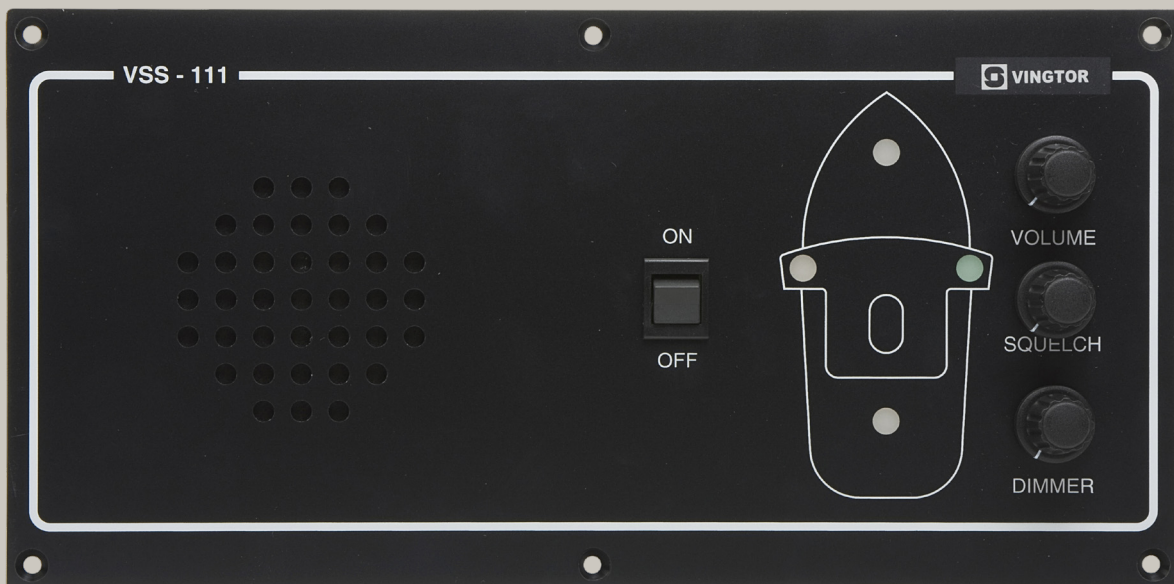


VSS Sound Reception System



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1. Introduction

About this document

This document is intended to give relevant information on the system features, available equipment, typical configurations, simplified wiring and technical data for the concept.

Publication Log

Title:	Sound Reception System VSS Installation & Service Manual
Doc.no.	VSS_is
Author this revision	Svend Egil Nilsen
Verified By:	Jan Thorsen

Revision	Issued	Changes / Comments
V.1.1	1998.	First release, Vingtor Marine Author Bjørn Holmer
01	2001.03.16	Second release, Stento Marine ID. From now on revision status 01,02....
02	2002.07.01	Third release, Zenitel Marine ID Additional part; Introduction. Doc. for new function; squelch.
03	2003.06.19	4 th . release, with supplementary EMC and environmental-testing by DNV. New rev. for circuit diagram and partlist From now on; VINGTOR brand.
03	2006.03.24	Simple change without new rev.no. Incorrect measurement on fastening bracket for microphone VSS-222. New rev. of datasheet VSS-222_ds rev.04 and drawing VSS-222_md rev.03
A100K10874	2010.08.27	New front and back pages. Doc.no. VSS_is rev.03 is replaced by this document no.
A100K10874	2011.02.01	Updating of IP rating

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Zenitel Norway AS, February 2011

2. General Description

The VSS system enable the navigator on a one man operated bridge to listen to the environmental sound signals from other ships or fog horns that are audible outside the ship when standing inside the enclosed bridge space.

The system is monitoring, according to rules; Resolution MSC.86(70), frequencies between 70 and 820 Hz.

Four (4) VSS-222 weatherproof microphones are mounted outside the wheelhouse and connected to the VSS-111 audio amplifier and loudspeaker within the bridge.

The VSS system has «remote muting» of the amplifier circuit when the vessel’s own tyfon is activated.

The VSS system has squelch function. Adjustable muting of undesirable sound sources.

Microphone Direction Detector (MDD)

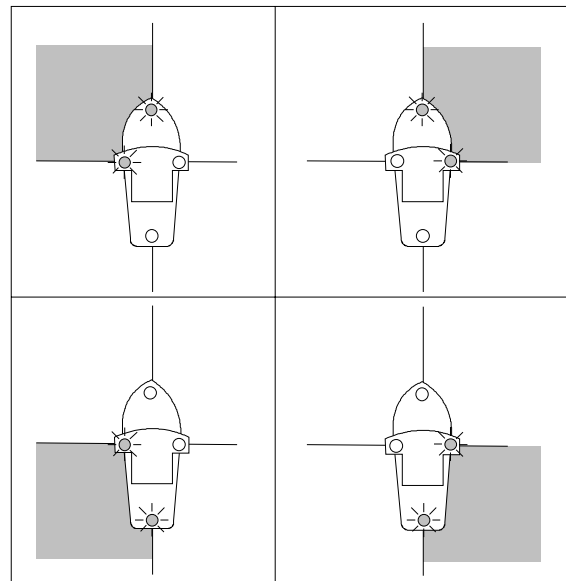
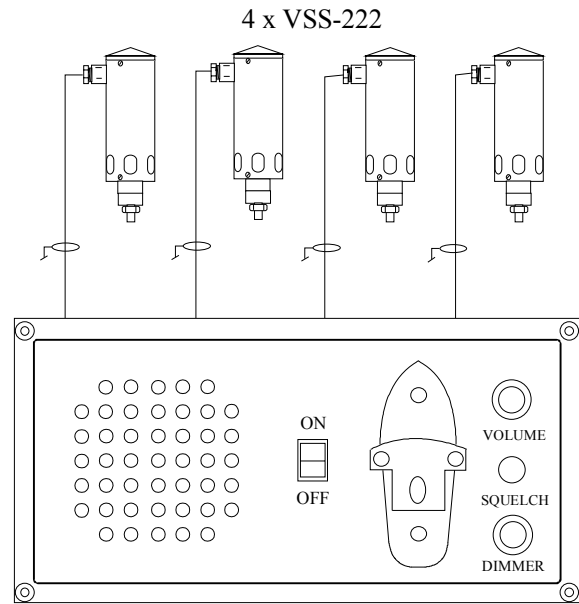
By use of four microphones the MDD will detect the direction of the incoming signal and activate the corresponding LEDs at the VSS-111 front panel

The four microphones operate in pair depending of the direction of the received sound signal.

The microphone first detecting the sound will be registrated in MDD and it will lock against influence from the other microphone. This will repeat each time a signal is strong enough to trig the detector.

The «bridgewing» pair of microphone will indicate if the sound is coming from the Sb or Ps direction, while the other pair tell if the sound signal is coming from «Fore» or «Aft».

The combination of above will indicate the actual sector (see illustration above)



The VSS «Sound Signal Reception System» has been EMC tested according to relevant CENELEC and IEC standards and type tested in order to qualify for Type Approval by Det Norske Veritas / Bureau Veritas / RINA

- Det Norske Veritas (DNV), Certification Notes no. 2.4.; «Environment test specification for Instrumentation and Automation Equipment» Optional EMC requirements:
- Det Norske Veritas (DNV) Supplementary EMC and Environmental Testing. Technical Report No.2003-3124 Revision No.01
- IEC 60945, Fourth edition, 2002-08
- EN50081-1 / EN50082-2 (CENELEC, Harmonized standards)

3. Installation

3.1 Main Unit VSS-111

For physical dimensions, recommended panel cut-out, size of mounting holes etc. please see mechanical drawing VSS-111_dd.

According to rules the system loudspeaker(s) should be installed so that incoming signals are audible at all positions inside the bridge.

The reproduction of the sound signal inside the bridge is normally done by use of the VSS-111 built-in loudspeaker (8 ohm).

If more than one loudspeaker required the built-in one can be disconnected (P2) and replacement loudspeakers can be connected. (total impedance = 8 ohm)

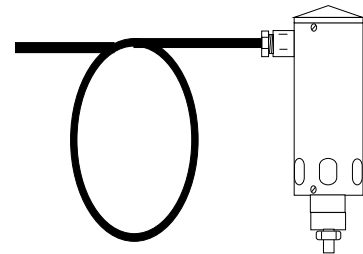
3.2. VSS-222 microphones

The efficiency of the system depends upon the microphone installation. The location of the microphones outside the wheelhouse are critical due to ship speed, wind and vibrations.

