Resonances From Aether Days

VINTAGE RADIO EQUIPMENT

A Pictorial and Technical Analysis from WW2 to the Internet Age



Giovanni Becattini



Resonances From Aether Days

Vintage Radio Equipment

Giovanni Becattini



- This is an Elektor Publication. Elektor is the media brand of Elektor International Media B.V.
- All rights reserved. No part of this book may be reproduced in any material form, including photocopying, or stored in any medium by electronic means, whether or not transiently or incidentally to some other use of this publication, without the written permission of the copyright holder except in accordance with the provisions of the Copyright Designs and Patents Act 1988 or under the terms of a licence issued by the Copyright Licensing Agency Ltd., 90 Tottenham Court Road, London, England W1P 9HE. Applications for the copyright holder's permission to reproduce any part of the publication should be addressed to the publishers.
- The author, editor, and publisher have used their best efforts in ensuring the correctness of the information contained in this book. They do not assume, and hereby disclaim, any liability to any party for any loss or damage caused by errors or omissions in this book, whether such errors or omissions result from negligence, accident or any other cause.
- Collins, Racal, Siemens, Telefunken trademarks and logos are acknowledged and remain their property.
- ISBN 978-3-89576-672-5, hard cover, print only.
- © Copyright 2025 Elektor International Media B.V. Editors: Jan Buiting MA, Glaucileine Vieira.

Table of Content

limeline	14	Mechanical Filters	82
		51J-4 Top View	84
General Culture Issues	19	51J-4 Bottom View	86
Historical Framework	20	Competition	88
SSB Reception	24	R-390A/URR	91
Radioteletype (RTTY)	32	R-390A, His Majesty	93
Mechanical Filters	36	Better Than The Best	94
R-390A	37	The R-390/URR	95
Filters	37	The R-390A/URR	96
51S-1 Mechanical	38	1967 EAC R-390A/URR	97
Filters	38	Mona Lisa Replicas	98
Sensitivity	41	Collins "First Order"	100
2 2112111139		1954 "First Contract" R-390A/URR	101
Collins Radio Company	47	The R-390A Today	103
-		R-390A Information	104
A Great Man, a Great Brand	49	A Few References	106
We Could Stop Here	51	R-390A in Short	108
Great Products	53	Innovations	111
The Roots of the Tree	55	The Value of a Counter	112
AN/ART-13 Transmitter	56	Mechanical Filters	114
(R)Evolutions: Autotune	58	Modular!	116
(R)Evolutions: PTO	61	IF Subchassis	118
R-91/ARC-2 RX / TX	66	An Empty Mainframe	120
		Mainframe Top View	122
Collins 51J Receivers69		Mainframe Bottom View	124
Introduction	70	R-390A A-Side	126
The Data Age Begins	73	R-390A B-Side	128
Description	74	The RF Assembly	130
The Magic of Tubes	79	The RF Subchassis	132
A Linear Scale	81	The Miles discosio	102

Table of Content (cont'd)

Tuning System	134	Autotune Motor	244
Gear Box	136	Dynamotors	247
AF Subchassis	138	Sources	251
Temperature & Stability	141	Conclusions	253
The Great Radio Massacre	143	R-392/URR Receiver	255
Using the R-390A for SSB	145		
Some Practical Suggestions	152	R-392/URR Receiver	256
Looking Inside the R-390A	154	R-392 in Short	258
R-648 Å Flying R-390	158	R-392/URR	259
R-725 A Special R-390	162	Simplified	259
"Inspire" by the R-390s	164	Block Diagram	259
A Few Restoration Tip	166	Full Immersion	260
R-390A Sensitivity	174	Six IF Stages	262
A Never Ending Theme	184	More Than a Small R-390	265
Conclusions	186	Conclusions	266
AN/GRC-19	189	Collins 51S-1 Receiver	
New Equipment	190	Introduction	270
GRC-19 History	193	Great Products	273
Common Characteristics	195	The S-Line	274
T-195 Transmitter	107	Stay In Touch!	276
		KWM-2	277
Silence, please	199 200	A Star is Born	278
The Strength of Innovation Overview	200 202	Two Twins (almost)	280
	202 204	51S-1 (Country-) B-Side	282
Construction Quality	204 207	G133F	284
No Space is Wasted	208	Genial and Producible	286
Mainframe		Really Worse?	289
Exciter	210	Overall Block Diagrams	290
RF Power Amplifier	212	Detailed Block Diagram	292
Antenna Capacitor	214	An Optimized Construction	295
Antenna Inductor	216	The Turret	296
Output Capacitor	218	PTO & Mechanical Filters	301
Servo Amplifiers	219	51S-1 Sensitivity	302
Discriminator	220	IF Performance	306
Servo Amplifiers	221	Why 455 kHz?	313
Modulator	223	Why 500 kHz?	316
Positioning Secrets	224		
Positioning Recap	230	AN/CDC 7	210
Antenna Matching	232	AN/GRC-7	319
Feeding the Monster	234	The Modular Data System	320
Restoration Story	236	AN/GRC-7	323

