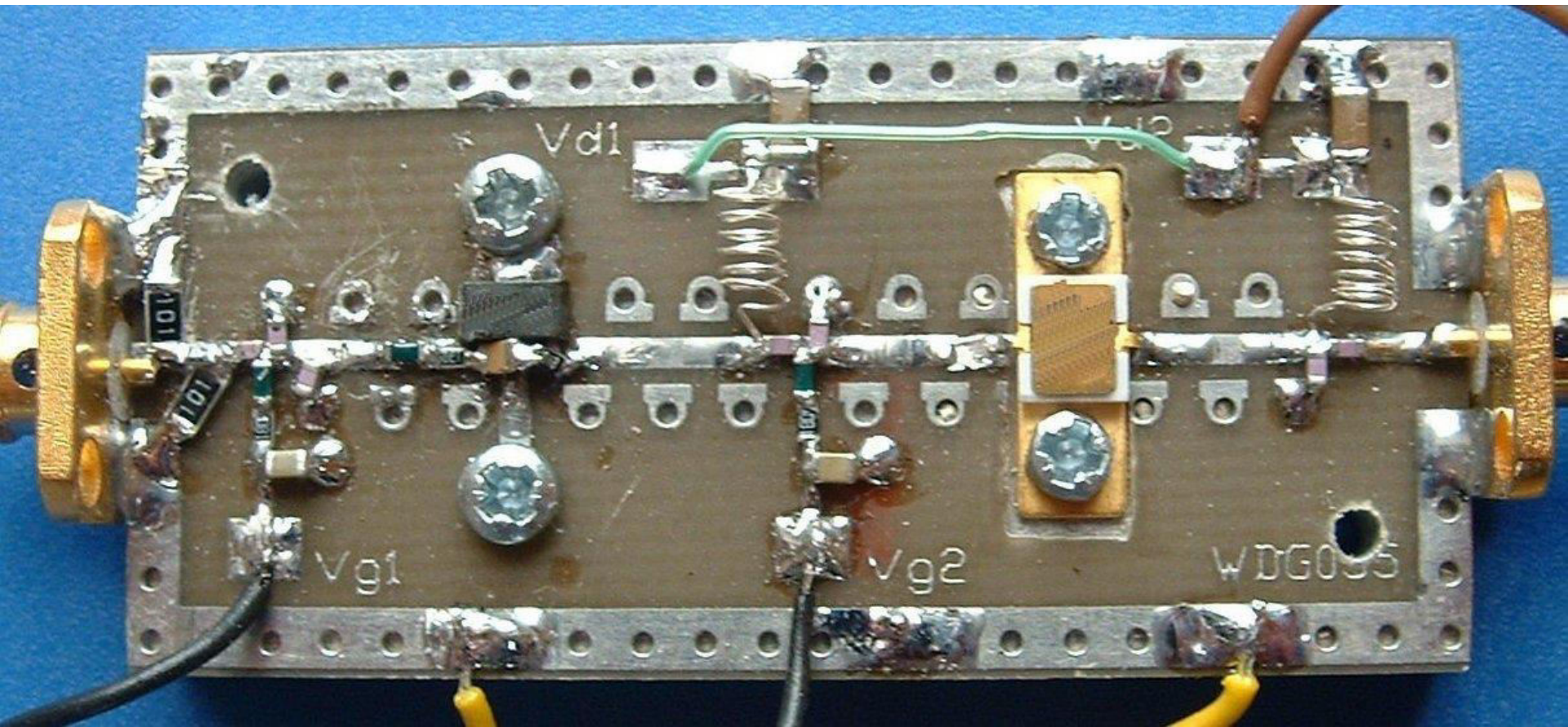


23 cm Repeater for Trondheimsgruppen Håvard, LB9RE



Hvorfor 23 cm repeater?

- Ny teknologi, høyere frekvenser
- Nytt bånd og ny signalutbredelse for mange
- Første 23 cm repeater for FM tale i Norge
- Fleksible tekniske løsninger
- Portabel repeaterteknologi
- Nye utfordringer!
- Mye moro!

1240 - 1300 MHz BANDPLAN

IARU region 1

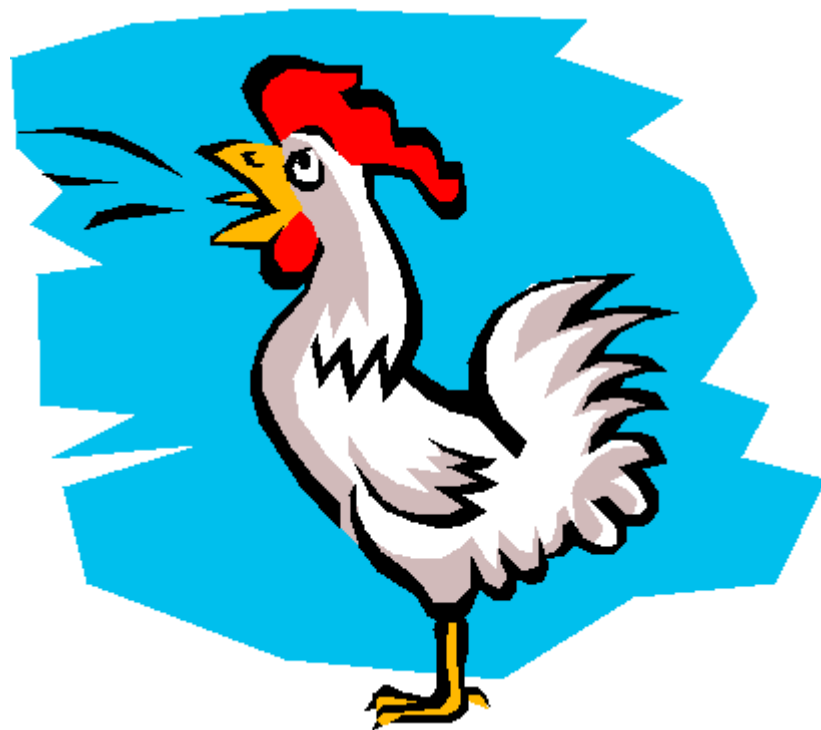
Frekvens (MHz)	Maksimum Båndbredde	MODE	Anbefalt bruk
1240.000	20 kHz	ALL MODES	1240.000-1241.000 Digital kommunikasjon
1243.250	d)	ATV	1258.150-1259.350 Repeatere UT, kanaler R20 – R68
1260.000	12 kHz	SATELLITT / ALL MODES	KUN satellitt
1270.000	20 kHz	ALL MODES	1270.025-1270.700 Repeater input, kanaler RS1 -- RS28 1270.725-1271.250 Packet Radio dupleks, kanaler RS29- RS50
1272.000	d)	ATV	
1290.994	12 kHz	FM REPEATER INN,	RM0 (1291.000) 25 kHz kanalavstand. 6 MHz splitt RM19 (1291.475)
1291.481	d)	ALL MODES	
1291.494	500 Hz	TELEGRAFI, MGM a)	1296.00-1296.025 EME 1296.138 PSK31 aktivitetssenter
1296.000	2700Hz	TELEGRAFI, SSB, MGM.	1296.200 smalband (SSB/telegrafi) aktivitetssenter. 1296.370 MGM random MS (FSK441) 1296.400-1296.600 Lineære transpondere inn. 1296.500 SSTV 1296.600 RTTY 1296.700 FAX 1296.600-1296.800 Lineære transpondere ut.
1296.800	500 Hz	TELEGRAFI MGM	Kun Fyr (b)
1296.994	12 kHz	FM REPEATERE UT	RM0 (1297.000) 25 KHz kanalavstand, 6 MHz splitt RM19 (1297.475)
1297.481	12 kHz	FM SIMPLEX c)	Kanal. SM20 (1297.500) 1297.500 FM OPPKALL
1297.981		25 KHz kanalavstand	Kanal. SM39 (1297.975)
1298.000	20 kHz	ALL MODES	1298.500-1300.000 Digital kommunikasjon