Normally the microphones are mounted outside on each side of the bridge bulkhead or top plus if wanted one in the bow and one aft.

Precautions:

- * Mount the microphones leeward due to wind and the ship's speed.
- * Do not mount the microphone too close to regularly opened doors or windows near the operator panel and loudspeaker. This prevent the system to start oscillating due to acoustic feedback
- * When the microphone bracket is fastened on the bulkhead, let the cable do a one-turn service-loop before entering the micro-telephone housing. The loop will ensure that the effect of the vibrations shock absorber is not impaired. This is necessary to reduce ship-born vibrations reaching the sensitive microphone elements.



NOTE!

The cable screen is connected to the microphone housing.

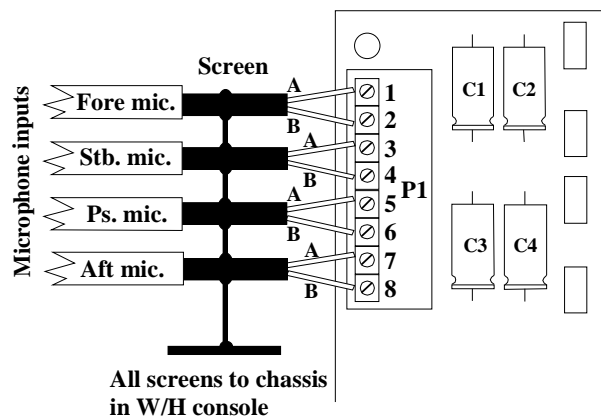
In the operators panel (VSS-111) the cable screens must all be proper terminated to the chassis in the W/H console.

Above is important to avoid noise problems

The panel should of course be suitable placed near the person operating it.

On the VSS-111 main PC board

Connect the microphone cables as shown in the figure.



4. Setting & Adjustment

4.1 General

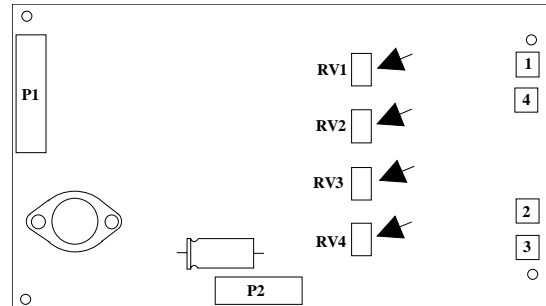
The settings are factory adjusted and set to a level close to the real operation conditions as possible. But in order to optimise the performance of the system, may be the installation must be adjusted on site.

4.2 Microphone adjustment

To prevent that the LEDs are activated by normal background noise, the microphone input sensitivity can be adjusted.

The threshold level for the received sound signals, the amplifier input sensitivity, is individually adjusted by the four screwdriver potentiometers; RV1, RV2, RV3 and RV4.

This level adjustments are necessary to limit the background noise triggering of the LED circuitry.



VSS-111 main PC board

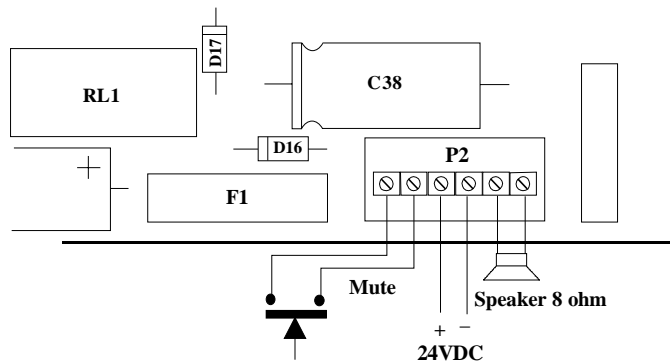
1. Power up the system. The surrounding noise level should be as close to the real operating conditions as possible.
2. Adjust each of the four channel's potentiometer anti clockwise until the corresponding LED light up and clockwise until it turns off and then carefully anti clockwise until light up again.
3. NB! Avoid adjustments during unnatural noise situations. If necessary turn up the volume control on front and listen to separate the sounds.

4.3 Remote Muting when using own typhoon

VSS-111 is prepared for «remote muting» of the amplifier circuit when the vessel's own typhoon is activated.

The function is obtained by activating relay RL1. The relay is activated when the typhoon is activated.

Connect a potential free closing contact to the P2 terminals 1 and 2, marked "Mute" as shown in the figure. The closing contact to be in parallel with the operating of the vessels own typhoon.



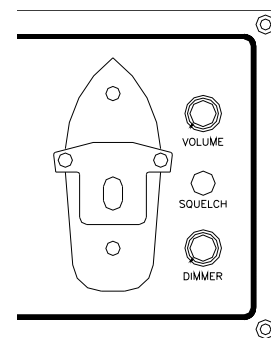
4.4 Adjustment and setting of Squelch function

Note! The squelch function is independent of the LED settings.

The surrounding noise level is different and to avoid the system to be activated by undesirable sound sources as from other technical equipment and from arbitrary activity as waves and birds, the squelch setting may be adjusted on site.

The sensitivity is factory adjusted and set to approx.3mV input signal. (Middle position for the squelch potentiometer)

To change this level you will need a sound source near as the undesirable sound sources as possible. A radio can be used. Place the source min.1mtr. from one of the microphones.



1. Remove cover for access to the potentiometer marked squelch. Use a screwdriver.
2. In case of higher noise threshold level than factory adjusted.
Turn potentiometer clockwise until the undesirable sound source not activates the system.
3. Increase the signal from the sound source with approx.3 dB.(To simulate the real sound source) and check if the system activates. If yes the setting is successful, replace the pot. cover.
4. In case of lower noise threshold level than factory adjusted.
Turn anticlockwise until the undesirable sound source not activates the system.
5. Increase the signal from the sound source with approx.3dB.(To simulate the real sound source) and check if the system activates. If yes the setting is successful, replace the pot. cover.

5. Operation of the system

Activate the system by the VSS-111 power ON/OFF switch.

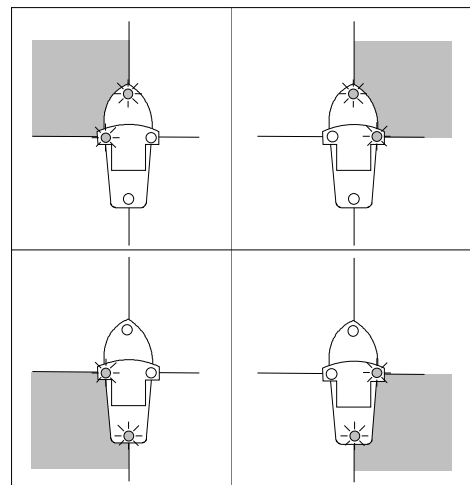
Adjust the listening level of the received sound by the VOLUME control. The sound pressure level shall at least be 10 dB(A) above the bridge noise level.

The reproduction of the sound signal inside the bridge

(Note. When windows and doors are left open, howling may result. The volume must then be turned down until the howling stops).

Adjust the LED`s intensity level by use of the DIMMER control

Sound signals outside the bridge will be heard in the loudspeaker and the approximate direction or sector for the incoming sound signal will be indicated by two of the front LED`s as illustrated below:

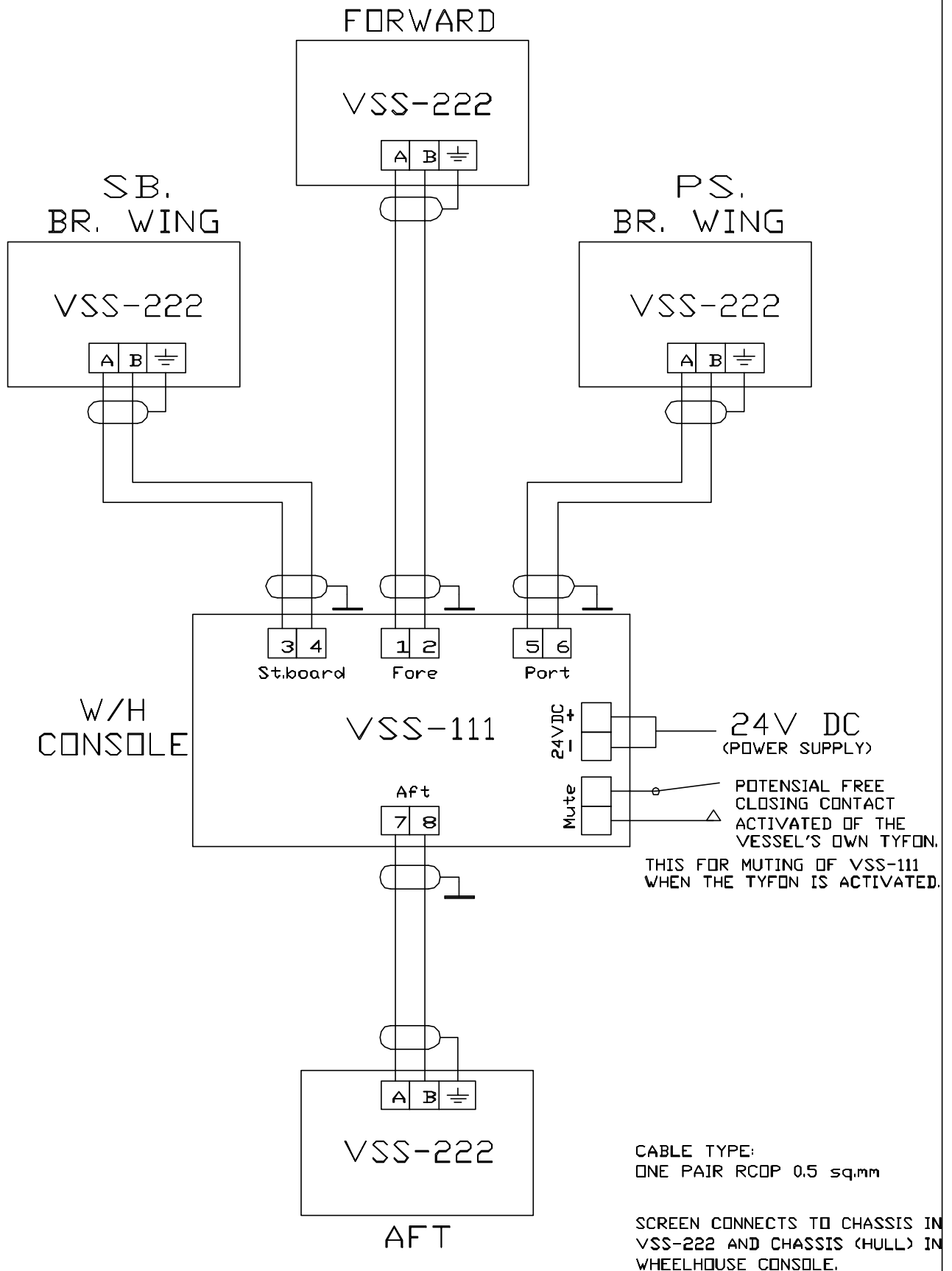


6. Specifications

Order no: VSS-111	Order no: VSS-222
<p><u>Main Unit</u></p> <p>Power: 24 VDC</p> <p>Freq.range: 70 - 820 Hz</p> <p>S/N ratio: > 60 dB</p> <p>THD-N: > 1 %</p> <p>Connection: Screw terminals</p> <p>Coulor/finish: Black</p> <p>Material: Anodized Al.</p> <p>IP: 44</p> <p>Dimensions (mm): 280 x 140 x 90 260 x 122 panel cut-out</p> <p>Weight: 1.0 kg</p>	<p><u>Microphone</u></p> <p>Element: RE50 ElectroVoice.</p> <p>Type: Dynamic</p> <p>Freq.response: 80 - 13000 Hz</p> <p>Polar pattern: Omnidirectional</p> <p>Impedance: 150 ohms</p> <p>Coulor/finish: Grey</p> <p>Material: Anodized Al.</p> <p>IP: 56</p> <p>Mounting: Bracket (stainless steel)</p> <p>Termination: Cable 1.5m</p> <p>Dimensions (mm): 110 x Ø40 150 x Ø40 w/bracket</p> <p>Weight: 1.0 kg</p>

7. Datasheet, Electrical & Mechanical drawings

Cable diagram	Doc.no.GVSS CD1294B rev.04
Datasheet.....	VSS-111A100K10520
Dimension, mounting details.....	VSS-111Doc.no.VSS-111_dd Rev.05
Datasheet.....	VSS-222A100K10521
Bracket for mounting VSS-222.....	Art.no.VM-1564 Doc.no.VSS-222_md rev.03
Circuit diagram Audio amplifier circuit.....	VSS-111Doc.no.VSS-111_cd part 1 rev.04
Circuit diagram Sound reception detector.....	VSS-111Doc.no.VSS-111_cd part 2 rev.03
Component location	VSS-111 Doc.no.VSS-111_lo rev.02
Circuit diagram & Component lay out.....	Squelch circuit.....Doc.no.VSS-squelch_cd_lo rev.00
Part list	Squelch circuit..... Doc.no.VSS-squelch_pl rev.00
Partlist, complete.....	VSS-111Doc.no.VSS-111_part list rev.02
Sparepart kit.....	VSS.....Doc.no.VSS-sparepart kit rev.00



DATE: 15.08.97	PREPARED BY: T.J.	APPROVED BY: J.T.	SCALE:	
CABLE DIAGRAM FOR SOUND SIGNAL RECEPTION SYSTEM VSS-SYSTEM				DOC.NO: GVSS CD1294B
				REV.NO: 04

VSS-111

MAIN STATION



when communication is **critical**

FEATURES

- Sound Reception system main unit
- Built-in system amplifier
- Inputs for four (4) VSS-222 microphones
- Built-in loudspeaker with manual volume control
- LED dimmer control
- Remote muting of the amplifier circuitry when the vessel's own typhone is activated
- Squelch function

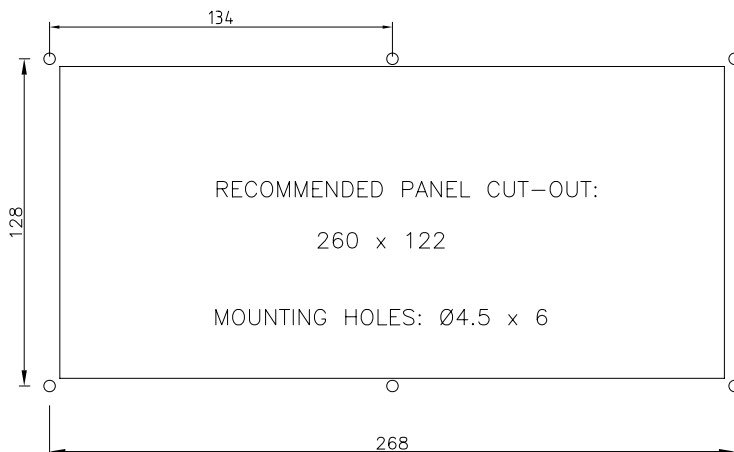
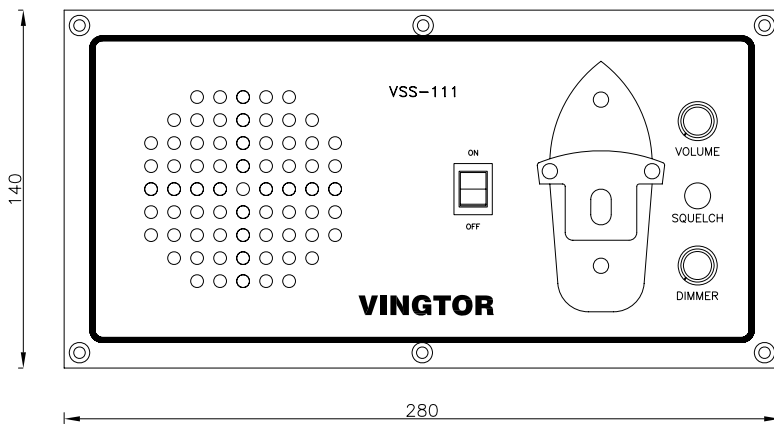
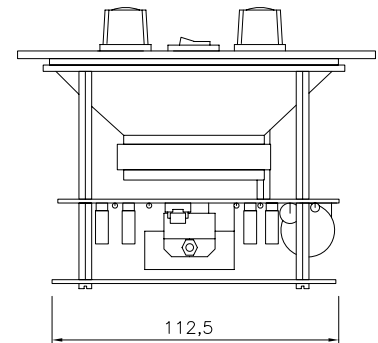
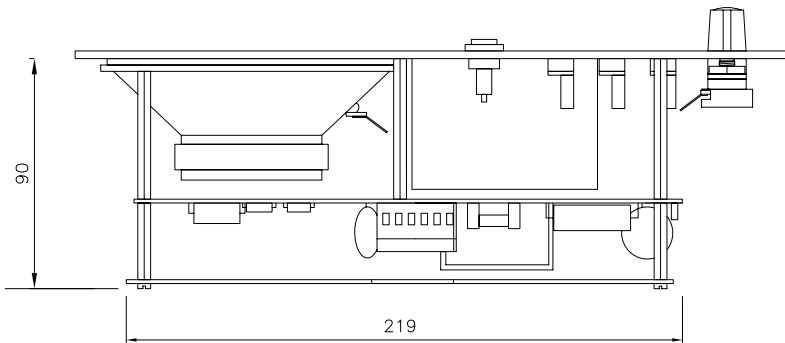