Underrated	330	Competition	410
RT-66/GRC (67, 68)	332	Distant Drums	418
RT-67/GRC	336	German Precision	422
Right View	336	Siemens E311 Receiver	427
Block Diagram	339	Introduction	428
RT-68/GRC	340	Better Than Ever	43
RT-67/GRC	342	Some Comparisons	432
Top View	342	Main Specs	430
General Architecture	343	Modular	438
RT-68/GRC	346	Multi Modality	440
IF Chassis	346	Documentation	442
Wiring Side	346		44!
Mechanics	349	Receiver Versions	44:
PP-112 Power Supply Unit	351	The Journey of the Signal RF Sections	449
Wonderful Labels!	352	Intermediate Frequency Stages	450
R-108/GRC Receiver	355	Filters	452
Specifications	356	A Road Test	45,
RT-70 Receiver/Transmitter	358	The Phantom Filter	45
To Work Inside A Tank	360		458
RT-70 Specifications	362	Detectors	45
RT-70A Architecture	364	Audio Frequency Circuits An Ante-Litteram PLL	462
			460
Some WW-2 Equipment	367	How Does it Operate? Complementary Equipment	47
		Conclusions	473
First Love Is Never Forgotten	368		
The WS N°19	379	Telefunken E863 Receiver	475
R-107 The Sensitive Ugly	380	Introduction	476
BC-348, an Airborne Receiver	383	The Opportunity	478
BC-348	384	Its First Words	480
R-44/ARR-5 Receiver	386	A First Road Test	48
R-45/ARR-7 Receiver	387	Technology Canned	482
Human Interfaces	389	What Else Is Striking?	484
		Nixies, Come Again?	48
German Equipment	391	Telefunken & the E863	488
Not Worse Indeed	392	What Is BWB?	49
		Modular	492
Siemens E309 Receiver	395	Key Points	494
A Great Brand	396	RF Stages	496
Siemens E309	398	Modern PLL Frequency Synthesis	503
Sprechen Sie Deutsch?	399	German Gears	505
Still Single	400	Frequency Display	506
B-Side	404	IF Stage	508
Oscillator & Filtering	406	Mechanical Filters	510
Filters Check-up	408	IF Amplifier	512
Tuning Dials	410	Decoders & AGC	514
Electronic Nonius	412	The J2 Instrument	516
Liceuonie i ionius	412	THE 32 Instrument	210

Table of Content (cont'd)

More On the Front Panel	518
Audio Amplifiers	520
Power Supply	522
Voltage Regulation	524
The "Smoother"	526
Thermostats	528
Structure	530
The Front Frame	533
Upper Chassis From The Rear	537
A World Of Interfaces	538
The Upper Chassis	541
seen from Below	541
	541
Frequency Control	543
The Accessories Box Set	555
Measurements	556
So Beautiful	564
Conclusions	564

Racal RA.17 Et Al.	567
Racal RA.17, David vs. Goliath	569
Space Wasters	572
Nudity	574
Seen From Below	577
Geloso G4/216	578
Allocchio Bacchini AC 18	580

The Silent Symphony of Radio Waves

Invisible, weightless, and swift as thought, radio waves swept across the void—a whisper through the ether, unlocking the miracle of human connection.

From the first spark across a wire to voices leaping continents, they gave us more than sound—they gave us <u>reach</u>, binding hearts and minds across oceans and time zones.

With every broadcast, a bridge; with every signal, a step closer.
Music found ears it never dreamed of, laughter and learning traveled where no road could lead.

Friendships bloomed in static and Morse, hope flew on frequencies in the darkest nights.

These waves, unseen yet ever present, carry not just data, but dreams—and in their rhythm, humanity found its voice.