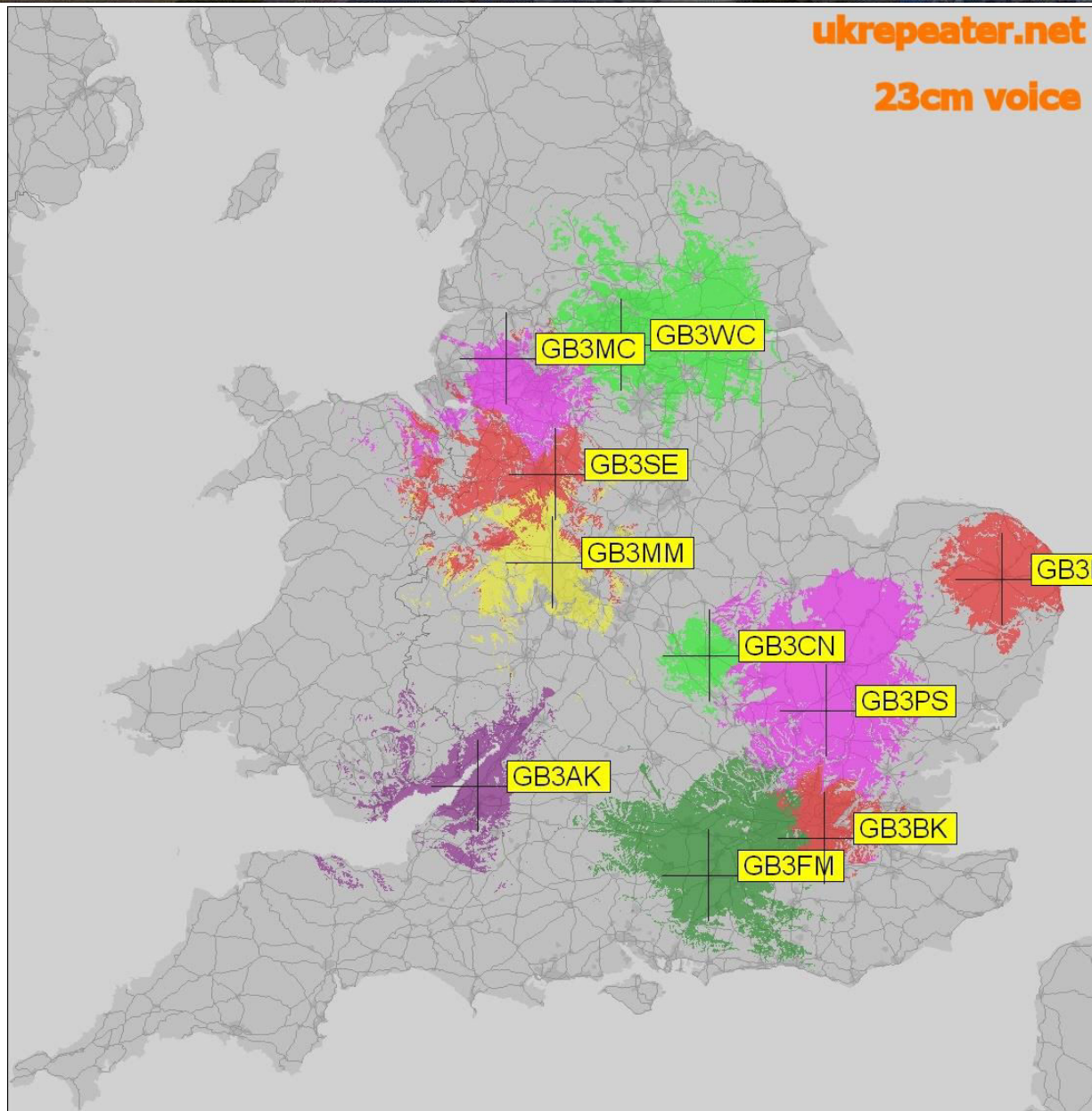
Kanalplan for 23cm reléstasjon lav innfrekvens (RX-B og RX-C)

Kanal	TX Frekvens (MHz)	RX Frekvens (MHz)	RX-B Frekvens (MHz)	RX-C Frekvens (MHz)
→ RM-0	1297.0000	1291.0000	1271.0000	1241.0000
RM-1	1297.0250	1291.0250	1271.0250	1241.0250
RM-2	1297.0500	1291.0500	1271.0500	1241.0500
RM-3	1297.0750	1291.0750	1271.0750	1241.0750
RM-4	1297.1000	1291.1000	1271.1000	1241.1000
RM-5	1297.1250	1291.1250	1271.1250	1241.1250
RM-6	1297.1500	1291.1500	1271.1500	1241.1500
RM-7	1297.1750	1291.1750	1271.1750	1241.1750
RM-8	1297.2000	1291.2000	1271.2000	1241.2000
RM-9	1297.2250	1291.2250	1271.2250	1241.2250
RM-10	1297.2500	1291.2500	1271.2500	1241.2500
RM-11	1297.2750	1291.2750	1271.2750	1241.2750
RM-12	1297.3000	1291.3000	1271.3000	1241.3000
RM-13	1297.3250	1291.3250	1271.3250	1241.3250
RM-14	1297.3500	1291.3500	1271.3500	1241.3500
RM-15	1297.3750	1291.3750	1271.3750	1241.3750
RM-16	1297.4000	1291.4000	1271.4000	1241.4000
RM-17	1297.4250	1291.4250	1271.4250	1241.4250
RM-18	1297.4500	1291.4500	1271.4500	1241.4500
RM-19	1297.4750	1291.4750	1271.4750	1241.4750

Hva gjør de i andre land?

- USA
- England
- Sverige
- Finland
-mange flere





N3KL



The repeater went on the air 12/15/2001 Output: 1286.1 MHz Input: 1274.1 MHz (-12)

Current Status

Operating with reduced output power (~12w to antenna) due to PA failure.

Purpose

to provide an opportunity for local area hams to use the 23cm band more frequently, and to challenge them to improve their skill and equipment by working this difficult band.

Coordination

Full Coordination was issued by T-MARC on Feb. 16, 2002.

Exciter

TM-541 modified for modulator input.

Power Amp

Currently shopping around

Receiver

TM-541 modified for discriminator output

Duplexer

TxRx Systems 4 cavity bp/br 23cm Duplexer

Antennas/Feedline

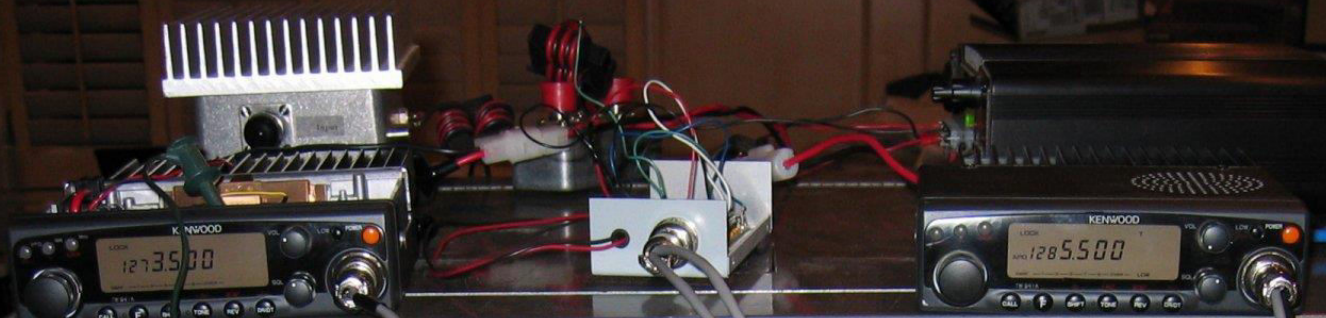
Diamond U200A fed with Andrew LDF4-50 7/8" hardline.