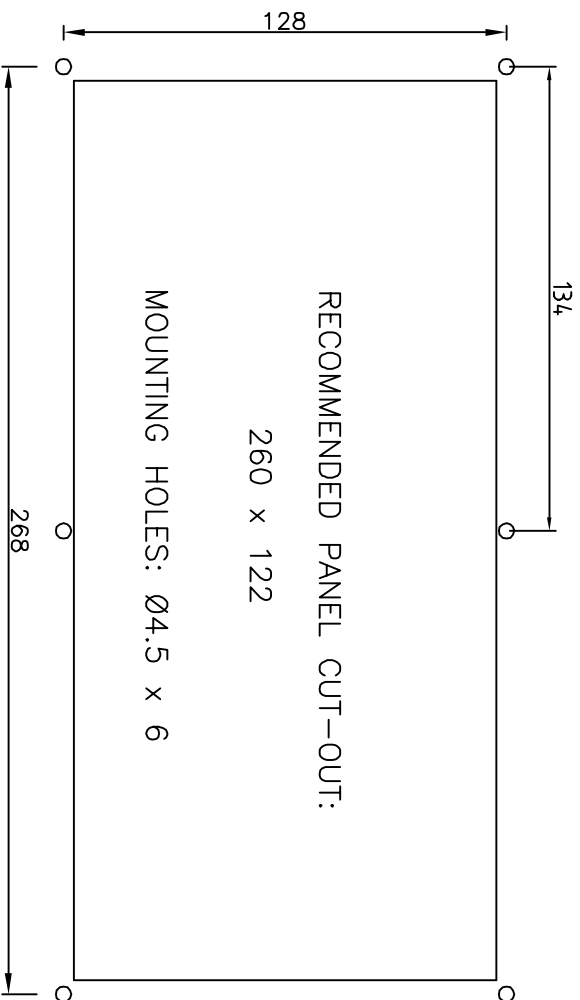
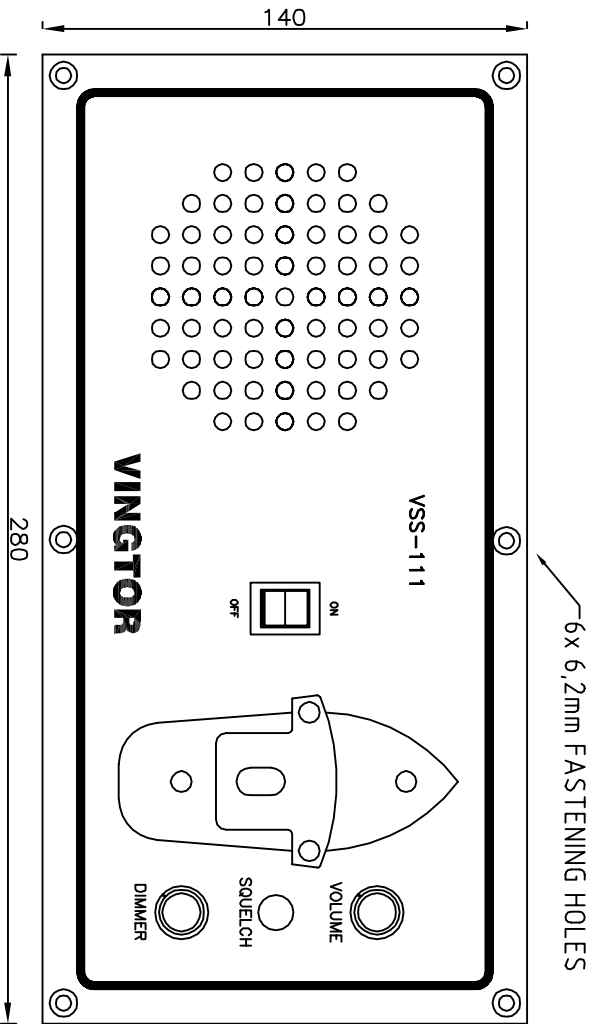
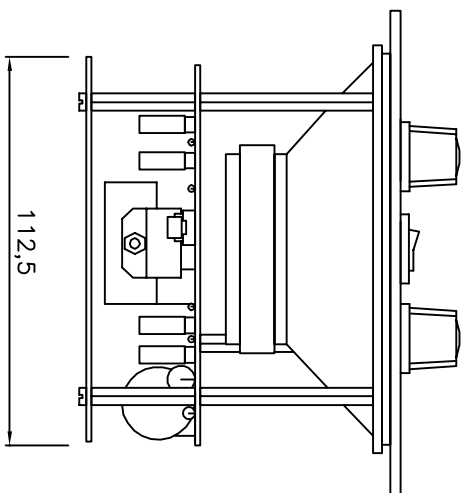
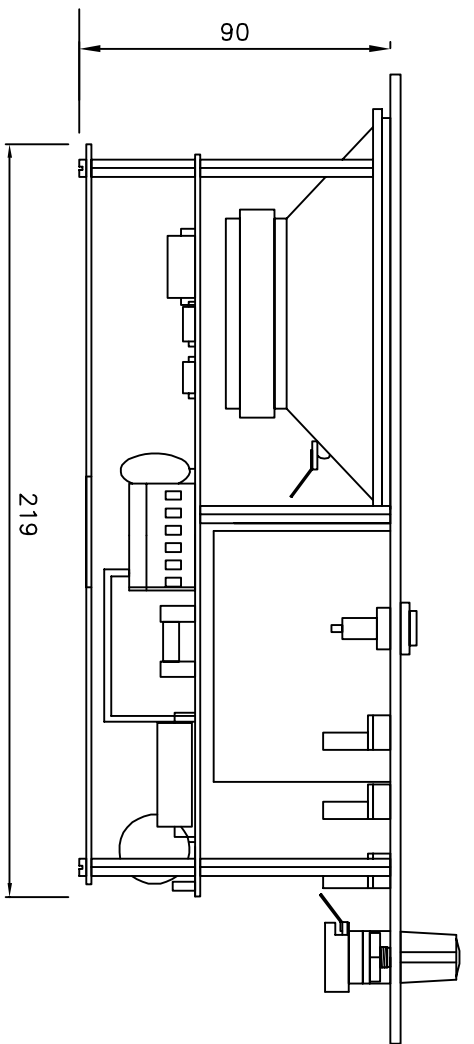
SPECIFICATIONS


Dimensions (WxHxD)	280 x 140 x 90 mm
Mounting	Flush with six 4mm screws
Weight	Approx 1.0 kg
Housing	Anodized aluminium
Colour	Black
IP-rating	IP-41
Cable entry	Without glands
Connections	Screw terminals
Operation voltage	24 VDC
Frequency range	70 - 820 Hz
S/N ratio	> 60dB
THD-N	> 1%

ORDER NUMBER	DESCRIPTION	SHIP WEIGHT
3006216001	VSS-111 Main station for 4 microphones	0.4 kg
Related Items		
3006216003	VSS-222 Microphone station waterproof	0.9 kg

VSS-111 MAIN STATION





 Zenitel Marine Norway		SOUND SIGNAL RECEPTION SYSTEM Type VSS Main unit VSS-111 Dimension / Mounting details	
Prepared by	Date	Project no.	Revision by
Trym Jarneid	1997.09.03		S.E.Nilsen
Approved by	Date	Sheet	Rev.date
	1/1		2003.04.07
Dwg.no. / File		Rev. no.	
VSS-111_dd		05	

