to +2 V (@ 0 V differential signal)
Input impedance	> 100 MΩ
CMRR	> 90 dB
Connectors	active shielded micro coax per channel subD37 female unshielded per 32 channels

Bipolar ExG inputs (ECG, EOG, EMG etc):

Number	4
RMS Noise	< 1 µV (@ lowest sample frequency)
Gain	26.55 x
Input signal difference	-150 mV to +150 mV (@ 0 V common signal) (no positive overflow)
Input common mode range	-2 V to +2 V (@ 0 V differential signal)
Input impedance	> 100 MΩ
CMRR	> 90 dB
Connector	4 pin plastic connector, active shielding

AUX inputs:

Number	4
RMS Noise	< 20 µV (@ lowest sample frequency)
Gain	1 x
Input signal difference	-3 V to +3 V (@ 0 V common signal)
Input common mode range	-4 V to +4 V (@ 0 V differential signal)
Input impedance	> 100 MΩ
CMRR	> 70 dB
Output voltage	+5 V & -5 V, max. 20 mA for all channels together
Connector	5 pin plastic connector

Digital input

Input turn-on current	2 mA @ 3 V input, max. input = 5 V
Isolation	> 4000 V, by means of optocoupler (H11L1)
Connector	8 bit via DB25 female, shared first bit via BNC female

Sampling:

Number of channels	136 channels simultaneously
Resolution	24 bits, ExG & BIP 0.01839 µV per bit, AUX 0.48828 µV per bit
Sample frequency	2000 Hz, 1000 Hz, 500 Hz, 250 Hz, 125 Hz

Channel list:

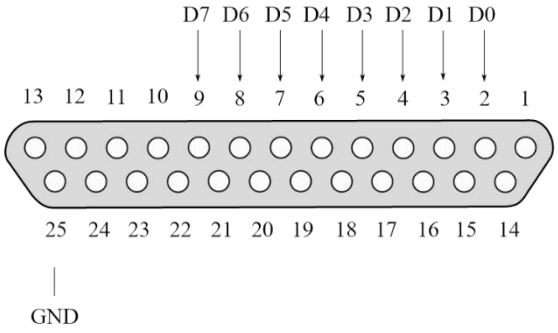
nr	name	Function	resolution	range
1	ExG1	Unipolar input 1	0.01839 µV	-150 mV to +150 mV
2	ExG2	Unipolar input 2	0.01839 µV	-150 mV to +150 mV
3	ExG3	Unipolar input 3	0.01839 µV	-150 mV to +150 mV
4	ExG4	Unipolar input 4	0.01839 µV	-150 mV to +150 mV
5	ExG5	Unipolar input 5	0.01839 µV	-150 mV to +150 mV
6	ExG6	Unipolar input 6	0.01839 µV	-150 mV to +150 mV
7	ExG7	Unipolar input 7	0.01839 µV	-150 mV to +150 mV
8	ExG8	Unipolar input 8	0.01839 µV	-150 mV to +150 mV
9	ExG9	Unipolar input 9	0.01839 µV	-150 mV to +150 mV
10	ExG10	Unipolar input 10	0.01839 µV	-150 mV to +150 mV
11	ExG11	Unipolar input 11	0.01839 µV	-150 mV to +150 mV
12	ExG12	Unipolar input 12	0.01839 µV	-150 mV to +150 mV
13	ExG13	Unipolar input 13	0.01839 µV	-150 mV to +150 mV
14	ExG14	Unipolar input 14	0.01839 µV	-150 mV to +150 mV
15	ExG15	Unipolar input 15	0.01839 µV	-150 mV to +150 mV
16	ExG16	Unipolar input 16	0.01839 µV	-150 mV to +150 mV
17	ExG17	Unipolar input 17	0.01839 µV	-150 mV to +150 mV
18	ExG18	Unipolar input 18	0.01839 µV	-150 mV to +150 mV
19	ExG19	Unipolar input 19	0.01839 µV	-150 mV to +150 mV
20	ExG20	Unipolar input 20	0.01839 µV	-150 mV to +150 mV
21	ExG21	Unipolar input 21	0.01839 µV	-150 mV to +150 mV
22	ExG22	Unipolar input 22	0.01839 µV	-150 mV to +150 mV
23	ExG23	Unipolar input 23	0.01839 µV	-150 mV to +150 mV
24	ExG24	Unipolar input 24	0.01839 µV	-150 mV to +150 mV
25	ExG25	Unipolar input 25	0.01839 µV	-150 mV to +150 mV
26	ExG26	Unipolar input 26	0.01839 µV	-150 mV to +150 mV
27	ExG27	Unipolar input 27	0.01839 µV	-150 mV to +150 mV
28	ExG28	Unipolar input 28	0.01839 µV	-150 mV to +150 mV
29	ExG29	Unipolar input 29	0.01839 µV	-150 mV to +150 mV
30	ExG30	Unipolar input 30	0.01839 µV	-150 mV to +150 mV
31	ExG31	Unipolar input 31	0.01839 µV	-150 mV to +150 mV
32	ExG32	Unipolar input 32	0.01839 µV	-150 mV to +150 mV
33	ExG33	Unipolar input 33	0.01839 µV	-150 mV to +150 mV
34	ExG34	Unipolar input 34	0.01839 µV	-150 mV to +150 mV
35	ExG35	Unipolar input 35	0.01839 µV	-150 mV to +150 mV
36	ExG36	Unipolar input 36	0.01839 µV	-150 mV to +150 mV
37	ExG37	Unipolar input 37	0.01839 µV	-150 mV to +150 mV
38	ExG38	Unipolar input 38	0.01839 µV	-150 mV to +150 mV
39	ExG39	Unipolar input 39	0.01839 µV	-150 mV to +150 mV
40	ExG40	Unipolar input 40	0.01839 µV	-150 mV to +150 mV
41	ExG41	Unipolar input 41	0.01839 µV	-150 mV to +150 mV
42	ExG42	Unipolar input 42	0.01839 µV	-150 mV to +150 mV
43	ExG43	Unipolar input 43	0.01839 µV	-150 mV to +150 mV
44	ExG44	Unipolar input 44	0.01839 µV	-150 mV to +150 mV
45	ExG45	Unipolar input 45	0.01839 µV	-150 mV to +150 mV
46	ExG46	Unipolar input 46	0.01839 µV	-150 mV to +150 mV
47	ExG47	Unipolar input 47	0.01839 µV	-150 mV to +150 mV
48	ExG48	Unipolar input 48	0.01839 µV	-150 mV to +150 mV
49	ExG49	Unipolar input 49	0.01839 µV	-150 mV to +150 mV
50	ExG50	Unipolar input 50	0.01839 µV	-150 mV to +150 mV
51	ExG51	Unipolar input 51	0.01839 µV	-150 mV to +150 mV
52	ExG52	Unipolar input 52	0.01839 µV	-150 mV to +150 mV
53	ExG53	Unipolar input 53	0.01839 µV	-150 mV to +150 mV