Controller

Cat 200B in minimalist mode

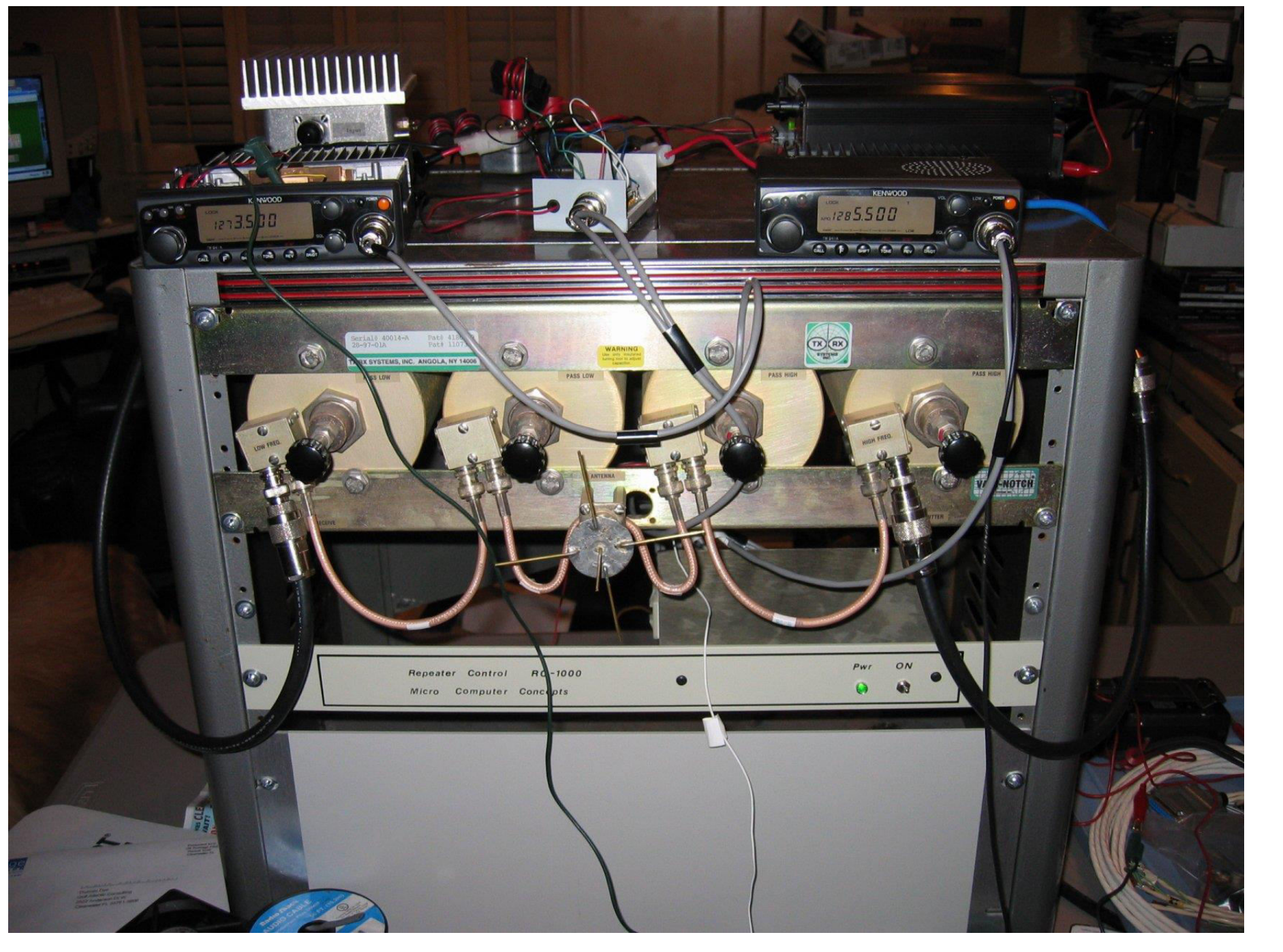
Other

Behringer PEQ-2200 Parametric EQ (for pre-emphasis)
Behringer 8024 DSP (for delay and de-emphasis)



Repeater Control RC-1000
Micro Computer Concepts

Pwr ON





IC-RP1220
1200MHz FM REPEATER

ICOM

MICPHONE

SQUELCH

VOLUME

CLOCK LOCAL MANUAL ID

POWER

TRANSMIT

POWER

DL 9 PY

Sverige

Callsign	QTH	Locator	QRG (TX)	Shift	Öppning	Status	Anteckningar
SK5RYM	UPPSALA		1297.0000	-6MHz	1750 hZ	QRV	
SK0CT	KISTA		1297.0250	-6MHz	88,5 Hz	QRV	
SK6RIC	ALINGSÅS		1297.0250	-6MHz	1750 HZ	QRT tf.	QRV 2009-10
SK7RFH	NÄSSJÖ		1297.0500	-6MHz	1750 Hz	QRV	
SK3RMG	BERGSJÖ		1297.1000	-6MHz	1750 Hz	QRV	
SM0KOT/R	Stockholm		1297.1000	-6MHz	1750Hz	QRT	
SK6RKI	GÖTEBORG		1297.1500	-6MHz	1750 Hz	QRV	
SK7REP	MALMÖ		1297.1750	-6MHz	1750Hz	QRV	
SK7CY	HELSINGBORG		1297.2000	-6MHz	1750 Hz	QRV	
SK3WH	HÖGAKUSTEN BRON		1297.2750	-6MHz	1750 Hz	QRV	
SK0GO/R	Göteborg		1297.3000	-6MHz		QRT	QRV?
SK7RVL	KRISTIANSTAD		1297.3250	-6MHz	1750 Hz	QRV	

Finland

Callsign	Channel	Output freq.	Location	LOC	Power	H asl	H agl	Trustee	Remarks
OH1RAU	RM0	1297.000 MHz	Turku	KP10CL	15 W	101 m	43 m	OH1CO	QRT
OH2RCH	RM5	1297.125 MHz	Espoo / Kauniainen	KP20JD	35 W	99 m	39 m	OH2LAK	QRT due to relocation
OH3RAA	RM2	1297.050 MHz	Hämeenlinna	KP20FX	25 W	185 m	45 m	OH3UW/O H3XA	
OH3RNE	RM0	1297.000 MHz	Tampere	KP11UM	10 W	247 m	137 m	OH3NYB	
OH5RUG	RM8	1297.200 MHz	Kouvola	KP30IU	15 W	130 m	30 m	OH5NOL	
OH5RUM	RM3	1297.075 MHz	Vehkalahti	KP30NP	15 W	113 m	36 m	OH5AZU	
OH6RVC	RM17	1297.425 MHz	Lapua	KP12XL	3 W	116 m	-	OH6MF	

Brukt 23 cm utstyr



Kenwood TM-541

Nytt 23 cm utstyr



Digital Voice + Digital Data

1200MHz DIGITAL TRANSCEIVER

ID-1

Repeater konfigurasjoner

- 6 MHz TX/RX, 1-2 antenner, stort kavitetsfilter
- 26 MHz TX/RX, 1-2 antenner, lite kavitetsfilter
- 56 MHz TX/RX, 1-2 antenner, båndpassfilter?
- Simpleks TX/RX, 1 antenne, ingen filter