VSS-222

MICROPHONE STATION WATERPROOF



when communication is **critical**

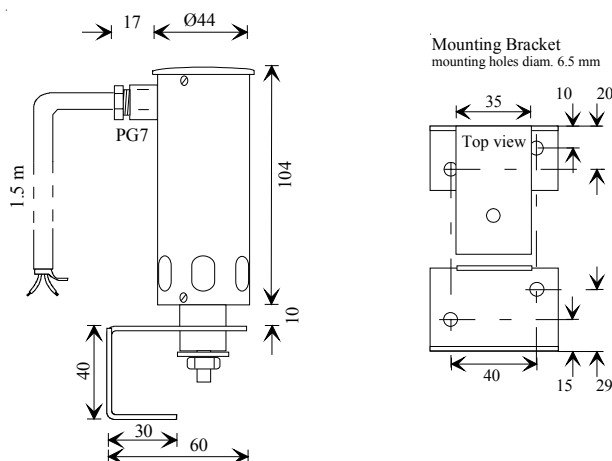
FEATURES

- Waterproof microphone for bulkhead mounting outside the wheelhouse and connected to one of four corresponding inputs in amplifier unit VSS-111

SPECIFICATIONS



Dimensions (WxHxD)	See drawing
Mounting	Bracket (stainless steel)
Weight	Approx 0.9 kg
Housing	Anodized aluminium
Colour	Grey
IP-rating	IP-56
Cable entry	Gland PG-7
Connections	Cable 1.5m
Operation voltage	24 VDC
Microphone element	RE50 ElectroVoice dynamic
Frequency response	80 - 13000 Hz
Polar pattern	Omnidirectional
Omnidirectional impedance	150 ohms



ORDER NUMBER	DESCRIPTION	SHIP WEIGHT
3006216003	VSS-222 Microphone station waterproof	0.9 kg
Related items		
3006216001	VSS-111 Main station for 4 microphones	0.4 kg

ORDER NUMBER

3006216003

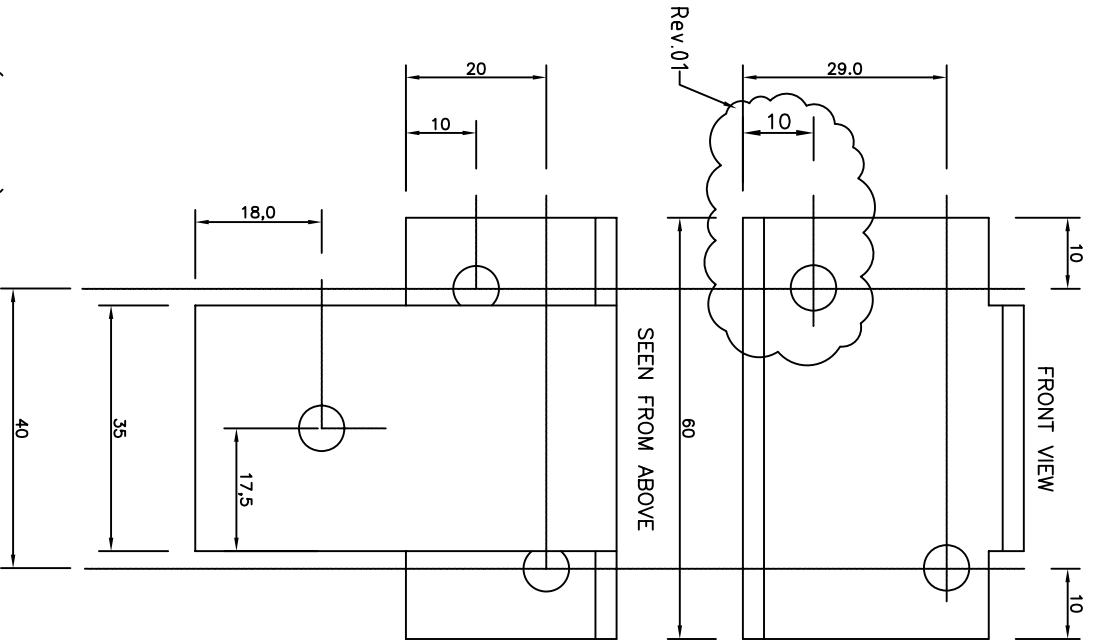
DOC NO

A100K10521

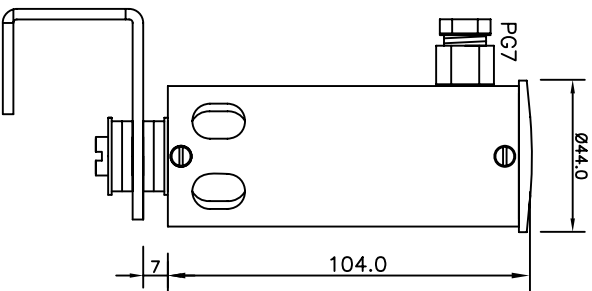
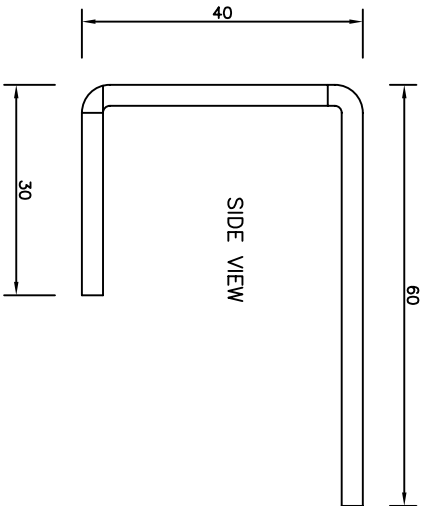
02.02.2011

www.vingtor.com - sales@vingtor.com





HOLES:
 Ø6.5 mm (5 pcs.)
 Stainless steel 2mm

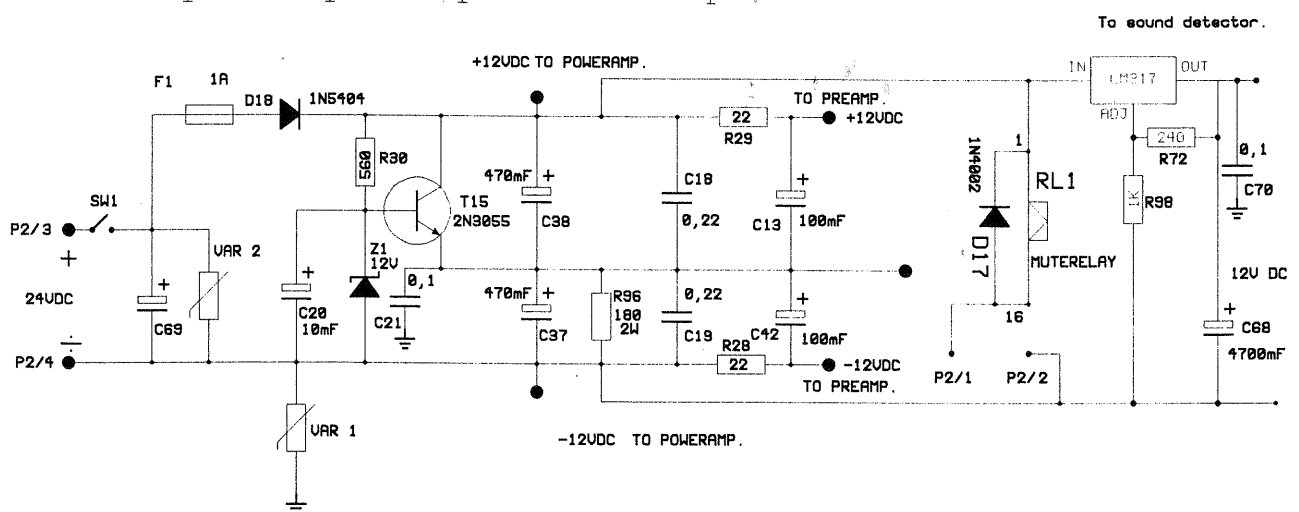
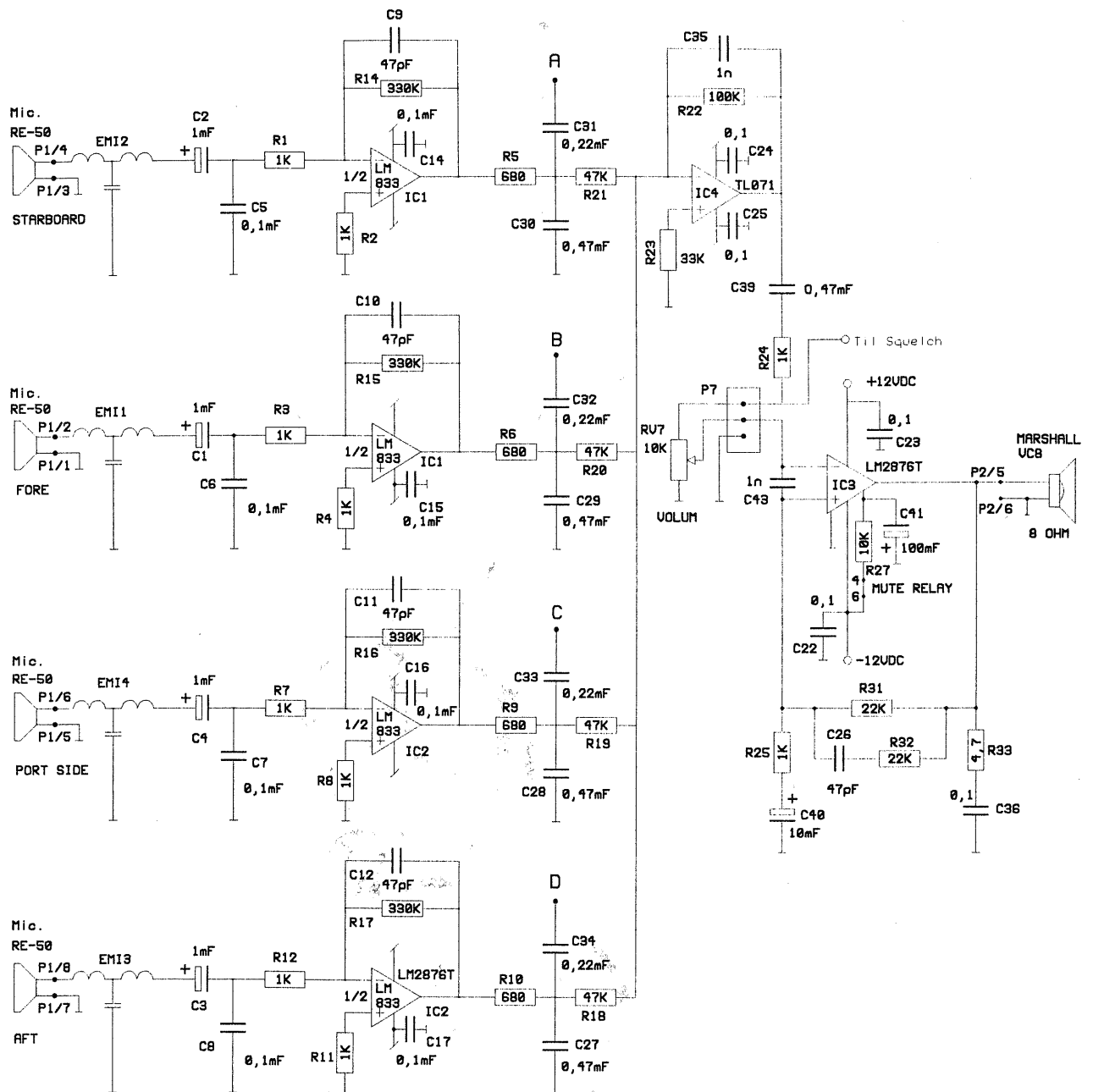


