BROADCAST AUDIO EQUIPMENT

Customer Price List

RCA

"HIS MASTER'S VOICE"

RCA product offerings in audio are diverse. However, these diverse products share the common characteristics of excellence in performance, dependable service and quality construction.

This Customer Price List "puts it all together" in one compact package, including a convenient Order Form at the back of the booklet. All sales are subject to RCA's Standard Terms and Conditions of Sale. Prices are subject to change without notice and are FOB shipping point.

Not all items of Broadcast Audio Equipment are listed. Contact your RCA Representative for special requirements or complete specification detail.

Unless otherwise indicated, all RCA Stock Numbers identify equipment to be operated on 115 volts, 60 Hz power. Similar equipment is available for operation on 230 volts and 50 Hz power.

EFFECTIVE DATE: June 2, 1980

RCA is pleased to provide you with this current Broadcast Audio Customer Price List, and we encourage you to make use of it. The prices shown are valid for the United States only, and some equipment items listed may be in limited supply and subject to prior sale.

If you have any questions, or need further information, contact your RCA Representative. Further, please feel free to call or write me for product data, availability or pricing.

I'm Gordon Allison, Audio Product Manager, and you can reach me at:

RCA Broadcast Audio
Building 2-5
Front & Cooper Streets
Camden, N.J. 08102

or

(609) 338-2342

In addition to the products covered in this listing, RCA offers fine products from such manufacturers as:

- ADM Technologies
- Crown International
- LPB
- Eventide
- UREI
- Dictaphone
- Telex
- Technics
- J. B. Lansing

and many more!

RCA Sales Offices are listed on the inside back cover of this booklet. Also for convenience in ordering or requesting further information, a tear-out reply Order Form is included.

Let us hear from you.

Gordon N. Allison

Gordon Allison

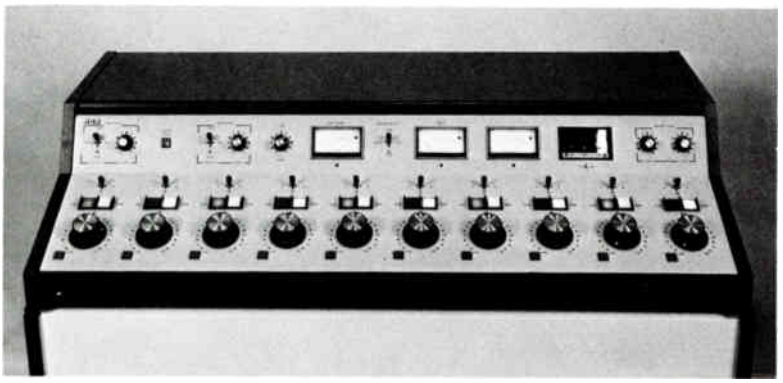
Contents

	Page
AMPLIFIERS/MONITOR SYSTEM	10-11
See also Processing Equipment	10-11
CARTRIDGE TAPE EQUIPMENT	4
RT-124 Multicartridge Player	4
RT-125 NAB A Size Player	4
RT-126 NAB A or B Size Player/Recorder	5
RT-127 NAB A, B or C Size Player/Recorder	5
RT-128 NAB A or B Size Player/Record Amplifier	6
CONSOLES	2
BC-300 Series, Dual Channel Stereo	2
BC-50 Custom, Mono or Stereo	3
HEADSETS	13
INTERPHONE EQUIPMENT	13
LOUDSPEAKERS	13
Loudspeakers	13
Wall Housings	13
Accessories	13
MICROPHONE ACCESSORIES	12
MONITORING SYSTEM	11
See Amplifiers/Monitor System	11
PHONO EQUIPMENT	8
BQ-52 D.C. Servo Variable Speed Turntable	8
BQ-50 3 Speed Turntable	8
Phono Preamplifier	8
Pick-up Arm	8
Cabinets	8
PROCESSING EQUIPMENT	10
BA-150 DOC Processor	10
BA-145 AGC Amplifier	10
BA-146 Limiter Amplifier	10
RACK EQUIPMENT	14
84" Blue & Aluminum Epoxy Racks	14
77" Blue & Aluminum Epoxy Racks	14
Miscellaneous Rack Accessories	14
BR-22D Mounting Shelf	14
Jack Panels & Patch Cords	14
REEL-TO-REEL TAPE RECORDERS	9
Otari MX-5050B	9
Otari Mark II	9
SPEAKERS	13
See Loudspeakers	13
STUDIO ACCESSORIES	11
Lighted Studio Signs	11
VU Meter Panels	11
Bridging, Line, Isolation Transformers, Pads	11
Console Tables	11
TAPE RECORDERS	9
See Cartridge Tape of Reel-to-Reel	9
TEST EQUIPMENT	
Potomac Instruments	14
AT-51 Audio Distortion Test Set	14

Note: Related Accessories are listed following the equipment items.

BROADCAST AUDIO CONSOLES

RCA has a full line of audio consoles to serve your needs. In addition to the BC-300 series and BC-50 consoles, we also supply products from ADM technologies and LPB.



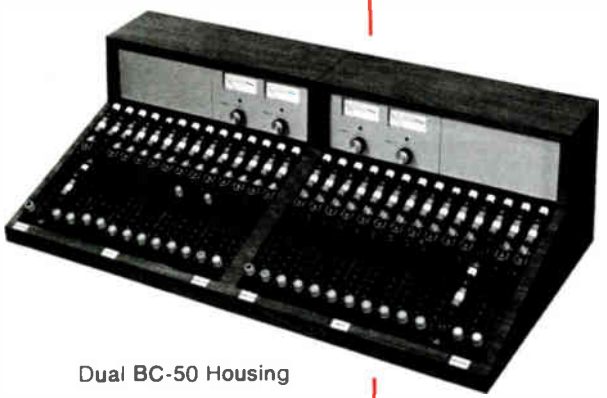
BC-310S

BC-300 SERIES CONSOLES

Designed specifically with the needs of today's broadcaster in mind, the BC-300 series of consoles provides an excellent combination of high quality, advanced human engineering with functional flexibility. These dual channel stereo consoles are available with six, eight and ten mixers. Each mixer channel accepts four inputs and is complete with a standard remote start feature. The modular design allows convenient upgrading when additional features are desired. Screw terminal connections and logical labeling make installation a snap.

RCA Stock No.	Type	Description	Suggested List Price
	BC-306S	**Six Mixer Stereo Consoles, Dual Channel**	
MI-141103-2A		BC-306S with Two Mike Preamps	**$ 4,875.00**
MI-141103-2B		BC-306S with Three Mike Preamps	**$ 5,000.00**
MI-141103-2C		BC-306S with Four Mike Preamps	**$ 5,125.00**
	BC-308S	**Eight Mixer Stereo Consoles, Dual Channel:**	
MI-141104-2A		BC-308S with Two Mike Preamps	**$ 6,090.00**
MI-141104-2B		BC-308S with Three Mike Preamps	**$ 6,215.00**
MI-141104-2C		BC-308S with Four Mike Preamps	**$ 6,340.00**
	BC-310S	**Ten Mixer Stereo Consoles, Dual Channel:**	
MI-141105-2A		BC-310S with Two Mike Preamps	**$ 7,475.00**
MI-141105-2B		BC-310S with Three Mike Preamps	**$ 7,600.00**
MI-141105-2C		BC-310S with Four Mike Preamps	**$ 7,725.00**
		All BC-310S consoles include MI-141636-2 and MI-141633 as standard equipment.	
		BC-300 SERIES ACCESSORIES—OPTIONS	
MI-141636-2		Mono Mixdown Kit for BC-306S or 308S	**$ 150.00**
MI-141610		Third Meter BC-306S, BC-308S, BC-310S*	**$ 225.00**
MI-141633		Reference Oscillator, BC-306S or BC-308S	**$ 185.00**
MI-141609		Digital 99 Minute Timer, BC-306S, BC-308S, BC-310S*	**$ 405.00**
MI-141608		Digital 12/24 Hour Clock, BC-306S, BC-308S, BC-310S*	**$ 345.00**
		*NOTE: The BC-306S and 308S Consoles will accept only one of these items, but the BC-310S will take any two of these options.	

BROADCAST AUDIO CONSOLES



Dual BC-50 Housing

Single BC-50 Housing

BC-50 CUSTOM AUDIO CONSOLES

Do it yourself . . . or let us build and test the BC-50 Audio Console you designed. Single housing consoles may be mono, dual channel mono, or stereo. Dual housing BC-50 configurations may be operated 4-channel mono, dual channel stereo or input/output expanded capability found in the single housing configurations. Features include: five inputs per mixer, pan pot kits for mono mike inputs or stereo input balance, switchable 3-band equalizers, talkback, foldback, echo send/return, submasters, remote start, and input phase reversal. Module assemblies have cables and connectors to plug into the motherboard for easy assembly and troubleshooting without extender cords. Contact your RCA Representative for further description and specifications in RCA Catalog AU.3110, and a complete BC-50 Planning Manual, 3J5924-2. Prices are competitive and you'll save $3,000 when you assemble you own single housing BC-50 or $6,000 when you assemble your dual housing console.

CARTRIDGE TAPE EQUIPMENT

RCA Cartridge Tape equipment is designed to meet the rigid specifications set forth by broadcast and studio engineers for economy, convenience and reliability in recording and playback systems. High quality cartridge playback and/or record equipment is available in 60 distinctive models with various cue, mute and fast forward features.

RT-124

RCA Stock No.	Type	Description	Suggested List Price
		RT-124 Kartwheel Multicartridge Playback-Only System. 24 cartridges; random and sequential select (RCA Catalog AU.8440B)	
MI-141852	RT-124	Kartwheel, stereo, 60 Hz/115V	**$ 2,995.00**
MI-141853	RT-124	Kartwheel, mono, 60 Hz/115V	**$ 3,095.00**
MI-141856	RT-124	Kartwheel, stereo, 50 Hz/115V	**$ 2,995.00**
MI-141857	RT-124	Kartwheel, mono, 50 Hz/115V	**$ 3,095.00**
		For further description and specifications ask for RCA Catalog AU.8440B.	
MI-141010-250		Step-Down Auto Transformer, 220V to 115V or 250VA	**$ 71.00**

MI-141750A

		RT-125A Cartridge Tape Playback Only for "A" Size NAB Cartridges. Supplied less Desk Cover or Rack Mounting Shelf. 117V, 50/60 Hz (add $50.00 for 220V)	
MI-141750A-1	RT-125A	Monaural, w/1000 Hz stop cue	**$ 930.00**
MI-141750A-5	RT-125A	Monaural, w/stop cue, end cue, trip cue, and audio switching	**$ 995.00**
MI-141750A-7	RT-125A	Monaural, w/stop cue, end cue, trip cue, audio switching and fast forward	**$ 1,110.00**
MI-1414750A-9	RT-125A	Mono as above except with auto fast forward	**$ 1,105.00**
MI-141751-A1	RT-125AS	Stereo, w/1000 Hz stop cue	**$ 1,075.00**
MI-141751A-5	RT-125AS	Streo, w/stop cue, end cue, trip cue and audio switching	**$ 1,125.00**
MI-141751A-7	RT-125AS	Stereo, w/stop cue, end cue, trip cue, audio switching and fast forward	**$ 1,250.00**
MI-141721A		Desk Top Cover for RT-125A/AS	**$ 1,600.00**
		See also Accessories for RT-125; 126 and 127.	

CARTRIDGE TAPE EQUIPMENT

MI-141752A

MI-141755A

MI-141757A

RCA Stock No.	Type	Description	Suggested List Price
		RT-126A Cartridge Tape Playback Only for "A" or "B" Size NAB Cartridge Supplied less Desk Cover. 117V, 50/60 Hz (add $50.00 for 220V)	
MI-141752A-1	RT-126A	Monaural, w/1000 Hz stop cue	$ 945.00
MI-141752A-5	RT-126A	Monaural, w/stop cue, end cue, trip cue and audio switching	$ 1,010.00
MI-141752A-7	RT-126A	Monaural, w/stop cue, end cue, trip cue, audio switching and fast forward	$ 1,125.00
MI-141753A-1	RT-126AS	Stereo, w/1000 Hz stop cue	$ 1,075.00
MI-141753A-5	RT-126AS	Stereo, w/stop cue, end cue, trip cue and audio switching	$ 1,140.00
MI-141753A-7	RT-126AS	Stereo, w/stop cue, end cue, trip cue, audio switching and fast forward	$ 1,255.00
		See also Accessories for RT-125, 126 and 127.	
		RT-126A Cartridge Tape Record/Playback Supplies less Desk Cover. 117V, 50/60 Hz (add $50.00 for 220V)	
MI-141754A-1	RT-126AR	Monaural, w/1000 Hz stop cue	$ 1,645.00
MI-141754A-5	RT-126AR	Monaural, w/stop cue, end cue, trip cue and audio switching	$ 1,735.00
MI-141754A-7	RT-126AR	Monaural, w/stop cue, end cue, trip cue, audio switching and fast forward	$ 1,850.00
MI-141755A-1	RT-126AR	Stereo, w/1000 Hz stop cue	$ 2,000.00
MI-141755A-5	RT-126AR	Stereo, w/stop cue, end cue, trip cue and audio switching	$ 2,090.00
MI-141755A-7	RT126AR	Stereo, w/stop cue, end cue, trip cue, audio switching and fast forward	$ 2,205.00
MI-141722A		Desk Top Cover for RT-126A/AS	$ 17.00
		See also Accessories for RT-125, 126 and 127.	
		RT-127A Cartridge Tape Playback Only for "A" "B" or "C" size NAB Cartridges Supplied less Desk Cover. 117V, 50/60 Hz (Add $50.00 for 220V)	
MI-141756A-1	RT-127A	Monaural, w/1000 Hz stop cue	$ 1,000.00
MI-141756A-5	RT-127A	Monaural, w/stop cue, end cue, trip cue and audio switching	$ 1,065.00
MI-141756A-7	RT-127A	Monaural, w/stop cue, end cue, trip cue, audio switching and fast forward	$ 1,180.00
MI-141757A-1	RT-127AS	Stereo, w/1000 Hz stop cue	$ 1,150.00
MI-141757A-5	RT-127AS	Stereo, w/stop cue, end cue, trip cue and audio switching	$ 1,215.00
MI-141757A-7	RT-127AS	Stereo, w/stop cue, end cue, trip cue, audio switching and fast forward	$ 1,330.00
MI-141723A		Desk Top Cover for RT-127A/AS	$ 18.00
		See also Accessories for RT-125, 126 and 127.	

CARTRIDGE TAPE EQUIPMENT

MI-141759A

RCA Stock No.	Type	Description	Suggested List Price
		RT-127A Cartridge Tape Record/Playback Supplied less Desk Cover. 117V, 60 Hz (add $50.00 for 220V)	
MI-141758A-1	RT-127AR	Monaural, w/1000 Hz stop cue	**$ 1,675.00**
MI-141758A-5	RT-127AR	Monaural, w/stop cue, end cue, trip cue and audio switching	**$ 1,765.00**
MI-141758A-7	RT-127AR	Monaural, w/stop cue, end cue, trip cue, audio switching and fast forward	**$ 1,880.00**
MI-141759A-1	RT-127ASR	Stereo, w/1000 Hz stop cue	**$ 2,000.00**
MI-141759A-5	RT-127ASR	Stereo, w/stop cue, end cue, trip cue and audio switching	**$ 2,090.00**
MI-141759A-7	RT-127ASR	Stereo, w/stop cue, end cue, trip cue, audio switching and fast forward	**$ 2,205.00**
MI-141723A		Desk Top Cover for RT-127A/AS	**$ 18.00**
		Accessories for RT-125, 126 and 127	
MI-141725A		Shelf for RT-125/126/127A/AS	**$ 70.00**
		For other RT-125A, RT-126A and RT-127A Accessories, contact your RCA Representative.	
		For further description and specifications ask for RCA Catalog AU.8460.	

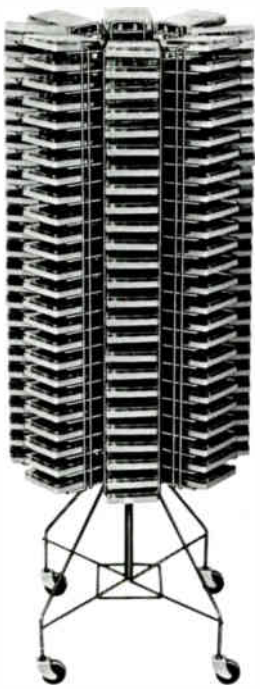
RT-128 THREE DECK NAB CARTRIDGE TAPE PLAYER

Optional record amplifier converts the bottom deck into record-playback system. Two RT-128's may be rack mounted side-by-side if desired. Rack mounting kits are not supplied. 115V/60Hz operation only.

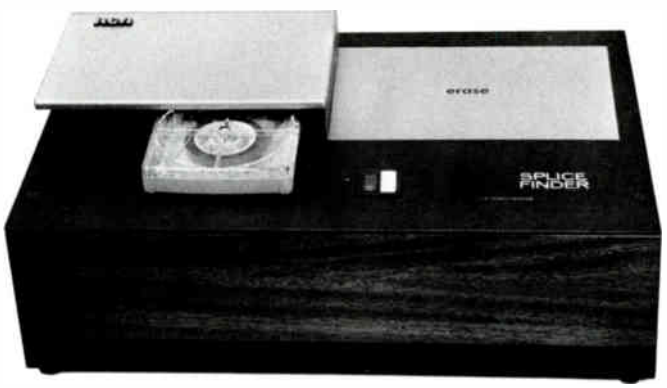
MI-141760-1	RT-128	Monaural, w/stop cue	**$ 2,200.00**
MI-141760-5	RT-128	Monaural, w/all cue tones	**$ 2,350.00**
MI-141761-1	RT-128S	Stereo, w/stop cue	**$ 2,550.00**
MI-141761-5	RT-128S	Stereo, w/all cue tones	**$ 2,700.00**

CARTRIDGE TAPE EQUIPMENT

RCA Stock No.	Type	Description	Suggested List Price
		RT-128 ACCESSORIES	
MI-141764-1	RT-128	Mono Record Amplifier, w/stop cue	$ 800.00
MI-141764-2	RT-128S	Stereo Record Amplifier, w/stop cue	$ 950.00
MI-141765-1		Cue Tones for Mono Record Amplifier	$ 65.00
MI-141765-2		Cue Tones for Stereo Record Amplifier	$ 65.00
MI-141766-1		Rack Mount for single RT-128	$ 100.00
MI-141766-2		Rack Mount for two RT-128's	$ 30.00
		UNIVERSAL CARTRIDGE TAPE ACCESSORIES For complete list, see RCA Catalog AU.8900A, or contact your RCA Representative.	
MI-141041	MR-200	Mobile Carousel Cartridge Rack	$ 230.00
MI-141036-1	SFE-1	Cartridge Tape Splice Finder and Eraser	$ 660.00
MI-141036-3	SF-1	Cartridge Tape Splice Finder w/o Eraser	$ 635.00



MI-141041



MI-141036-1

PHONE EQUIPMENT

RCA products for record reproduction include turntables, tone arms, cartridges, equalizers, amplifiers, and cabinets. Features are heavy platters, "flat-less" drives, easy stylus replacement. Shure and Stanton pickup cartridges are offered.

BQ-52

BQ-50

MicroTrak

RCA Stock No.	Type	Description	Suggested List Price
MI-141652-1	BQ-52	D.C. Servo Variable Speed Turntable, 115V, 50 or 60 Hz	$ 610.00
MI-141004	BQ-50	Turntable Mechanism, 3-speed, 33⅓; 45 and 78 rpm	$ 275.00
MI-141005		Adapter Plate, 22" × 18-1/16", to mount BQ-50 mechanism in turntable cabinet	$ 75.00
MI-11809A		Turntable Cabinet (metal) for BQ-52 and BQ-50	$ 245.00
MicroTrak	6401	Pickup Equalizer Preamplifier, Stereo	$ 159.50
MI-11894C		Lightweight Pickup Arm, 12", less cartridge or stylus	$ 90.00
		For further description and specifications for stylii, pickup cartridges and turntables, ask for RCA Catalog AU.8010A.	


Pickup Arm

Mounting Accessories, Phone Equipment

MI-141026-1	Single Turntable Console, Walnut Laminate and Chrome Steel Legs; requires MI-141027/A	$ 150.00
MI-141026-2	Dual Turntable Console, Walnut Laminate and Chrome Steel Legs; requires two MI-141027/A	$ 195.00
MI-141026-3	Triple Turntable Console, Walnut Laminate and Chrome Steel Legs; requires three MI-141027/A	$ 230.00
MI-141027	Blank Plastic Laminate Top, Off-White Color	$ 40.00
MI-141027-A	Plastic Laminate Top, Off-White Color and Pre-cut to accept MI-141652-3 for BQ-52	$ 61.00
MI-141652-3	BQ-52 Shelf Base used to set BQ-52 on table top or to mount in MI-141027/A	$ 35.00

REEL-TO-REEL TAPE RECORDERS

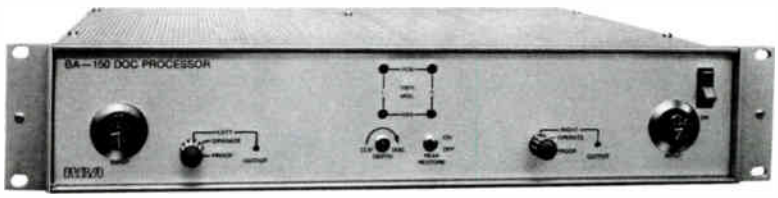
	RCA Stock No.	Type	Description	Suggested List Price
 MX-5050B	Otari	MX-5050B	Two Channel Half Track Recorder/Reproducer with Auxiliary Quarter Track Playback Heads, D.C. Servo Capstan—3¾ & 7½ or 7½ & 15 I.P.S. in desk top cabinet, 117/234V, 50/60 Hz, less Input Transformers	**$ 2,150.00**
			ACCESSORIES	
	Otari	IPT-B	Input Transformer, Balanced 600 Ohm (Two required for MX-5050B)	**$ 14.00 ea.**
	Otari	RK-2B	Rack Mount Kit for MX-5050B	**$ 38.00**
	Otari	CSL-B	Wood Floor Console for MX-5050B	**$ 350.00**
 Mark II-2	Mark II-2		Two Channel Recorder/Reproducer, 7½-15 I.P.S. with D.C. Servo Capstan in table top console less input transformers	**$ 2,695.00**
			ACCESSORIES	
	Otari	IPT-HW	Input Transformer, balanced 600 Ohm input —two required for Mark II-2	**$ 43.00 ea.**

PROCESSING SYSTEMS

RCA Signal Processing Systems are fast-acting automatic units that maintain desired program levels, permit high peak modulation without overmodulation, provide expansion and compression, provide symmetrical/non-symmetrical selection for high positive AM modulation peaks. Sound quality is improved. No thumps, ringing or gain pumping.

BA-150—the sure cure for overmodulation

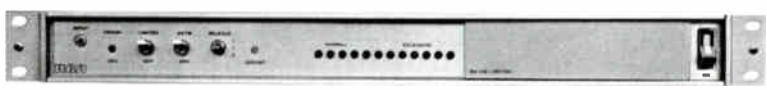
This DOC processor is a unique system that utilizes the time-proven technique of peak clipping preferred by the majority of listeners. It is a sophisticated peak clipper that forms bi-level clipping to precisely control and maintain high frequency peaks without audible filter ring. The BA-150 permits clean, responsive signal transmission. Your audience will notice a freshness and new brightness in your sound that will keep them tuning in.



BA-150

RCA Stock No.	Type	Description	Suggested List Price
MI-141467	BA-150	Stereo Digital Overshoot Controller	**$ 1,500.00**
MI-141455A	BA-145	AGC Amplifier, monaural with transformer inputs and outputs	**$ 1,600.00**
MI-141462A	BA-145S	AGC Amplifier, stereo with transformer inputs and accessories	**$ 1,775.00**
MI-141456A	BA-146	Limiter Amplifier, monaural	**$ 1,280.00**
MI-141456AS	BA-146S	Matched Pair BA-146's for stereo	**$ 2,425.00**
		For further description and specifications ask for RCA Catalogs AU.6400, AU.5410A, and AU.6500B.	

BA-145S



BA-146A

AUDIO AMPLIFIERS/MONITOR SYSTEM

BA-8

RCA Stock No.	Type	Description	Suggested List Price
MI-11450C	BA-8C	Ten-input Monitoring System with built-in Loudspeaker which may be muted. Bridging matching inputs are customer selectable for each input. 117/230 Volts, 50/60 Hz operation.	$ 335.00
MI-11449B		Rack Mount Panel, 3½" height	$ .70.00
RTS	410	Ten Watt Monitor Amplifier, half rack width package with rack mounting hardware included. Two RT-410's may be rack mounted side-by-side. 120V, 50/60 Hz operation.	$ 177.00
RTS	1400	In-Line Mike Preamp, requires external power supply or two 9V transistor batteries. Has line level output and switchable limiter.	$ 290.00

MISCELLANEOUS STUDIO ACCESSORIES

ES-11706-1


MI-11265H

RCA Stock No.	Type	Description	Suggested List Price
ES-11706-Series		Lighted Studio Signs: "On-Air", "Rehearsal", "Audition", "Standby", "Silence"	$ 109.00 to $ 114.00
MI-11265H	BI-5H	VU Meter, Panel, monaural; bridging input selector and attenuator	$ 430.00
MI-11712		Bridging Transf., 20k to 150/600 ohms, 20-20 kHz, ±.5 dB, 19 dB insertion loss	$ 118.00
MI-11713A		Line Transf., 150/600 to 150/600 ohms, 20-20 kHz, ±.5 dB, +10 dBm	$ 122.00
MI-141001		Isolation Transf., 150/600 to 150/600 ohms, 30-20 kHz, ±.25 dB, 0 dBm	$ 61.00
Various		Fixed, Dividing and Bridging Pads	$ 30.00 to $ 35.00
		(See RCA Catalogs AU.7410A, AU.7610A, and AU.7610A for further description and specifications.)	
		FURNITURE	
MI-141030-1		Walnut Laminate Table with Chrome Steel Legs, 36" × 64"	$ 190.00
MI-141030-2		Walnut Laminate Table with Chrome Steel Legs, 36" × 44"	$ 195.00
MI-141030-3		Walnut Laminate Table with Chrome Steel Legs, 36" × 84"	$ 220.00

MICROPHONE ACCESSORIES

RCA's line of microphone accessories offers quality, performance and economy for virtually every application. The Electro-Voice and Shure lines of microphone and accessories are also available. Refer to these supplier catalogs, or ask your RCA Representative about these products.

RCA Stock No.	Type	Description	Suggested List Price
MI-11021-8	MS-20	Heavy Duty Floor Stand, chrome, ⅝-27 thead	$ 50.00
MI-11020-1		Mike Arm (flanged vertical mount)	$ 60.00
MI-11020-2		Mike Arm (clamp screw mount)	$ 50.00
MI-11020-4		Mike Arm (perpendicular flanged mount)	$ 60.00
MI-11056	75	Mic. Boom and Stand	$ 497.00
MI-26574-1	103B	Mole Richardson Mic. Boom only	$ 4,355.00
MI-26574-2	126B	Mole Richardson Perambulator only	$ 5,369.00
		Plus a complete stock of mic goosenecks, thread adapters, clamps, cable and wall receptacles. For further description and specifications, ask for Catalog AU.1050.	

MI-11021-8

MI-11010

MI-11020-1

MI-26574-1/2

INTERPHONE EQUIPMENT

RCA headsets and headphones are lightweight, durable assemblies for use by commentators, cameramen and others. Interphones provide convenient headset interconnections between studios and remotes. RCA intercom systems are expandable to meet the communications needs of the largest radio and TV plants. In addition, RTS interphone equipment is available from RCA.

MI-141007

MI-11784A

RCA Stock No.	Type	Description	Suggested List Price
MI-11743B		Single Headset/Carbon Mic., PJ-051B plug	$ 66.00
MI-11744B		Double Headset/Carbon Mic., PJ-6 plug	$ 194.00
MI-141006		Cameraman Headset/Carbon Mic., single PJ051B plug	$ 149.00
MI-141007		Cameraman Headset/Carbon Mic., double, PJ-6 plug	$ 215.00
MI-11784A		Interphone Connection Unit, for transistor intercom systems, three lines, phone and cue volume controls	$ 250.00

See RCA Catalog AU.5110A and AU.7010A for Interphone Accessories.

LOUDSPEAKERS

RCA offers loudspeakers, speaker systems and enclosures especially suited to studio monitoring or quality listening. Electro-Voice Sentry V and JBL loudspeakers are also available from RCA. For information, refer to the Electro-Voice and JBL catalogs, or contact your RCA Representative.

MI-38315C

RCA Stock No.	Type	Description	Suggested List Price
MI-38315C	SL-12D	Dioplex 12" Speaker, 50-16,000 Hz, 10 watts	$ 39.00
MI-11414A-2		Speaker Wall Baffle for SL-12D	$ 48.00
MI-11407E	LS-3E	Wall Housing for SL-12D	$ 175.00
MI-11708A		Speaker Power Attenuator, 15 ohms	$ 89.00

MI-11414A-2

MI-11407E

RACK EQUIPMENT & ACCESSORIES

This includes a line of cabinet racks, panels, rack-mounted shelves, jack panels, terminal blocks, power circuit breakers, patch cords, and other accessories. (For complete information, refer to RCA Catalog AU.7010A.)

De Luxe
Cabinet Racks

RCA Stock No.	Type	Description	Suggested List Price
		84" Blue & Aluminum Epoxy Racks, 24" Deep	
MI-36551-U84	BR-84U	Cabinet Rack, including one set full-length panel mounting angles but less Doors, Side Panels, Cover	$ 360.00
MI-36535-S84		Door, ventilated	$ 216.00
MI-36530-S84		Door, non-ventilated	$ 218.00
MI-36541-B84		Side Panel	$ 114.00
MI-36521-B1		Top Cover	$ 55.00
MI-36546-A28		Electrical Side Shield, top and bottom sect.	$ 39.00
MI-36546-A21		Electrical Side Shield, center sect.	$ 39.00
MI-30527-A29		Panel Mounting Angle, 29"	$ 55.00
MI-30526-A84		Panel Mounting Angle, 84" cabinet	$ 74.00
MI-30566-A84		Single Trim Strip	$ 70.00
MI-30568-A84		Double Trim Strip	$ 72.00
		77" Blue & Aluminum Epoxy Racks, 24" Deep	
MI-36551-U77	BR-77U	Cabinet Rack, including one set full-length panel mounting angles but less Doors, Side Panels, Cover	$ 350.00
MI-36535-S77		Door, ventilated	$ 210.00
MI-36530-S77		Door, non-ventilated	$ 212.00
MI-36541-B77		Side Panel	$ 112.00
MI-36521-B1		Top Cover, ventilated	$ 55.00
MI-36546-A21		Electrical Side Shield, top and bottom sect.	$ 39.00
MI-36546-A28		Electrical Side Shield, center sect.	$ 39.00
MI-30566-A77		Single Trim Strip	$ 65.00
MI-30568-A77		Double Trim Strip	$ 67.00
MI-30527-A29		Panel Mounting Angle, 29"	$ 55.00
MI-30526-A77		Panel Mounting Angle, 77" cabinet	$ 68.00
		Miscellaneous Rack Accessories (For a complete list, see Cat. AU.7010A.)	
MI-11597D	BR-22D	Mounting Shelf for audio modules, 5¼" × 19"	$ 110.00
MI-11645	BJ-24	Double Jack Panel, double plug	$ 127.00
Mi-4652-B2		Double Plug Patch Cord, 2 ft.	$ 24.00
MI-11666	BJ-20TRS	Tip, Ring, Sleeve, Jack Panel—20 jacks	$ 120.00
MI-4652D-2	PJ-72	Tip, Ring, Sleeve, Patch Cord, 2 ft.	$ 22.00
		System and microphone cables, audio and power terminal blocks, blank panels available. Contact your RCA Representative.	