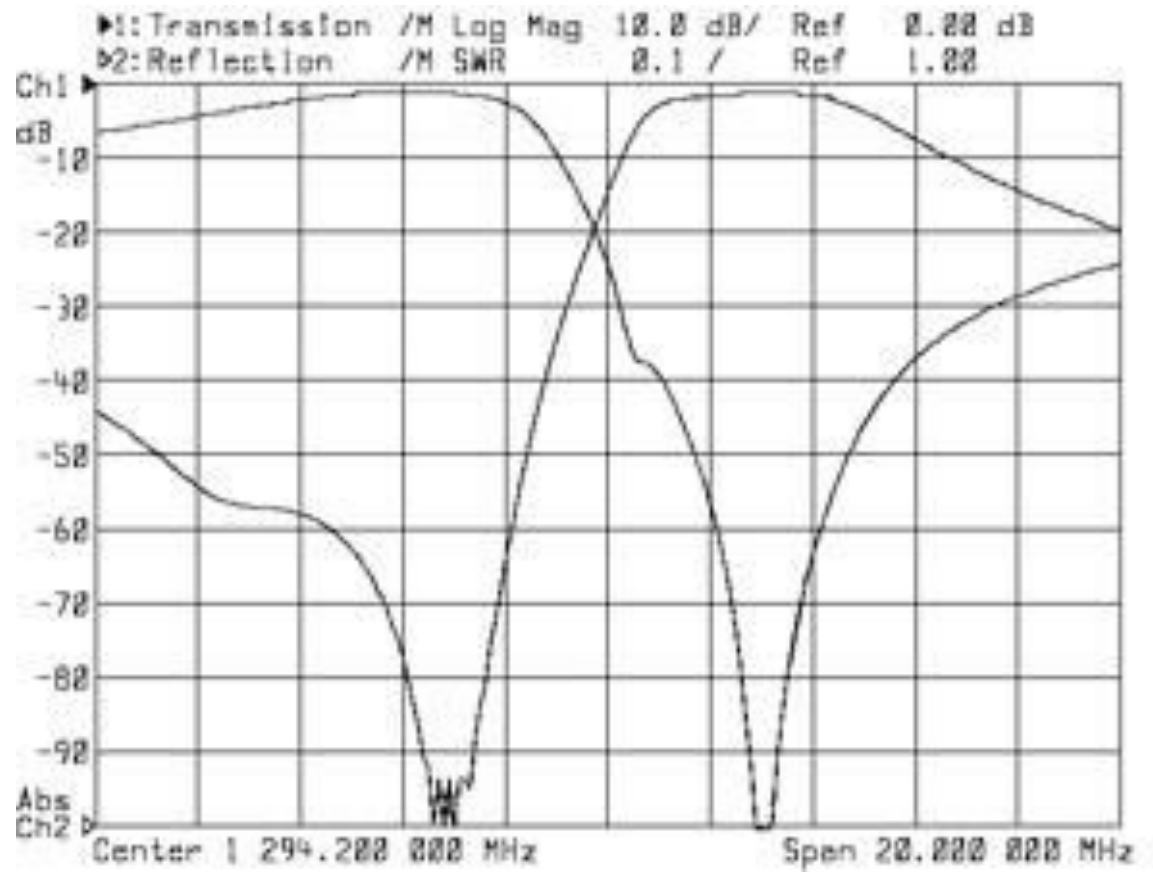
Pass-reject duplexer DPRE4-6-23cm



€ 1177.53

1290-1292 RX

1296-1298 TX



Filter

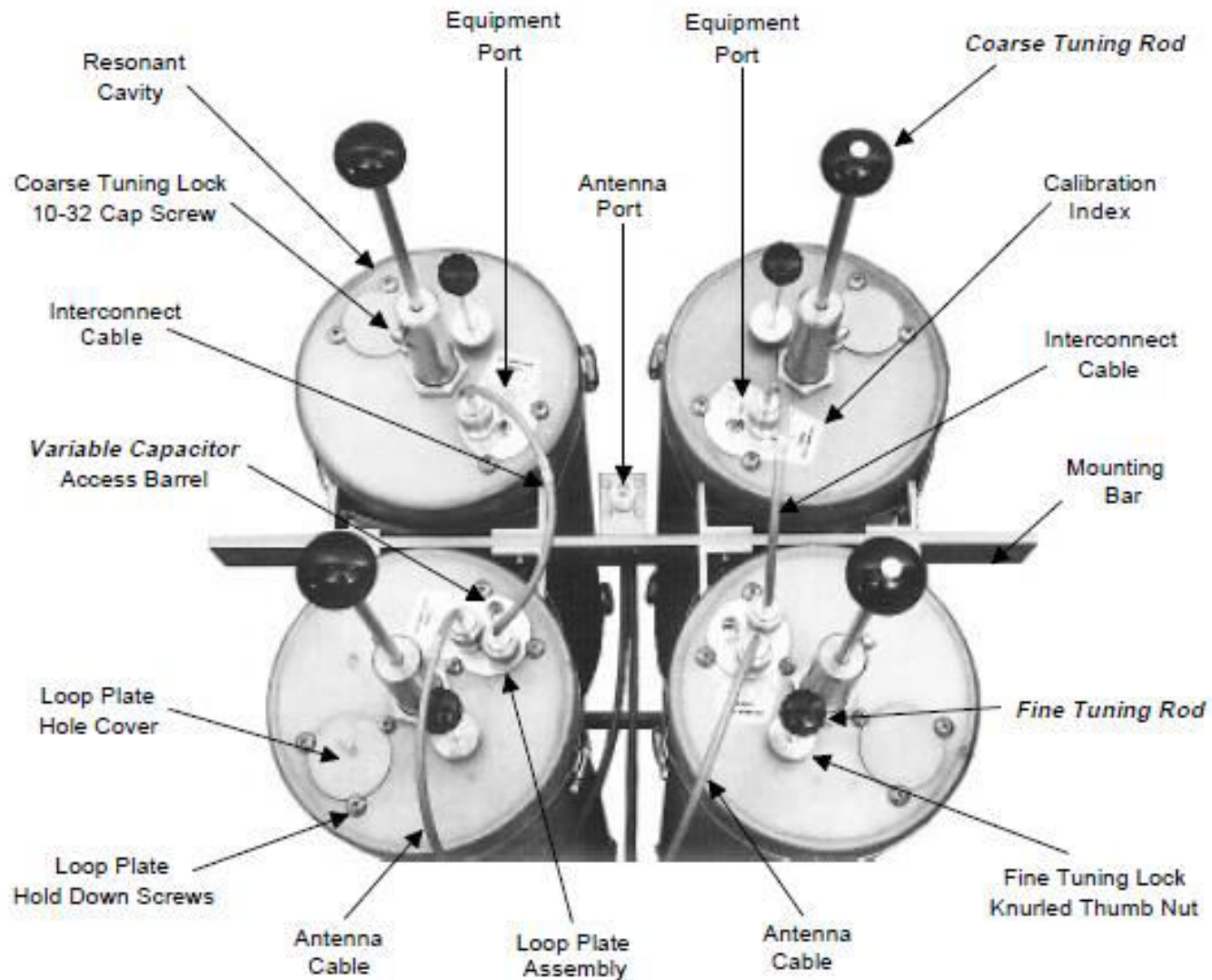
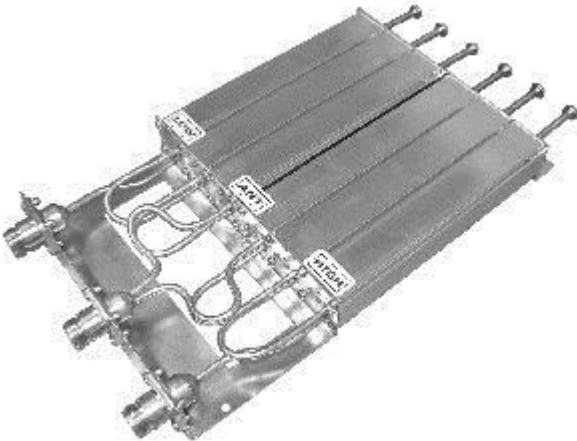


Figure 2: Top view of a typical four-cavity Vari-Notch Duplexer (6.625" diameter cavities).