Rev.01 Distance changed from 15 to 10mm

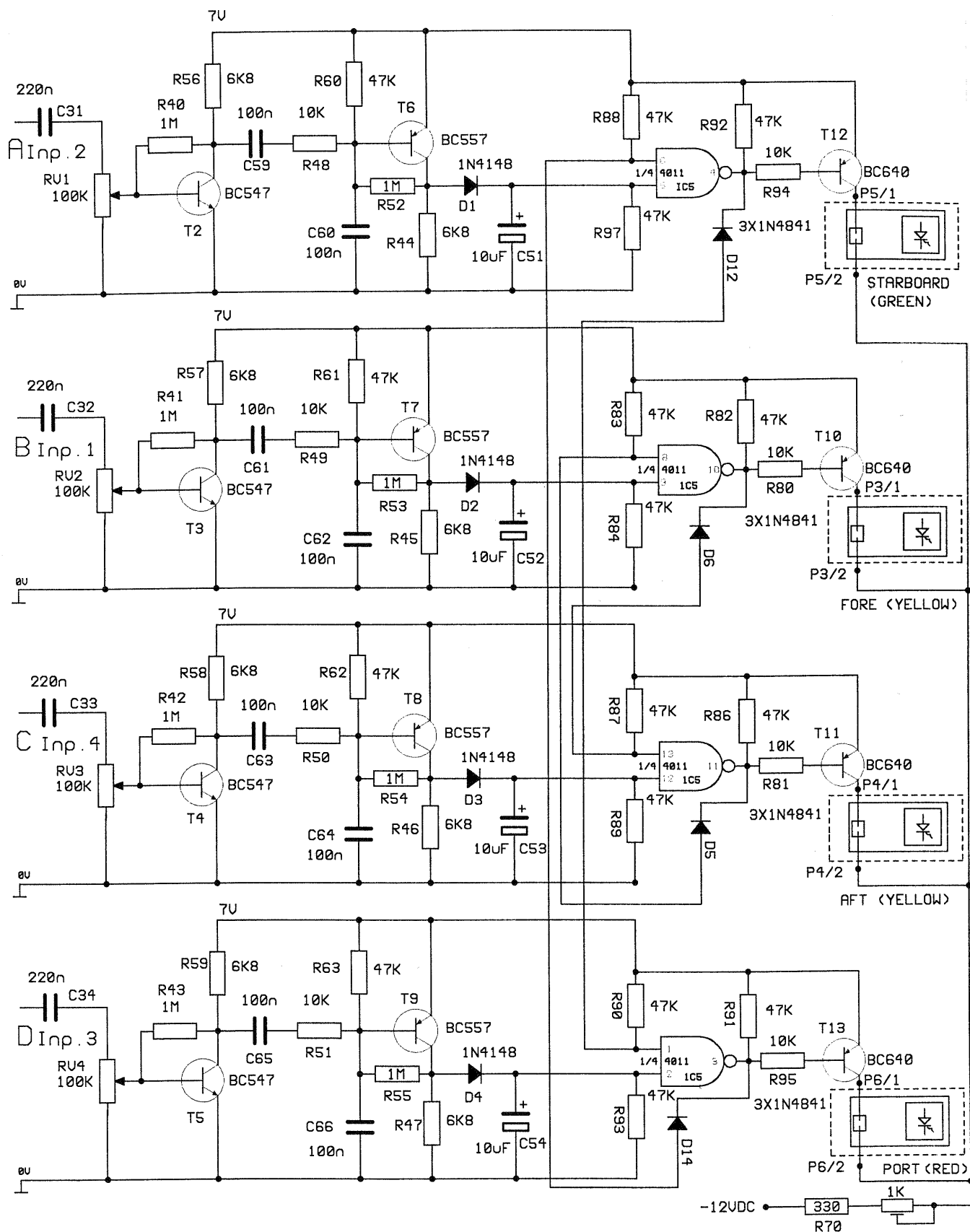


SOUND SIGNAL RECEPTION SYSTEM
 Type VSS
 Bracket for mounting
 VSS-222
 Art.no. VM-1564

Prepared by T.J.	Date 1998.09.14	Project no.	Revision by Sen
Approved by	Date	Sheet 1/1	Rev.date 2006.03.24
Dwg.no. / File VSS-222_md		Rev.no. 03	