nr	name	Function	resolution	range
54	ExG54	Unipolar input 54	0.01839 µV	-150 mV to +150 mV
55	ExG55	Unipolar input 55	0.01839 µV	-150 mV to +150 mV
56	ExG56	Unipolar input 56	0.01839 µV	-150 mV to +150 mV
57	ExG57	Unipolar input 57	0.01839 µV	-150 mV to +150 mV
58	ExG58	Unipolar input 58	0.01839 µV	-150 mV to +150 mV
59	ExG59	Unipolar input 59	0.01839 µV	-150 mV to +150 mV
60	ExG60	Unipolar input 60	0.01839 µV	-150 mV to +150 mV
61	ExG61	Unipolar input 61	0.01839 µV	-150 mV to +150 mV
62	ExG62	Unipolar input 62	0.01839 µV	-150 mV to +150 mV
63	ExG63	Unipolar input 63	0.01839 µV	-150 mV to +150 mV
64	ExG64	Unipolar input 64	0.01839 µV	-150 mV to +150 mV
65	ExG65	Unipolar input 65	0.01839 µV	-150 mV to +150 mV
66	ExG66	Unipolar input 66	0.01839 µV	-150 mV to +150 mV
67	ExG67	Unipolar input 67	0.01839 µV	-150 mV to +150 mV
68	ExG68	Unipolar input 68	0.01839 µV	-150 mV to +150 mV
69	ExG69	Unipolar input 69	0.01839 µV	-150 mV to +150 mV
70	ExG70	Unipolar input 70	0.01839 µV	-150 mV to +150 mV
71	ExG71	Unipolar input 71	0.01839 µV	-150 mV to +150 mV
72	ExG72	Unipolar input 72	0.01839 µV	-150 mV to +150 mV
73	ExG73	Unipolar input 73	0.01839 µV	-150 mV to +150 mV
74	ExG74	Unipolar input 74	0.01839 µV	-150 mV to +150 mV
75	ExG75	Unipolar input 75	0.01839 µV	-150 mV to +150 mV
76	ExG76	Unipolar input 76	0.01839 µV	-150 mV to +150 mV
77	ExG77	Unipolar input 77	0.01839 µV	-150 mV to +150 mV
78	ExG78	Unipolar input 78	0.01839 µV	-150 mV to +150 mV
79	ExG79	Unipolar input 79	0.01839 µV	-150 mV to +150 mV
80	ExG80	Unipolar input 80	0.01839 µV	-150 mV to +150 mV
81	ExG81	Unipolar input 81	0.01839 µV	-150 mV to +150 mV
82	ExG82	Unipolar input 82	0.01839 µV	-150 mV to +150 mV
83	ExG83	Unipolar input 83	0.01839 µV	-150 mV to +150 mV
84	ExG84	Unipolar input 84	0.01839 µV	-150 mV to +150 mV
85	ExG85	Unipolar input 85	0.01839 µV	-150 mV to +150 mV
86	ExG86	Unipolar input 86	0.01839 µV	-150 mV to +150 mV
87	ExG87	Unipolar input 87	0.01839 µV	-150 mV to +150 mV
88	ExG88	Unipolar input 88	0.01839 µV	-150 mV to +150 mV
89	ExG89	Unipolar input 89	0.01839 µV	-150 mV to +150 mV
90	ExG90	Unipolar input 90	0.01839 µV	-150 mV to +150 mV
91	ExG91	Unipolar input 91	0.01839 µV	-150 mV to +150 mV
92	ExG92	Unipolar input 92	0.01839 µV	-150 mV to +150 mV
93	ExG93	Unipolar input 93	0.01839 µV	-150 mV to +150 mV
94	ExG94	Unipolar input 94	0.01839 µV	-150 mV to +150 mV
95	ExG95	Unipolar input 95	0.01839 µV	-150 mV to +150 mV
96	ExG96	Unipolar input 96	0.01839 µV	-150 mV to +150 mV
97	ExG97	Unipolar input 97	0.01839 µV	-150 mV to +150 mV
98	ExG98	Unipolar input 98	0.01839 µV	-150 mV to +150 mV
99	ExG99	Unipolar input 99	0.01839 µV	-150 mV to +150 mV
100	ExG100	Unipolar input 100	0.01839 µV	-150 mV to +150 mV
101	ExG101	Unipolar input 101	0.01839 µV	-150 mV to +150 mV
102	ExG102	Unipolar input 102	0.01839 µV	-150 mV to +150 mV
103	ExG103	Unipolar input 103	0.01839 µV	-150 mV to +150 mV
104	ExG104	Unipolar input 104	0.01839 µV	-150 mV to +150 mV
105	ExG105	Unipolar input 105	0.01839 µV	-150 mV to +150 mV
106	ExG106	Unipolar input 106	0.01839 µV	-150 mV to +150 mV
107	ExG107	Unipolar input 107	0.01839 µV	-150 mV to +150 mV