MI-11597D

TEST EQUIPMENT

For a complete list of available test equipment contact your RCA Representative.

Potomac	AT-51	Audio Test System, includes analyzer and audio generator	$ 2,595.00

RCA Broadcast Systems

FOR YOUR CONVENIENCE

Postage-paid, pre-addressed order form

Tear out Form, Fold Here, Secure and Mail.

Enter my order for the following RCA Audio Equipment.

	Quantity	Stock No.	Description	Total Price
1.				
2.				
3.				
4.				
5.				

Signature_____ Date_____

Ship Via_____ Our Purchase Order #_____

Name_____ Title_____

Station or Company_____

Address_____

City_____ State_____ Zip_____

Fold Here, Secure and Mail.

Tear out along this line.

NO POSTAGE
STAMP
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS Permit No. 81 Camden, N.J.

Postage will be paid by

RCA BROADCAST SYSTEMS
Audio Products, Bldg. 2-5
Camden, NJ 08102

RCA

Regional Offices

RCA BROADCAST SALES

ATLANTA, GA 30341
RCA Building
3395 N.E. Expressway
404-455-7717

AUSTIN, TX 78731
3409 Executive Center Drive
Suite 213
512-345-2224/5

BIRMINGHAM, AL 35215
2244 Center Point Road
Suite 208
205-854-3096/3097

BOSTON, MA
40 William Street
Wellesley Office Park
Wellesley, MA 02181
617-237-6050

CAMDEN, NJ 08102
Front & Cooper Streets
Bldg. 2-2
609-338-3592

CHARLOTTE, NC 28209
1515 Mockingbird Lane
Suite 211
704-525-4870

CHICAGO, IL
120 West Eastman Street
Suite 303
Arlington Heights, IL 60004
312-255-2202

CINCINNATI, OH 45231
11430 Hamilton Avenue
513-825-1550

DALLAS, TX 75247
8700 Stemmons Freeway
214-638-6820

DENVER, CO
777 So. Wadsworth Blvd.
Iron Gate IV
Suite 205
Lakewood, CO 80226
303-433-8484

DETROIT, MI
16400 W. Twelve Mile Road
Suite 215
Southfield, MI 48075
313-569-5880

LOS ANGELES, CA
Suite 531
6363 Sunset Blvd.
Hollywood, CA 90028
213-468-4084

INDIANAPOLIS, IN 46260
9240 N. Meridian Street
Suite 102
317-267-6395

KANSAS CITY, KS
5750 West 95th Street
Suite 111
Overland Park, KS 66207
913-642-3185, 6, 7

MIAMI BEACH, FL
3900 RCA Blvd.
Palm Beach Gardens, FL 33410
305-622-1100

MILWAUKEE, WI
Grafton State Bank Building
Suite 403
101 Falls Road
Grafton, WI 53024
414-377-8430

MINNEAPOLIS, MN 55416
4601 Excelsior Blvd.
Suite 305
612-920-6395/6396

NEW YORK, NY 10036
22nd Floor
1180 Avenue of the Americas
212-930-4654/4655

PITTSBURGH, PA
Nationwide Office Bldg.
761 N. Washington Road
McMurray, PA 15317
412-941-5570

SAN FRANCISCO, CA
Suite 305
330 Primrose Road
Burlingame, CA 94010
415-343-2741

SEATTLE, WA 98109
1818 Westlake Avenue, North
Suite 222
206-285-2375

ST. LOUIS, MO
Noah's Ark
Suite 340
St. Charles, MO 63301
314-946-7755

SYRACUSE, NY 13202
500 South Salina Street
Suite 214
315-478-4195

WASHINGTON, D. C. Area
Arlington,VA 22209
1901 N. Moore Street
705-558-4233

Broadcast Audio Products
Building 2-5
Camden, NJ 08102

Gordon H. Allison

Telephone: (609) 338-2342

RCA Broadcast Systems

RCA

Custom-Built Audio Consoles, Type BC-50

- A modular, do-it-yourself console system
- Essentially unlimited input facilities
- Wide range of output capabilities
- Modular design allows future revision
- Mono, stereo, quad or multiple-channel

This is the new idea in audio consoles: A do-it-yourself system from a series of modules that connect together in a myriad of combinations to form almost anything anyone could desire in an audio console.

For those who'd rather buy a console already made and tested, we can assemble the console you want from these modules, at nominal expense.

The design centers around a versatile module called a "Unimodule." This device, through a series of plug-in submodules, serves as an input mixer, a submaster mixer or an echo send/return level control.

Each of the modules and submodules are described on the next few pages along with a typical console functional diagram to illustrate the relationships of the various devices.

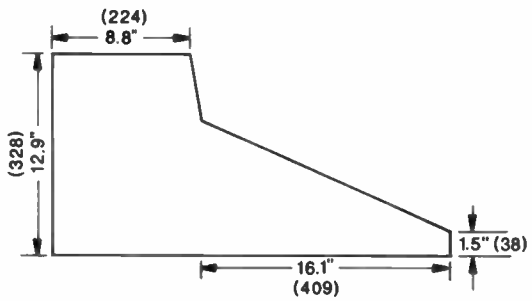
Console Housing

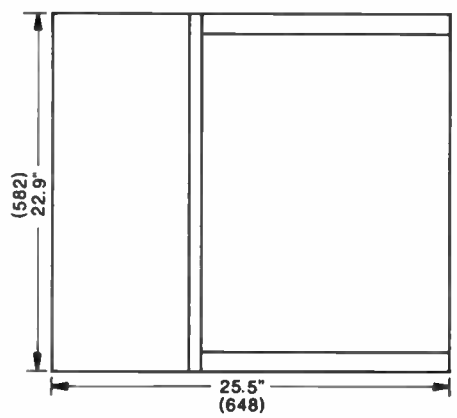
Finished in walnut-grained plastic laminate, the housing accommodates up to 14 Unimodules. In the base are connector strips for the output lines such as program outputs, echo send-and-return, monitor lines and power connections. Also at the rear are provisions to mount XLR panel-type connectors. (XLR connectors not included.)

For situations requiring more than 14 places and up to 28 places, two console housings couple through a "jumper" cable. Each console section requires a separate power supply (see *Accessories*).

On the base plate of each console are connectors that mate with those of the modules to make console assembly that much easier. The connectors allow module interchange without rewiring.

The housings include the upper panels, one of which is equipped with two VU meters, two master gain controls, two input monitor-select switches and a monitor output gain control. Inside, there's space for two monitor amplifiers and two program amplifiers.





PARENTHETICAL DIMENSIONS ARE MILLIMETERS

Specifications

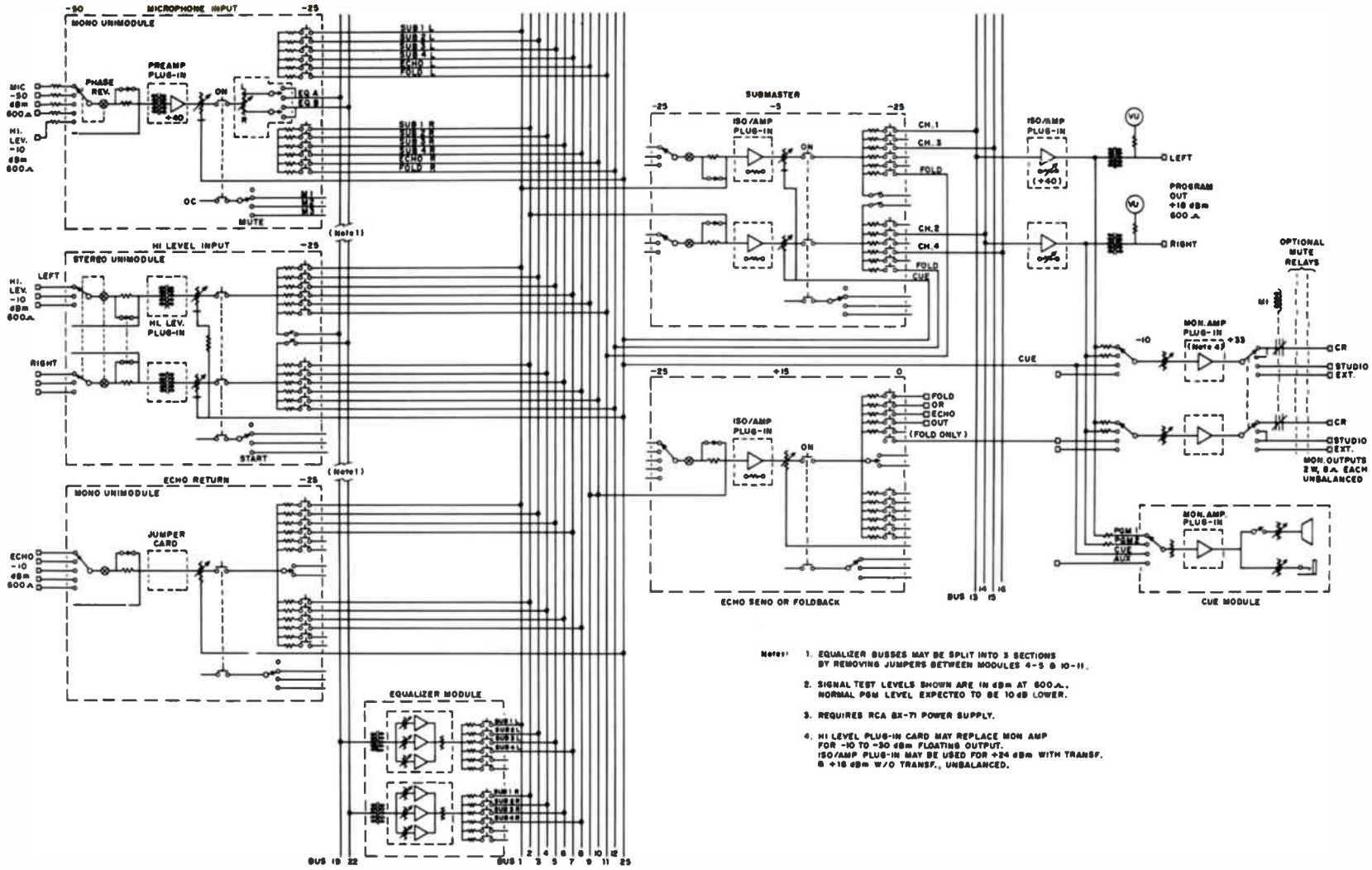
Dimensions	See Drawing
Weight (Approx.)	25 lbs. (11.4 kg)
Shipping Weight (Approx.)	30 lbs. (14 kg)
Shipping Volume	6 ft.^{3} (0.17m^3)

Accessories

Power Supply, Type BX-51	MI-11318
Mono Unimodule	MI-141665
Stereo Unimodule	MI-141666
Equalizer Submodule	MI-141685
Cue Module	MI-141692
Mike Preamp Submodule	MI-141670
High Level Balanced and Isolating Submodule	MI-141672
High Level Unbalanced Submodule	MI-141674
Iso/Mix Amplifier Submodule	MI-141680
Program Output Module	MI-141680
Monitor/Cue Submodule	MI-141690
Blank Panel	MI-141695
Console Interconnect Cable	MI-141697
Output Bus Assembly	MI-141696

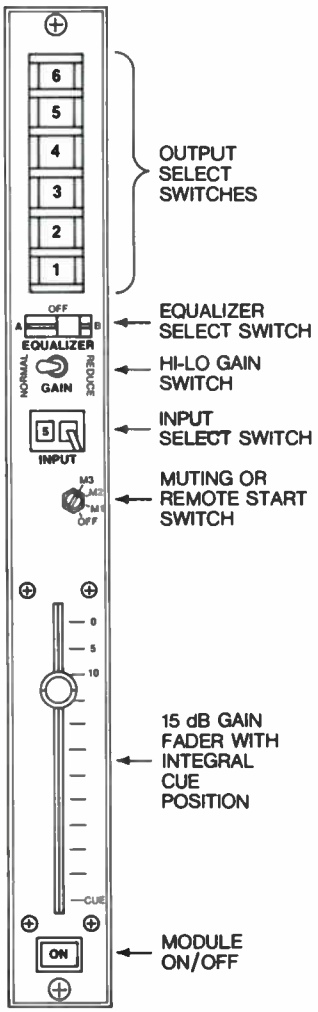
Ordering Information

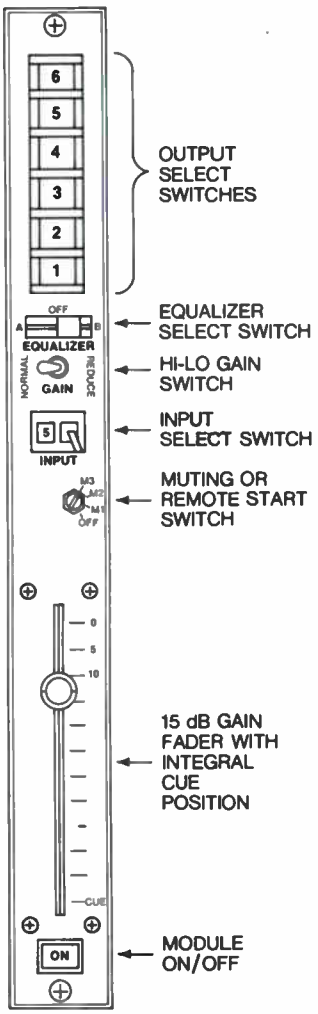
Console Housing, Type BC-50 ..... MI-141660
(Includes two VU meters, monitor switch and two program level controls.)



Notes:
1. EQUALIZER BUSSES MAY BE SPLIT INTO 3 SECTIONS BY REMOVING JUMPERS BETWEEN MODULES 4-5 & 10-11.
2. SIGNAL TEST LEVELS SHOWN ARE IN dBm AT 600Ω. NORMAL PGM LEVEL EXPECTED TO BE 10 dB LOWER.
3. REQUIRES RCA BX-71 POWER SUPPLY.
4. HI LEVEL PLUG-IN CARD MAY REPLACE MON AMP FOR -10 TO -30 dBm FLOATING OUTPUT. ISO/AMP PLUG-IN MAY BE USED FOR +24 dBm WITH TRANSF. & +18 dBm W/O TRANSF., UNBALANCED.

Functional diagram, typical stereo console using BC-50 components.





Mono Unimodule, Type BMM-50

The mono unimodule serves as an input mixer, submaster mixer or echo send/return level controller. Submodules required for operation, see *Accessories*, below.

Specifications

Dimensions (approx.) . . 1.5″ W, 15″ L, 6″ D (38, 381, 152 mm)
Weight (Approx.) . . . . . 2 lbs. (1 kg)
Shipping Dimensions . . . . . 4″ x 20″ x 10″ (102, 508, 254 mm)
Shipping Weight (Approx.) . . . . . 10 lbs. (4.5 kg)

Accessories

Microphone Preamp Submodule MI-141670
High Level Matching and Isolating Submodule MI-141672
High Level Matching Submodule MI-141674
Iso/Mix Amplifier Submodule MI-141680

Ordering Information

Mono Unimodule, Type BMM-50 . . . . . MI-141665

Stereo Unimodule, Type BMS-50

The stereo unimodule is essentially two mono units in one: it serves as a stereo input mixer, stereo submaster mixer or, if desired, stereo echo send/return level controller. Submodules required for operation, see *Accessories*.

Specifications

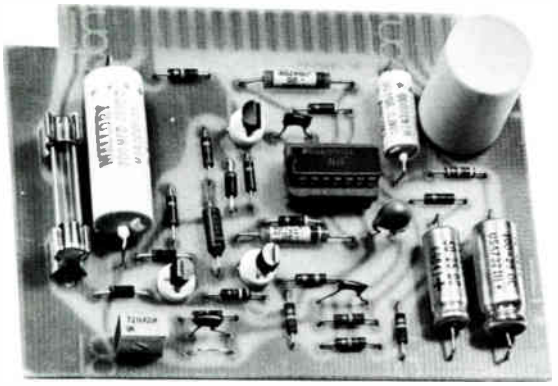
Dimensions (approx.) . . 1.5″ W, 15″ L, 6″ D (38, 381, 152 mm)
Weight (Approx.) . . . . . 2 lbs. (1 kg)
Shipping Dimensions . . . . . 4″ x 20″ x 10″ (102, 508, 254 mm)
Shipping Weight . . . . . 10 lbs. (4.5 kg)

Accessories

High Level Matching and Isolating Submodule MI-141672
High Level Matching Submodule MI-141674
Iso/Mix Amplifier Submodule MI-141680

Ordering Information

Stereo Unimodule, Type BMS-50 . . . . . MI-141666



Microphone Preamplifier Submodule

Used with the mono unimodule only, the preamp submodule provides 25 dB of gain and includes an isolation transformer. It plugs into a socket on the unimodule.

Specifications

Input Impedance (floating) ..... 1200 ohms
Source Impedance ..... 150 ohms
Nominal Input Level (Unterminated) ..... –50 or –30 dBm
Maximum Input Level ..... 0 dBm

Ordering Information

Microphone Preamplifier Submodule MI-141670

High-Level, Balanced and Isolating Submodule

Used in either the mono or stereo unimodule, this submodule interconnects the unimodule input circuitry with the signal-routing components of the unimodules. Built-in, balanced transformer isolates the input. (Not illustrated.)

Specifications

Input Impedance (floating) ..... 600/1200 ohms
Source Impedance ..... 600 ohms
Nominal Input Level ..... –10 to +10 dBm
Maximum Input Level ..... +20 dBm

Ordering Information

High-Level, Balanced and Isolating Submodule MI-141672

High-Level, Unbalanced Input Submodule

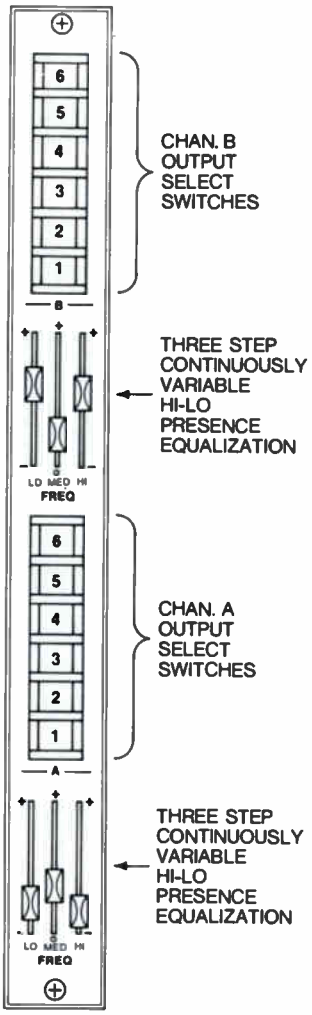
Essentially identical to the high-level submodule described above, this unit omits the built-in isolation transformer which, in turn, makes the input unbalanced and unisolated.

Specifications

Input Impedance (unbalanced) ..... 600 ohms
Source Impedance ..... 600 ohms
Nominal Input Level ..... –10 to +5 dBm
Maximum Input Level ..... +30 dBm

Ordering Information

High-Level, Unbalanced Input Submodule MI-141674



Equalizer Unimodule, Type BEM-50

Using the same panel dimensions as the mono and stereo unimodules, the equalizer module provides two separate equalized channels for mono or one stereo channel. The module provides continuously variable boost or cut of high and low frequencies in addition to a variable boost in mid-frequency region. Submodule with active circuitry sold separately, see *Accessories*. Inoperable without submodule.

Specifications

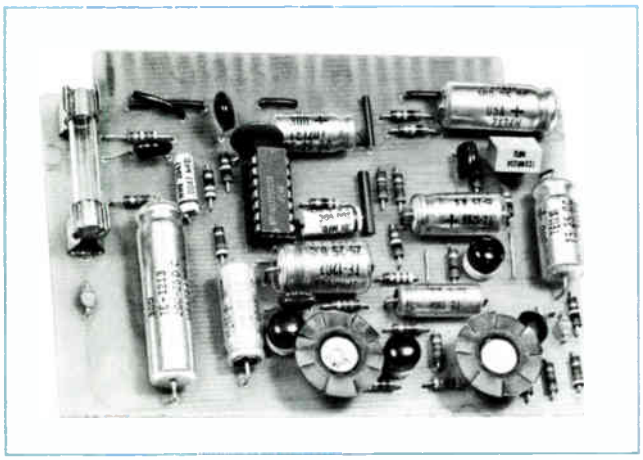
Low Frequency Boost/Cut (40Hz) ..... +18/–18 dB
High Frequency Boost/Cut (10 kHz) ..... +15/–15 dB
Mid-Frequency Boost (1100Hz) ..... +16 dB
Dimensions ..... 1.5" W, 15" L, 6" D (38, 381, 152 mm)
Weight ..... 2 lbs. (1 kg)
Shipping Weight ..... 10 lbs. (4.5 kg)
Shipping Volume ..... 2 ft.^{3} (0.6m^3)

Accessories

Equalizer Submodule (Two req'd) MI-141687

Ordering Information

Equalizer Module, Type BEM-50 ..... MI-141685
(Submodules not included; two required for two-channel or stereo operation. See "Accessories" above.)



Isolation/Monitor/Program Amplifier Submodule

A quadruple-use submodule. First, it serves as an isolation amplifier in a unimodule operating as a submaster mixer; second, a booster amplifier in a unimodule operating as echo send/return or foldback control; third, as a program amplifier in the output line or lines and, fourth as a monitor amplifier (see functional diagram of typical system). Two are included in each console housing, mounted behind the VU-meter panel, operating as program amplifiers.

Specifications

Nominal Output Level ..... +18 dBm
Maximum Output Level ..... +24 dBm
Output Impedance ..... 60 ohms max.
Nominal Input Level ..... −25 dBm

Ordering Information

Iso/Mon/Pgm Amplifier Submodule MI-141680

Blank Panel, Type BP-50

For filling unused module spaces in consoles with fewer than maximum mixer modules, submaster modules or cue modules. Match modules in dimension, color and trim. Hardware included. (Not illustrated.)

Specifications

Dimensions ..... 1.5″ W, 15″ L, ⅛″ D (38, 381, 3 mm)
Weight ..... 0.5 lbs. (0.23 kg)

Ordering Information

Blank Panel, Type BP-50 ..... MI-141695

Console Interconnect Cable

For situations where two console housings are required to accommodate modules. (Not illustrated.)

Ordering Information

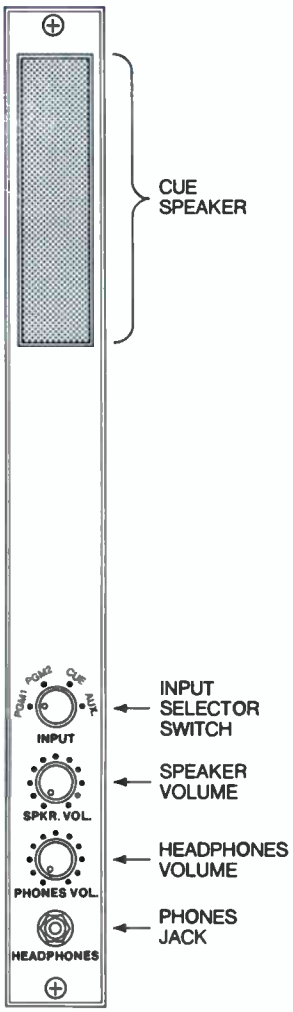
Console Interconnect Cable MI-141697

Output Bus Assembly

Allows use of BC-50 modules in housings other than those offered here. (Not illustrated.)

Ordering Information

Output Bus Assembly MI-141696



Cue Module, Type BCM-50

A combination cue and monitor module. It monitors two program lines, cue or an external source (network, for example). Built-in loudspeaker, headphone jack and separate volume controls for each increase operating convenience. Appropriate switching allows use of speaker and headphones individually or simultaneously. Requires monitor/cue submodule for operation, see *Accessories*.

Specifications

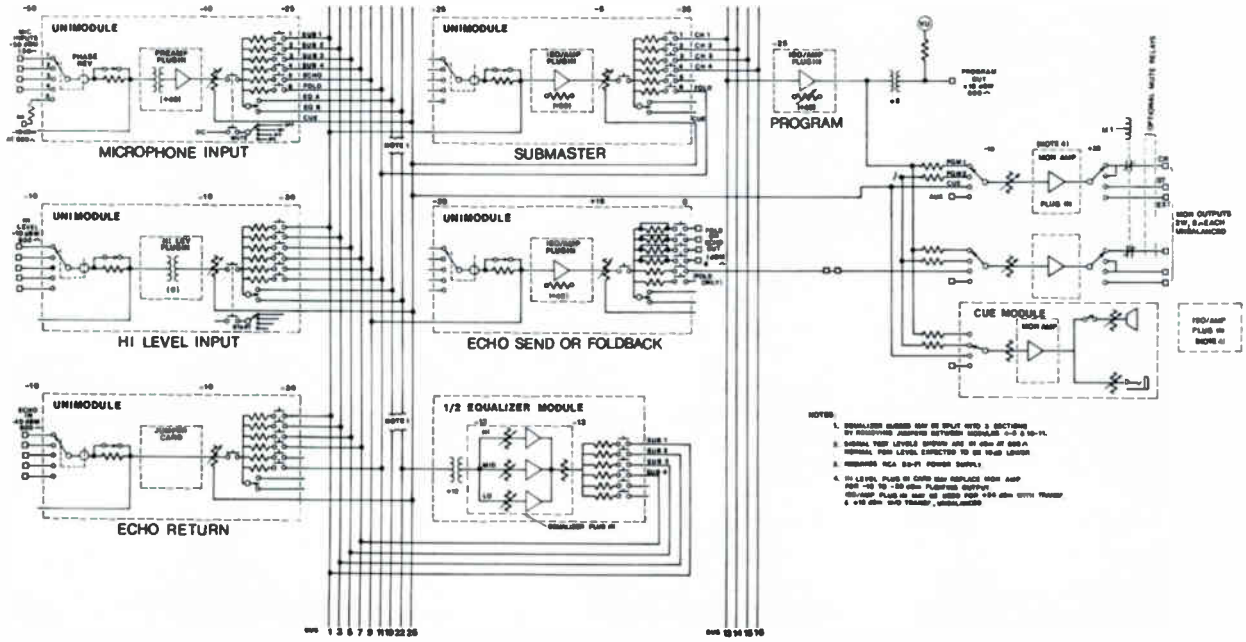
Power Output (8 ohms) ..... 2W max.
Load Impedance ..... 4-16 ohms
Dimensions ..... 1.5″ W, 15″ L, 6″ D (38, 381, 152 mm)
Weight ..... 2 lbs. (1 kg)
Shipping Weight (Approx.) ..... 10 lbs. (4.5 kg)
Shipping Dimensions (Approx.) ..... 4″ x 20″ x 10″ (102, 508, 254 mm)

Accessories

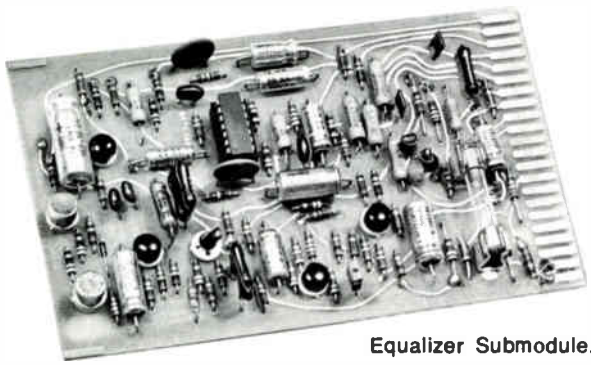
Monitor/Cue Amplifier, 2W MI-141690

Ordering Information

Cue Module, Type BCM-50 ..... MI-141692
(Less amplifier submodule, see "Accessories".)



Functional diagram, typical mono console using BC-50 components.



Equalizer Submodule.

Typical BC-50 Specifications

Published here as an indicator of the performance to be expected of BC-50 consoles assembled according to instructions and tested with nominal input and output levels. Normal operating level is 10 dB below nominal.

Specifications

Frequency Response[1]	30-15,000Hz ±0.75 dB
Harmonic Distortion:	
Program (30-15,000 Hz)	0.75% max.
Monitor (30-15,000 Hz)	1.5% max.
Signal/Noise Ratio (20-20,000 Hz, unweighted)	68 dB min.
Crosstalk[2]	−65 dB
Headroom (Above nominal level)	±15 dBm
Program Channel Gain:	
Nominal	68 dB
Maximum	108 dB
Fader Range	+14 to −44 dB
Ambient Operating Temperature	113°F (50°C) max.
Power Requirements[3]	117/234V, 50-60Hz

[1] At program outputs.

[2] Between any two operating channels, at 15,000 Hz, reference: nominal output level.

[3] Power consumption proportional to facilities included in console.

Front and Cooper Streets, Camden, New Jersey 08102, U.S.A.

RCA Broadcast Systems

catalog AU.6400
(Preliminary)

AGC Amplifier for Recording, AM & FM Radio & TV, Type BA,145 Mono, Type BA-145S Stereo

- Inaudible AGC action
- Gated gain with automatic reset
- Proof-of-performance operational mode
- High compression ratio — fast attack
- Absolute gain indication
- Program modulated release time

These systems are unique signal processing amplifiers that make gain correction decisions automatically to provide the maximum average modulation over extreme variations of program levels.

The BA-145 is a monaural unit and the BA-145S is a matched stereo unit. Two stereo units may be synced together for quad operation.

Type BA-145 Mono

Type BA-145S Stereo

Either unit occupies only 1¾ inches (44 mm) of rack space. Depth of 14½ inches (360 mm) allows mounting in 18-inch (457 mm) depth rack or rack cabinet.

Small Size—Easy to Install and Operate

The BA-145 (mono) is housed in a 1¾" high, 19" wide (standard rack) and 14½" deep chassis with sufficient covers and electrical protection against conducted and radiated RF. The BA-145S (stereo) is housed in the same size unit. Stereo operation is accomplished electrically by the addition of a printed circuit module to the mono unit. When ordered as a BA-145S, the stereo unit comes complete with the second module in place and tested as a stereo unit. However, the BA-145 mono can be converted to a BA-145S stereo in the field by the addition of the MI-141463 Stereo Conversion Kit.

All required controls and metering for either unit are mounted on the front panel for ease of installation and operation.

Decision Making Capability

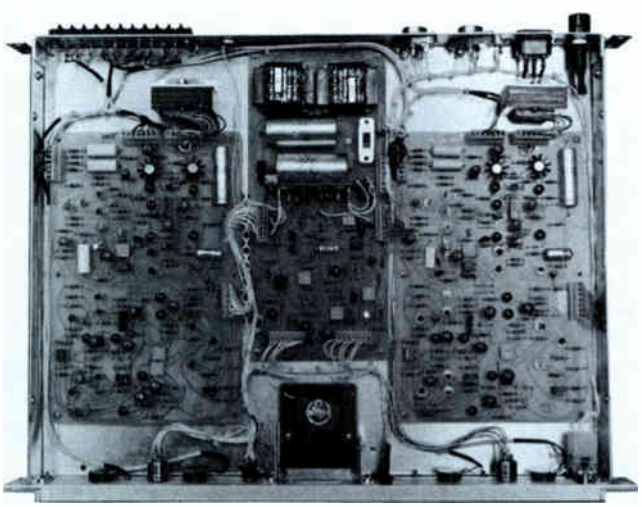
The BA-145 is a new generation of gain controlling device. It differs from conventional AGC amplifiers in that it makes gain changes under a strict set of logical conditions rather than continuously riding gain. This makes the BA-145 action virtually inaudible and eliminates all of the undesirable side effects (swish-up, gain pumping, etc.) of conventional automatic gain controlling amplifiers.