Connections marked A, B, C, D to VSS-111 part 2 Sound Direction Detector



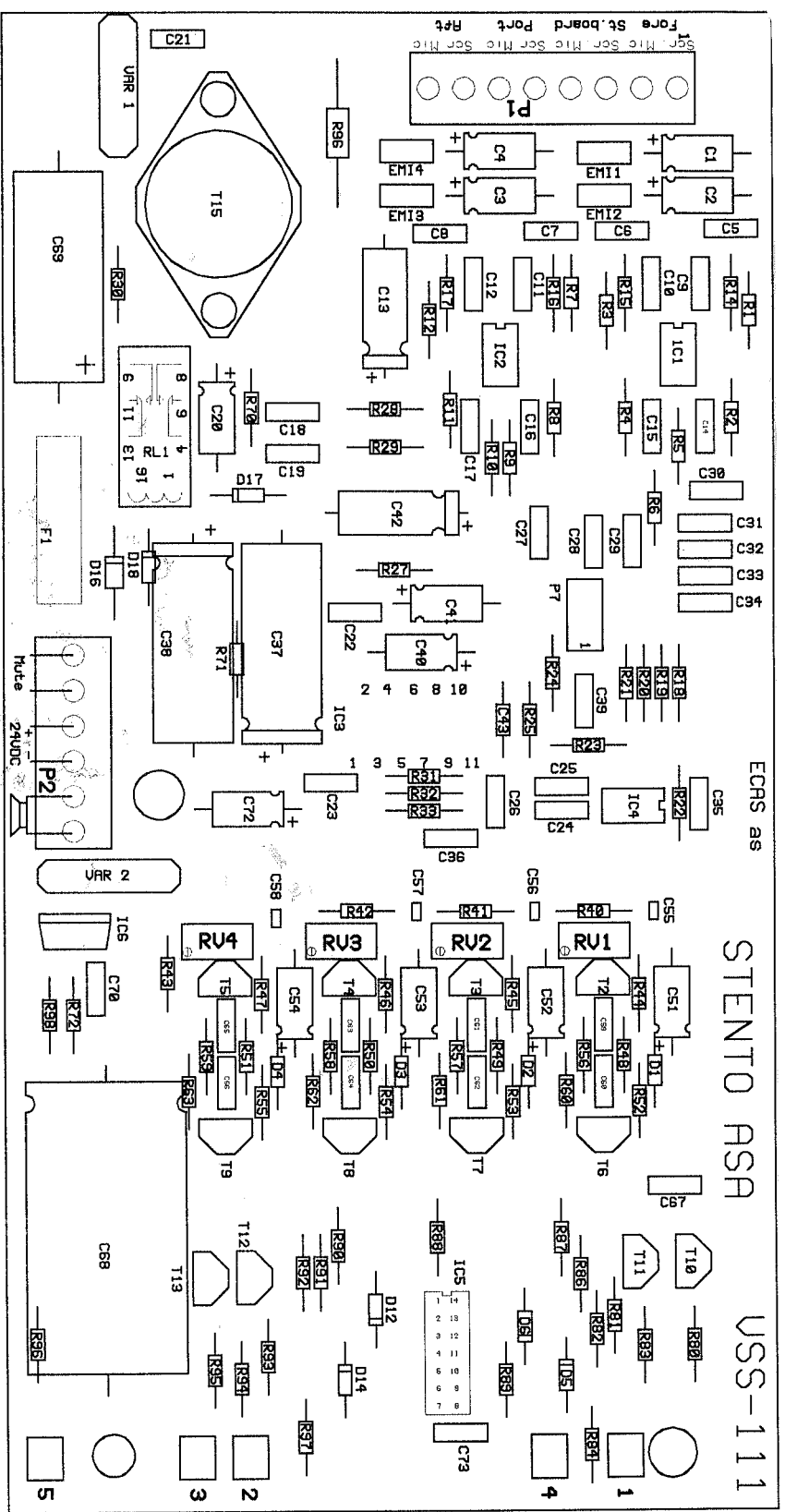
Connections marked A, B, C, D to VSS-111 part 1 Audio Amplifier Circuit



SOUND RECEPTION SYSTEM VSS
Main unit VSS-111
PCB VSS-111 part 2
Sound direction detector

Prepared by T.J.	Date 1997.09.01	Project no:	Revision by Sen
Approved by J.T.	Date 1997.09.01	Sheet 1/1	Rev.date 2003.06.18
Dwg.no. / File VSS-111_cd part 2			Rev. no. 03

Fore Mic.
 Starboard Mic.
 Port Mic.
 Aft Mic.



Speaker 8 ohm
 RU1 STARBOARD GREEN LED
 RU2 FORE YELLOW LED
 RU3 AFT YELLOW LED
 RU4 PORT RED LED

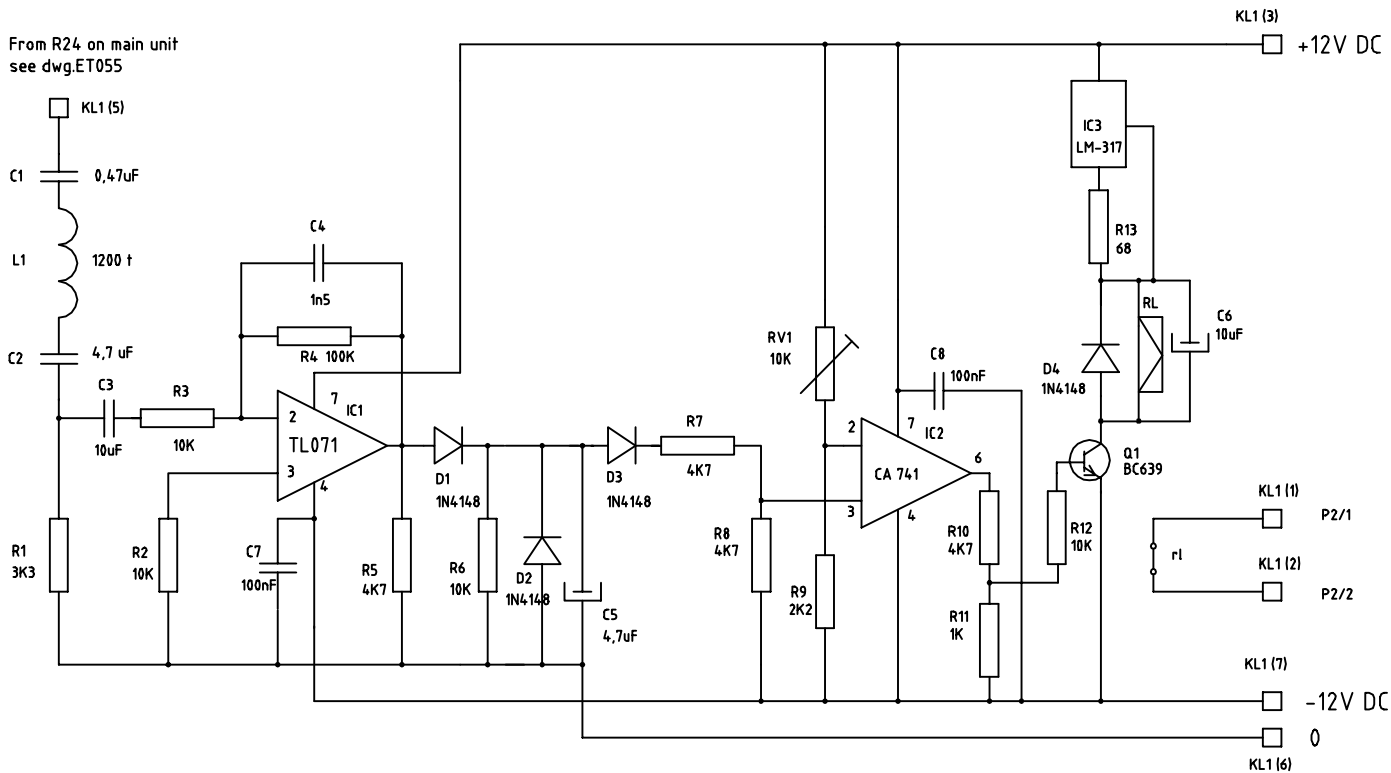
AFT
 (YELLOW LED)
 FORE
 (YELLOW LED)
 STARBOARD
 (GREEN LED)
 PORT
 (RED LED)



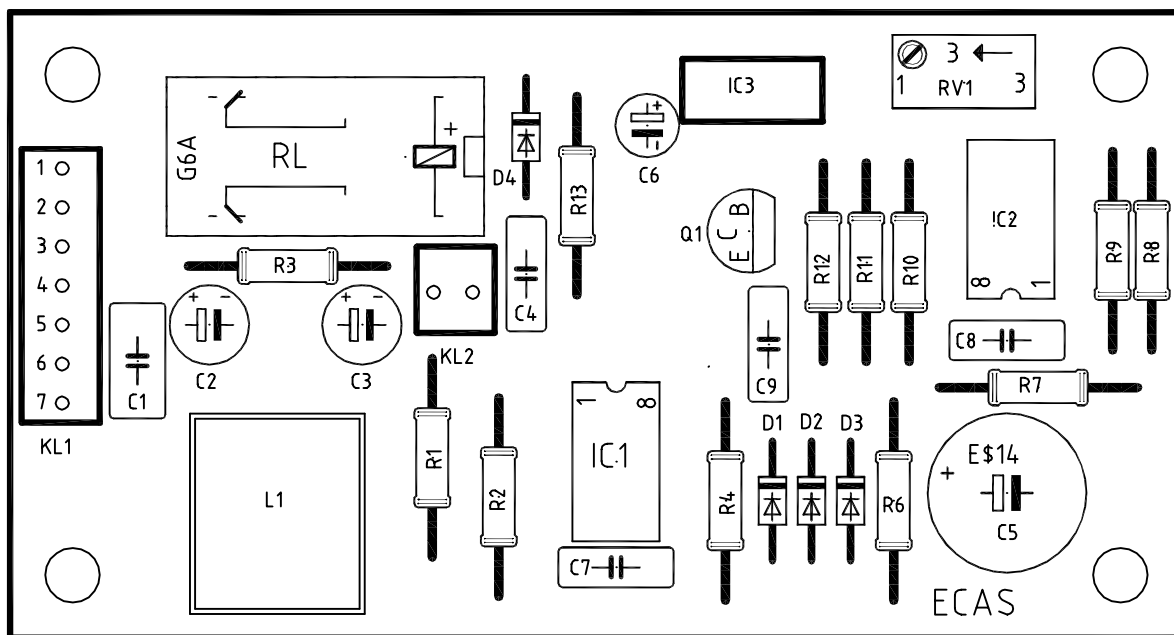
SOUND RECEPTION SYSTEM VSS
 Main unit VSS-111
 Component location
 PCB mark VSS-111