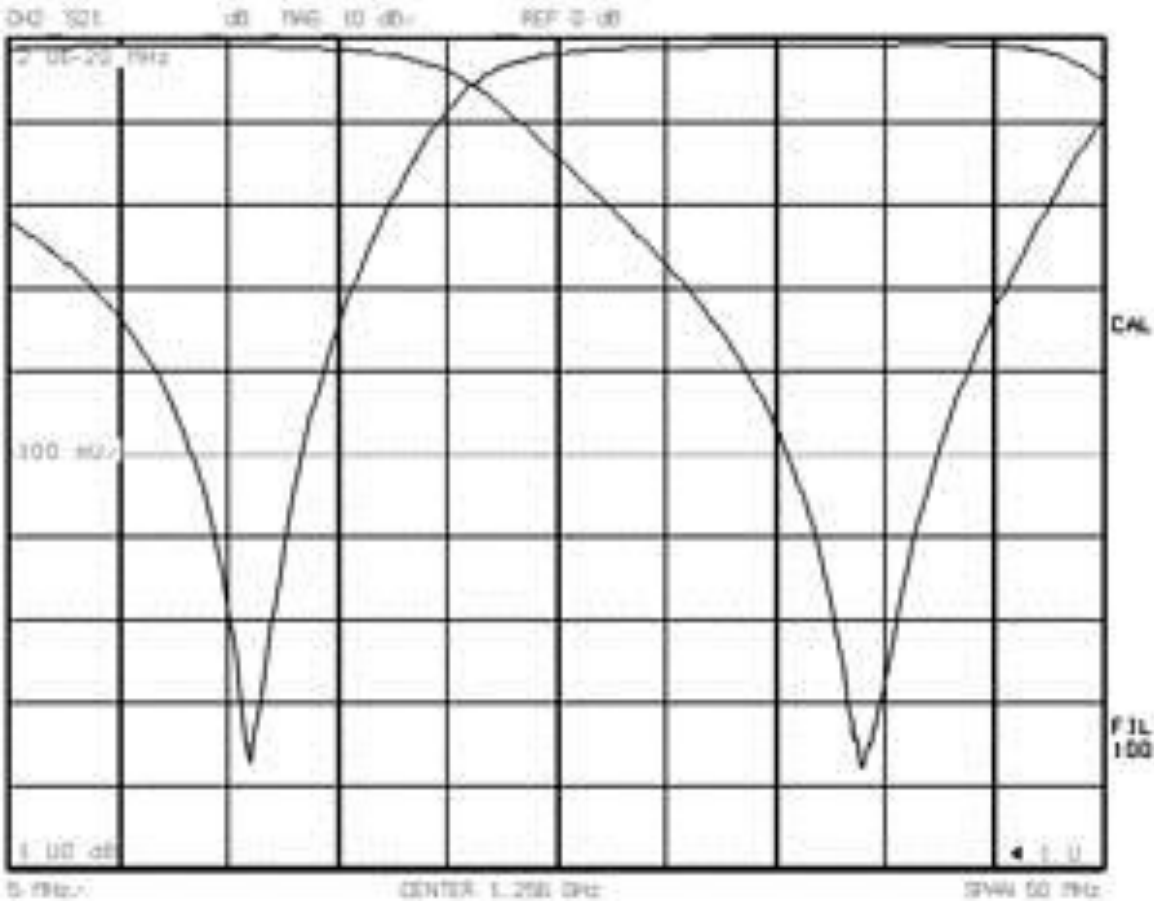
Reject duplexer MDF1-6-23cm

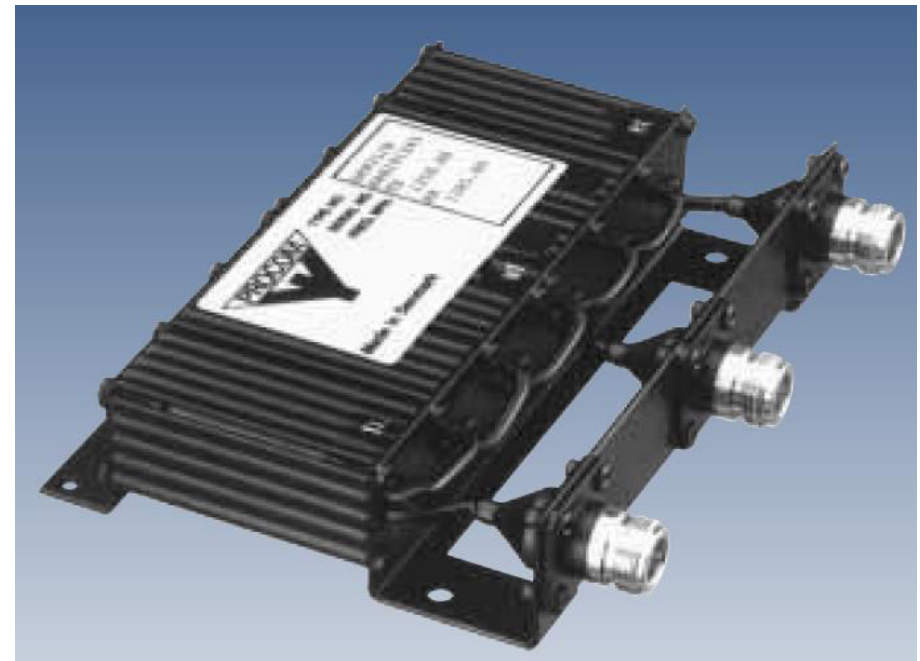


€ 179.58

1242-1243 1270-1272

1270-1272 1298-1300

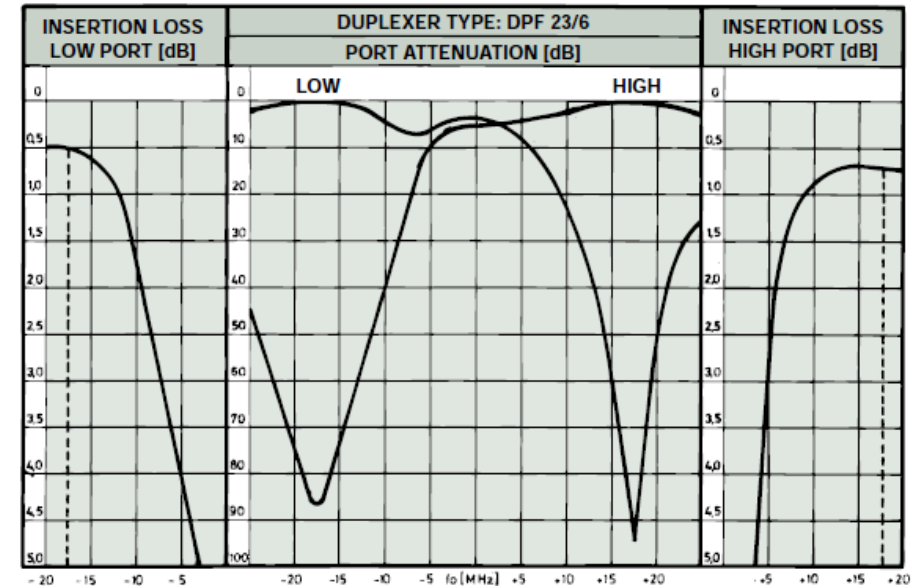




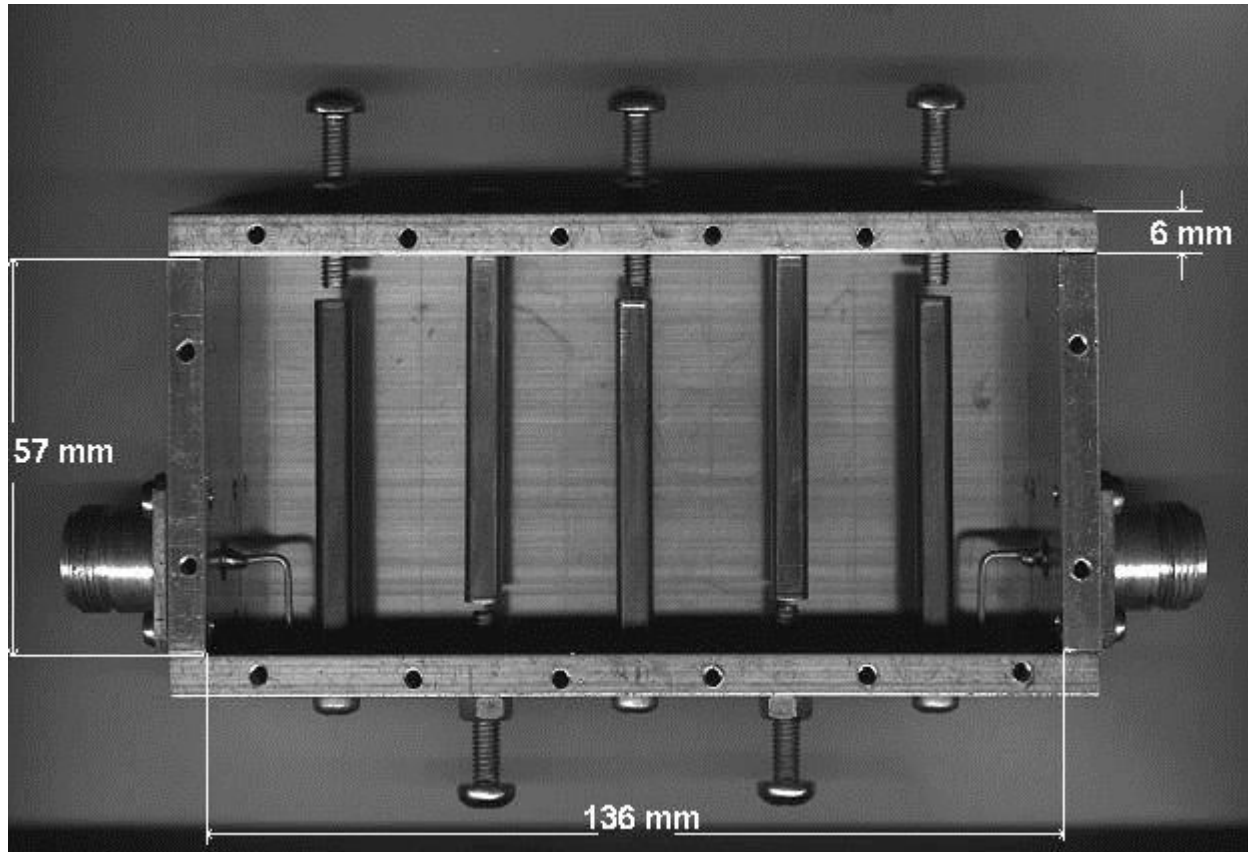
SPECIFICATIONS:

ELECTRICAL	
TX/RX FREQUENCY	1240-1300 MHz
MAX. INPUT POWER	50 watt
NOM. SPACING TX-RX	35 MHz – 28 MHz on request
INSERTION LOSS TX-ANT AND ANT-RX	≤ 1.0 dB (typically ≤ 0.7 dB)