Wide Range

The BA-145 provides for up to 24 dB of gain compression and a maximum of 16 dB of expansion. This, coupled with a selectable program modulated release time, gives complete control of the widest input dynamic range of any type programming format, from rock to classical.

Inaudible Gain Control

The heart of the BA-145 is the gain control device—an insulated-gate field-effect transistor (IG-FET). This device is the perfect gain control device in that it eliminates thump and provides the wide range and smooth gain control of a solid state device. The brain of the BA-145 not only determines when and how much to increase the gain, but also when not to vary the gain and to go into a hold mode. Length of the gain hold mode is internally computed based on program content. All logic and audio circuits are solid state.



A look inside a BA-145S.

Absolute Gain Indication—RCA Exclusive

The gain meter has a two color scale showing the amount of compression or expansion. (On conventional AGC's, it is the user's guess as to what is happening.) In addition, the BA-145 has an exclusive feature—a set of three LED's indicating gain expansion (green), compression (red), or hold (yellow)* and displays the relative amount. There can be no ambiguity.

Proof-of-Performance—Operational Mode

The BA-145 includes a front panel switch that allows proof-of-performance tests to be accomplished using the active components of the unit. This convenience eliminates the need to disconnect and reconnect the unit for "proof" test.

Designed for Quadraphonic

Two stereo units (BA-145S) may be synchronized for quadraphonic operation through an interconnection at the rear of the unit. An external quad synchronizing unit MI-141465 is required for this mode of operation.

Dual-Voltage Power Supply

The BA-145 is wired for operation on 117-Volt 50 or 60 Hertz power lines during manufacture. However, the unit's power transformer primary is split for operation on 234-Volt power. A simple rewiring operation converts the unit to 234-Volt operation.

*The meter is color coded to match the appropriate LED.

Rear view. Input/Output connections are screw-type; stereo/quad sync enters through connector at center.

Specifications—BA-145 AGC—Mono & Stereo

Maximum Gain ..... 46 dB with maximum expansion
Nominal Gain ..... 32 dB with 12 dB compression
Minimum Gain ..... 20 dB with 24 dB compression
Maximum Compression ..... 24 dB
Maximum Expansion ..... 16 dB
Compression Ratio ..... Better than 30:1
Noise ..... 70 dB below threshold of compression
Input Level ..... −12 dBm to +30 dBm for 12 dB of compression (adj)
Output Level ..... Adjustable to +18 dBm maximum with compression, +26 dBm amplifier maximum
Input Impedance ..... 600 ohms balanced or unbalanced
Output Impedance 600 or 150 ohms balanced or unbalanced
Compression Attack Time:
  Selectable
    Fast ..... 0.20 Milliseconds
    Med. ..... 2.0 Milliseconds
    Slow ..... 30.0 Milliseconds
Expansion Attack Time:
  Selectable
    Fast ..... 5.0 sec.
    Med. ..... 15.0 sec.
    Slow ..... 30.0 sec.
Compression Release Time:
  Selectable
    Fast ..... 10.0 sec.
    Med. ..... 20.0 sec.
    Slow ..... 40.0 sec.
Expansion Release Time:
  Selectable
    Fast ..... 4.0 sec.
    Med. ..... 6.0 sec.
    Slow ..... 10.0 sec.
    (Dependent on compression release time)

Frequency Response ..... ±0.5 dB 20 Hz-15,000 Hz
Harmonic Distortion ..... Less than 1.0% 20 Hz-15,000 Hz
Maximum Operating Temperature ..... 55°C (130°F)
Power Requirements ..... 117/234 VAC 50/60 Hz, 25 watts
Connections ..... Input/output via barrier terminal block, Quad sync jack, AC power cord
Metering ..... Red LED indicator lights for compression, Green LED indicator lights for expansion, Yellow LED indicator light for linear mode, Meter indicating amount of expansion or compression
Panel Controls ..... Input level control, Output level control, Proof-of-performance switch/operate, Release time/attack switch, See Fig. 1
Dimensions ..... Fits standard 19 inch rack, 1¾ inches high, 15 inches deep

	BA-145	BA-145S
	1.75″Hx19″Wx15″D (44x483x381 mm)	1.75″Hx19″Wx15″D (44x483x381 mm)
Weight—Net (approx.)	12 lbs. (5.5 kg)	13 lbs. (5.9 kg)
Weight—Shipping (approx.)	15 lbs. (6.8 kg)	16.5 lbs. (7.5 kg)

Accessories

Stereo Conversion Unit MI-141463
(For field modification of BA-145)
Quad Synchronizing Controller MI-141465
(For operating 2 BA-145S Synchronized)

Ordering Information

AGC Amplifier Mono, Type BA-145 ..... MI-141455
AGC Amplifier Stereo, Type BA-145S MI-141462

Front and Cooper Streets, Camden, New Jersey 08102, U.S.A.

RCA Broadcast Systems

catalog AU.6410A
(Replaces B.1440A)

Limiter Amplifier for AM Radio, Type BA-146
Limiter/Clipper Amplifier for FM Radio & TV, Type BA-147

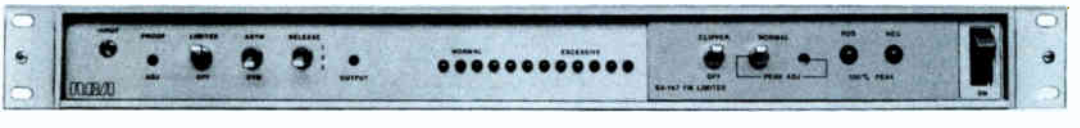
- Inaudible limiting action
- Asymmetrical and symmetrical limiting
- Proof-of-performance operational mode
- High compression ratio—fast attack
- Program modulated release time

These two units are fast-acting limiters to allow high peak-modulation levels for maximum broadcast coverage. They contribute little distortion to the audio waveform and inhibit transmitter overmodulation.

The BA-146 unit is intended for use in AM-radio operations while the BA-147 unit is designed for the need of FM radio or the aural channel of TV broadcast transmitters.

The BA-147 is essentially a BA-146 expanded to include a pre-emphasis time constant and a peak clipper.

Type BA-146



Type BA-147

Either unit occupies only 1¾ inches (44 mm) of rack space. Depth of 14½ inches (360 mm) allows mounting in 18-inch (457 mm) depth rack or rack cabinet.

AM-Broadcast Peak Limiter, Type BA-146

The BA-146 is a fast acting peak limiter for AM-broadcast operations. Its limiter action allows increased transmitter modulation without overmodulation. The effect is an apparent increase in broadcast coverage without an increase in licensed transmitter power.

Microsecond "Attack" Time

In operation, the BA-146 connects between the program line and the transmitter audio input. As long as the audio level on the program line is below the threshold of overmodulation, the limiter takes no action. However, when modulation peaks exceed a predetermined level that would result in overmodulation, the BA-146 applies limiting action at the rate of one microsecond per decible of compression. This action is inaudible to even trained ears.

Inaudible Limiting Action

Fast limiting action, in many systems, adds a noticeable "thump" to program audio. The faster the action, the more noticeable the thump.

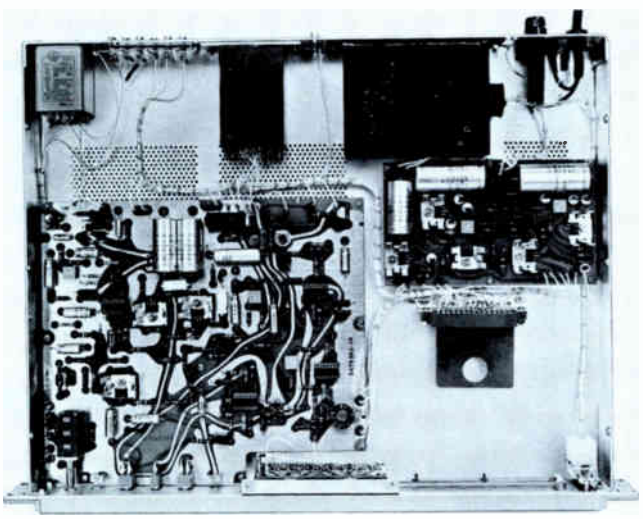
In the BA-146, the thump is nonexistent because the design isolates the control voltage (the thump-maker) from the program audio. The heart of this design is an insulated-gate field-effect transistor (IG/FET) that operates as a voltage-controlled amplifier in the program line.

Adjustable Release Time

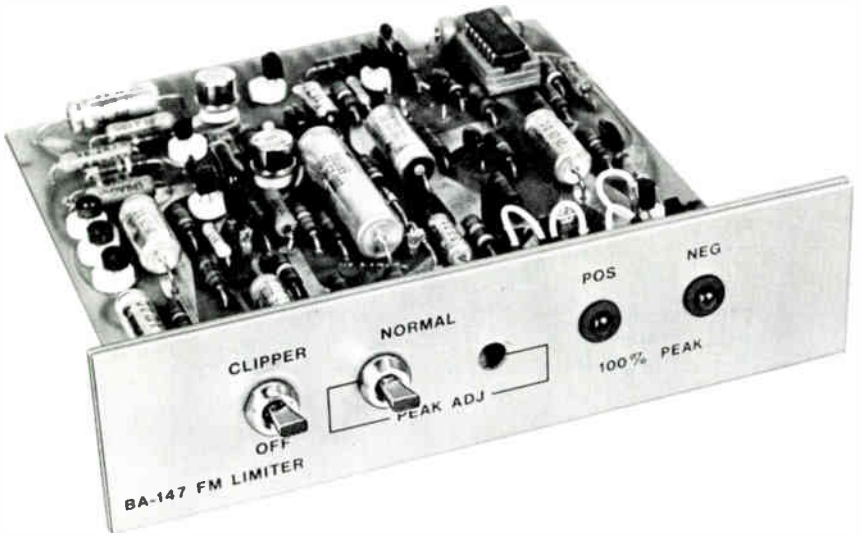
Uncontrolled release time can also introduce undesirable effects into the program material. In the BA-146, release time is adjustable to three values: 0.2, 0.5 and 5 seconds through a three-position toggle switch on the front panel. Should these three values be unsuitable for your programming, a simple circuit modification allows a variety of release times.

Asymmetrical and Symmetrical Limiting

The BA-146 affords two modes of limiting: symmetrical and asymmetrical. In symmetrical mode, the unit limits both positive and negative peaks equally; in



A look inside a BA-146. Clipper module fits in space at lower right.



This module plugs into a BA-146 to convert it to a BA-147 Limiter/Clipper for FM, SCA and TV aural use.

asymmetrical mode, it allows positive peaks to attain a 125 percent level while maintaining a 100 percent limit on negative peaks.

In the event that your transmitter cannot attain 125 percent positive modulation, a simple resistor change within the unit adjusts the BA-146 to limit at a level compatible with the transmitter.

Proof-of-Performance Operational Mode

The BA-146 includes a front-panel switch that allows proof-of-performance tests to be accomplished using the active components of the limiter.

LED Limit Readout

Instead of the familiar meter readout of limiting action, the BA-146 uses a series of twelve LED devices (light-emitter-diodes) on the front panel. As limiting action increases, the number of lighted diodes increases. This method eliminates the inaccuracies provided by the meter movement method of montoring.

FM & TV Broadcast Peak Limiter/ Clipper, Type BA-147

The BA-147 is a peak limiter and clipper for FM-broadcast, the aural channel of TV-broadcast or FM subsidiary communications authority (SCA) system where the pre-emphasis characteristics of the modulator can cause overmodulation in the high-frequency portion of the passband.

The BA-147 duplicates the peak limiting action of the BA-146 described in this section and adds to it a clipper that complements the pre-emphasis characteristic. The clipper circuitry is housed in a plug-in module. As a result, a BA-146 is convertible in the field to a BA-147 with the addition of the FM clipper module (see *Accessories*).

For stereo and quadraphonic programming, two (for stereo) or four (for quad) BA-147 amplifiers are synchronized through a simple interconnection at rear-mounted connectors.

Frequency Selective Clipper Action

The clipping action of the BA-147 is selective, according to the pre-emphasis curve used in the transmitter system and the desired operational fidelity. For example, a "Top 40" operation might establish a clipping level between 4 and 6 kHz; an MOR station between 6 and 10 kHz; while a classical-music facility clips only above 10 kHz.

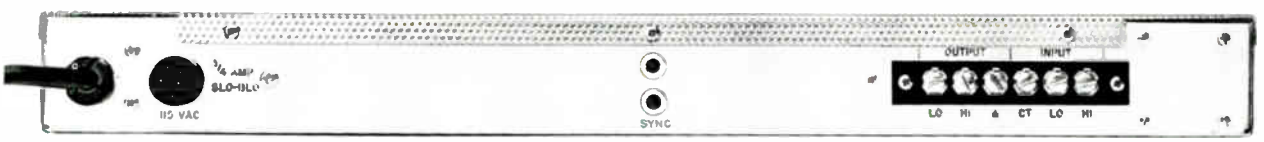
Selective clipping sets up easily with the use of an audio signal generator and an adjustment of the peak control on the front panel. LED's light as the negative and positive peaks reach clipping.

Proof-of-Performance Operation

A front-panel toggle switch bypasses the clipper and pre-emphasis functions for proof-of-performance measurements. This convenience eliminates the need to disconnect and reconnect the unit for "proof" tests.

Dual-Voltage Power Supply

The BA-146 and 147 are wired for operation from 117 volt, 50 or 60 hertz power lines during manufacture. However, the unit's power transformer primary is split for operation on 234-volt power. A simple rewiring operation converts the unit to 234-volt operation.



Rear view. Input/Output connections are screw-type; stereo/quad sync enters through connectors at center.

Specifications

	BA-146	BA-147
Input Impedance	600 ohms[1]	600 ohms[1]
Output Load Impedance	600/150 ohms[1]	600/150 ohms[1]
Input Level:		
Verge of Limiting Action	−26 dBm[2]	−26 dBm[2]
Maximum	+20 dBm	+20 dBm
Output Level:		
Symmetrical Limiting	+24 dBm	+24 dBm
Asymmetrical Limiting:		
Negative Peaks	+24 dBm	—
Positive Peaks	+26 dBm[3]	—
Clipping Level	—	+24 ±0.4 dBm
Clipping Indicator Sensitivity	—	0.5 dB max.[11]
Maximum Gain	50 ±0.5 dB	50 ±0.5 dB
Signal/Noise Ratio	70 dB min.[4]	70 dB min.[4]
Frequency Response	20-15,000 Hz ±0.5 dB 20-20,000 Hz ±1 dB	20-15,000 Hz ±1 dB[9]
Harmonic Distortion	1% max.[5]	1% max.[10]
Pre-emphasis Time Constant	—	75 μs[12]
Compression Ratio	50:1[6]	50:1[6]
Attack Time	1 μs/dB[7]	1 μs/dB[7]
Recovery Time	0.2, 0.5, 5s[8]	0.2, 0.5, 5s[8]
Ambient Operating Temperature	55°C (130°F) max.	55°C (130°F) max.
Compression Range	26 dB	26 dB
Connections	Term Strip	Term Strip
Power Requirements	117/234V, 50-60Hz 18W	117/234V, 50-60Hz 25W
Dimensions	1.75″ H, 19″ W, 15″ D (44, 483, 381 mm)	1.75″ H, 19″ W, 15″ D[13] (44, 483, 381 mm)
Weight	14 lbs. (6.4 kg)	15 lbs. (6.8 kg)

[1] Balanced or unbalanced, with input and output transformers.
[2] Adjustable to higher levels.
[3] For 125 percent modulation. Adjustable from 100 to 125 percent and above through resistor interchange in circuit.
[4] Bandwidth: 20 to 20,000 Hz.
[5] Bandwidth: 50-15,000 Hz; throughout control range.
[6] Compresses 25 dB change into 0.5 dB.
[7] Without clipping, regardless of signal waveform.
[8] Three fixed values. Adjustable through resistor change.
[9] At levels below clipping level.
[10] At levels below clipping level, 50 to 15,000 Hz.
[11] At any frequency between 30 and 20,000 Hz.
[12] Adjustable to 50 μs through components interchange.
[13] Clipper module dimension 6″ x 5.5″ x 1.375″ (132, 140, 35mm); weight, 16 oz. (454 g).

Accessories

FM Clipper Module (for BA-146) MI-141457

Ordering Information

AM Limiter Amplifier, Mono, Type BA-146 ..... MI-141456
As Above but for Stereo, Type BA-146S MI-141456S
FM Limiter/Clipper Amplifier, Type BA-147 ..... ES-11141
As Above but for Stereo, Type BA-147S ES-11141S

In the interest of product improvement, specifications are subject to change without notice.

Front and Cooper Streets, Camden, New Jersey 08102, U.S.A.

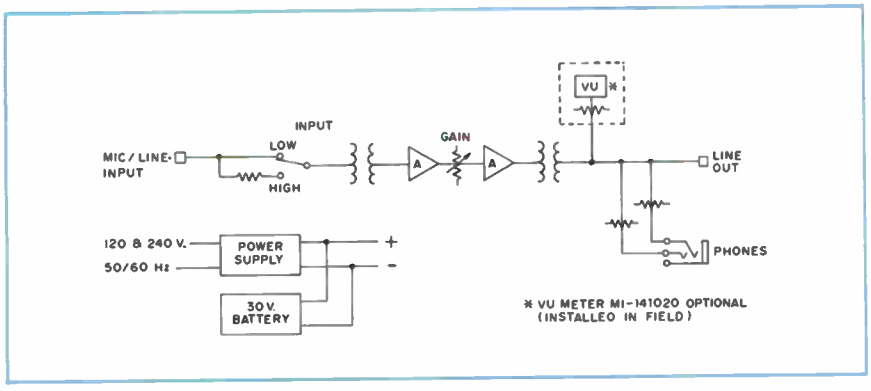
RCA Broadcast Systems

catalog AU.2610A
(Replaces B.1180)

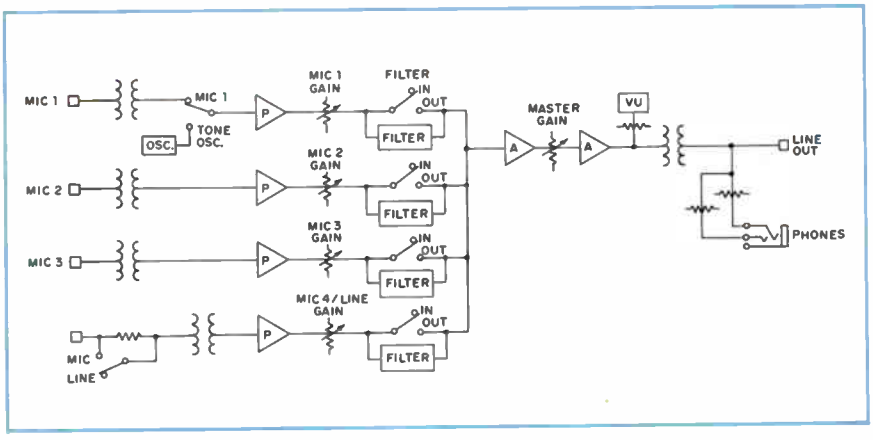
Remote Amplifiers,
Types BN-1 and BN-4

- Broadcast quality at low cost
- Balanced-line inputs and output
- Battery or power line operation
- Two compact units: one input or four inputs
- Lighted VU Meter

Each of the amplifiers described here is a low-cost, broadcast-quality product designed and built for programming on location. They are fully transistorized designs of compactness and convenience. The Type BN-1 Amplifier is a single-input device while the BN-4 handles four program sources. The Type BN-4 has usefulness in other fields beyond broadcasting. For example, it can be used as an audio mixer panel in "professional audio" situations or for sound reinforcement systems in theaters, arenas, stadiums and the like. The BN-4 serves CATV, educational sound systems (schools and colleges) and in the aural function of educational-TV systems. The BN-1 can also be used as a line amplifier by use of a bridging pad at the input. A rack-mount shelf is offered for both amplifiers (see **Accessories**) for installation of the BN-1 and BN-4 in any equipment rack or console using 19-inch (483 mm) panels.



Functional diagram, Type BN-1



Functional diagram, Type BN-4

Battery or Power Line Operation

So that they might be used most anywhere, both amplifiers operate from either battery power or commercial power line. The battery pack is optional (see *Accessories*). The amplifier automatically switches over to battery power (if so equipped) when disconnected from commercial power.

Lighted VU Meter

For operation independent of ambient lighting, the BN-1 and BN-4 contain lighted VU meters. The meter lights only when the amplifier operates from a power line. If equipped with the optional battery pack, the amplifiers operate from battery power but without lighting. The meter is an extra-cost option in the BN-1 unit and standard equipment in the larger BN-4.

Built-In Tone Oscillator

The BN-4 includes a built-in tone oscillator (in the "Mic 1" channel, see diagram). This is useful in a number of ways as a test tone, a level reference and the like. The tone oscillator switch is located on the unit's rear panel.

Two Compact Units

The Types BN-1 and BN-4 are the smallest ever included in the RCA product line. They are the choice where minimum size and weight are important criteria.

Specifications

Type BN-4 Remote Amplifier

Frequency Response Characteristic .....30-15,000 Hz, ±2 dB
Gain (150-ohm mike; 600-ohm load) .....90 dB
Hum and Noise (low-Z mike; 600-ohm load) .....–125 dBV[1]
Distortion (at +10 dBm output) .....1% or less: typically 0.5%
Inputs .....4 low-Z mikes; 1 line (600-ohm or bridging)
Output Level .....+18 dBm (max.) into 600-ohm line
Power Requirements
(see "Ordering Information") .....105 to 130V, 50/60 Hz
or 210 to 260V, 50/60 Hz
Dimensions .....11⅜" x 7½" x 2½" (289 x 190 x 64 mm)
Finish Color .....Shadow Blue and Silver Gray
Weight (approxiate) .....4 lbs., 13 oz. (2 kg)
Ambient Operating Temperature .....0° to 135° F.
(–18° to 57°C)

Shipping Data:
Dimensions .....19" x 10.5" x 5.5" (483 x 267 x 140 mm)
Cube .....0.6 ft.³ (0.02 m³)
Weight .....6.5 lbs. (3 kg)

Accessories

Battery Pack Power Supply (less batteries) MI-141016
Batteries for Battery Pack .....RCA VS085 or equivalent
Portable Carrying Case MI-141017
Amplifier Stacking Kit MI-141018
Rack-Mount Shelf MI-141019
Handle/Tilt Stand MI-141021

Type BN-1 Remote Amplifier

Frequency Response .....30-15,000 Hz ±1 dB
Gain (150-ohm mike; 600-ohm load) .....94 ±2 dB
Hum and Noise (low-Z mike; 600-ohm load) .....–120 dB[2]
Distortion (at +10 dBm output, 15-15,000 Hz) ....Less than 1%
Inputs .....One; Low-Z mike (30-600-ohms –30 dBm max.)
Output Level .....+18 dBm @ 600 ohm (after 6 dB isolation)
Power Requirements .....105-130V or 210-260V, 50/60 Hz, 5W
Dimensions .....7¼" W; 3½" H; 8⅛" D (184 x 89 x 205 mm)
Finish Color .....Shadow Blue and Silver Gray
Weight (Approx.) .....5 lbs. (2.3 kg)
Ambient Operating Temperature .....32 to 131°F (0 to 50°C)

Accessories

VU Meter (for Type BN-1 only) MI-141020
Battery Pack Power Supply
(Batteries not included) MI-141016
Batteries
(for battery pack, 3 required) .....RCA VS085 or equivalent
Rack-Mount Panel MI-11449

[1] Maximum equivalent input hum and noise, 30-15,000 Hz.
[2] Referred to input, 30-15,000 Hz.

Ordering Information

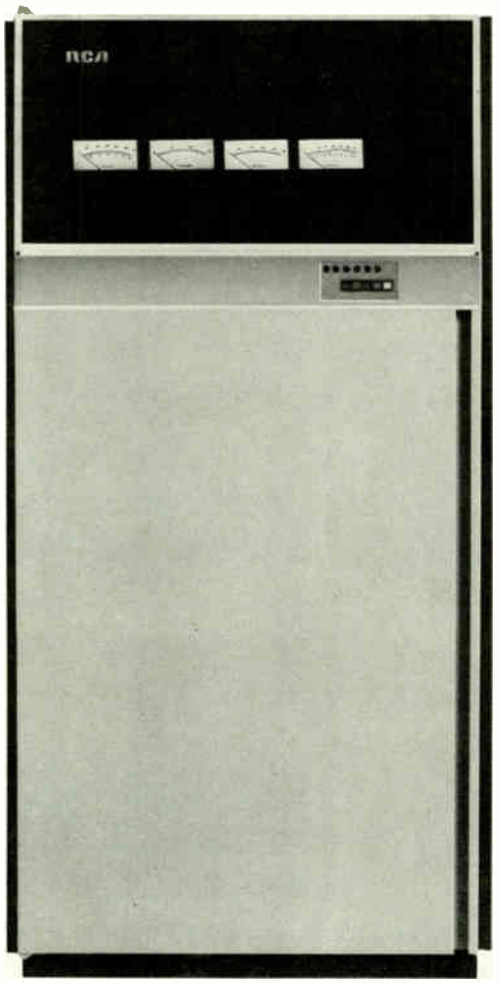
Four-Input Remote Amplifier Type BN-4 for 117-volt power (less batteries and battery case) MI-141402
Type BN-4 factory wired for 234-volt power MI-141403
One-Input Remote Amplifier, Type BN-1
(less VU meter, batteries and battery case) MI-141401

Front and Cooper Streets, Camden, New Jersey 08102, U.S.A.

RCA Broadcast Systems

Five Kilowatt Solid State AM Transmitter, BTA-5SS

- All solid state design
- Low AC power consumption
- Low cost of ownership
- High reliability
- Designed for automatic, unattended operation
- Modular construction
- Shipped ready to operate



The RCA BTA-5SS is a 5 kilowatt high efficiency AM broadcast transmitter designed for operation in the standard AM broadcast band (535-1620 kHz). The basic design is all solid state. It is lightweight, occupies less space, is easy to install and reduces AC power consumption greatly.

Technically, the BTA-5SS is a breakthrough in performance. The new modulation techniques yield the same bright audio response made famous in RCA Ampliphase transmitters. The wide bandwidth capability makes the transmitter transparent to the desired effects of modern audio processing systems used in contemporary AM radio. The BTA-5SS is consistent with expected AM stereo applications.

In size, a further breakthrough is realized. Not only does the BTA-5SS occupy about one-half the space of its predecessor, but it is largely modularized. The trays are easily accessible and can be quickly removed for service and maintenance ease. The BTA-5SS modules are self-contained in a single 38-inch wide cabinet. Installation time is only a matter of hours, eliminating costly rigging, assembly and wiring time.

A New Bright Sound

The wideband performance characteristics of the BTA-5SS sets a new standard in sound against which future transmitters will be compared. It has a bright, full dimension sound, trendsetting in scope. This new bright sound is made possible by RCA's wideband modulation system characteristics and performance that allow passage of one-third additional audio frequencies up to, and including 15 kHz with minimum signal degradation. The improvement over other types, consistent with RCA's pacesetting ampliphase transmitter techniques, is an RCA sound performance characteristic that is measurable by ear and by instrument.

Maintainability & Reliability

The overall maintainability and reliability features are due to factors inherent to solid-state design. The reliability of an "all silicon" transmitter is enhanced because of the greatly reduced wearout characteristics of transistors versus vacuum tube.

The BTA-5SS is largely modular with six RF Power Amplifier and four modulator trays.

Solid state reliability is further enhanced by use of a low volume cooling fan keeping accumulation dust at a minimum. Added operating reliability is provided by the characteristic of "graceful degradation". Even if some RF output transistors fail the transmitter will continue to operate at the same or slightly reduced RF output.

Low Cost of Ownership

The BTA-5SS represents not only a sound investment but a low cost of ownership in daily and long term operating expense, initial installation and maintenance.

AC power saving is substantial; about 25% or more of the current average level of AC power usually consumed by tube type transmitters will be conserved. In terms of AC power cost per kilowatt, the BTA-5SS will realize a hard dollar savings of hundreds of dollars per year in the most conservative estimates.

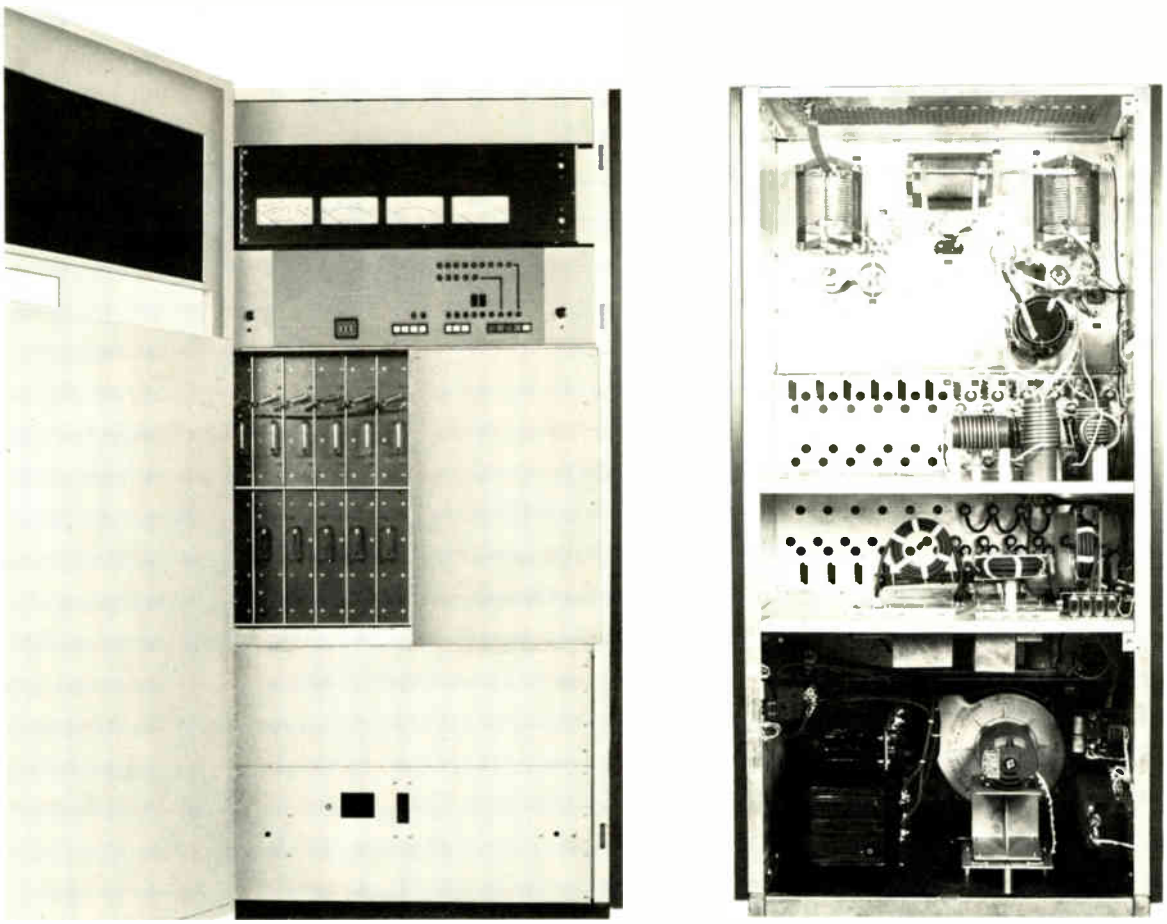
The reason for this cost improvement in transmitter operating expense is the extremely efficient circuit design. To calculate the power consumption of any given transmitter simply apply this formula:

Cost per kW hour × hours per year of operation × kW's of power used.