Prepared by	Date	Project no:	Revision by
T.J.	1997.06.25		Sen
Approved by	Date	Sheet	Rev.date
J.T.	1997.06.25	1/1	2003.06.18
Dwg.no./File			Rev. no.
VSS-111_10			02


From R24 on main unit
see dwg.ET055



Connection from KL1 (1,2,3,4,6,7)
to regulator see dwg.ET055



Complete circuit consist of:
Main circuit dwg.ET055 rev.03
Sound direction detector dwg. ET056 Rev02
Squelsh function, this dwg.

 Zenitel Marine Norway	SOUND RECEPTION SYSTEM VSS PCB for squelsh function VSS-111 Type ECAS 2002.11985-344 Circuit diagram / Component lay out	Prepared by S.E.Nilsen	Date 2002.07.01	Project no:	Revision by
		Approved by Jan Thorsen	Date 2002.07.02	Sheet 1/1	Rev.date
		Dwg.no. / File VSS-squelsh_cd_lo			Rev. no. 00

Zenitel Marine	Component List	VSS-111-squelsh
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Order no.	Description	ID	Q,ty
	ECAS EP 2002.11985-344	PCB	1
	3K3 1/4W Resistor	R1	1
	10K 1/4W Resistor	R2,3,6,12	4
	100k 1/4W Resistor	R4	1
	4K7 1/4W Resistor	R5,7,8,10	4
	2K2 1/4W Resistor	R9	1
	1k 1/4W Resistor	R11	1
	68 1/4W Resistor	R13	1
	10K Potensiometer	RV1	1
	0,47uF Capasitor	C1	1
	4,7uF Capasitor	C2,5	2
	10uF Capasitor	C3,6	2
	1n5 Capasitor	C4	1
	100nF Capasitor	C7,8,9	3
	BC 639 Transistor	Q1	1
	TL071 IC	IC1	1
	CA741 IC	IC2	1
	LM-317 Regulator G6A 12V	IC3	1
	G6A 12V Relay	RL	1

Doc.no: VSS-squelsh_pl Rev.no.: 00 Date: 2002.06.20	Page 1 of 1 pages	Prepared by: Sen Approved by:
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Order no.	Description	ID	Q'ty
02A1001	1k0 1/4W Resistor	R1,2,3,4,7,8,11,12,24,25,98	11
02A1002	10k 1/4W Resistor	R27,48-51	5
02A1003	100k 1/4W Resistor	R22	1
02A1004	1M0 1/4W Resistor	R40-43,52-55	8
02A2202	22k 1/4W Resistor	R31-32	2
02A2209	22R 1/4W Resistor	R28-29	2
02A3302	33k 1/4W Resistor	R23	1
02A3303	330k 1/4W Resistor	R14-17	4
02A4702	47k 1/4W Resistor	R18-21,60-63,80-84,86-95,97	28
02A4708	4R7 1/4W Resistor	R33	1
02A5600	560R 1/4W Resistor	R30	1
02A6801	6k8 1/4W Resistor	R44-47,56-59	8
02A6809	68R 1/4W Resistor	R5,6,9,10	4
02F1800	180R 2W Resistor	R96	1
	240R 1/4W Resistor	R72	1
06C1003	100k Var.resistor 3296W-1-104	RV1-4	4
08A0914	1N 4148 Diode	D1-15	15
08A4004	1N 4002 Diode	D17	1
08A0504	MR 504 Diode	D16	1
10A5242	BZX79C 12V Zener	Z1	1
12D4011	IC 14011 CMOS	IC5	1
12E0071	IC TL 071 Op.amp.	IC4	1
12E0833	IC LM 833 Op.amp.	IC1,2	2
12E2876	IC LM 2876T Power amp.	IC3	1
	IC LM317 Regulator	IC6.	1
16A1003	100n/63V Condensator MKT1826	C5-8,14-17,21-25,59-66, 70	22
16A2203	220n/63V Condensator MKT1826	C18,19,31-34,39	7
16A4703	470n/63V Condensator MKT1826	C27-30,39,67	6
16D047H	47pF Condensator Ceramic	C55-58	4
16D1004	1n Condensator Ceramic	C35	1
18A102Z	1n0/63V Condensator MKT1813	C43	1
18A113N	100n/250V Condensator MKT1813	C36	1
18A470Z	47pF Condensator Styroflex	C9-12,26	5
18E105D	1uF/63V Condensator Elytt EL	C1-4	4
18E106F	10uF/40V Condensator Elytt EB	C20,40,51-54,	6
18E107D	100uF/25V Condensator Elytt EB	C41	1
18E107H	100uF/63V Condensator Elytt EB	C13,42,68	3
18E108F	1000uF/40V Condensator Elytt EB	C69	1
18E477E	470uF/40V Condensator Elytt EB	C37,38	2
22A0547	BC 547B Transistor	T2-5	4
22A0556	BC 556C Transistor	T9-6	4
22A0640	BC 640 Transistor	T10-13	4
22C3055	2N 3055 Transistor	T15	1
24A0033	V33ZA70 Varistor	VAR1,2	2
40F0224	RY-24W Relay	RL1	1
46A1000	1A T Fuse 5x20	F1	1
46H5201	PTF/15 Fuse holder		1
48E7012	10k L Potensiometer Piher	RV7	1
48E6008	1k L Potensiometer Piher	RV8	1
52B7101	7101 C&K Switch J51		1
58A0016	LED w/print VSS-111		4
60A0010	NPS 5060 8ohm Loudspeaker		1
64B1032	25.131.0253 Screw Terminals		1
64B1034	25.131.0453 Screw Terminals		3

Zenitel Marine	Component List	VSS-111
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64H1262	640456-2	MTA pin header connector male	8
64H1264	640441-4	MTA pin header connector male	1
64H1912	640441-2	MTA pin header connector female	8
64H1913	640441-3	MTA pin header connector female	1
68B0001		Cable clip , small	10
68B1001	LIMB-10	Sticker, small	2
70A0022	1 x 0,22	TPF wire NB! DM	20
98C0306	DSS-306	Murata filter EMI1-4	4
VM-1559	VSS-111	front plate	1
VM-1560	VSS-111	bracket for potentiometers	1
VM-1561	VSS-111	heatsink	1
VM-1562	VSS-111	back cover	1
VP-1110	VSS-111	PCB	1
VS-1532	VSS-111	Lexan front cover	1
80A308C	M3x8	Screw cyl.	8
80A308S	M3x8	Screw sunk.	3
80A312S	M3x12	Screw sunk.	6
80A316S	M3x16	Screw sunk.	4
80B0030	M3	Nut	12
80C1032	Ø3,2	star lock washer	12
80C2032	Ø3,2	washer	4
80E3008	ENMET 6x8	Spacer M3	3
80E3045	ENMET 6x45	Spacer M3	5
80F3030	ENINT 6x30	Spacer M3	4
	PCB Complete	For squelch function	1

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SPAREPART-KIT	For VSS – system.
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Part No. **VSS111S**

Parts No.	Qty.	Description
10A5242	1	BZX79C 12V ZENER DIODE
12D4011	1	IC 1411 CMOS
12E0071	1	IC TL 071 OP.AMP.
12E0833	1	IC LM 833 OP.AMP.
12E2876	1	IC LM 2876T POWER AMP.
22A0547	1	BC 547B TRANSISTOR
22A0557	1	BC 557B TRANSISTOR
22A0640	1	BC 640 TRANSISTOR
22C3055	1	2N 3055 TRANSISTOR
46A1000	10	1A T FUSE 5x20

Delivered in plastic box