nr	name	Function		resolution	range
108	ExG108	Unipolar input 108		0.01839 µV	-150 mV to +150 mV
109	ExG109	Unipolar input 109		0.01839 µV	-150 mV to +150 mV
110	ExG110	Unipolar input 110		0.01839 µV	-150 mV to +150 mV
111	ExG111	Unipolar input 111		0.01839 µV	-150 mV to +150 mV
112	ExG112	Unipolar input 112		0.01839 µV	-150 mV to +150 mV
113	ExG113	Unipolar input 113		0.01839 µV	-150 mV to +150 mV
114	ExG114	Unipolar input 114		0.01839 µV	-150 mV to +150 mV
115	ExG115	Unipolar input 115		0.01839 µV	-150 mV to +150 mV
116	ExG116	Unipolar input 116		0.01839 µV	-150 mV to +150 mV
117	ExG117	Unipolar input 117		0.01839 µV	-150 mV to +150 mV
118	ExG118	Unipolar input 118		0.01839 µV	-150 mV to +150 mV
119	ExG119	Unipolar input 119		0.01839 µV	-150 mV to +150 mV
120	ExG120	Unipolar input 120		0.01839 µV	-150 mV to +150 mV
121	ExG121	Unipolar input 121		0.01839 µV	-150 mV to +150 mV
122	ExG122	Unipolar input 122		0.01839 µV	-150 mV to +150 mV
123	ExG123	Unipolar input 123		0.01839 µV	-150 mV to +150 mV
124	ExG124	Unipolar input 124		0.01839 µV	-150 mV to +150 mV
125	ExG125	Unipolar input 125		0.01839 µV	-150 mV to +150 mV
126	ExG126	Unipolar input 126		0.01839 µV	-150 mV to +150 mV
127	ExG127	Unipolar input 127		0.01839 µV	-150 mV to +150 mV
128	ExG128	Unipolar input 128		0.01839 µV	-150 mV to +150 mV
129	BIP129	Bipolar input 129		0.01839 µV	-150 mV to +150 mV
130	BIP130	Bipolar input 130		0.01839 µV	-150 mV to +150 mV
131	BIP131	Bipolar input 131		0.01839 µV	-150 mV to +150 mV
132	BIP132	Bipolar input 132		0.01839 µV	-150 mV to +150 mV
133	AUX133	Auxiliary input 133		0.48828 µV	-3 V to +3 V
134	AUX134	Auxiliary input 134		0.48828 µV	-3 V to +3 V
135	AUX135	Auxiliary input 135		0.48828 µV	-3 V to +3 V
136	AUX136	Auxiliary input 136		0.48828 µV	-3 V to +3 V
137	Digi	Digital channel (bits)		1 (bit)	0 to 255
		0	Digital input bit 0		
		1	Digital input bit 1		
		2	Digital input bit 2		
		3	Digital input bit 3		
		4	Digital input bit 4		
		5	Digital input bit 5		
		6	Digital input bit 6		
		7	Digital input bit 7 (MSB)		
		8-15	reserved		
138	Saw	Sawtooth test signal (bits)		1 (bit)	0 to 32767

Digital input DB25 connector

Pin	Input
2	bit 0 (parallel to BNC connector in software)
3	bit 1
4	bit 2
5	bit 3
6	bit 4
7	bit 5
8	bit 6
9	bit 7 (MSB)
25	common ground



Headcap connector

This table describes the relation between signal channel numbers and headcap connector pin numbers.

DB37 pin number	First Connector Channel number	Second Connector Channel number	Third Connector Channel number	Fourth Connector Channel number
1	-	-	-	-
20	1	33	65	97
2	2	34	66	98
21	3	35	67	99
3	4	36	68	100
22	5	37	69	101
4	6	38	70	102
23	7	39	71	103
5	8	40	72	104
24	9	41	73	105
6	10	42	74	106
25	11	43	75	107
7	12	44	76	108
26	13	45	77	109
8	14	46	78	110
27	15	47	79	111
9	16	48	80	112
28	17	49	81	113
10	18	50	82	114
29	19	51	83	115
11	20	52	84	116
30	21	53	85	117
12	22	54	86	118
31	23	55	87	119
13	24	56	88	120
32	25	57	89	121
14	26	58	90	122
33	27	59	91	123
15	28	60	92	124
34	29	61	93	125
16	30	62	94	126
35	31	63	95	127
17	32	64	96	128
36	Pat. GND	Pat. GND	Pat. GND	Pat. GND
18	-	-	-	-
37	-	-	-	-
19	-	-	-	-