Then compare the RCA BTA-5SS with other 5 kW transmitters.

Controls

The Transmitter Control System and the Fault Control System provide complete control and protection for the transmitter. The control circuit has remote control capability and a remote/local switch is provided for the safety of operating personnel. The main controls are: Transmitter On, Transmitter Off, RF On, and RF Off. A digital power increase/decrease control is also included and is controlled by two push buttons which give eight steps of power increase (to 10% above nominal) and eight steps of power decrease to 10% below nominal. A switch gives the operator the option of either automatic or manual overload recycle control, and a digital counter is provided in the automatic mode to set the number of overload steps allowed before the transmitter is shut down. The transmitter has four illuminated meters to monitor the RF PA Volts, RF PA Amperes, % Output Power/VSWR, and a multimeter for monitoring approximately forty circuit parameters.



Front and rear views, BTA-5SS Transmitter.

RF Generator and Amplifier

The RF generator or oscillator section contains a high stability frequency synthesizer which allows the output frequency to be programmed in 1 kHz steps in order to satisfy both domestic and foreign assignments. The heart of the synthesizer is a precise temperature controlled 5 MHz oscillator. The RF generator also has provisions for using an external frequency for emergency or for synchronous station operation and for frequency modulating the carrier for AM stereo applications.

The RF synthesizer feeds the RF predriver and the RF driver tray which provides adequate drive to power the 6 RF amplifier trays.

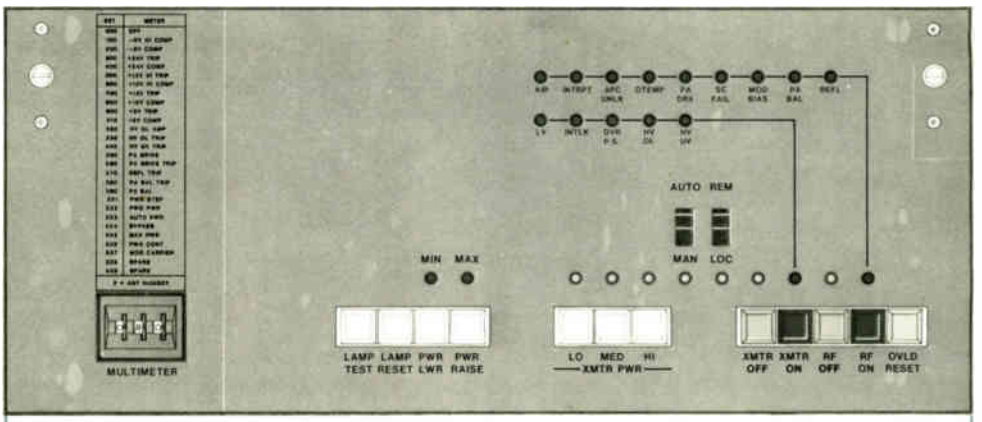
The RF amplifier consists of Class D amplifier stages which provide maximum efficiency. A special bridge circuit allows transistors to switch efficiently at frequencies which were previously unattainable with high power solid state design. The bridge circuit consists of four solid state legs with eight transistors in each leg. Should any transistor develop a fault, it will remove itself from the active circuit and light an appropriate LED status indicator located on the front of the RF tray. During a scheduled maintenance the operator may quickly locate and replace a defective component. However, because of the reserve power of the BTA-5SS, transmitter operation will not be appreciably affected if the component is not changed immediately. Replacement can take place at the next scheduled maintenance.

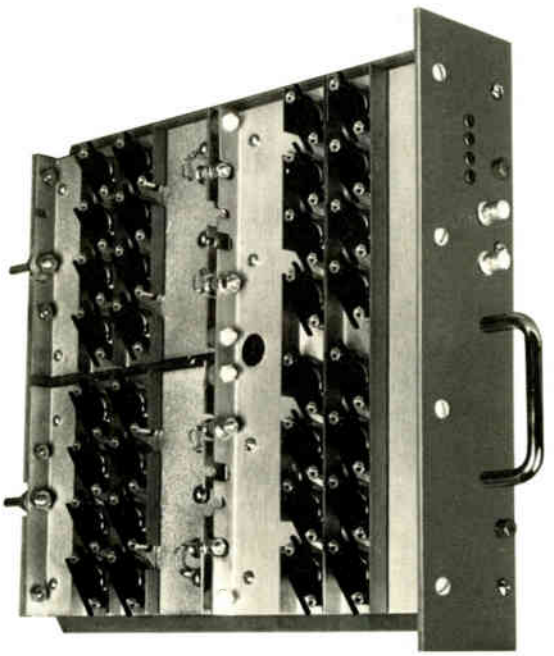
The RF power amplifier modules are summed in the RF combining and impedance matching network. This network provides low impedance lightning protection for the modules. A reflectometer is included to monitor forward power and VSWR and to provide protection by instantly quenching the RF output when a transmission line disturbances occur.

The Modulation System

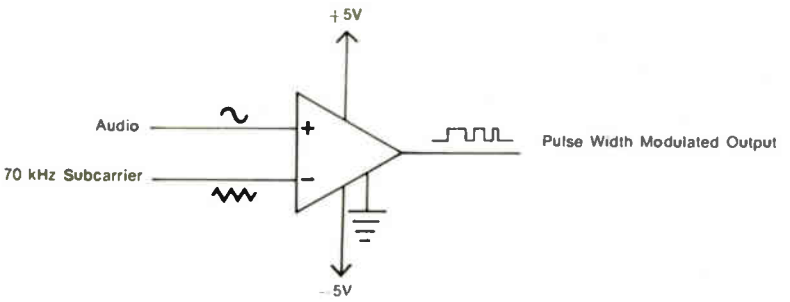
The modulation system of the BTA-5SS utilizes a highly refined pulse width modulator. The 70 kHz subcarrier is directly derived from the frequency synthesizer in the RF generator, and the resulting precise control of subcarrier frequency allows stable system performance and less distortion. The modulation generator produces a pulse train output with frequency equal to the subcarrier frequency and pulse width variations proportional to the modulating audio signal amplitude and frequency. In the absence of an audio input signal, the unmodulated duty cycle of the entire modulation section of the transmitter generates the required voltage

BTA-5SS CONTROL PANEL

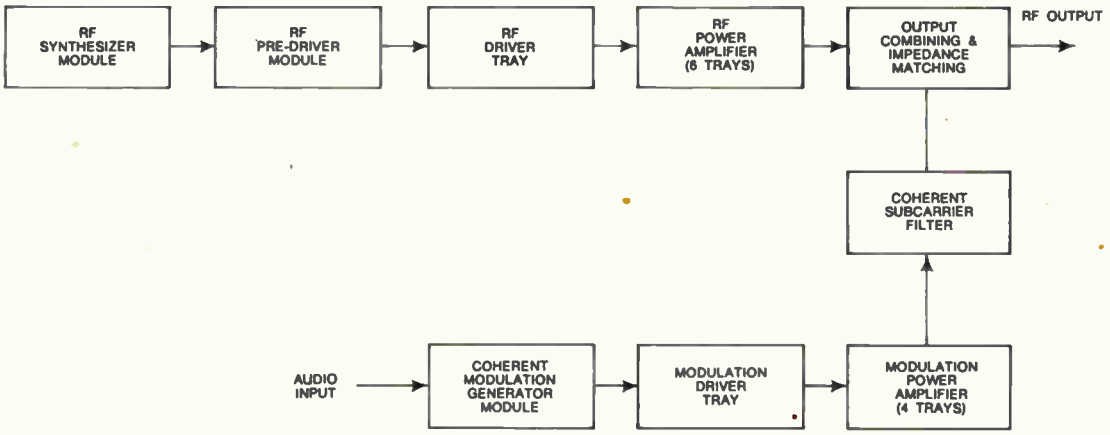




RF Power Amplifier tray.



Simple Comparator Circuit.



Block Diagram: RCA BTA-5SS Solid State Transmitter.

across the final RF stage to produce the unmodulated carrier power output. The entire modulator section consists of the Modulation Generator, Modulation Driver Tray, Modulator Power Amplifier Trays, and the Subcarrier Filter. The Modulation Driver Tray and the Modulator Power Amplifier Tray consist of transistor arrays which turn on and off at the subcarrier frequency and in accordance with the modulated duty cycle. The subcarrier filter removes the subcarrier frequency and applies a voltage, which varies at an audio rate, to the final RF amplifier. This modulation system provides low distortion, wide frequency response, fast transient response, high modulation levels, high efficiency, and a convenient method of adjusting and regulating carrier output power.

The modulation section, including the subcarrier filter, functions as a variable power supply. The transmitter's unmodulated carrier level can be adjusted by changing the duty cycle of the modulator pulse train. After the required carrier level has been set, audio can be applied to the modulation generator to modulate the duty cycle at AM audio rate to produce a varying voltage across the RF final resulting in amplitude modulation of the carrier output.

Preliminary Specifications*

Power Output:	
Nominal	5000 Watts
Capability	5500 Watts
Frequency Range	535 kHz to 1620 kHz Supplied to one frequency as ordered
RF Output Impedance	50 ohms, unbalanced 40 to 235 ohms available
Carrier Shift	Less than 1.5% at 100% modulation
Audio Frequency Response	±1.5 dB, 30 to 15,000 Hz
Audio Frequency Distortion	2% Max. 30 to 10,000 Hz @ 95% modulation
Noise (Unweighted)	–60 dB or better at 100% modulation
Audio Input	600/500 ohms at +10 dBm, ±2 dB Zero dBm or other impedance easily provided
Power Input	208/240 volts, 3 phase, 50/60 Hz
Estimated Power Consumption (5 kW Output):	
At 0% Modulation	6.92 kW
At 85% Modulation	9.6 kW
At 100% Modulation	10.5 kW
Overall Efficiency	65% or better
Power Factor	95% or better
RF Harmonics	Meets or Exceeds FCC & CCIR Specifications
Positive Peak Capability	125% positive peak modulation capability at 5.5 kW (BTA-5SS)
Ambient Temperature Range	–10°C to 50°C
Altitude	Sea Level to 10,000 feet (3,050 m)
Cooling	Ambient Air 500 CFM
Size	77″ high x 36″ wide x 35″ deep (196 cm, 91.5 cm, 89 cm)
Weight (Approx. unpacked)	1000 lb. (455 kg)
Monitor Provisions	10 RF volts at 50/70 ohms for modulation monitor
Remote Control	Normal interfaces

For additional information, contact your local RCA Broadcast Sales Representative or Radio Station Products Management, RCA Building 2-5, Camden, N. J. 08102, U.S.A.

*Subject to change without notice.

- Designed for unattended, long-duration logging and monitoring
- Carefully crafted basic design provides highest reliability
- Modular, solid-state heavy duty components
- Lower tape cost
- Large reel capacity—up to 330 hours with no reel turnover

RCA Program Logger, Type RT-19A

Description

The Type RT-19A Program Logger a tape recorder designed for continuous long-duration recording, records and plays in both directions with equal performance. The logger is especially useful with broadcast automation systems where it can serve as a complete and accurate program log and monitor to assure compliance with FCC regulations.

Since the basic mechanism is 4-track, a broadcast station with AM, FM and TV facilities can record the AM station on Track 1, FM on Track 2, TV on Track 3 and the 4th track can be used to record external time signals. It is also possible to superimpose time signals from the external source over the respective program as it is recorded. The level of the time signals is generally reduced to at least 10 dB below the program level.

The modular solid-state electronics provides amazingly clear recording, high reliability and long, unattended operation. Even at the slowest speed of 5/16 IPS, recorded voices are clear and sharp. The signal-to-noise ratio is better than 43 dB, flutter is low, and response is within 3 dB from 200 to 2700 Hz.

The RT-19A is simple to operate. Accessibility is rapid; no point on the tape is more than 1½ to 3 minutes away. All electronic adjustments and operation are readily accessible from the front. It boasts such features as straight-line threading, automatic tape lifters, interlocked controls which make it impossible to break or spill tape by improper control sequences, and editing and cueing versatility.

The modular, solid-state electronics provide quick plug-in replacement of any components requiring service. Extremely high reliability in the transport is inherent in the basic design. The heavy-duty components and careful construction more than meet the continuous heavy duty recording functions demanded of the equipment.

The RT-19A uses standard 10½-inch NAB reels and hubs, or EIA 7-inch plastic reels. Lowest cost tape of 1 mil plastic base will provide nearly 154 hours of continuous recording and reproducing at a tape cost of less than 4 cents per hour. This means that six 24-hour days can be monitored for less than a dollar per day on one roll of tape. If extremely long unattended hours of recording are desired, 7200 feet of tape on an NAB hub will provide over 300 hours of continuous logging (twelve 24-hour days, or seventeen 18-hour days) at a cost well under 5 cents per hour.

The RT-19A Automated Tape Recorder is designed for rack or console mounting or can easily be incorporated in custom audio installations demanding either horizontal or vertical mountings. Several models are available to provide the utmost flexibility. The RT-19A makes four tracks available on quarter-inch tape, which may be used in a variety of ways. One channel of communication may be recorded on each of the four tracks in sequence, or four communications channels may be recorded simultaneously.

Specifications

Head and Track Configurations ..... 4 track, 1 channel, 2 channel, 4 channel and multiples thereof. Erase on special order

Overall Frequency Response ..... 15/16 IPS: ±3 dB, 200 Hz –8 kHz; 15/32 IPS: ±3 dB, 200 Hz –4 kHz; 5/16 IPS: ±3 dB, 200 Hz –2.7 kHz. Adjustable level and equalization for each head, as well as bias and calibration adjustments

Signal-to-Noise Ratio ..... 43 dB min.

Total Unattended Time ..... 204 hours 48 min. at 15/32 IPS w/triple play tape; 307 hours 12 min. at 15/16 w/triple play tape

Inputs ("XL" connectors) ..... One per channel, –15 dBm sensitivity, 100 K bridging. Provision for various plug-in units, such as 200-Ohm adjustable 30-60 dB mic. preamplifier, balanced line bridging or matching transformers, etc.

Outputs ("XL" connectors) ..... 0, +4 or +8 dBm into 600 Ohm balanced or unbalanced (per strapping). +25 dBm undistorted capability. Monitoring jacks

Distortion (circuit induced) ..... Less than 25% THD at +8 dBm

Power Requirements ..... 117 Volts AC, 50-60 Hz, approximately 100 Watts. Regulator stabilizes bias and signal levels against power line fluctuations

Tape Counter ..... 4 digit resettable, returns toward zero on reverse tape travel to reference measurements to supply reel

Size and Weight ..... Transport 19" x 15¾", 47 lbs. Electronics 19" x 5¼", 9 lbs. (4 channel models require 2 electronics chassis)

Reel Size ..... 10½" NAB, or 7" EIA reels. Independent torque switches allow intermixed sizes

Tape Size and Tape Guides ..... ¼", ½ mil to 1½ mil Acetate or Mylar. Non-magnetic, close tolerance guides provide accurate quarter track guidance

Speeds and Playback Timing Accuracy ..... Speed 15/16 IPS, 15/32 IPS, 5/16 IPS within 1% (specify one when ordering)

Wow and Flutter (rms max.) 1%

Fastwind Time ..... 3600 feet, approximately 100 seconds

Start Time ..... Less than 1/10 sec.

Remote Control ..... Designed for complete adaptability to any automation system

Capstan Control ..... Solenoid actuated (externally controllable)

Brakes ..... Fail-safe solenoid actuated Permaband design, for smoothness and predictable action. Solid-state control eliminates relays, tape feelers, etc.

Reversing ..... Low current conductive tape contacts reliably trigger reversing circuit for completely automatic action and maximum unattended playing (or recording) time

Motors ..... 3 motor, long-life ball bearing system

Ordering Information

RT-19A Logger Tape Recorder, 1-channel, 4 track Automatic Triple Reverse, 5/16 IPS MI-141904-1

RT-19A Logger Tape Recorder, 1-channel, 4 track Automatic Triple Reverse, 15/32 IPS MI-141904-2

RT-19A Logger Tape Recorder, 1-channel, 4-track Automatic Triple Reverse, 15/16 IPS MI-141904-3

RT-19A Logger Tape Recorder, 2-channel, 4 track Automatic Reverse, 5/16 IPS MI-141905-1

RT-19A Logger Tape Recorder, 1-channel, 4 track Automatic Reverse, 15/32 IPS MI-141905-2

RT-19A Logger Tape Recorder, 2-channel, 4 track Automatic Reverse, 15/16 IPS MI-141905-3

RT-19A Logger Tape Recorder, 4-channel, 4 track One Direction, 5/16 IPS MI-141906-1

RT-19A Logger Tape Recorder, 4-channel, 4 track One Direction, 15/32 IPS MI-141906-2

RT-19A Logger Tape Recorder, 4-channel, 4 track One Direction, 15/16 IPS MI-141906-3

Commercial Electronic Systems Division
Front and Cooper Streets, Camden, New Jersey, U.S.A. 08102

RCA Broadcast Equipment

- **Fully transistorized**
- **Pushbutton selection of high level sources**
- **Self-contained relay switching permits remote operation**
- **Plug-in modules interchangeable with other consolettes**
- **Built-in intercom**

Audio Consolette, Type BC-9A

Description

The BC-9A is a monaural consolette which has just been added to the RCA family of transistorized audio mixing equipments. This compact consolette packs a lot of versatility and convenience. Multiple pushbuttons permit easy selection of high level sources (such as tape recorders, cartridge tape, turntable, etc.) to each of two mixer controls. The BC-9A may be operated remotely, since the sources are switched by self-contained relays. Two additional mixers are provided for use with microphones.

The modular plug-in amplifiers and power supply used in the BC-9A are identical with those incorporated in several other RCA audio consolettes (BC-19A, BC-7A, BC-8A). The advantages of this interchangeability are obvious.

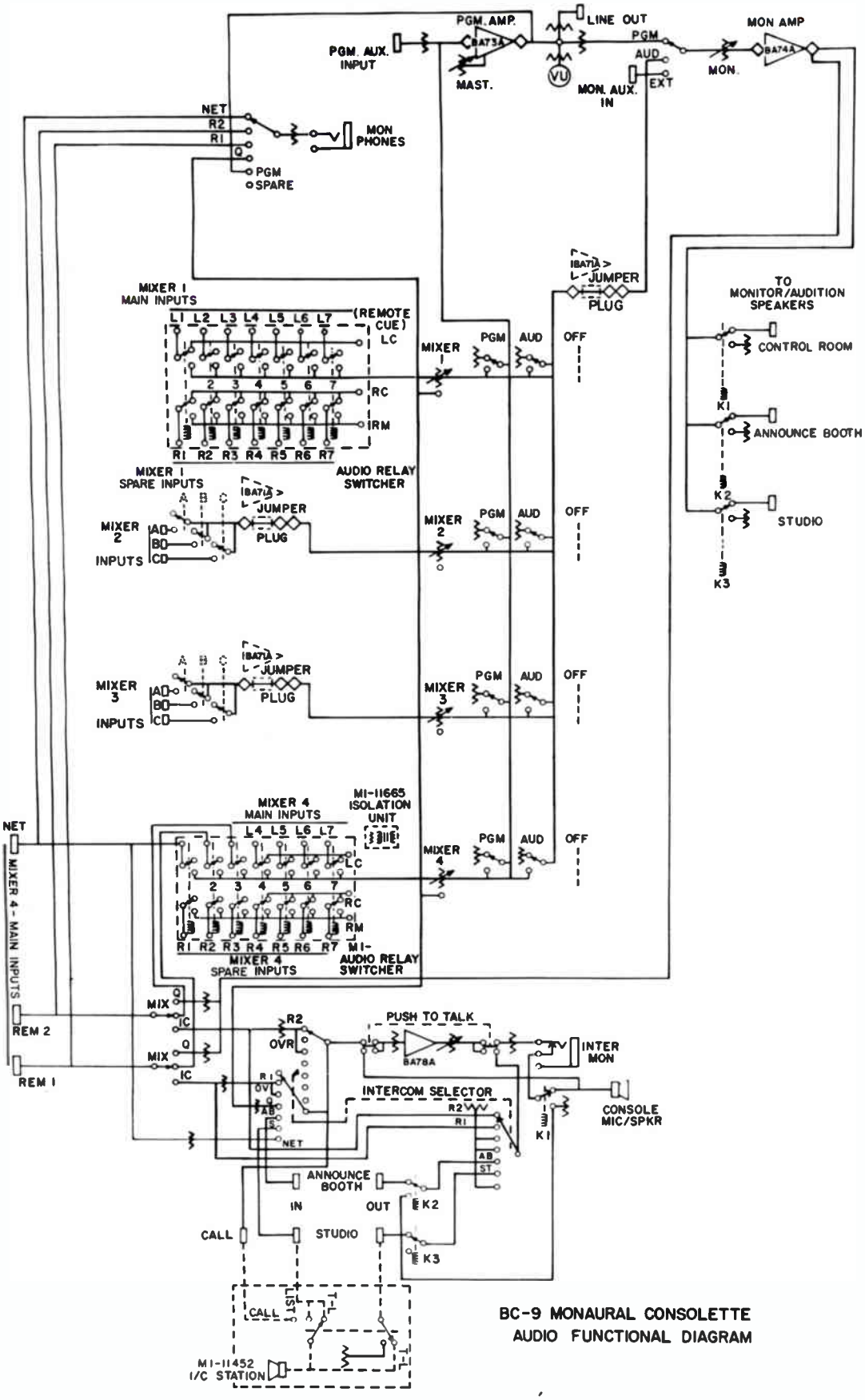
Communications between control room and studio or remote locations is facilitated by the intercom facilities built into the BC-9A.

Specifications

Mixers	4 mono
Inputs:	
Low Level (Microphone)	6
High Level	14 (7 to each of 2 mixers)
Outputs:	
Program	1
Audition	1
Monitor Speaker Relays	2
Source Impedances:	
Microphones	3.75/150/600 ohms
Turntables/Tape	600 ohms
Input Levels:	
Microphone	−22 dbm maximum
Turntables/Tape/Remote	−10 dbm
Maximum Gain	105 db
Frequency Response	±1.5 db 30-15,000 cps
Distortion:	
Program Channel	Less than .5% 50-15,000 cps Less than .75% 30 cps
Monitor Amplifier	Less than 1% 50-15,000 cps
Signal-to-Noise Ratio	68 db
Dimensions	19½" wide, 12½" high, 24" deep

Ordering Information

Type BC-9A Monaural Consolette consisting of:		ES-11153-A
2	Type BA-71B Preamplifiers	MI-11658-A
1	Type BA-73A Program Amplifier	MI-11659-A
1	Type BA-74A Monitor Amplifier	MI-11661-B
1	Type BX-71A Power Supply	MI-11663-A
1	Type BA-78A Cue Amplifier	MI-11662-A
1	High Level Isolation Unit	MI-11665
1	Console Housing	MI-11670-A



BC-9 MONAURAL CONSOLETTE
AUDIO FUNCTIONAL DIAGRAM

RADIO CORPORATION OF AMERICA

PRINTED IN U.S.A.

BROADCAST AND COMMUNICATIONS PRODUCTS DIVISION, CAMDEN, N. J. 08102 • RCA INTERNATIONAL DIVISION, CENTRAL and TERMINAL AVENUES, CLARK, NEW JERSEY, U.S.A. 07066

RCA

catalog AU.2100

(Preliminary)

Audio Consoles

Types BC-306, 308, 310

- Excellent Audio Quality
- Rugged and Reliable
- Advanced Human Engineering
- Dual Channel Mono and Stereo
- High Operational Flexibility and Versatility

The RCA Type BC-300 Series audio console line is a family of state-of-the-art audio consoles which provides an excellent combination of high performance level, highly functional human engineering, flexibility of configuration, ruggedness and reliability—all in an attractively styled cabinet at competitive prices.

Standard Features

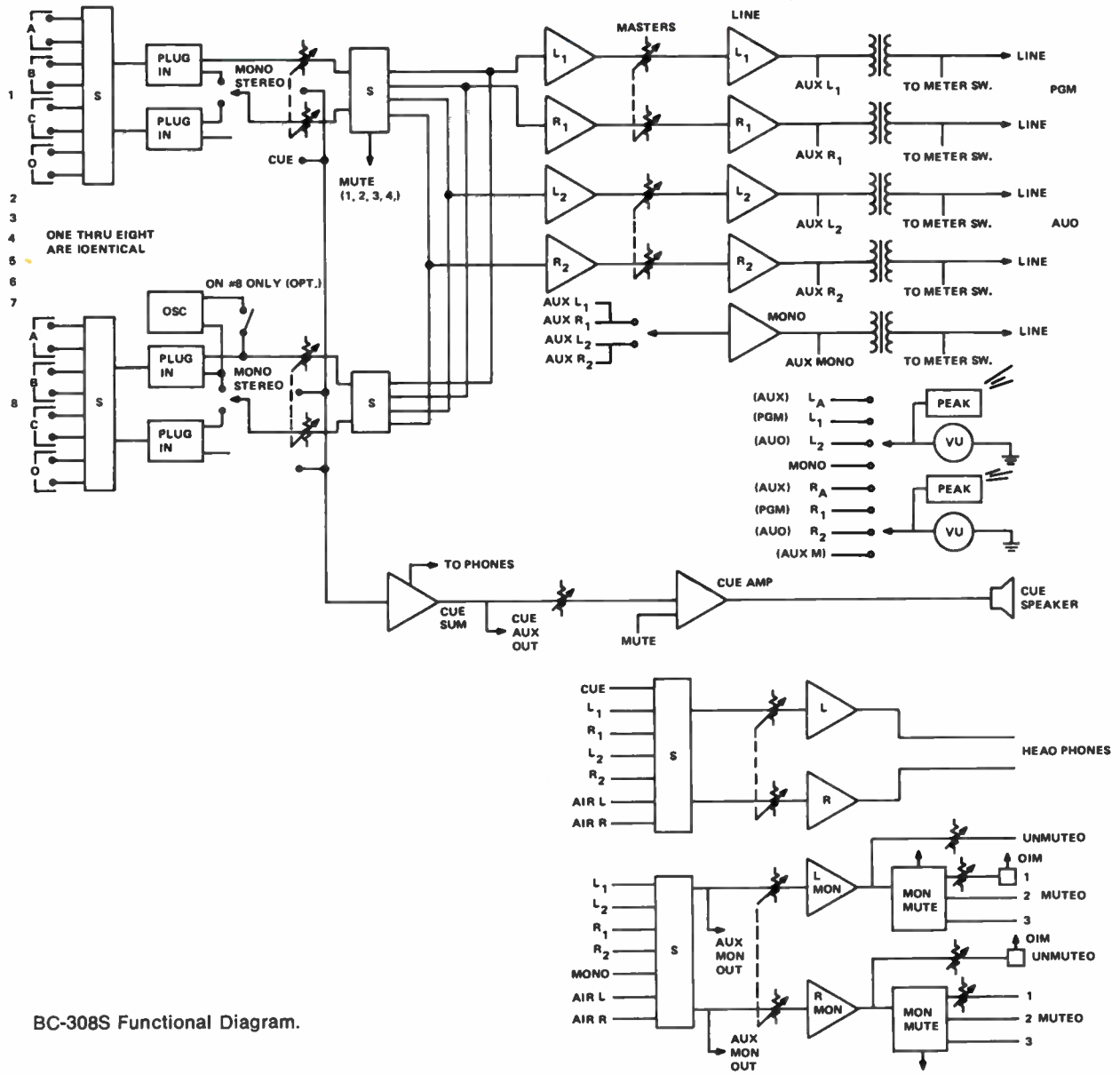
The BC-300 consoles are available in 6, 8 and 10 mixer versions. Designated the BC-306, BC-308 and BC-310 respectively, these dual channel, mono or stereo consoles come standard with a wide array of special features which make them ideal for both radio broadcasting and many TV/Teleproduction facilities.

Each mixing channel is equipped with 2 dB/step rotary step attenuators. A unique input switch allows each input channel to accept one of four inputs thus allowing each BC-300 console to accept 24, 32 or 40 inputs depending on console size. Each of the first four mixing channels are supplied with microphone preamps (strappable for high level input) with user selectable gains for input levels of —45, —55 and —65 dBm. If so desired, the BC-300 pre-amp cards may be placed in any input to expand the microphone positions available. With this wide selection of inputs and input types, the BC-300 consoles allow you the flexibility you need for today's broadcasting requirements.

Each BC-306, BC-308 and BC-310 is equipped with remote start circuitry on each mixer. This feature allows the operator to remotely activate the high level source which has been selected as the input to the mixer. Remote start not only makes the operator's job easier and hence more reliable, it also permits greater flexibility and efficiency in studio layout.

BC-300 consoles are equipped with illuminated VU meters and LED peak indicators. The peak indicators are programmable by the user to suit the requirements of each particular operation or format.

Other very useful features include programmable muting, monitor "dim" circuitry to reduce monitor output to a



BC-308S Functional Diagram.

user-adjustable pre-set level, microphone pre-amps with internal strapping which can be removed to allow insertion of microphone processing equipment (such as the RCA Type BA-145 AGC or BA-146 limiter amps) and, on stereo consoles, a switch which allows a mono source to be directed to both left and right program and audition busses and a stereo phase test circuit.

Optional Features

The extensive list of standard BC-300 features is complemented by an assortment of optional accessories which allow you to further tailor the BC-300 to your particular needs.

For stereo consoles, there is an optional mono mixdown bus and third meter available. An ESE three or four digit timer is also available. This timer fits the space which would be occupied by the mono mixdown meter (thus both options may not be used together). However, it is possible to monitor the mixdown bus on the left meter and install the digital timer in the third panel opening.

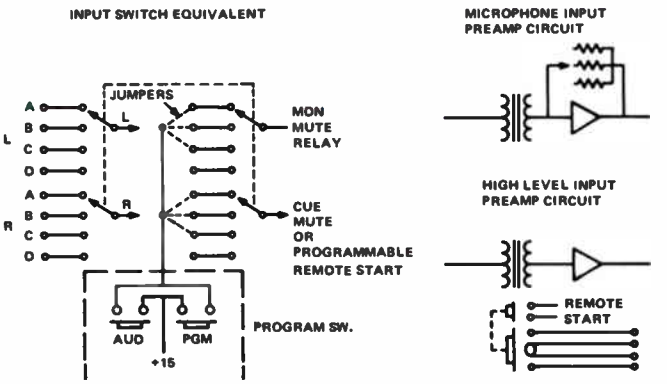
Also available for BC-308 and -310 consoles is a reference tone oscillator. Fixed in level and frequency, it may be switched into the last mixer position on the BC-308 and BC-310 to set the master output levels quickly, easily and reliably.

An important feature of the BC-300 options is that they may be added to the console at any time. The BC-300 has the flexibility to grow with your operation or to change as your requirements dictate.