TX-NOISE SUPPRESSION ON RX-FREQUENCY (SINGLE CHANNEL TUNED)	≥ 85 dB
RX ISOLATION ON TX-FREQUENCY (SINGLE CHANNEL TUNED)	≥ 85 dB
DUPLEX SPACING	35 MHz (nominal) 28 MHz on request
IMPEDANCE	Nom. 50 Ω
SWR	≤ 1.5
MECHANICAL	
TEMPERATURE RANGE	-30° C ÷ +60° C
FREQUENCY STABILITY	Approx. 5 ppm/° C
CONNECTORS	N-female
DIMENSIONS (L x W x H)	135 x 154 x 33 mm
WEIGHT	Approx. 620 g

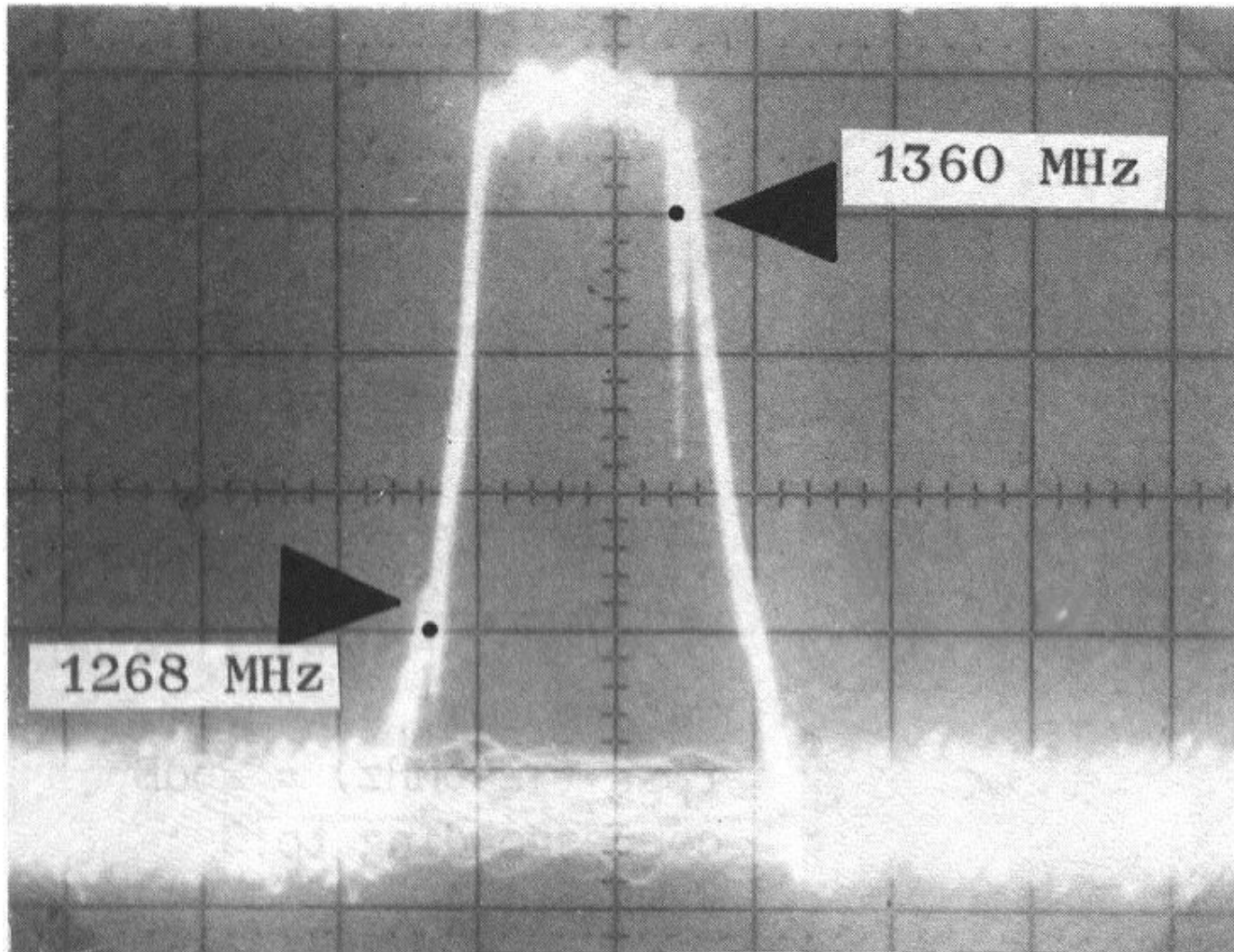
TYPICAL RESPONSE CURVES @ 35 MHz DUPLEX SPACING:



23 cm Interdigital bandpass filter



Frequency response of the filter tuned for 23 cm



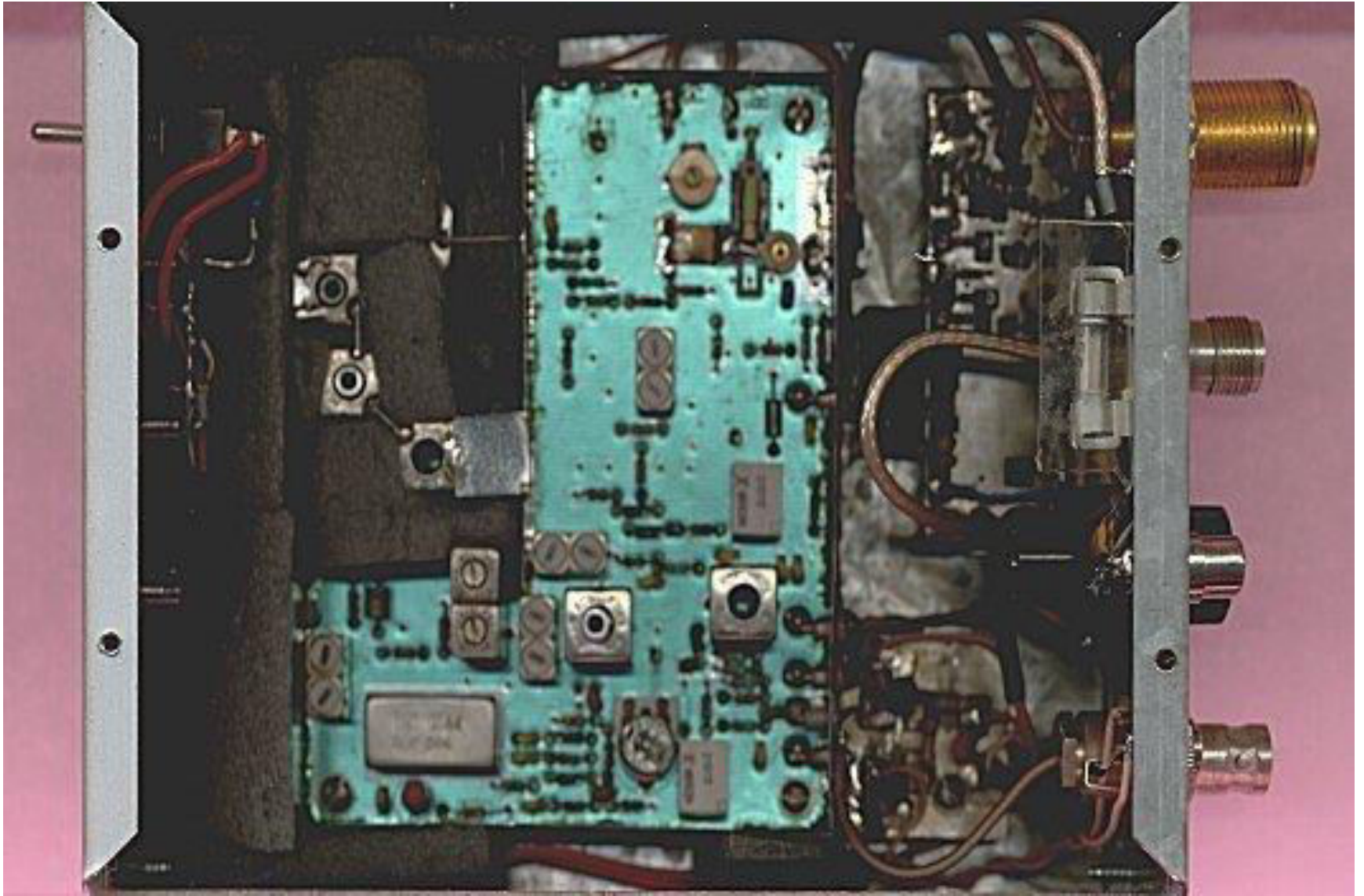
Selvbygging

- Forforsterker
- Transverter, 23 cm til/fra 2m/70cm
- Sendeforsterker, ferdige moduler
- Exciter,
- Mye mer kan bygges selv
- Måleinstrumenter er en utfordring, frekvensteller og swr/wattmeter er rimelige