Advanced Human Engineering

The careful attention to human engineering incorporated in the BC-300 series consoles shows up in numerous ways. Large, easy-to-handle rotary attenuators spaced to allow easy operation, logically laid out, self explanatory controls for monitoring, cue, metering and output, illuminated remote start and bus selection push button—all contribute to operator acceptance of and competence with BC-300 consoles. Five position (center is "OFF") lever switches for channel input selection allow immediate identification of the input selected and take up a minimal amount of space on the panel leaving it clean and uncluttered. This contributes to operator efficiency and reduced operating errors.

This attention to human engineering carries through to maintenance and service—inside the console. All the BC-300 circuitry is on plug in boards with each circuit component carefully and completely labeled on the circuit boards and the interior of the console is easily accessible.



BC-300 Series Input Circuits.

High Performance

Highly desirable features, many useful options and careful attention to the human element—all are characteristic of the BC-300 line. But, as with any console, it is performance that counts. And it is performance where the BC-300 consoles excel. Frequency response is virtually flat from 20 Hz to 20 kHz on the Program, Audition, Monitor and Optional Mono mixdown channels. Signal to noise ratio is better than 74 dB below +18 dBm (−50 dBm input) from 20 Hz to 20 kHz. Crosstalk between busses (Program, Audition and Monitor) is below the noise level. The clipping level is above +22 dBm.

This high level of performance means that the BC-300 consoles are well suited to almost any broadcasting or production requirements. But performance does not stop at signal output. The BC-300s are designed to take the 24 hour use and abuse of the broadcast environment. Careful attention is also paid to RF immunity. The consoles are constructed of ⅛" aluminum and coated with Armorhide® and oversprayed with clear epoxy to withstand the heaviest handed operators.

The BC-306, BC-308 and BC-310 are designed and built to perform reliably and will in a wide variety of broadcast and production facilities. Equipped with a wide variety of useful and desirable standard features, the BC-300 consoles can also be equipped with the optional accessories necessary to tailor the console more closely to the requirements. The BC-300 consoles will ideally complement a wide range of broadcast or production audio applications.

Specifications

Mixers:
- BC-306 6
- BC-308 8
- BC-310 10

Inputs (Standard Factory Equipped):

	BC-306	BC-308	BC-310
Mic	4 Stereo	4 Stereo	4 Stereo
High Level	20 Stereo	28 Stereo	36 Stereo
Total	24 Stereo	32 Stereo	40 Stereo

- External Monitor (AIR) ..... 1 Stereo
- External Headphone (AIR) ..... 1 Stereo

Input Impedance:
- Mic ..... 150 ohms source, Transformer Balanced
- Hi-Level ..... 600 ohms terminating, Transformer Balanced
- External Monitor (AIR) ..... 4700 ohms
- External Headphone (AIR) ..... 4700 ohms

Input Levels:
- Mic ..... Selectable: –45 dBm, –55 dBm, –65 dBm
- Hi-Level ..... –10 dBm
- External Monitor (AIR) ..... 250 MV
- External Headphone (AIR) ..... 250 MV

Outputs:
- Program (PI) ..... Stereo +8 dBm (OVU) clipping level above +22 dBm
- Audition (P2) ..... Stereo +8 dBm (OVU) clipping level above +22 dBm
- Mono Mixdown (OPT) .. Stereo +8 dBm (OVU) clipping level above +22 dBm
- Monitor ..... 4, Stereo @ 1 V, 10K ohm load
- Cue ..... 1 @ 1 watt with 5″ internal speaker
- Headphone ..... 1, Stereo, switchable between PGM, AUD, AIR (EXT) or Cue
- Tape Out ..... 3: Program, Audition, Mono Mixdown, –14 dBm Bridging
- Cue Bus ..... 1, Mono @ –10 dB

Output Impedance:
- Program ..... 600 ohms, Transformer Balanced
- Audition ..... 600 ohms, Transformer Balanced
- Mono Mixdown (Opt) ..... 600 ohms, Transformer Balanced
- Monitor ..... 600 ohms min. load
- Aux. Monitor ..... 2000 ohms load
- Cue Bus ..... 1000 ohms load
- Headphone ..... 8 ohms & up load
- Tape Out ..... 600 ohms source

Frequency Response:
- Program ..... Within 1 dB 20 Hz ____ 20 kHz
- Audition ..... Within 1 dB 20 Hz ____ 20 kHz
- Mono Mixdown (Opt) ..... Within 1 dB 20 Hz ____ 20 kHz
- Monitor ..... Within 1 dB 20 Hz ____ 20 kHz

Total Harmonic Distortion:
- Program, Audition, Mono Mixdown .. Typ. 0.1%, 0.25% max., 20 Hz ____ 20 kHz @ +18 dBm output, –55 dBm input
- Monitor ..... 0.3% max., 20 Hz ____ 20 kHz @ 1 volt

Intermodulation Distortion:
- Program, Audition, Mono Mixdown ..... Less than 0.1% @ +22 dBm output
- Monitor ..... Less than 0.1% 1 volt

Signal to Noise:
- Program, Audition, Mono Mixdown ..... Better than 74 dB below +18 dBm output with –50 dBm input 20Hz ____ 20 kHz
- Monitor ..... Better than 65 dB below 1 volt output

Crosstalk:
- Program, Audition, Monitor ..... Below noise level

Power Requirements:
- Voltage ..... 117/234 Vac
- Frequency ..... 50/60 Hz
- Power ..... 40 watts

Cabinet:
- Material ..... 0.125″ Aluminum
- Finish ..... Textured scratch resistant Armorhide exterior, grained and Gold anodized interior
- Panel ..... 0.125″ Aluminum
- Finish ..... Matte Armorhide, epoxy paint silk screened, Clear epoxy overspray

Dimensions:
- BC-306 ..... 27″ W, 22″ D, 9″ H
- BC-308 ..... 35″ W, 22″ D, 9″ H
- BC-310 ..... 43″ W, 22″ D, 9″ H

Ordering Information

Six Mixer Consoles:
- Dual Channel Mono, Type BC-306 ..... MI-141103-1
- Dual Channel Stereo, Type BC-306S MI-141103-2

Eight Mixer Consoles:
- Dual Channel Mono, Type BC-308 ..... MI-141104-1
- Dual Channel Stereo, Type BC-308S MI-141104-2

Ten Mixer Consoles:
- Dual Channel Mono, Type BC-310 ..... MI-141105-1
- Dual Channel Stereo, Type BC-310S MI-141105-2

RCA

An Audio Console for every use at a price for every user

Over 30 Standard Consoles Plus Unlimited Custom Audio Combinations

Can RCA Supply a Console for your Needs?

With the wide choice available, chances are you will find an "off-the-shelf" console that matches your exact requirements. Standard offerings range from basic single channel units to versatile 3-channel, 46-input systems. And, when you move into the custom area, we have just about every component needed for the most sophisticated audio system, attractively packaged in furniture-style housings that fit any decor.

The RCA console line has always been strong on reliability, quality and performance. With new additions to the line, you might be pleasantly surprised (even shocked) at the affordable, down-to-earth pricing. As little as $795 for a complete single channel mono console; $199 for a compact 4-input remote console that can be battery operated. Can RCA supply a console to meet your needs? In a word—"Yes!"

BC-14 Console

Introduced at this year's NAB, the low-cost BC-14 Series consoles are really making their mark in the field. Six models are offered — Mono, Dual and Stereo — in rackmount and console versions, all with 4 mixer positions, 16 inputs. These high-performance units are designed for quality audio production where cost is critical. (Prices start as low as $795.)

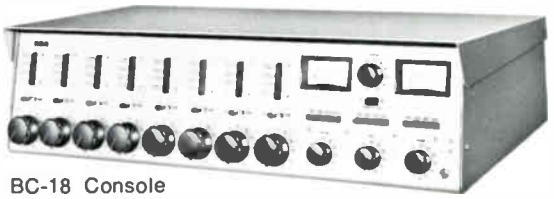
BC-14 consoles feature pushbutton input selection and audition provisions on all input mixer channels. Each input mixer handles four inputs through interlocked pushbuttons. Input transformers and pre-amplifiers are included for all input mixer channels.

The moderately-priced BC-18A and BC-15A Series consoles offer the happy combination of versatility and simplicity of operation. Each is available in mono, dual channel and stereo, with modest prices beginning at $1595 for a BC-15A mono console.

The BC-18A, an 8-mixer console, features pushbutton selection of up to 32 input sources. step attenuators, 10-Watt monitor amplifier, cue amplifier and speaker, self-contained power supply and speaker-muting relays.

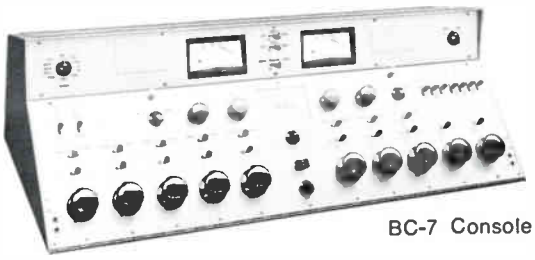
The attenuators are equipped with cue position, and each handles four inputs through the interlocked pushbuttons. Mixers 1, 2, 3 and 4 provide three microphone inputs and one high level input. Mixers 4 through 8 are wired as high level inputs and also offer pushbutton selection of four sources. All mixers employ preamplifiers, either low or high level.

The BC-15A, a compact 5-mixer console, is similar in design to its larger companion BC-18A. It can handle up to 20 input sources.

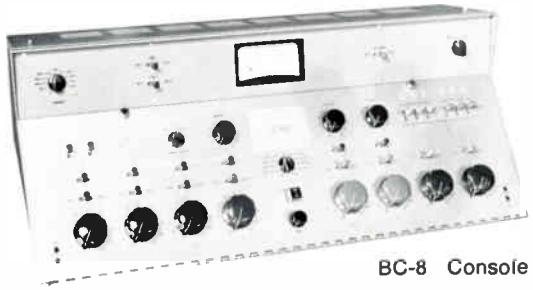


BC-18 Console

"Flexible" aptly describes the BC-7 console, a completely self-contained system which provides mono, dual or stereo mixing, switching and monitoring facilities plus dependable plug-in solid state amplifiers. Other features include low impedance mixing circuits, built-in power supply and cue/intercom amplifier. The BC-7 is equipped with 10 input channels and can handle up to 33 sources. Five of the mixer positions are low level, 3 high level and 2 line level. Accessible terminal connections for input and output circuits make it easy to wire to external jack panels, compensating networks or sound effects equipment. Plug-in modules for preamps, program amplifiers, cue/intercom amplifier, power supply and high level isolation simplify maintenance and provide extra flexibility in adapting the BC-7 to changing requirements.



BC-7 Console



BC-8 Console

The high-performance BC-8A console has 8 mixers which can be used for monaural or dual channel operation. Designed for operating convenience and ease of servicing, the console offers two-channel mixing and switching with monitoring facilities, plus dependable plug-in solid state amplifiers, low impedance mixing circuits, built-in cue/intercom amplifier and self-contained power supply. Switching controls are grouped and color-coded.

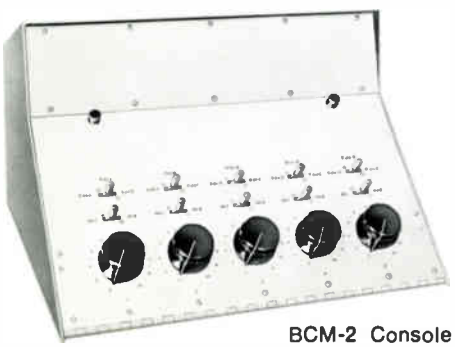
Each of the 8 mixer positions can be switched to 3 input sources. Three low level, 3 high level and 2 line mixers are provided. For extra reliability and simplicity of maintenance, the BC-8A features plug-in construction, employing the same modules used in the larger BC-7 console.

A lot of capability in a compact package. That's the BC-9A, a quality monaural console that takes up to 20 input sources. Two high level and two microphone mixer positions are provided, with convenient push-button selection of sources. Since the sources are switched by self-contained relays, the BC-9A may be operated remotely. The plug-in modules used with the BC-9A are identical with those in the companion BC-7, BC-8A and BC-19A consoles, providing the important advantage of interchangeability. Built-in intercom facilities permit communication between control room and studio or remote locations.

The BC-19A console is essentially identical to the BC-9A except that it is designed for stereo or dual channel operation.

BC-19 Console

When extra inputs are needed for RCA audio consoles of the BC-7, 8, 9, 17 and 19 series, the BCM-2 auxiliary console is a versatile, money-saving solution. It adds 5 mixing channels and 15 input sources, and if necessary, two BCM-2 units can be paralleled to provide 10 mixers and 30 source inputs. The console is designed so that each mixer channel accepts a preamplifier, or a high level isolation unit or a straight-through jumper plug, to accommodate a wide choice of input levels. Each mixer position includes a source selector switch as well as a 3-position Fader Delegation switch for selecting Channel 1, Channel 2, and "Off". This arrangement permits the BCM-2 to be used with mono, dual channel and stereo consoles.



BCM-2 Console

For 3-channel operation, the deluxe BC-17 console is without peer. This versatile audio console provides complete mono and stereo mixing facilities, together or separately. It can handle up to 46 inputs — 28 mono and 18 stereo. Mixing is accomplished by a 10-fader low impedance system, using ladder attenuators for minimum loss. Cueing positions are provided on all medium and high level faders. A 5-position Monitor-Selector switch permits the operator to control the mode of program fed to studio speakers. Other monitoring facilities are provided for program amplifier outputs, line outputs, cue information and network and remote line programs.

For operator convenience, the functionally styled BC-17 has a double slope front panel with three illuminated VU meters plus color-coded controls.

BC-17 Console

BN-17Remote Console

For remote broadcasts, RCA provides a selection of single channel, 2-channel and 4-channel portable consoles, all designed for battery or a-c operation. The new economy BN-1 and BN-4 amplifiers give you good performance at low, low cost. (Would you believe $199. for a 4-channel remote console?).

The BN-7B provides two separate channels that can be operated either balanced or unbalanced. It features excellent frequency response and low harmonic distortion. The 4-channel BN-17A remote amplifier delivers versatility, dependability and excellent performance. Four separate balanced input channels and two high-level inputs are provided as well as cue, monitor, a test oscillator and a mixer facility. Microphone input transformers and step attenuators for all channels, earphone monitoring, line cueing facilities and a PA gain control are also included.

If you're in need of remote consoles, we suggest you get all the facts on ours.

Custom Customers Welcome

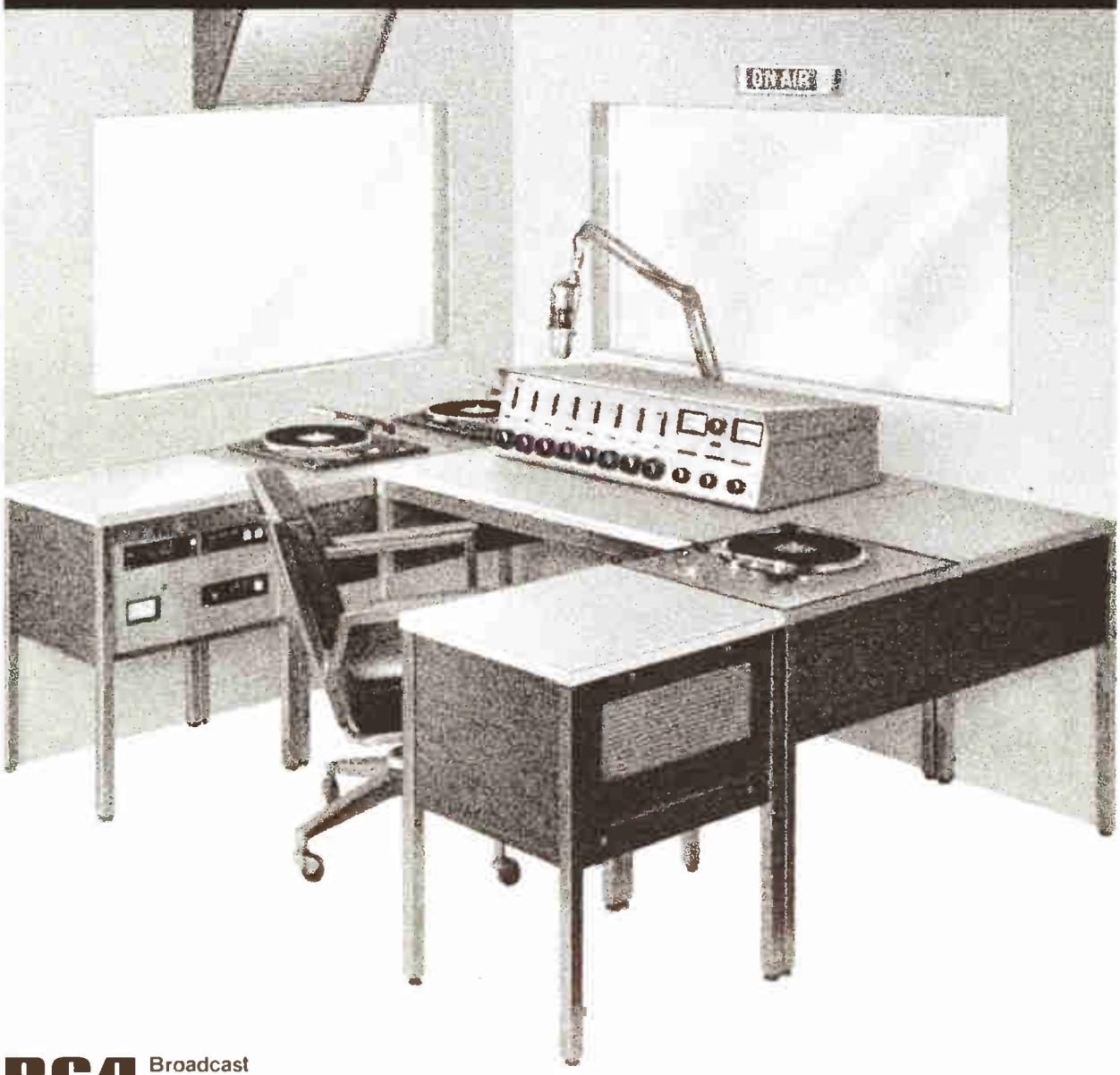
With increased emphasis on quality audio, growing numbers of broadcasters are turning to custom systems which fill the requirements for a sophisticated audio system. For such critical requirements, RCA offers a new modularized Audio Console, the BC-100. This system permits you to design a custom console from standard modules. A wide selection of input modules permit microphones, turntables, film chains, cart machines, etc. to be mixed to any number of outputs with complete functional flexibility. Compact packaging of circuitry permits fitting a 20-input, 4-output system into a 54" wide console, 42" high. The system can provides feeds to echo chambers, foldback amplifiers, house monitors and performer reinforcement systems. BC-100 custom audio systems are for the discriminating broadcaster—they're not for everyone. But if you need a superbly unique system tailored around your specific need, we're ready to work with you to make your concept a reality. Our BROADCAST NEWS article, "The Professional Sound in Radio/TV" (June 1970 issue) will give you an idea of the unusual versatility of the BC-100. If you don't have it, your RCA representative will be glad to supply a copy—

BC-100 Custom Console

We cover the audio spectrum with a full line of quality equipment.

- Microphones
- Reel-to-Reel Tape
- Cartridge Tape
- Transcription
- Automation
- Amplifiers
- Loudspeakers
- Intercom/Interphone
- Test
- Consoles

Whatever your need, we would welcome the opportunity to assist... in planning or in providing equipment or pricing information. Contact your nearest RCA sales representative, or write RCA Audio Equipment. Building 2-2, Camden, N.J. 08102.



RCA Broadcast Systems

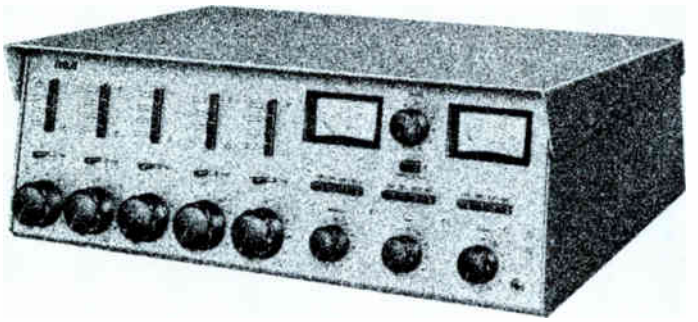
RCA

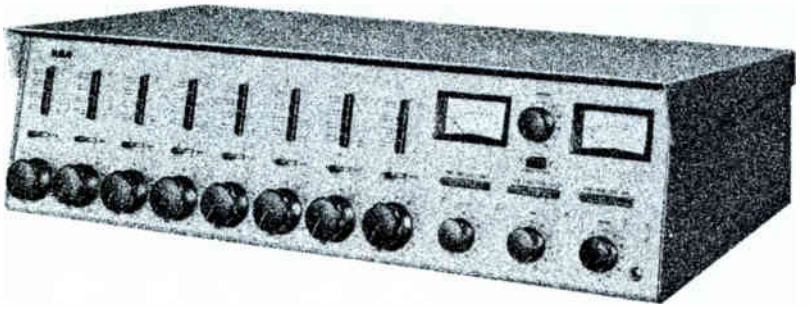
catalog AU.2210A

(Replaces B.1170)

Audio Consoles,
Types BC-14, -15, -18

- Competitively priced
- Mono, stereo and dual-channel
- Pushbutton input selection
- Four, five or eight input faders
- Sixteen, twenty or thirty-two inputs





Striking an excellent compromise between capability and purchase price, the Type BC-14, -15 and -18 Consoles deliver versatility at low cost. Each console is offered in mono, dual-channel mono and stereo configurations.

Four-Fader Consoles, Type BC-14 Series

Available in desk-top cabinet or rack-mount versions, the Type BC-14 Console series is intended primarily for light-duty production such as in broadcasting, mobile units, sound-reinforcement systems and the like. The low initial cost and dependable operation give it universal appeal.

Five-Fader Consoles, Type BC-15 Series

The Type BC-15 Console series is intended for those situations where production needs are moderate and duty is severe. The BC-15 provides for twenty inputs to its five input faders. Each fader handles four inputs through pushbuttons.

Eight-Fader Consoles, Type BC-18 Series

Our largest audio console, the Type BC-18 provides for 32 program inputs to its eight input faders. Like the BC-15 consoles, the BC-18 input faders each have four inputs, selected through pushbuttons.

Five-Fader Consoles, Type BC-15

Eight-Fader Consoles, Type BC-18

- Mono, stereo and dual-channel
- Built-in cue channel
- Preamp in each mixer circuit
- 10-watt monitor
- Step-attenuator faders, with cue position

The BC-15 and BC-18 consoles are available in stereo, mono and dual-channel versions. The consoles differ only in physical size and the number of input faders each includes. The smaller console, the BC-15, contains five input faders; the BC-18, eight input faders.

The consoles are ideally suited to the audio control needs of radio, TV, CCTV and cable-television production. Too, these consoles serve in the control of sound reinforcement systems in auditoriums, amphitheaters, coliseums, stadiums and convention halls.

Each console is a self-contained audio-control center featuring pushbutton input selection, high-quality, step-type attenuators (with cue position), telephone-type lever switches, 10-watt monitor amplifiers, built-in cue amplifiers, speaker-muting re-

Five-Fader Type BC-15 Console

lays (with space for additional relays, see *Accessories*), cue speaker and a self-contained power supply.

Preamplifier Modules

The number of preamplifiers included in each console is proportional to the number of faders. The stereo consoles contain two preamplifiers for each input fader; the mono and dual-channel consoles contain a single preamplifier for each input fader.

Program Channel

A program-bus amplifier drives the Master Gain control which, in turn, drives the program amplifier and line driver amplifier. In the stereo console, the Master Gain Controls are ganged and an adjustment is provided to balance the gain of each channel individually.

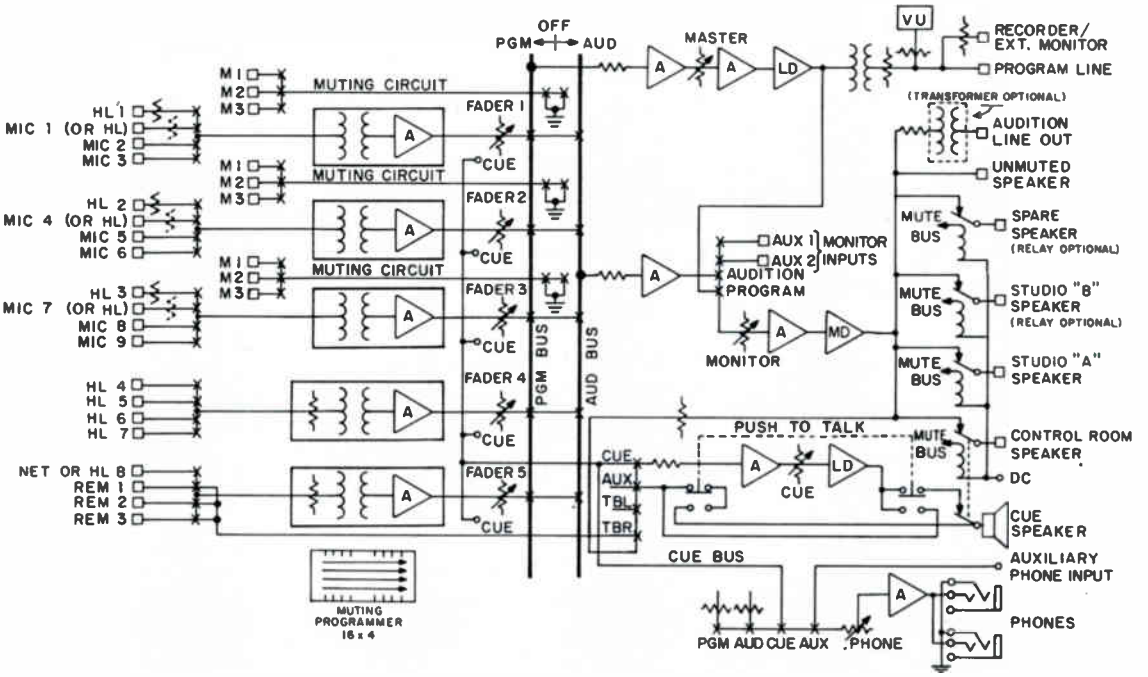
The driver amplifier delivers a balanced, transformer-coupled, 18-dBm output level to the line. A balanced, bridging, zero-level recorder output is permanently connected to the program line. Program outputs are also provided to the Audition/Monitor Input Selector switch and the Program Headphone Jack.

Audition/Monitor Channel

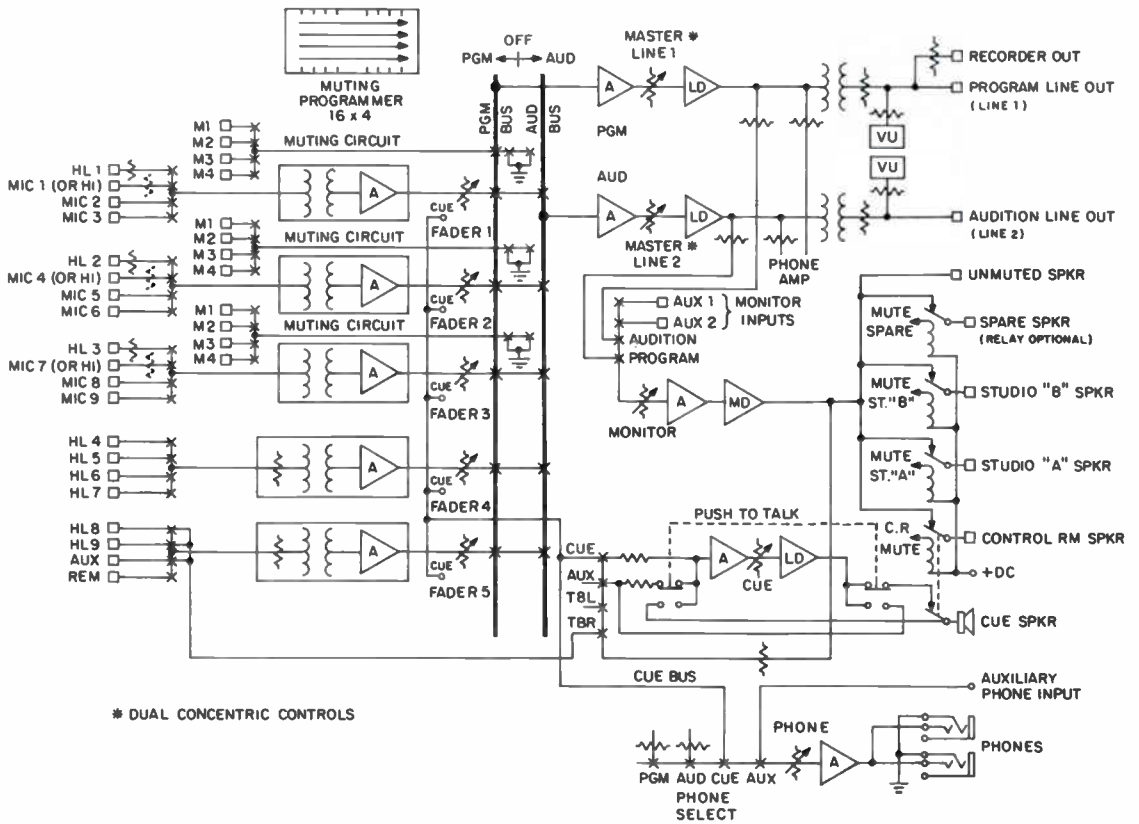
The audition-bus boost amplifier feeds an input of the Monitor-Input Selector. Plug-in, speaker-mute relays are included: three in the BC-18 and two in the BC-15. The muting relays are energized through the mike-input selector switch.

A switchable headphone-jack output, with level control, delivers +10 dBm output.

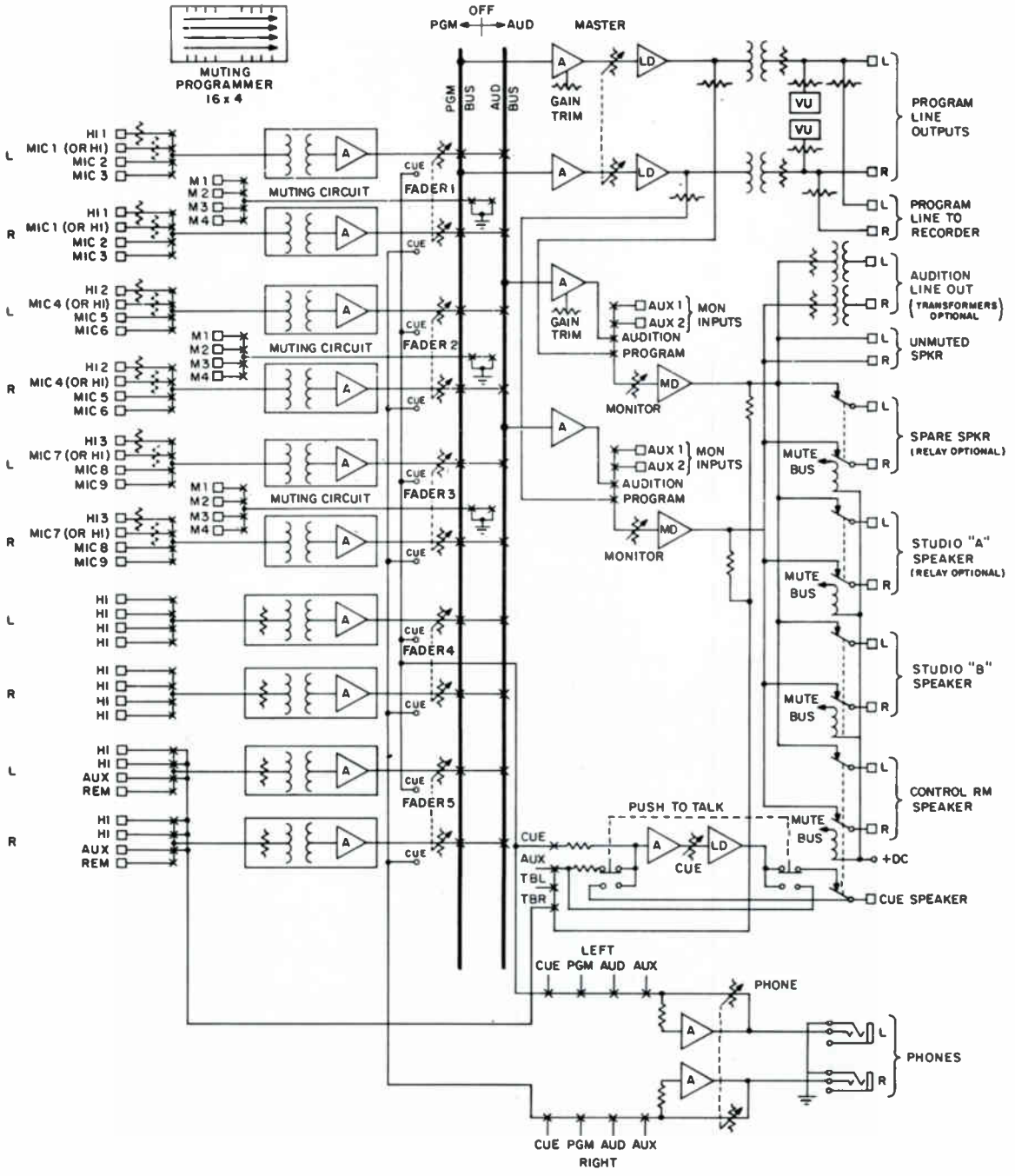
Eight-Fader Type BC-18 Console



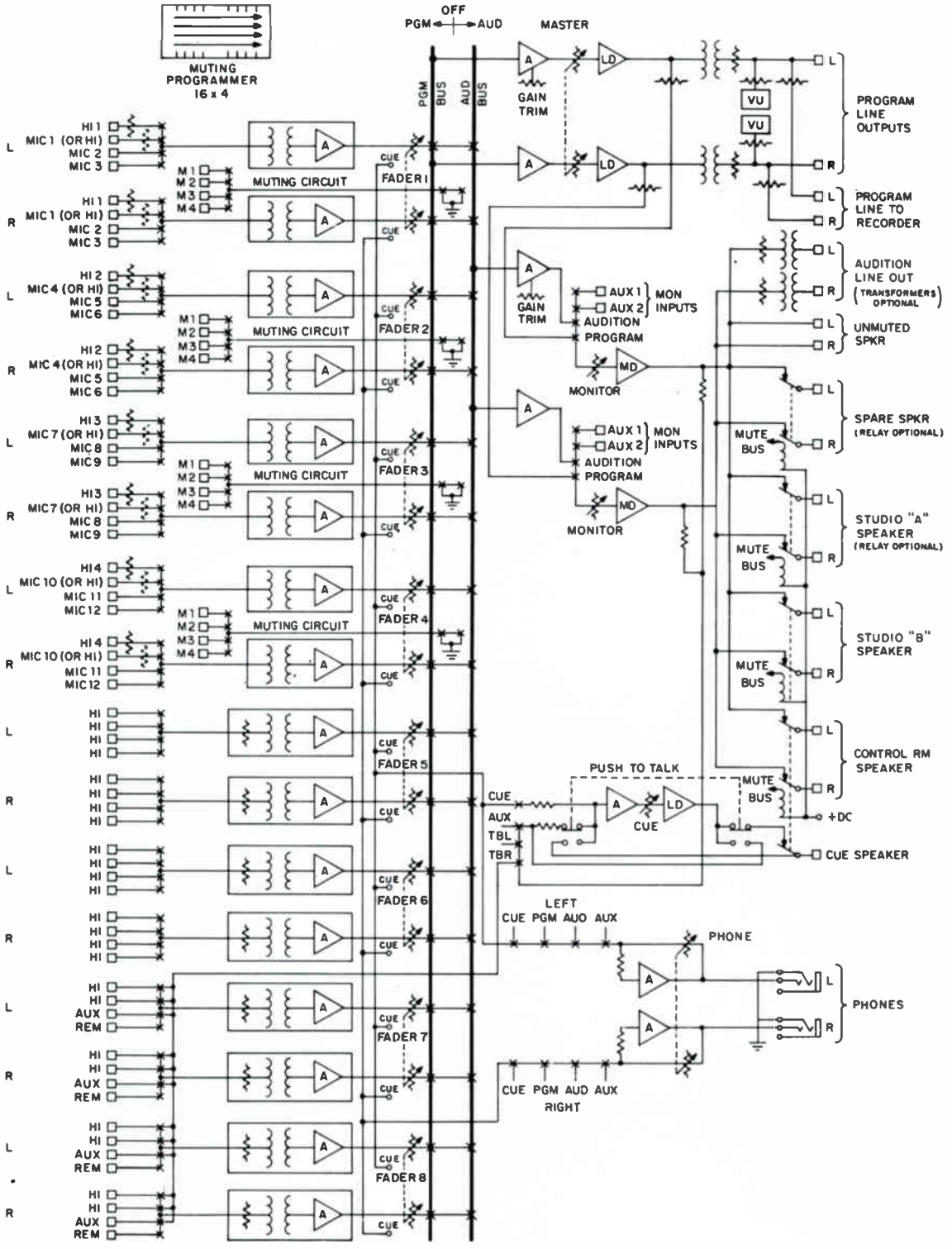
Functional Diagram, Type BC-15 Mono Console



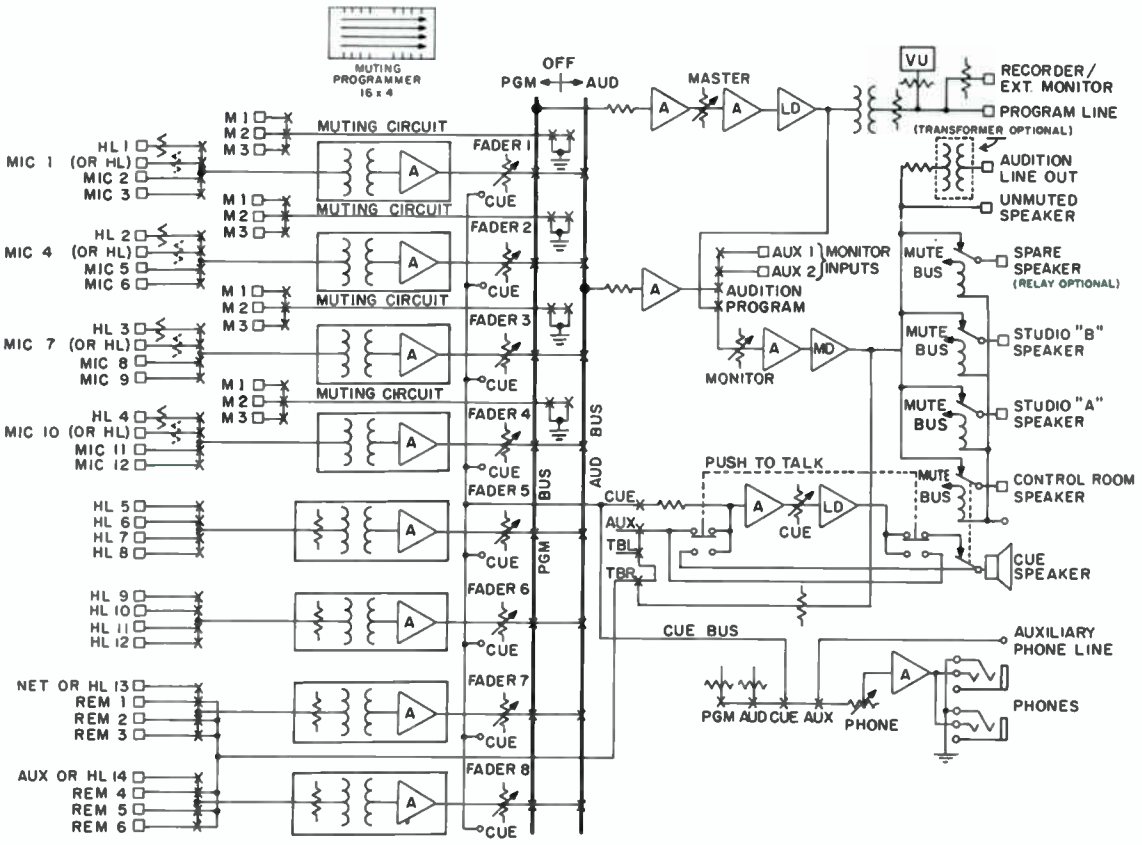
Functional Diagram, Type BC-15D Dual-Channel Mono Console



Functional Diagram, Type BC-15S Stereo Console



Functional Diagram, Type BC-18S Stereo Console



Functional Diagram, Type BC-18 Mono Console

Specifications

Inputs:
- BC-15, BC-15S, BC-15D ..... 20: 9 Lo-; 11 Hi-Level*
- BC-18, BC-15S, BC-18D ..... 32: 12 Lo-; 20 Hi-Level*

Input Faders:
- BC-15, BC-15S, BC-15D ..... Five (dual-ganged in BC-15S), with cue position
- BC-18, BC-18S, BC-18D ..... Eight (dual-ganged in BC-18S), with cue position

Input Impedances (Source):
- Microphone (Balanced) ..... 150/600 ohms
- Hi-Level (Balanced) ..... 600 ohms or bridge

Input Levels (dBm):
- Microphone ..... −50 nom.; −26 max.
- Net/Remote ..... 0 nom.; +10 max.
- High Level (Bridging) ..... −20 nom.; +5 max.

Output Levels (dBm):
- Program ..... +18 nom.; +24 max.
- Audition ..... +10
- Monitor ..... 10W or +40

Crosstalk ..... 67 dB down

Load Impedances:
- Line (Balanced) ..... 600 ohms
- Speakers (Minimum) ..... 4 ohms
- Headphones (Minimum) ..... 600 ohms

*Factory-wired. Easily rewired in field for more high-level and fewer mike inputs.

Overall Gain ..... 104 dB max.

Frequency Response ..... 20 to 20,000 Hz, ±1.5 dB

Distortion (30-20,000 Hz)
- Program Channel ..... 0.75% max.
- Monitor Channel (10 W, 4/8 ohms) ..... 1% max.

Signal/Noise Ratio (20-20,000 Hz) ..... 70 dB min.

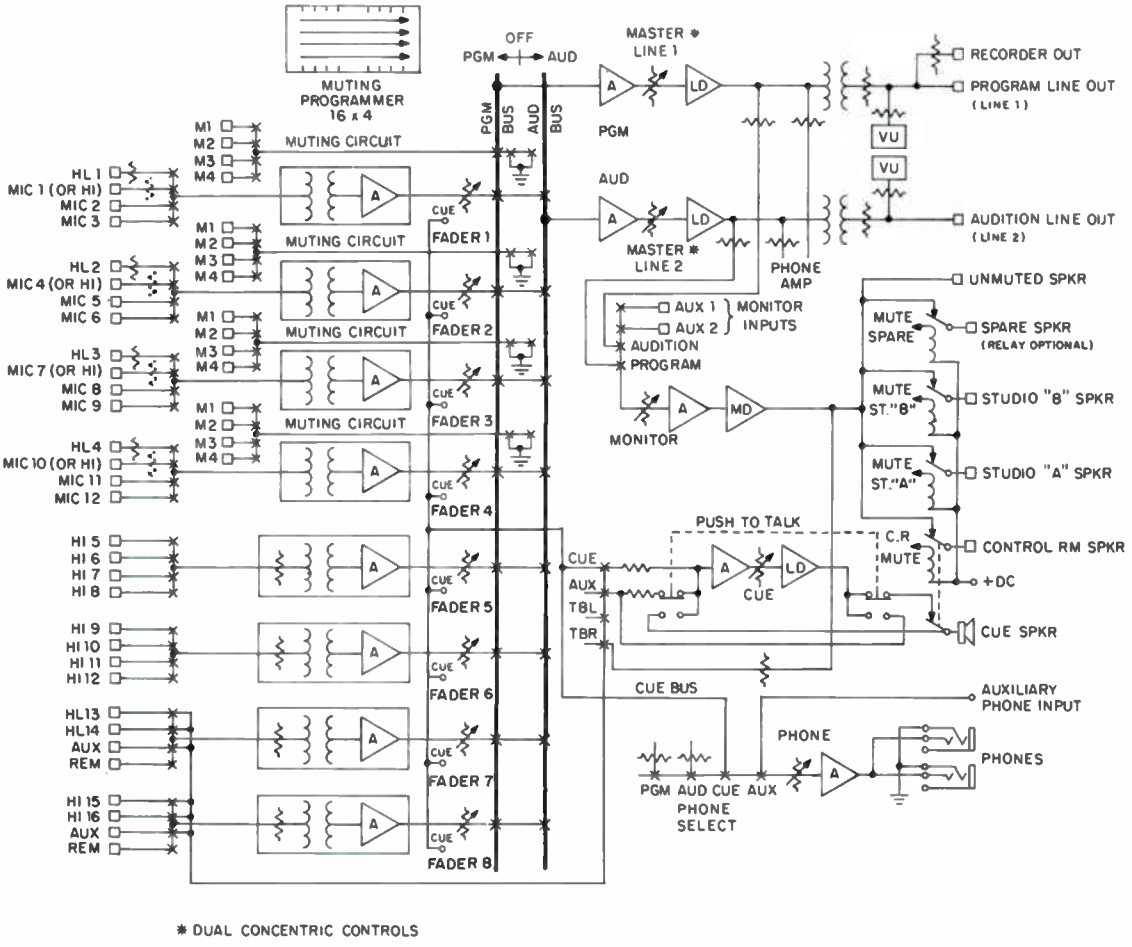
Power Requirements ..... 117/234V, 50/60 Hz 110W max.

Dimensions
- BC-15 Series ..... 27⅜" W; 9⅜" H; 18¾" D (695, 238, 476 mm)
- BC-18 Series ..... 36⅜" W; 9⅜" H; 18¾" D (924, 238, 476 mm)

Weight:	Mono	Stereo	Dual
BC-15	40 lbs. (18 kg)	50 lbs. (23 kg)	45 lbs. (20 kg)
BC-18	47 lbs. (21 kg)	57 lbs. (26 kg)	52 lbs. (24 kg)

Accessories

- Monitor Amplifier MI-141048
- Audition Line Transformer MI-141011
- Speaker Muting Relay MI-141012
- Preamplifier Module (for mono or dual-channel console) MI-141013
- Preamplifier Module (for stereo console) MI-141023
- Hi-Level Preamp Module (for mono or dual channel console) MI-141014
- Hi-Level Preamp Module (for stereo console) MI-141024
- Output Circuit Assembly MI-141049
- Power Supply Regulator MI-141025



Functional Diagram, Type BC-18D Dual Channel Console

Ordering Information

Five-Fader Consoles:

Mono, Type BC-15	MI-11676
Stereo, Type BC-15S	MI-11678
Dual-Channel, Type BC-15D	MI-11683

Eight-Fader Consoles:

Mono, Type BC-18	MI-11677
Stereo, Type BC-18S	MI-11679
Dual-Channel, Type BC-18D	MI-11684

Shipping Data:

Packing Dimensions

BC-15	13" x 24" x 32" (330, 610, 813 mm)
BC-18	13" x 24" x 41" (330, 610, 1041 mm)

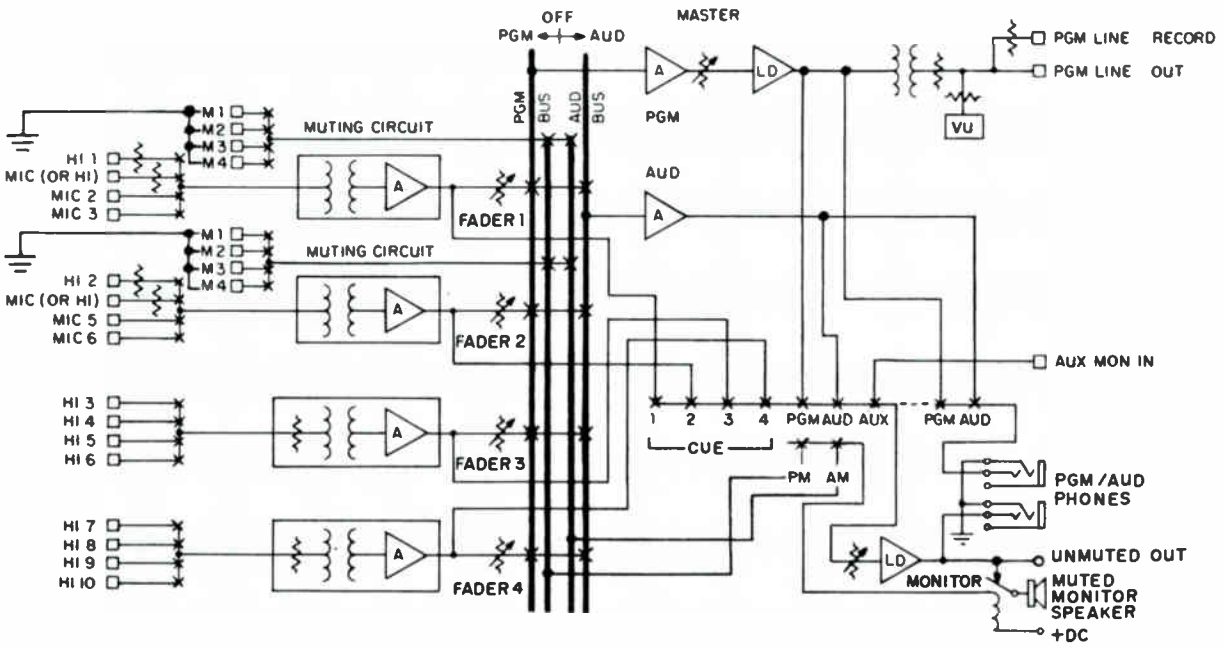
Gross Weight (approx.):

BC-15	55 lbs. (25 kg)
BC-18	70 lbs. (32 kg)

Four-Fader Consoles, Type BC-14

- Mono, stereo and dual-channel
- Desk-top or rack-mount versions
- Pushbutton input selection
- Four input faders
- Balanced inputs and outputs

The BC-14 consoles are provided in stereo, mono and dual-channel mono models, each of which is available in console and rack-mounted versions. All are identical in physical size, with the exception that the rack-mounted versions have no console cabinet housing. The consoles are ideally suited to the audio-control needs of radio, TV and CCTV program production and for the control of sound reinforcement systems in auditoriums, amphitheaters, coliseums, stadiums and convention halls. They are high-performance units designed for high-quality audio production, particularly for economical and cost-conscious applications.



Functional Diagram, Type BC-14 Mono Console

Pushbutton Input Selection

The consoles feature pushbutton input-selection, and audition provisions on all input fader channels. Each input fader handles four inputs through a four-position pushbutton bank.

Low-level preamplifiers are included for input mixer channels 1 and 2. These preamplifiers (with 40 dB gain) and the program line amplifier (with 60 dB gain) provide a maximum program line gain of 100 dB. For the high-level input to these preamplifiers, a bridging pad is provided between the selector pushbutton switch and its input transformer. Thus, faders 1 and 2 each handle three microphone and one high-level inputs. With strapping, faders 1 and 2 can handle two microphone and two high-level inputs.

Faders 3 and 4, for high-level inputs only, include a bridging pad between the input selector pushbutton switch and the preamplifier input. Thus, input faders 3 and 4 each handle four high-level inputs.

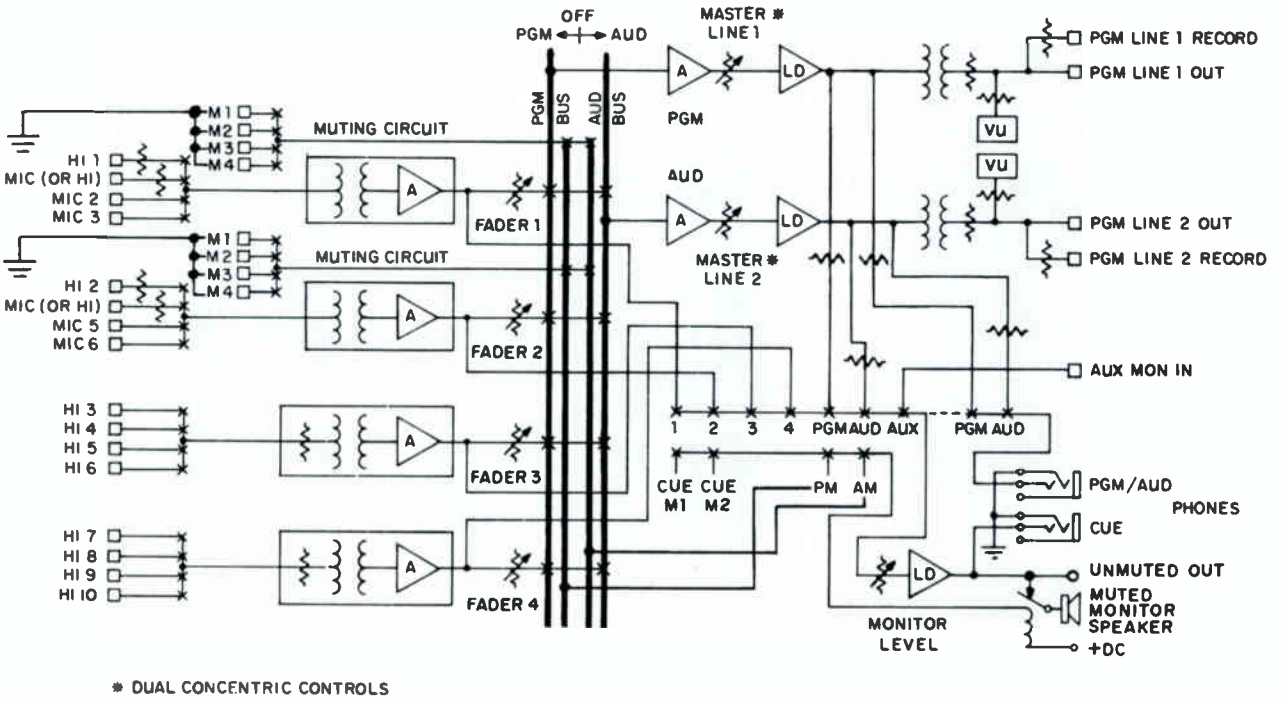
Separate Program Amplifier

A program-boost amplifier drives the Master Gain Controls (individual master gain controls for mono and dual-channel consoles; ganged master gain control for stereo). The program line amplifier delivers a balanced, transformer-coupled, +18 dBm output level, through a 6 dB pad, to the program line.

Monitor Line Output

The audition bus feeds a monitor-selector pushbutton switch which is used to select the input to the cue speaker, located in the top cover of the console housing assembly. The monitor output power is 1.5 watts into a 45-ohm load.

A single muting relay is provided. The relay is energized by operating the mike input selector switch for faders 1 and 2.



Functional Diagram, Type BC-14D Dual-Channel Mono Console

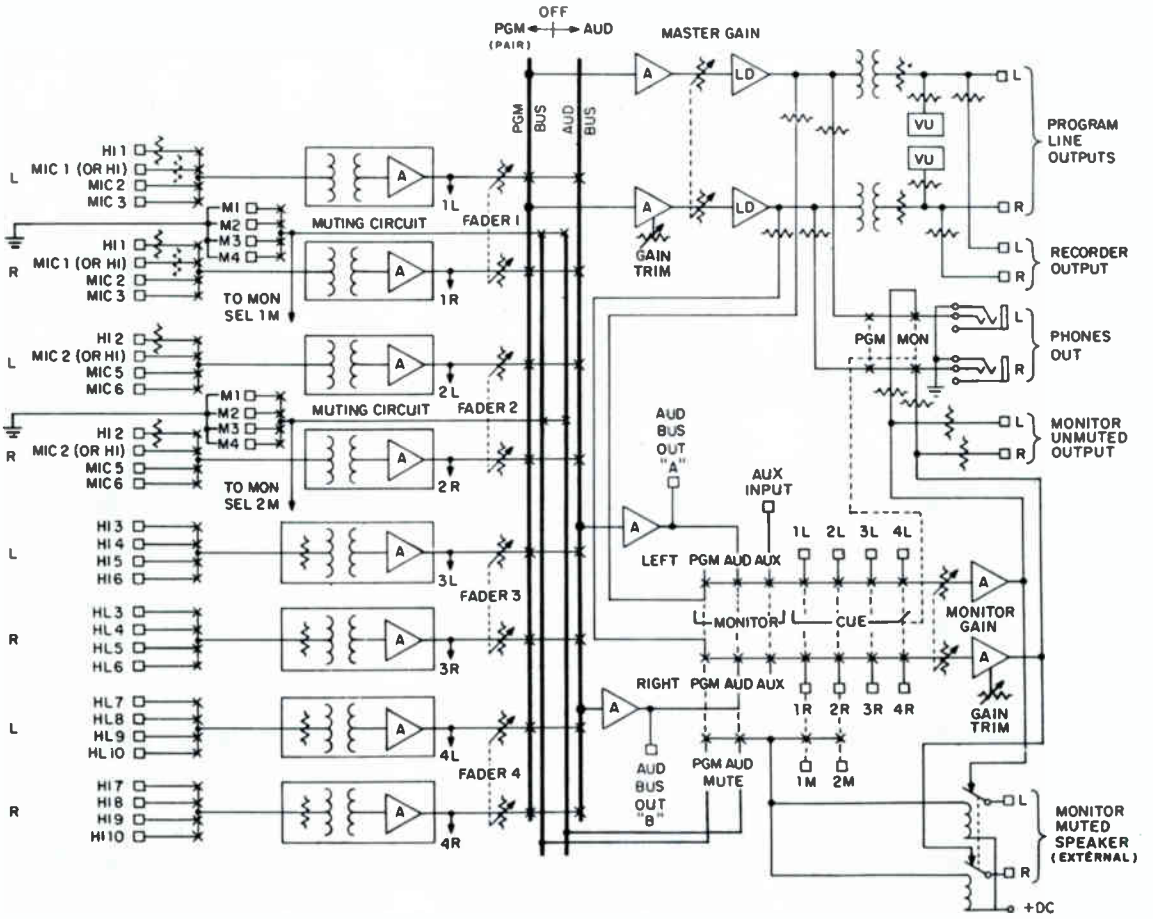
Specifications

Program Output Level (after 6 dB pad) ..... +18 dBm
Monitor Output Level ..... +32 dBm (1.5 watts)
Frequency Response Characteristics:
  Program and Audition Channels ..... 30 to 15,000 Hz, ±1 dB
  Monitor Channel ..... 30 to 15,000 Hz, ±1.5 dB
Harmonic Distortion:
  Program Line (+18 dBm output, 50 to 15,000 Hz) ..... 1% max.
  Monitor Line ..... 1% max.
Noise Level (rel. input noise in mike channels) ..... −120 dBm
Gain:
  Mike to Line ..... 100 dB
  High-Level to Line ..... 55 dB
Load Impedances:
  Program Line (Balanced) ..... 600 ohms
  Monitor Loudspeakers ..... 45 ohms
  Headphones (Minimum) ..... 600 ohms
Source Impedances:
  Microphone (Balanced) ..... 150 ohms
  High Level (Balanced) ..... 600 ohms

Power Requirements ..... 117/234 V., 50/60 Hz
Dimensions:
  BC-14, BC-14D, BC-14S ..... 17" W, 7½" H, 16¾₆" D (432, 191, 411 mm)
  BC-14R, BC-14DR, BC-14SR ..... 19" W, 7½" H, 16¾₆" D (483, 191, 411 mm)

Accessories

Mono and Dual Hi-Level Preamp MI-141014
Mono and Dual Microphone Preamp MI-141013
Stereo Hi-Level Preamp MI-141024
Stereo Microphone Preamp MI-141023
Power Supply Regulator MI-141046
Muting Relay, Plug-in MI-141012
Console Cabinet (converts rack unit to console) MI-11685
Transformer, 45-ohm to speaker MI-11686
Stereo Output Assembly MI-141047



Functional Diagram, Type BC-14S Stereo Console

Ordering Information

Desk-Top Console, Four Fader:

Mono, Type BC-14	MI-11680
Stereo, Type BC-14S	MI-11681
Dual-Channel, Type BC-14D	MI-11682

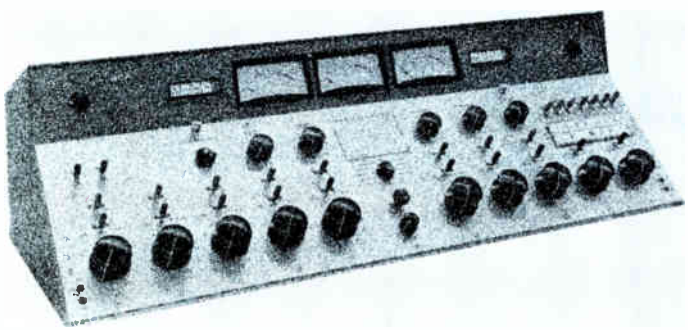
Rack-Mount Console, Four Fader:

Mono, Type BC-14R	MI-11680R
Stereo, Type BC-14SR	MI-11681R
Dual-Channel, Type BC-14DR	MI-11682R

catalog AU.2010A
(Replaces B.1160)

Audio Consoles,
Types BC-7, -8, -9, -17, -19; BCM-2

- All amplifiers and power supplies plug-in
- Mono, stereo, two-channel mono and simulcast units
- Long-life, step-type faders
- Noiseless, telephone-type key switches
- Expandable capabilities



RCA Audio Consoles are high-quality systems designed to stand up under day-in, day-out use and abuse. There are mono, stereo, two- and three-channel consoles plus an auxiliary console for system expansion. Modular construction permits a variety of input combinations, depending on the modules selected. For your convenience, a selection of input arrangements is included for each console.

Two-Channel Console, Type BC-7
The Type BC-7 is offered in five basic forms for dual-channel mono and stereo operation. The console provides ten faders.

Two-Channel Console, Type BC-8
The Type BC-8 is a dual-channel, mono console with eight faders. It uses plug-in modules identical to those of the BC-7 and is offered in two versions.

Mono Console, Type BC-9
Featuring four input faders, the Type BC-9 is a mono console ideally suited to the needs of the smaller studio or audio system. Its components are identical to those of the larger consoles described in these pages.

Simulcast Audio Console, Type BC-17
Essentially a three-channel version of the versatile Type BC-7 Console, the Type BC-17 provides mono and stereo mixing facilities together or separately without external switching or jack-field assemblies. As a result, the BC-17 can control stereo and mono program material simultaneously.

Stereo Console, Type BC-19
The Type BC-19 is a stereo or two-channel equivalent of the mono Type BC-9. Its components are interchangeable with those of the other consoles described in these pages.

Auxiliary Mixer Console, Type BCM-2
The Type BCM-2 expands the input capability of any of the foregoing consoles by five faders. It is offered in two standard versions: one for mixer bus bridging and one for mixer input.

Two-Channel or Stereo Console, Type BC-7

- Eight dual, two single step-attenuator faders
- Plug-in assemblies
- Balanced inputs and outputs
- Solid state design
- High reliability components

The BC-7 Audio Console provides stereo or mono mixing, switching, and monitoring, plus dependable plug-in amplifiers, low-impedance mixing circuits, power supply and built-in cue/intercom amplifier. Two mono and three stereo versions are available from stock. Special configurations are available on order.