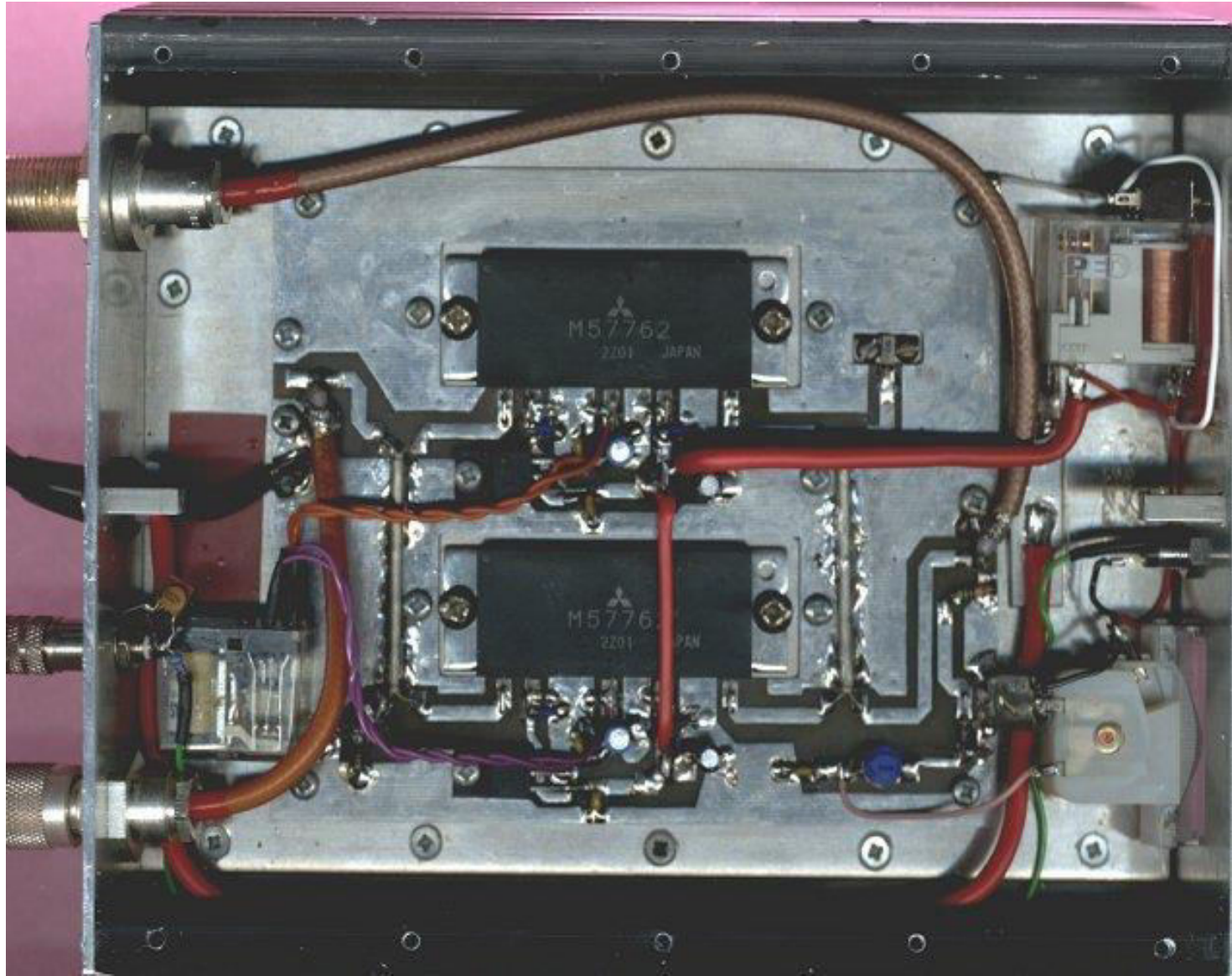
HB9BBD preamplifier



23 cm transverter

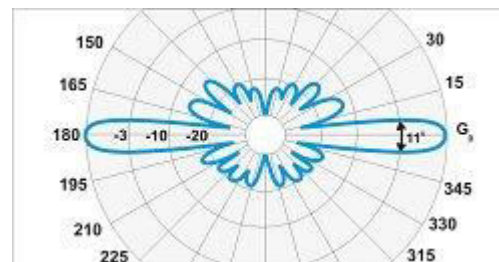
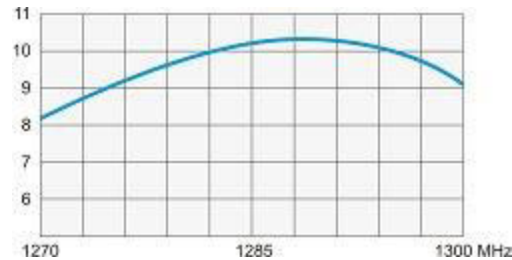
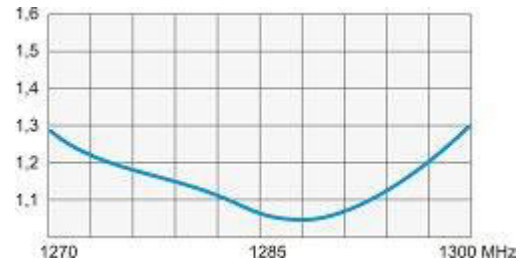
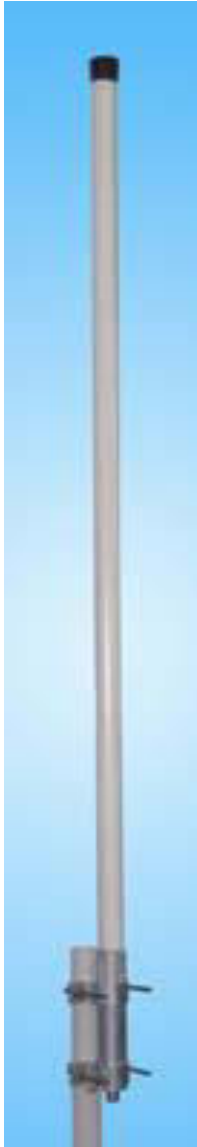


23 cm linear amplifier





Vertical antenna A10-23-H



ADS-SR1 simpleks repeater

- Alle typer radioer kan benyttes
- Liten, enkel og lett
- Lav kostnad
- Lavt strømforbruk
- Portabel

 ARGENT
DATA SYSTEMS

ADS-SR1
Simplex Repeater / Vote Recorder

PHONE
PHONE

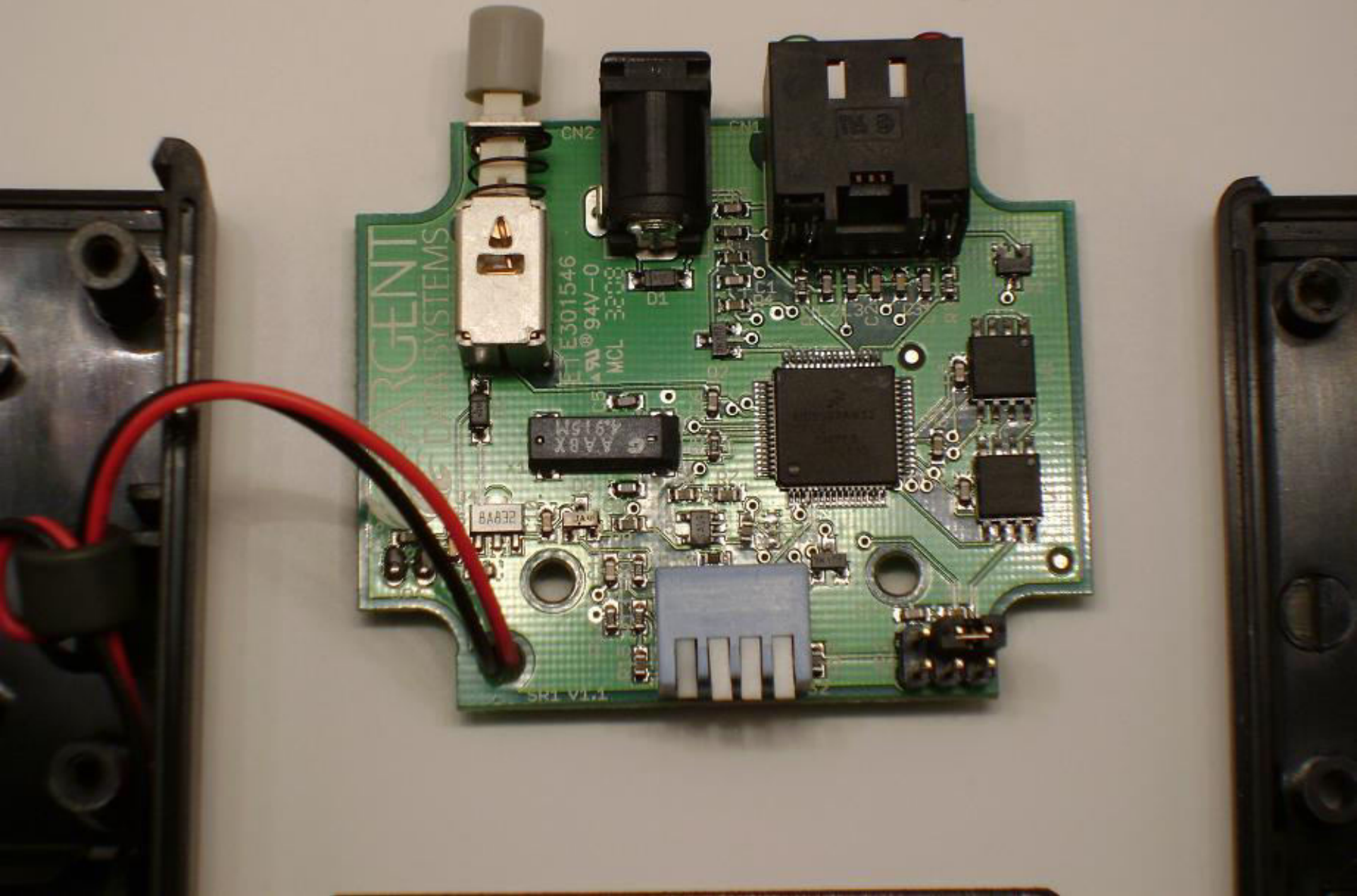
PHONE
PHONE

PHONE
PHONE





- 218 seconds total recording time
- 19.2 kHz sample rate for excellent voice clarity
- 10 voice announcements with independent timers
- Up to 20 voicemail messages
- Programmable maximum message length setting
- Messages and settings retained for 20 years with no power
- Optional Morse code or voice identification
- DTMF remote control for all functions
- Operates from two AA batteries or external 4-28 V DC supply
- Runs for weeks on alkaline or lithium batteries
- 'Say again' function repeats last received transmission on command
- Selectable courtesy tones
- Audio output adjustable in hardware and by remote command
- PTT modes for handheld and mobile radios
- Upgradeable software for future enhancements
- Programmable security code with auto-lock feature
- Unit remains controllable even with stuck receiver squelch
- 1 year warranty on complete unit, 5 years on flash memory







Takk for meg!
LB9RE