Ten Input Faders

The BC-7 console contains ten faders: five low level, three high level and two line level. All inputs and outputs are brought out to terminal connections within the console, so that external wiring is easily accomplished.

Functional Design

The BC-7 Console is designed for operating convenience with a double-sloped front panel, large illuminated VU meters and uncluttered control panel. The main control panel finish is anodized, brushed aluminum while the housing and upper panel are finished in a pleasant blue color.

Compact Control Arrangement

All switching, mixing, and operational controls are contained on the main control panel and are grouped and color coded for fast identification. Permanent panel designations are etched in black, while designations which are most subject to change, are left blank. Panel recesses, provided at these locations, accept an assortment of pressure-sensitive labels supplied with each console. Plug-in, unitized construction is the key to the flexibility of the BC-7 to meet varying studio applications. Six types of plug-in units are used in the BC-7: preamplifier, program amplifier, monitor amplifier, cue/intercom amplifier, power supply and high-level isolation unit.

All Solder Input Connectors

One feature of the design is the availability of the input and output circuits on terminals. This facilitates wiring to external sound effects equipment, compensating networks or jack panels. Another feature is the muting-relay strapping panel, conveniently located behind the main control panel at the top, center. Any of the five muting relays may be controlled by any combination of source selection lever keys associated with faders 1 thru 8.

Self-Contained Power Supply

The power supply provides operating power for up to ten preamplifiers, two program amplifiers, five speaker muting relays as well as reserve power for operation of five additional optional warning light relays. The 10-watt monitor amplifier and the cue/intercom amplifier contain their own power supply.

Mixing Features

Each of the ten faders accepts one of three plug-in units: the preamplifier (for low-level sources); a high-level isolation unit (for balanced high-level sources); or a simple jumper plug (for direct, unbalanced-input). The console housing is supplied with dual attenuators in fader positions 1 through 8.

Specifications

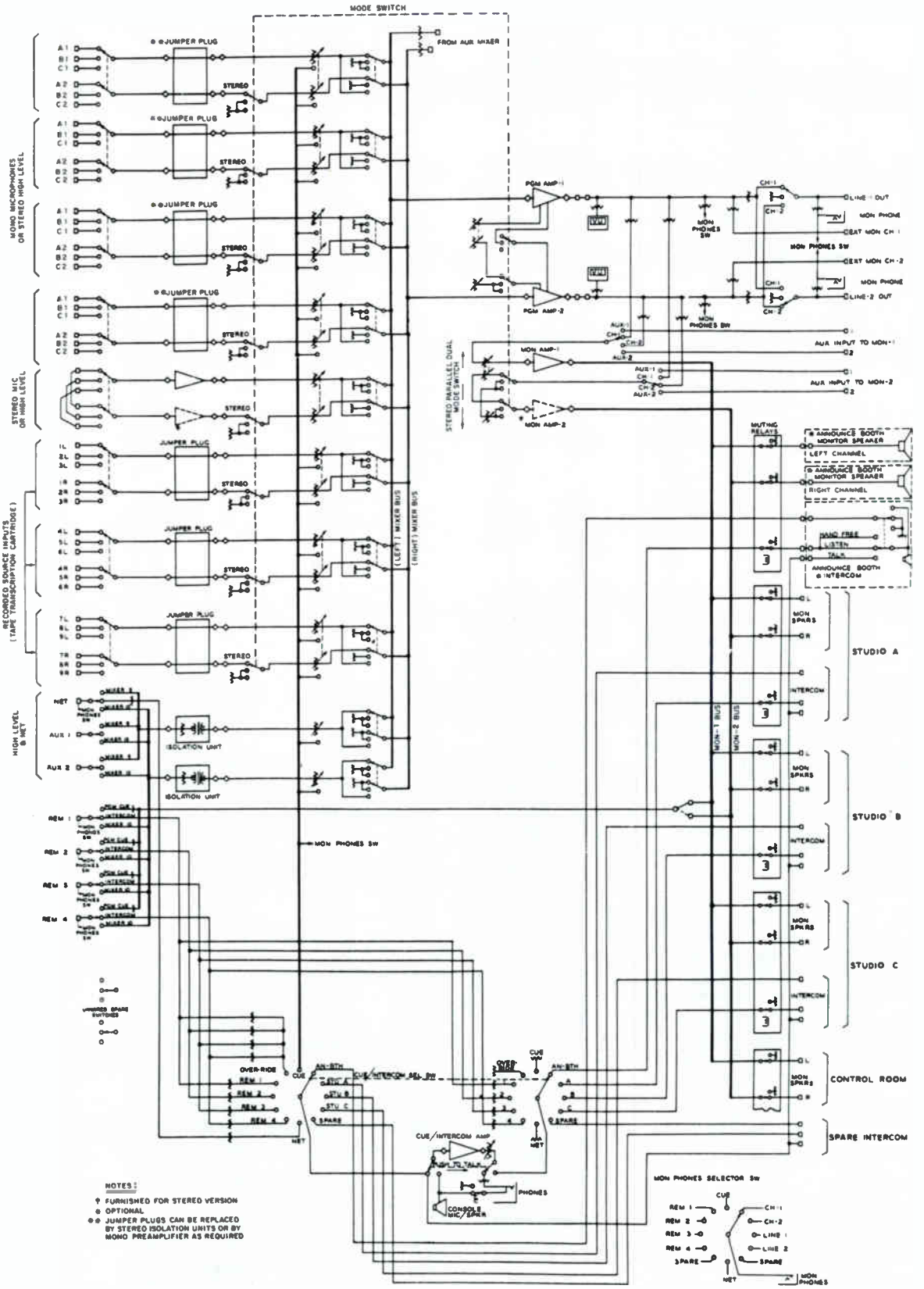
Faders	10
Inputs	31
Outputs:	
Program lines	2
External monitors (one for each channel)	2
Speakers per channel (or 10 speakers, two per location for stereo using optional second monitor amplifier)	5
Source Impedances:	
Microphones	37.5/150/600 ohms
Hi-Level (Balanced)	600 ohms
Load Impedances:	
Line (Balanced)	600 ohms
Loudspeaker (Balanced)	16 ohms
Headphone	High Impedance
Output Level:	
Program Channels (after 6 dB isolation pad)	+18 dBm
Monitor Amplifier	10 watts or +40 dBm
Input Level:	
Microphone Inputs (maximum)	−22 dBm
Hi-Level Input (maximum)	+18 dBm
Gain:	
Mic to Program Line	105 or 111 dB
Hi-Level to Program Line	64 dB
Frequency Response	30 to 20,000 Hz, ±0.75 dB
Distortion:	
Program Channel	50-20,000 Hz 0.5% max.
Monitor Amplifier	30-20,000 Hz 1% max.
Signal-to-Noise Ratio	
Microphone to Program Line (68 dB gain, +18 dBm output)	68 dB
Power Requirements	117/234V, 50/60 Hz, 120W max.
Dimensions	39¼″ W, 12½″ H, 20″ D (997, 318, 508 mm)

Accessories

Auxiliary Mixer Housing, Type BCM-2B	MI-11656
On-Air Light Relay	MI-11702
Warning Lights	MI-11706-Series
Spare Program Amplifier, Type BA-72	MI-11672
Spare Program Amplifier, Type BA-73	MI-11659
Spare Monitor Amplifier, Type BA-74	MI-11661
Spare Cue/Intercom Amplifier, Type BA-78	MI-11662
Spare Power Supply, Type BX-71	MI-11663
Spare Stereo Hi-Level Isolation Unit	MI-11665S
Spare Mono Hi-Level Isolation Unit	MI-11665
Intercom Sub Station	MI-11452
Jumper Plugs, Set of two	MI-141015

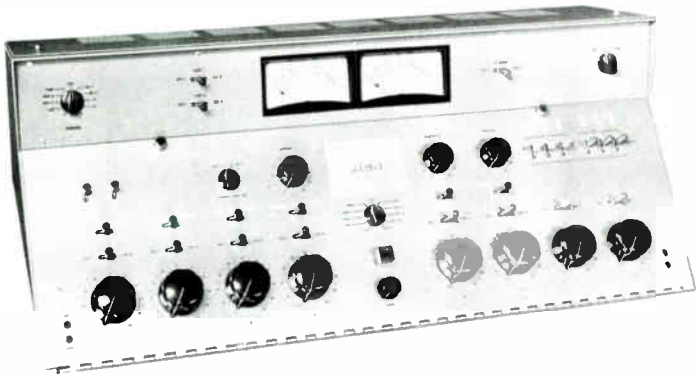
Ordering Information

Mono, Two-Channel Consoles, Type BC-7: (4 BA-72 Preamps; 2 BA-73 Program Amps; 1 BA-74 Monitor Amp; 1 BA-78 Cue/Intercom Amp; 2 Hi-Level Iso Units; 1 BX-71 Power Supply)	ES-11176
As above, with **two** BA-72 Preamps	ES-11177
Stereo, Two-Channel Consoles, Type BC-7: (6 BA-72 Preamps; 2 BA-73 Program Amps; 2 BA-74 Monitor Amps; 1 BA-78 Cue/Intercom Amp; 2 Hi-Level Iso Units; 1 BX-71 Power Supply)	ES-11180
As above, with **four** BA-72 Preamps	ES-11179
As above, with **two** BA-72 Preamps	ES-11178



Functional Diagram, Type BC-7 Console

Two-Channel Mono Console, Type BC-8



- Dual-channel operation
- Plug-in electronics
- Built-in cue and intercom amplifiers
- Step-attenuator faders
- Eight faders

Possessing great flexibility and featuring simplified operation, the BC-8 Studio Console provides a high-fidelity audio input system for AM, FM and TV stations. Designed for operating convenience and ease of servicing, the console offers two-channel mixing and switching with monitoring facilities, plus dependable plug-in amplifiers, low-impedance mixing circuits, self-contained power supply and built-in cue/intercom amplifier. Also included are two VU meters so that simultaneous, visual monitoring of both program channels may be accomplished.

Field installation of a third program channel is possible. This is useful for pre-testing microphone circuits for quality and level before switching to program or preview channels.

Plug-In Unitized Construction

Plug-in unitized construction is the key to the flexibility of the BC-8. The basic console consists of a wired housing including all operating controls, three dust-protected speaker muting relays, two VU meters, and guide assemblies for plug-in modules. These include microphone preamplifiers, program amplifiers, cue/intercom amplifier, a monitor amplifier, a power supply, and high-level isolation units. Plug-in units are identical with those of the BC-7 Console and BCM-2 Auxiliary Mixer.

Eight Low-Impedance Faders

The BC-8 Studio Console contains a total of eight fader positions; three low-level, (each switchable to one of three inputs); three high-level, (each switchable to one of three inputs); and two line-level, (each switchable to one of three inputs). All amplifier inputs and outputs are brought out to terminal connections within the console, so that wiring to external jack fields may be easily accomplished.

Ease of Operation

All switching, mixing, and operational controls are contained on the main control panel and are grouped and color coded for fast identification. The double-slope front panel, pleasing functional design, large illuminated VU meters and completely uncluttered control panel highlight the simplicity and beauty of the unit. The finish of the main control panel is anodized, brushed aluminum, while the housing and upper panel are finished in a harmonizing blue color. The console is intended for desk top mounting. The BCM-2 Auxiliary Mixer may be used with the BC-8 to increase the number of available faders by five. Convenient terminals are provided in the BC-8 to extend the mixer bus to the BCM-2.

Specifications

Faders (selectable to either program channel) 8

Inputs 24

Outputs:
- Program lines (either channel feeds either or both) 2
- External monitor (one for each channel) 2
- Loudspeakers 3

Source Impedance:
- Microphones (Balanced) ..... 37.5/150/600 ohms
- Hi-Level (Balanced) ..... 600 ohms

Load Impedance:
- Line ..... 600 ohms balanced from 6 dB pad
- Speaker (Balanced) ..... 16 ohms
- Headphone ..... High Impedance

Input Level:
- Microphone Inputs (maximum) ..... −22 dBm max.
- Hi-Level (maximum) ..... +18 dBm max.

Output Level:
- Program Line (After 6 dB isolation pad) ..... +18 dBm
- Monitor ..... 10W or +40 dBm

Gain:
- Mic Input to Program Line ..... 105 or 111 dB
- Hi-Level to Program Line ..... 64 dB

Frequency Response ..... 30 to 20,000 Hz, ±0.75 dB

Distortion:
- Program Channel (50-20,000 Hz) ..... 0.5% max.
- Monitor Amplifier (30-20,000 Hz) ..... 1% max.

Signal-to-Noise Ratio:
- Mic to Program Line (68 dB gain, +18 dBm output) ..... 68 dB min.

Dimensions ..... 34¾" W, 12½" H, 20" D (883, 318, 508 mm)

Weight (approx.) ..... 125 lbs. (58 kg)

Finish Color ..... Blue, brushed aluminum panel, color coded controls

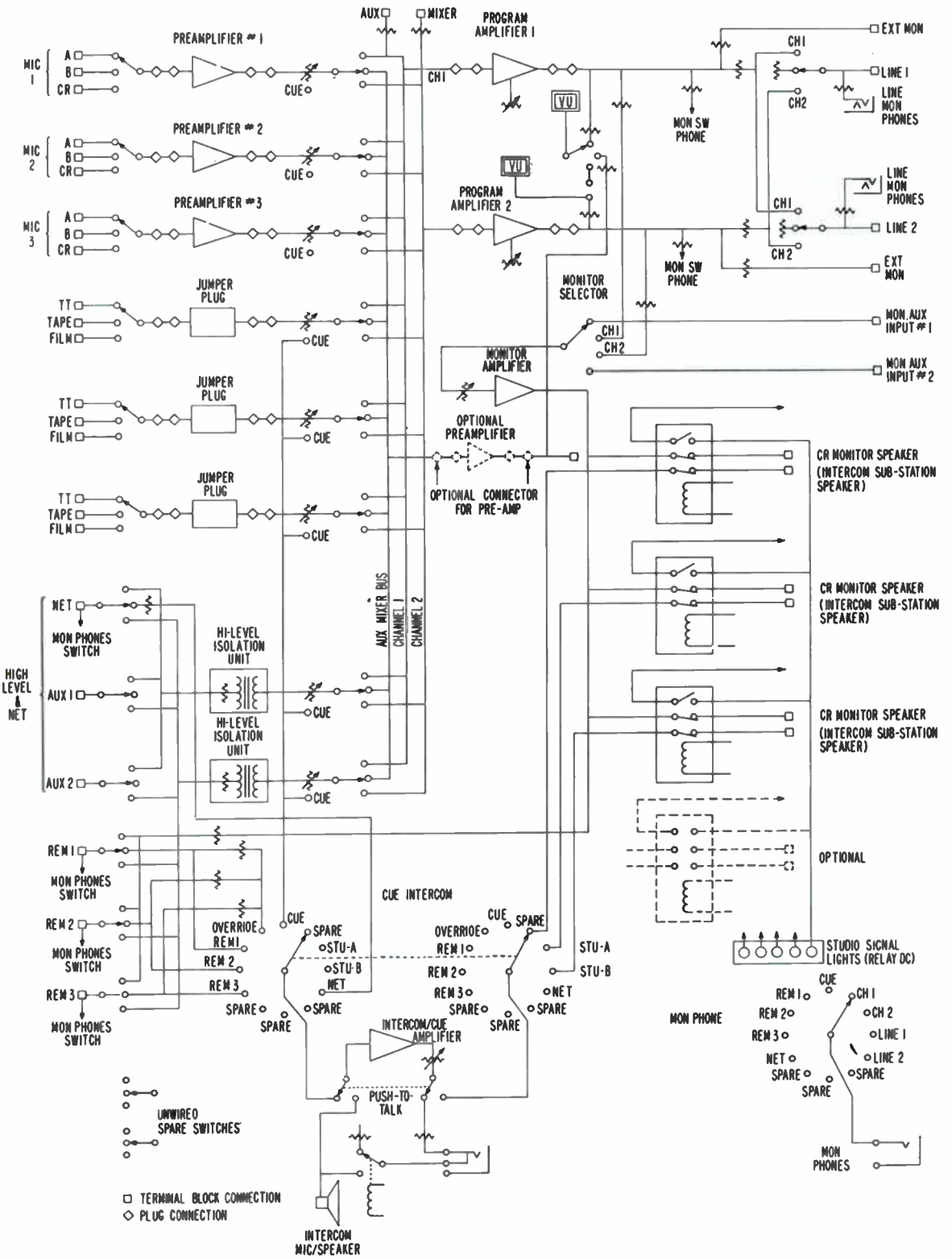
Power Requirements ..... 115/230 V, 50-60 Hz, 120 W max.

Accessories

Auxiliary Mixer Housing, Type BCM-2	MI-11656
On-Air Light Relay	MI-11702
Warning Lights	MI-11706-Series
Jumper Plugs, Set of two	MI-141015
Spare Preamplifier, Type BA-72	MI-11672
Spare Program Amplifier, Type BA-73	MI-11659
Spare Monitor Amplifier, Type BA-74	MI-11661
Spare Cue/Intercom Amplifier, Type BA-78	MI-11662
Spare Power Supply, Type BX-71	MI-11663
Spare Mono Hi-Level Isolation Unit	MI-11665
Intercom Sub-station	MI-11452

Ordering Information

Mono Two Channel Consoles, Type BA-8: (3 BA-72 Preamps; 2 BA-73 Program Amps; 1 BA-74 Monitor Amp; 2 Hi-Level Iso Units; 1 BA-78 Cue/Intercom Amp; 1 BX-71 Power Supply)	ES-11167
As above with one BA-72 Preamp	ES-11181



Functional Diagram, Type BC-8 Console

Simulcast Three-Channel Audio Console, Type BC-17

- Extensive FM, AM and TV features
- Reliable solid state design
- Easy operation
- Ten dual step-attenuator faders

The BC-17 Simulcast Three-Channel Audio Console provides modern mixing and switching facilities for the AM/FM/TV broadcaster. The console allows an operator to simultaneously switch program material to a stereo FM transmitter and an AM transmitter.

Input Facilities

The BC-17 has provisions for 46 audio inputs; 18 mono sources, 28 stereo inputs, including two inputs for auxiliary program sources. Two extra unwired utility level keys are also provided.

Mixing is accomplished by a ten-fader low impedance mixer, using ladder attenuators. Cueing positions are provided on all attenuators.

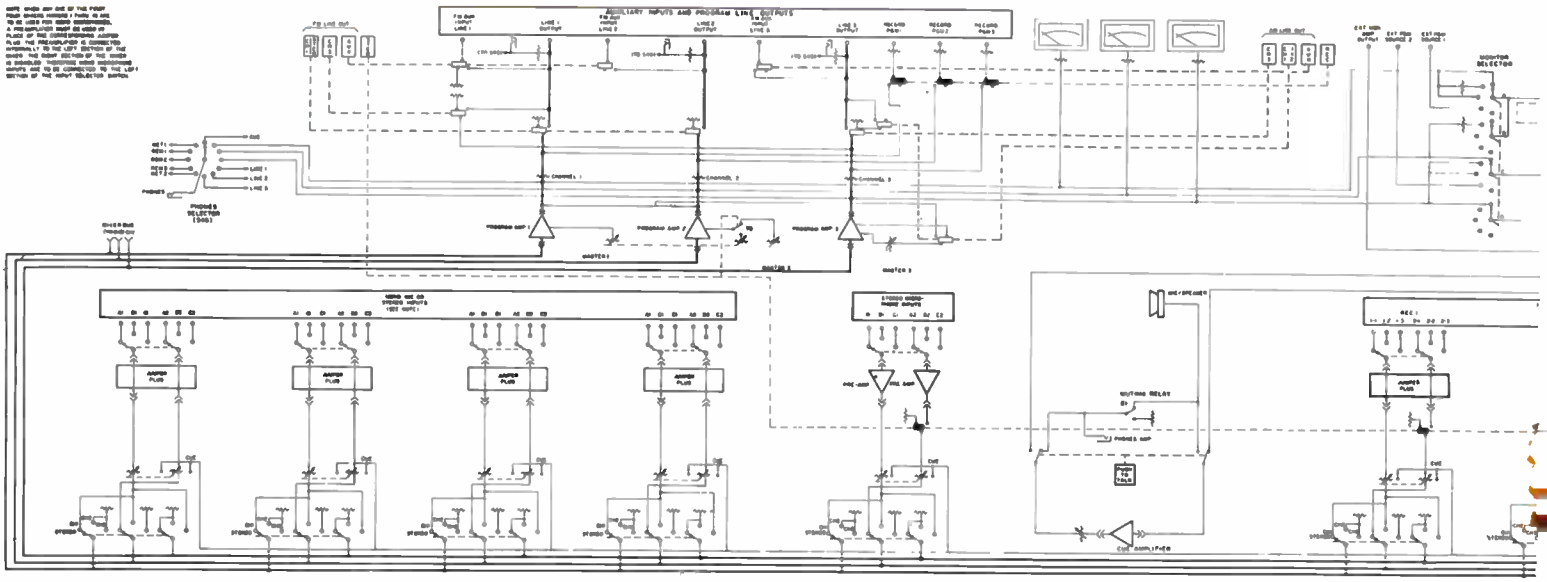
The console has twelve single, low-level input channels allowing twelve single mono microphones to be individually switched (three per channel) into four mixing channels. Three stereo pairs of microphones may be switched separately into the first five faders (stereo).

Ten high-level stereo inputs are provided. These channels include stereo turntable, reel- and cartridge-tape and film projector sources, and one auxiliary input.

The high-level channels include one network, one auxiliary, and three remote line inputs. They are individually switched to provide maximum flexibility. These inputs are wired for one (left) channel only. However, wiring for the right channel can be added since switch facilities are available to provide stereo when desired. Two relay switching assemblies and one external auxiliary input provide fifteen stereo inputs.

Program Channels

All input sources are routed to any one of three program channel buses which, in turn, direct mono programs into a corresponding program amplifier. A stereo source is routed into the channel 1 bus and channel 2 bus, then into program



amplifiers 1 and 2 respectively. A selector switch connects the right channel of the source through the channel 2 program amplifier.

Monitoring Features

Monitoring facilities permit the operator to control the mode of program fed to studio speakers.

Other monitoring facilities include four phone jacks for program amplifier outputs, line outputs, cue information and network and remote line programs. Through a panel speaker, it is possible to select cue, networks, or remote line information and studio intercommunications at speaker signal level.

Specifications

Mixing Channels 10
Inputs 46
External High Level Sources ..... 1 Mono; 1 Stereo
Operating Modes ..... Three-Channel or Stereo/Mono simultaneously
Output Levels:
- Program (Three Lines) ..... +18 dBm
- Recording Outputs (Four outputs) ..... −0 dBm
- Stereo Speaker Outputs (Five sets) ..... 10W or +40 dBm

Auxiliary Input/Output Circuits ..... 1 high-level auxiliary
Source Impedances:
- Microphone Inputs (Balanced) ..... 37.5/150/600 ohms
- Hi-Level Inputs ..... 600 or 600/150 ohms

Load Impedances:
- Line (Balanced) ..... 600 ohms
- Loudspeaker (Balanced) ..... 16 ohms
- Headphones ..... High Impedance

Input Levels:
- Microphone (Max.) ..... −22 dBm
- Hi-Level (Max.) ..... +18 dBm

Gain:
- Microphone to Program Line ..... 106 or 112 dB
- Recorded Inputs to Program Line ..... 66 dB max.
- Network, Auxiliary and Remote ..... 66 dB
- Microphone Input to Speaker Line ..... 127 dB

Signal-to-Noise Ratio ..... 68 dB min.
Frequency Response (30-20,000 Hz) ..... ±0.5 dB
Distortion:
- Program Channels (50-20,000 Hz) ..... 0.5% max.
- Monitor Amplifier (30-20,000 Hz) ..... 1.0% max.

Dimensions ..... 39¼" W, 12½" H, 20" D (997, 318, 508 mm)
Weight:
- Stereo Console ..... 180 lbs. (82 kg)

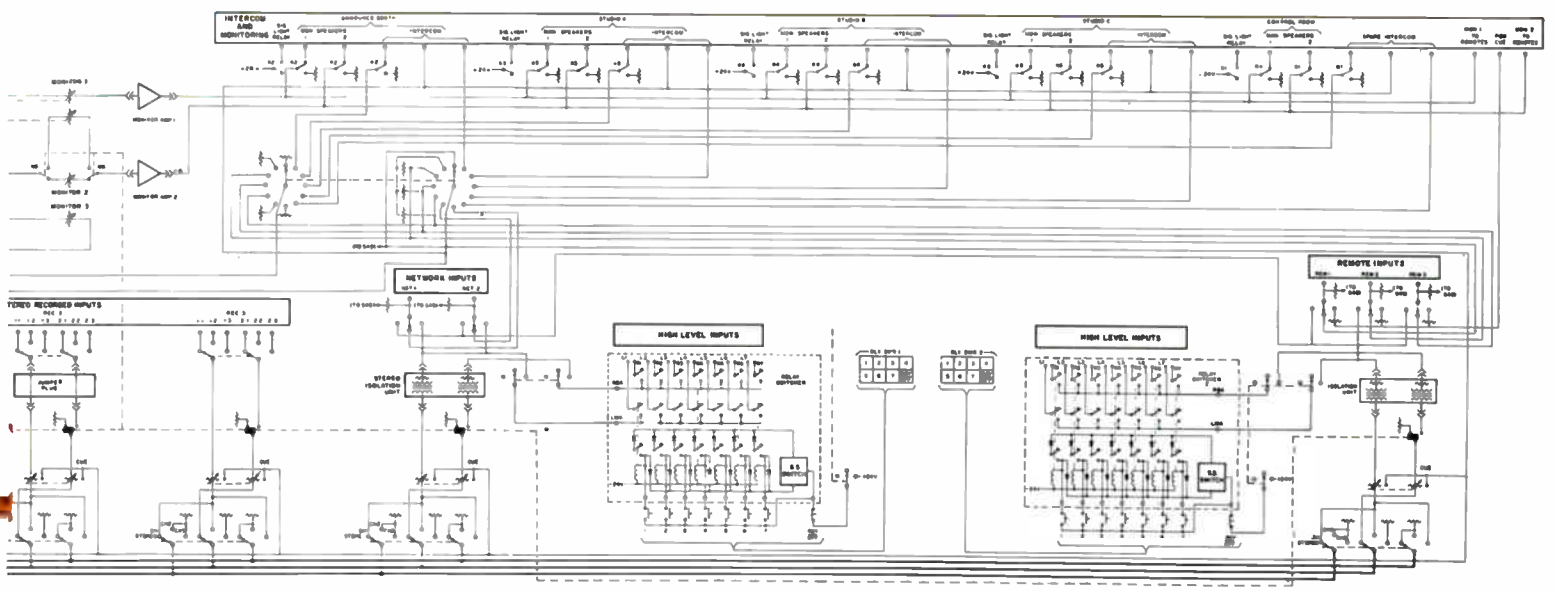
Power Requirements ..... 115 or 230 V AC, 50-60 Hz, 130 W max.

Accessories

On-Air Light Relay MI-11702
Warning Lights MI-11706-Series
Jumper Plugs, Set of Two MI-141015
Spare High Level Isolation Unit (Mono) MI-11665
Spare Hi-Level Isolation Unit (Stereo) MI-11665S
Spare Preamplifier, Type BA-72 ..... MI-11672
Spare Program Amplifier, Type BA-73 ..... MI-11659
Spare Monitor Amplifier, Type BA-74 ..... MI-11661
Spare Cue/Intercom Amplifier, Type BA-78 ..... MI-11662
Power Supply, Type BX-71 ..... MI-11663
Intercom Sub Station MI-11452

Ordering Information

Three-Channel Console, Type BC-17:
(6 BA-72 Preamps; 3 BA-74 Program Amps; 2 BA-74 Monitor Amps; 1 BA-78 Cue/Intercom Amp; 2 Stereo Hi-Level Iso Units; 1 BX-71 Power Supply) ES-11173
As above with **four** preamps ES-11174
As above with **two** preamps ES-11175



Functional Diagram, Type BC-17 Console

Mono Console,
Type BC-9

LIMITED QUANTITIES

- Extended frequency response
- Pushbutton source selection
- Self-contained relay switching
- Built-in intercom

The BC-9 Four-Fader Mono Console packs a lot of versatility and convenience. Multiple pushbuttons permit easy selection of high level sources (such as tape recorders, cartridge tape, turntable, etc.) to each of two fader controls. The BC-9 may be operated remotely, since the sources are switched by self-contained relays. Two additional faders are provided for use with microphones.

The modular plug-in amplifiers and power supply used in the BC-9 are identical with those incorporated in several other RCA audio consoles (BC-7, BC-8, BC-17, BC-19).

Communications between control room and studio or remote locations is facilitated by the intercom facilities built into the BC-9.

Specifications

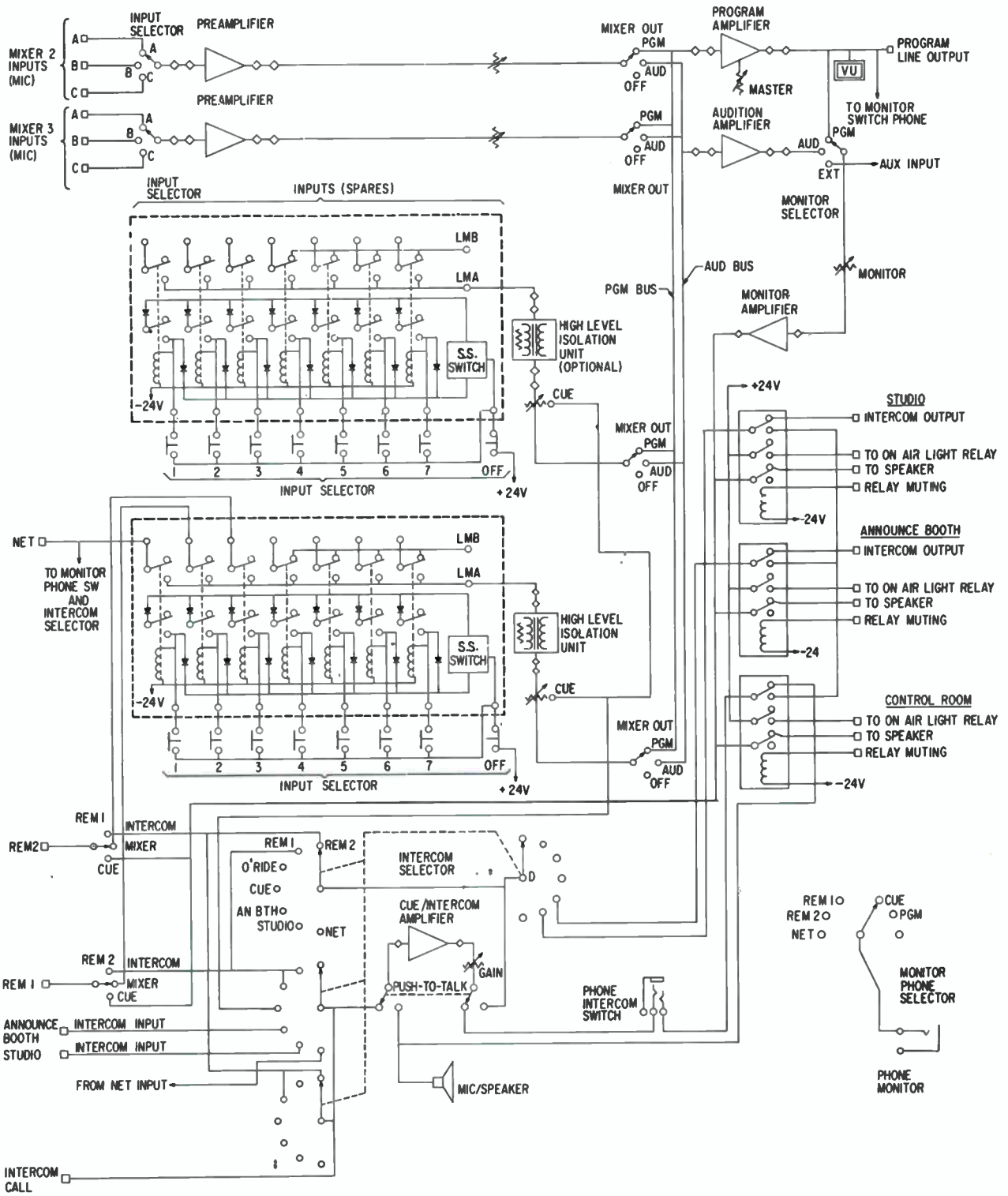
Faders	4
Inputs (Total)	20
Outputs	1 Program; 3 Monitor Speaker
Source Impedance:	
Microphones (Balanced)	3.75/150/600 ohms
Turntables/Tape (Balanced)	60 ohms
Input Levels:	
Microphone	−22 dBm max.
Hi-Level	−10 dBm
Output Levels:	
Program (after 6 dB isolation pad)	+18 dBm
Monitor	10W or +40 dBm
Maximum Gain	105 dB
Frequency Response	30-20,000 Hz, ±0.75 dB
Distortion:	
Program Channel (50-20,000 Hz)	0.5% max.
Monitor Channel (30-20,000 Hz)	1% max.
Signal-to-Noise Ratio	68 dB
Dimensions	19½" W, 12½" H, 24" D (495, 318, 610 mm)
Weight (Approx.)	125 lbs. (57 kg)

Accessories

On-Air Light Relay	MI-11702
Warning Lights	MI-11706-Series
High Level Isolation Unit	MI-11665
Spare Preamplifier, Type BA-72	MI-11672
Spare Program Amplifier, Type BA-73	MI-11659
Spare Monitor Amplifier, Type BA-74	MI-11661
Spare Cue/Intercom Amplifier, Type BA-78	MI-11662
Power Supply, Type BX-71	MI-11663
Jumper Plugs, Set of two	MI-141015
Intercom Sub Station	MI-11452

Ordering Information

Mono Console, Type BC-9: (3 BA-72 Preamps; 1 BA-73 Program Amp; 1 BA-74 Monitor Amp; 1 BA-78 Cue/Intercom Amp; 2 Hi-Level Iso Units; 1 BX-71 Power Supply)	ES-11153



Functional Diagram, Type BC-9 Console

Two-Channel or Stereo Console, Type BC-19

LIMITED QUANTITIES

- Compact and versatile
- Two-Channel or stereo operation
- Four stereo step-attenuator faders
- Fourteen high-level inputs
- Built-in intercom
- Balanced inputs and outputs

The BC-19 Console offers versatility and many performance features.

Multiple pushbuttons permit easy selection of high level sources (such as tape recorders, cartridge tape, turntable, etc.) to each of two stereo mixer attenuators. Self-contained relays switch the sources, permitting remote operation of the BC-19. Two additional stereo faders are provided for use with microphones.

Interchangeability is another feature of the BC-19. The modular, plug-in amplifiers and power supply are identical to those used in the BC-7, BC-8, BC-9 and BC-17 consoles. Intercom facilities built into the BC-19 facilitate communications between control room and studio or remote locations.

For applications where stereo operation is not required, the console can be used to provide two program channels and a separate intercom channel. (See diagram.)

Specifications

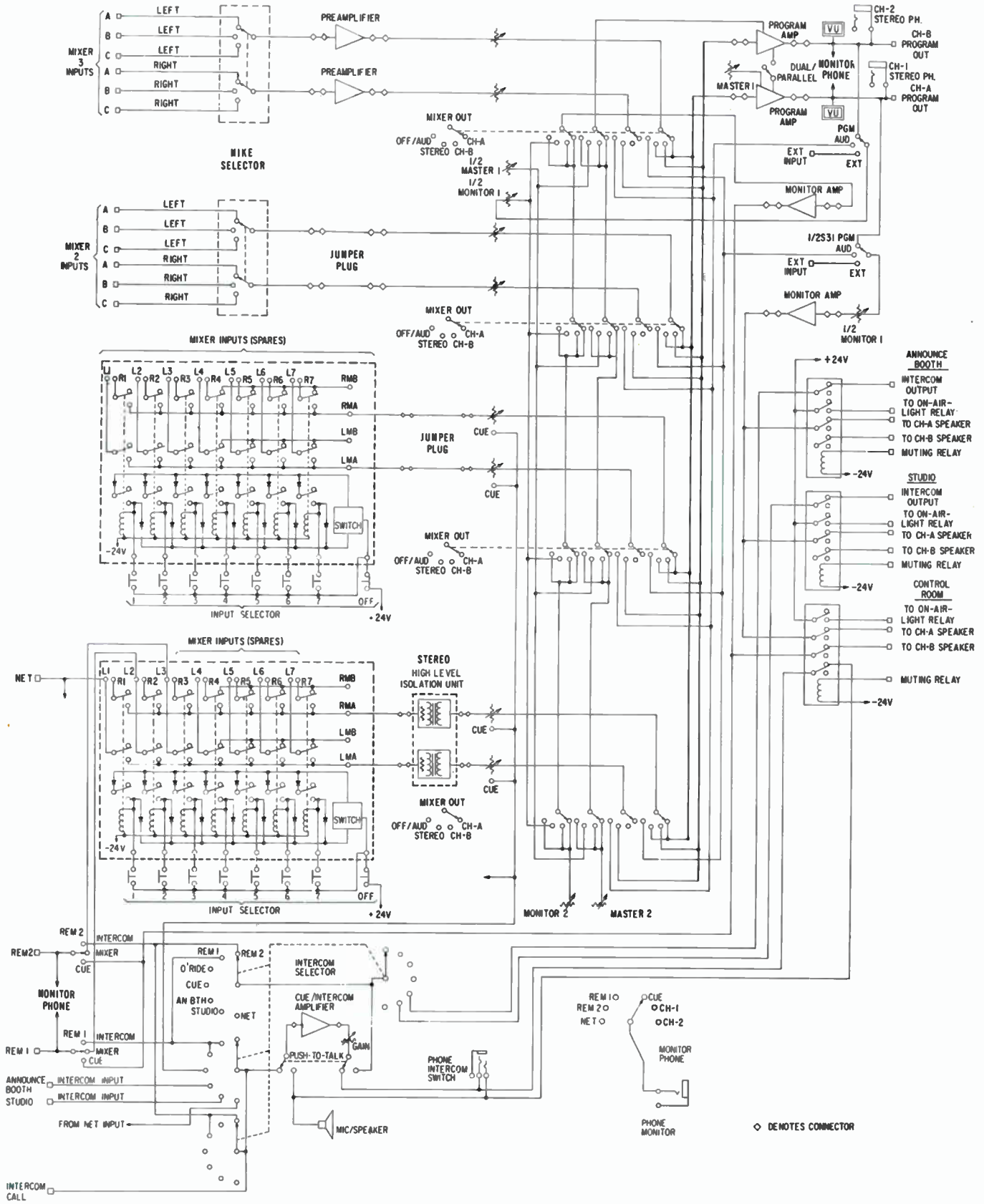
Faders	4 stereo
Inputs (Total)	20
Outputs:	
Program	2 mono, 1 stereo
Monitor Speaker Relays	2
Source Impedances:	
Microphones	37.5/150/600 ohms
Hi-Level	600 ohms
Load Impedances:	
Line (Balanced)	600 ohms
Loudspeaker (Balanced)	16 ohms
Headphone	High Impedance
Input Levels:	
Microphone	−22 dBm max.
Turntables/Tape/Remote	−10 dBm max.
Output Levels:	
Program (after 6 dB isolation pad)	+18 dBm
Monitor	10W or +40 dBm
Maximum Gain	105 dB
Frequency Response	30 to 20,000 Hz, ±0.75 dB
Distortion:	
Program Channel (50-20,000 Hz)	0.5% max.
Monitor Amplifier (30-20,000 Hz)	1% max.
Signal-to-Noise Ratio	68 dB min.
Power Requirements	117/234V, 50/60 Hz
Dimensions	19½" W, 12½" H, 24" D (495, 318, 610 mm)

Accessories

Auxiliary Mixer Housing, Type BCM-2B	MI-11656
On-Air Light Relay	MI-11702
Warning Lights	MI-11706-Series
Spare Preamplifier, Type BA-72	MI-11672
Spare Program Amplifier, Type BA-73	MI-11659
Spare Monitor Amplifier, Type BA-74	MI-11661
Spare Cue/Intercom Amplifier, Type BA-78	MI-11662
Spare Power Supply, Type BX-71	MI-11663
Spare Stereo Hi-Level Isolation Unit	MI-11665S
Spare Mono Hi-Level Isolation Unit	MI-11665
Intercom Sub Station	MI-11452
Jumper Plugs, Set of two	MI-141015

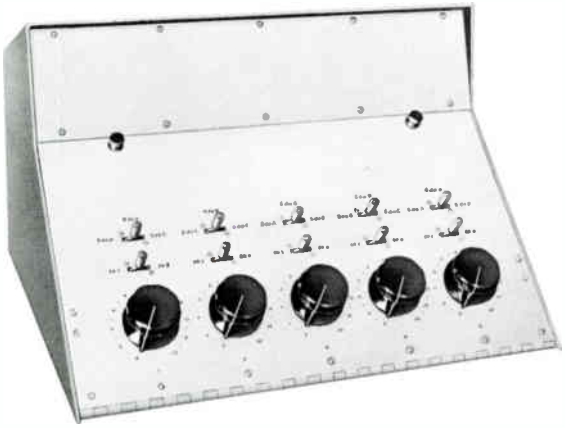
Ordering Information

Type BC-19 Stereo Consolette:
2 BA-72 Preamplifiers; 2 BA-73 Program Amplifiers; 2 BA-74 Monitor Amplifiers; 1 BX-71 Power Supply; 1 BA-78 Cue Amplifier; 1 Stereo High-Level Iso Unit ES-11154



Functional Diagram, Type BC-19 Console

Auxiliary Mixer Console, Type BCM-2



- Supplements facilities of stereo or mono consoles
- Five step faders with fifteen additional sources
- Modules offer low- or hi-level input
- Modules interchangeable with other RCA consoles RCA consoles

The BCM-2 Auxiliary Console is designed to supplement RCA Mono, Dual-Channel and Stereo Consoles by providing five additional fader controls and fifteen inputs. The console is styled to match the BC-7, BC-8, BC-9, BC-17 and BC-19 Consoles and is designed so that each fader channel accepts a preamplifier, high-level isolation unit or straight-through jumper plug, for a wide choice of input levels.

By use of preamplifiers as booster amplifiers, the 600-ohm outputs of the console may be bridged into the console's main mixer buses; or the BCM-2 may be fed into one of the high level inputs of the main console to provide a submaster. Substitution of high level isolation units for booster amplifiers enables the auxiliary mixer outputs to be fed into the microphone inputs of the main console. The gain is such that the same fader settings may be used on both BCM-2 and the console faders for equivalent levels.

The console has panel space for additional equipment or controls including extra space on the main panel plus a 4½-by-19-inch panel and a spare shelf for housing additional equipment such as the BA-70 Series of plug-in amplifiers.

Five faders and delegation switches are equally spaced across the console. Above each fader is also a source selector switch. Throwing a fader delegation switch to the left connects it to the channel 1 mixer bus; throwing it to the right connects it to the channel 2 mixer bus; the center is an off position. Each of the five input selector keys permits selection of one of three inputs, thus the BCM-2 Auxiliary Console makes available fifteen sources.

Two Channel Facilities

Three-position fader delegation keys and two mixer buses provide facilities suitable for two-channel operation (either stereo; program-audition; or two independent channels). The mixer delegation keys are pre-wired for stereo faders so that any fader can be conveniently replaced by a dual (stereo) fader available from stock. Extra contacts are provided on the input selector switches so that, if desired, it may be custom wired to simultaneously select both left and right channels of a stereo source.

Control Circuit Patch Board

A muting relay panel is located behind the main control panel. The console muting relays may be controlled by any combination of source selection lever keys.

Specifications

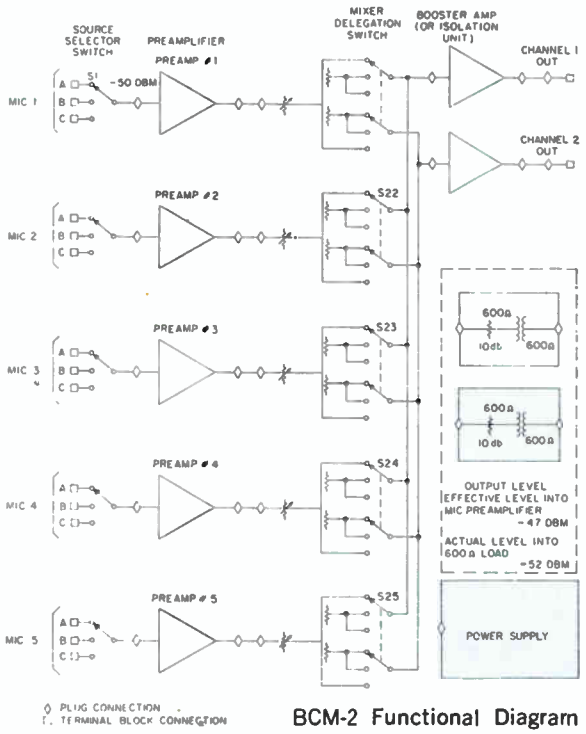
Mixers	5
Inputs (Total)	15
Source Impedance (Preamp Input, balanced)	37.5/150/600 ohms
Load Impedance (Balanced)	150/600 ohms
Outputs (from booster or isolation units	2-each 150/600 ohms
Maximum Output	+18 dBm
Frequency Response	30-20,000 Hz ±1 dB
Distortion	Less than 0.5%, 50-20,000 Hz
Signal-to-Noise Ratio: Microphone to Program Line Out (68 dB gain +18 dB output)	At least 68 dB
Power Requirements	117/234V, 50/60 Hz
Dimensions Overall	19½" W x 12½" H x 20" D (495, 317, 508 mm)
Weight (approx.)	70 lbs. (32 kg)
Power Supply (approx.)	14 lbs. (6.35 kg)
Preamps/Booster Amplifiers	Each approx. 2¼ lbs. (1020 g)

Accessories

Mono High-Level Isolation Unit	MI-11665
Stereo High-Level Isolation Unit	MI-11665-S
Power Supply, Type BX-71	MI-11663
Spare Preamplifier, Type BA-72	MI-11672
Jumper Plugs, Set of two	MI-141015

Ordering Information

BCM-2 Auxiliary Mixing Console (for Mixer Bus Bridging): (7 BA-72 Preamplifiers/Booster Amplifiers; 1 BX-71 Power Supply)	ES-11155
BCM-2 Auxiliary Mixing Console (for Mixer Input): (5 BA-72 Preamplifiers; 2 Isolation Units; 1 BX-71 Power Supply)	ES-11156



BCM-2 Functional Diagram

catalog AU.1210A
(Replaces B.1010)

Dynamic Microphones, BK Series

- Smooth, wide-range frequency response for voice or music
- Semi- and omni-directional models
- Hand-held, lavalier or stand mount
- Durable design to withstand rough usage

Dynamic microphones are ideally suited for indoor, remote or outdoor TV, radio or public address applications where the mike is hand-held, mounted on a stand, or worn as a lavalier. The speech balance and directional characteristics of these dynamic microphones make them especially desirable for voice pickup of interviews or performers. Omni- and semi-directional models are offered, all with smooth, wide-range frequency response.

Pressure Microphone, Type BK-1

- **Wide range—60 to 10,000 Hz response**
- **Smooth response over essential range**
- **Removable from base for floor-stand mount or hand-held use**
- **Ideal for remote pickups — low sensitivity to wind and mechanical vibrations**
- **Frequency characteristic independent of source distance**

The high-fidelity BK-1 Pressure Microphone is particularly well suited for remote pickups where, if used in the open air, the modern design practically eliminates the effect of air currents. It features a smooth response and frequency range of 60 to 10,000 Hz.

The BK-1 is an omni-directional microphone when mounted vertically. A semi-directional characteristic is obtained when horizontally mounted, in which case the BK-1 is essentially non-directional for frequencies below 2,000 Hz. The higher frequencies are attennuated more as the angle with the perpendicular to the diaphragm increases.

Specifications

Directional Characteristics ..... Semi-Directional (horizontal) Omni-Directional (vertical)
Frequency Response ..... 60 to 10,000 Hz
Output Impedance ..... 30/150/250 ohms (250 as shipped)
Output Level (1000 Hz):
a. Effective (10 dynes/cm²) ..... –52 dBm
b. EIA—G_m ..... –144 dB
Hum Pickup (.001 gauss, 60 Hz) ..... –102 dBm (max.)
Cable (attached) ..... 30 ft., 3 conductor shielded, without connector
Mount ..... Ball and socket, ½" pipe thread
Dimensions ..... 7¾" long, 1⅞" dia. (200 x 48 mm)
Weight (less cable) ..... 18 oz. (510 g)
Finish ..... Low luster gray and satin chrome

Ordering Information

Pressure Microphone, Type BK-1 ..... MI-11007
Desk Stand, Type KS-11 ..... MI-11008

Subminiature Dynamic Microphone, Type BK-12

The BK-12 Subminature Dynamic Microphone is a very small, extra lightweight mike with excellent speech balance. The BK-12's small bulk and neutral color make it inconspicuous when clipped to the clothing or worn around the neck on a lanyard. As a result of its small size, the BK-12 is essentially non-directional to 6,000 hertz, thus ordinary errors in orientation are inconsequential.

The 0.71-ounce mike has a wide range frequency response of 60 to 18,000 Hz which is compensated for proper speech balance. Other notable features include a line-impedance voice coil that permits use with 30- to 250-ohm unloaded inputs. Through elimination of the output transformer, magnetic hum sensitivity is lower than comparable microphones with line-matching transformer. The micron-mesh acoustical filter provides dirt and moisture protection. Through careful design and the availability of improved magnetic materials, an extremely high acoustical-to-electrical power efficiency is achieved in the BK-12 despite its small diaphragm area.

Due to its small size and light weight, the BK-12 is adequately supported by the tie clip holder which fastens equally well to shirt front or lapel. A lavalier holder is also supplied for suspending the microphone around the neck.

The user need never send the BK-12 back for factory repairs. A complete replacement cartridge can be installed in a few minutes. The cable is also easily replaced.

Specifications

Directional Characteristics ..... Non-directional
Output Impedance ..... Low—for use with 30- to 250-ohm unloaded inputs
Frequency Response ..... 60 to 18,000 Hz, shaped for lavalier use
Output Level (1000 Hz):
Effective (10 dynes/cm²) ..... –60 dBm (150 ohms)
EIA—G_m ..... –154 dB (150 ohms)
Effective Output Level @ 1000 Hz ..... –60 dBm (150 ohms) (referred to a sound pressure of 10 dynes/cm²)
EIA Sensitivity Rating ..... –159 dB (150 ohms)
Output Voltage (open circuit) ..... 75 mV/d/cm²
Hum Pickup (0.001 gauss, 60 Hz) ..... –120 dBm max.
Cable (attached) ..... 30 ft. 2-conductor shielded, highly flexible, beige PVC jacket
Mounting ..... Tie-clip and lavalier holders supplied
Dimensions ..... ¾" dia. x 1½" long (20 x 38 mm)
Weight (less cable) ..... 0.71 oz. (20 g)
Finish ..... Bronze epoxy and matte gold

Ordering Information

Subminiature Dynamic Microphone, Type BK-12 complete with Lavalier Holder, Tie Clip Holder and Cable Clip MI-11024

Dynamic Microphone, Type BK-14

- **Lightweight broadcast microphone**
- **Wind and "pop" resistant**
- **Internal shock resistant**
- **Replaceable cartridge**
- **Uniform frequency response—40 to 20,000 Hz**

The BK-14 is a dynamic cartridge-type microphone, ideal for indoor or outdoor use where a hand held lightweight mike with good response to voice and music is required. The microphone is omnidirectional with a frequency response essentially uniform from 20 to 20,000 Hertz.

It is contained in a non-reflecting satin nickel 8-inch long case only ¾-inch in diameter. A protective wind screen, and internal shock and isolation construction permit effective use with loud "pop" noises. The microphone has provisions for stand mounting. A swivel mount and a 30-foot, 2-conductor shielded cable with Cannon plug to fit the microphone base are supplied as standard equipment.

Specifications

Directional Characteristics	Omnidirectional
Frequency Response	40 to 20,000 Hz
Output Impedance	Low—for use with 30 to 250 ohm unloaded inputs
Output Level (1000 Hz):	
Effective (10 dynes/cm²)	–60 dBm (150 ohms)
EIA-G_m	–154 dB (150 ohms)
Hum Pickup Level (.001 gauss, 60 Hz)	–120 dBm (max.)
Cable (Removable)	30 feet, 2 conductor, shielded with Cannon XLR-3-11C to fit microphone base
Mounting	Hand held or stand (swivel mount supplied)
Finish	Non-reflecting satin nickel
Dimensions	8" long, 0.75" dia., screen dia. 2" (193, 19, 51 mm)
Weight (less cable)	6 oz. (170 g)

Ordering Information

Dynamic Microphone, Type BK-14	MI-11042

Dynamic Microphone, Type BK-16

- **Extremely smooth frequency response—40 to 20,000 Hz**
- **New slim silhouette for hand or stand use**
- **Replaceable cartridge**
- **Omnidirectional at all frequencies**

The slim silhouette and light weight of the BK-16 microphone make it particularly well suited for pickups where a hand held or stand microphone is required. It is omnidirectional, and has a smooth response over a frequency range of 40 to 20,000 Hz.

The BK-16 is encased in a non-reflecting satin nickel housing 8 inches long and ¾-inch in diameter. It is provided with a swivel mount and a 30-foot, 2-conductor shielded cable with Cannon connector to fit the base. Internal shock and isolation filters assure smooth speech or music pick-up.

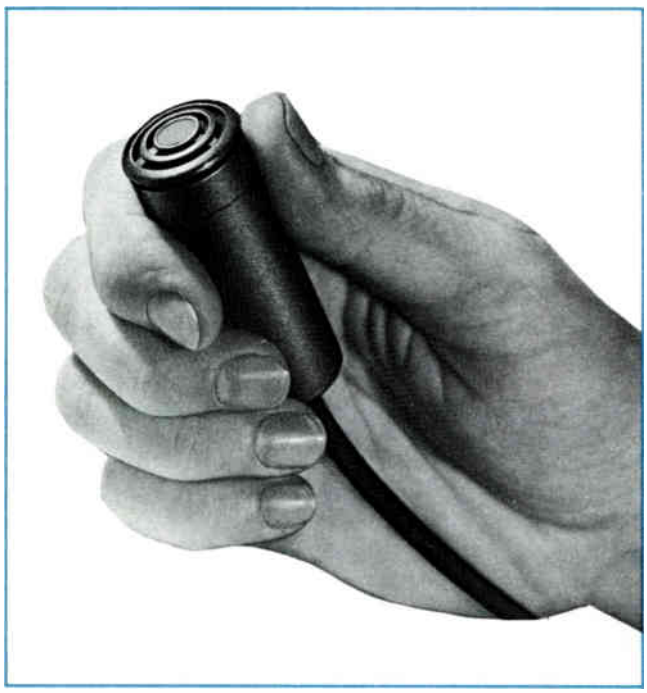
Specifications

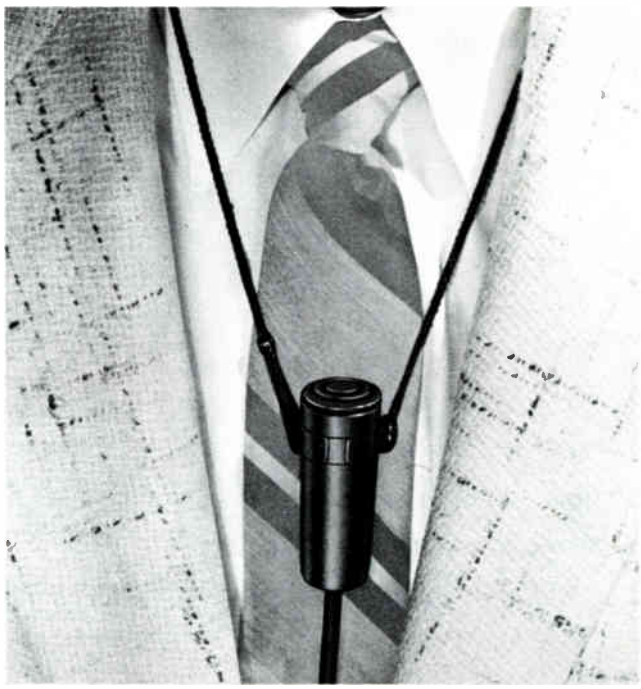
Directional Characteristics	Omnidirectional
Frequency Response	40 to 20,000 Hz
Output Impedance	Low—for use with 30 to 250 ohm unloaded inputs
Output Level (1000 Hz):	
Effective (10 dynes/cm²)	–59 dBm (150 ohms)
EIA-G_m	–153 dB (150 ohms)
Hum Pickup Level (.001 gauss, 60 Hz)	–120 dBm (max.)
Cable (removable)	2 conductor, shielded, 30-ft. with Cannon XLR-3-11C plug to fit microphone base
Mounting	Hand held or stand (swivel mount supplied)
Finish	Non-reflecting satin nickel
Dimensions	8" long, 0.75" dia. (193 x 19 mm)
Weight (less cable)	5.5 oz. (156 g)

Ordering Information

Dynamic Microphone, Type BK-16	MI-11048

Miniature Dynamic Microphone, Type BK-6





The Miniature Dynamic Microphone, Type BK-6 is specially designed for correct speech balance. Frequency response and directional characteristics are engineered to complement human speech so that the microphone has excellent balance when the performer is talking "off axis."

The BK-6 may be worn by the performer; its small bulk and neutral color make it inconspicuous. The lightweight and flexible cable permit free, unhampered movement of the performer. Suspended from the neck, resting on the chest, the BK-6 attenuates the low pitched chest sounds while at the same time it points straight up towards the lips, the position in which it is most sensitive to the high-frequency sounds that would normally be lost.

A special internal acoustic resonator is employed to support the response to lower frequencies and a damped resonator placed in front of the diaphragm reduces high frequency emphasis while extending the upper frequency limit. The result is a pleasing balance for speech when the microphon is used "off axis," or worn on the person. The special plastic diaphragm and coil assembly, output transformer and terminal board and bracket assembly are housed in a rugged and practically weather-proof case.

The cable for the BK-6 unit has unusual flexibility combined with long life under conditions of severe abuse. High tensile alloy conductors provide high flexibility and long life. The external jacket gives a tough, neutral color, protective covering to the cable.

Specifications

Directional Characteristics	Semi-directional
Frequency Response	60 to 15,000 Hz shaped for lavalier use
Output Impedance	30/150/250 ohms (250 as shipped)
Output Level (1000 Hz):	
Effective (10 dynes/cm²)	–65 dBm
EIA—G_m	–159 dB
Hum Sensitivity (.001 gauss, 60 Hz)	–112 dBm (max.)
Cable (Attached)	30 ft., two-conductor shielded, highly flexible, brown PVC jacket, no plug
Mounting	Removable lanyard supplied for suspending about neck
Dimensions	2 1/16" long x 15/16" diameter (65 x 24 mm)
Weight (less cable)	2.3 oz. (65 g)
Finish	Low luster gray

Accessories

Microphone Holder, Clamp Type	MI-12086
Microphone Stand Adaptor Kit (for gooseneck)	MI-11073
13" Flexible Microphone Stand	MI-11745
19" Flexible Microphone Stand	MI-11746

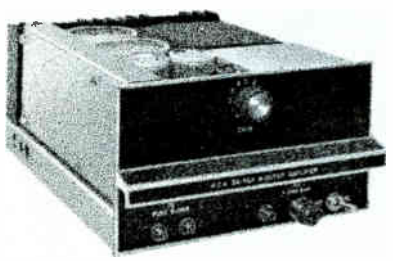
Ordering Information

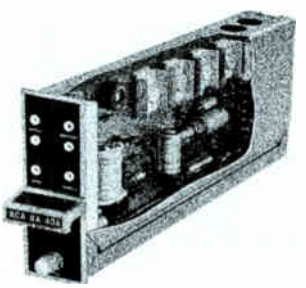
Type BK-6 Miniature Dynamic Microphone	MI-11017

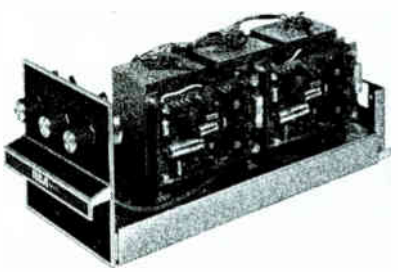
catalog AU.6010A
(Replaces B.1450)

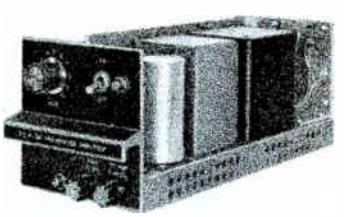
Modular Audio Amplifiers,
Type BA-40 Series

- Plug-in connections
- Wide frequency response—low noise
- Signal-processing systems included
- Low distortion









The BA-40 Series of modular amplifiers are similar to those included in RCA Consoles. They are offered for use wherever high-quality audio equipment is appropriate.

Distribution Amplifier, Type BA-40
The Type BA-40 converts one line into six well-isolated lines.

Preamplifier, Type BA-41
The Type BA-41 Audio Pre-amplifier is useful as a mike preamp or a line-booster amplifier.

Program Amplifier, Type BA-43
The Type BA-43 Program Amplifier is a bridging as well as matching amplifier.

10-Watt Monitor Amplifier, Type BA-44
Particularly suitable for monitoring, recording and talk-back duty, the Type BA-44 provides high-quality, low-distortion operation.

50-Watt Monitor Amplifier, Type BA-48
The Type BA-48 Monitor Amplifier produces 50 watts (47 dBm) of wideband, low-distortion audio power.

AGC Program Amplifier System, Type BA-43/45
The RCA Type BA-43/45 AGC Amplifier System expands low-level program material and compresses high-level material to maintain a constant program level.

Limiter Amplifier System, Type BA-43/46
For use where extremely fast and abrupt limiting action is needed, the Type BA-43/46 Limiter Amplifier operates only on program peaks.

FM-Clipper Amplifier System, Type BA-43/47
The Type BA-43/47 Program Clipper performs two functions essential to FM broadcasting: program pre-emphasis and peak-level clipping.

Distribution Amplifier, Type BA-40

- Input for bridging or matching
- Six isolated 600-ohm outputs
- Low harmonic distortion
- Broad, flat frequency response
- Versatile input and output configurations

Designed for program-audio distribution, isolation and level recovery applications, the BA-40 Distribution Amplifier either matches or bridges a 600-ohm program line and provides five isolated 600-ohm audio output lines.

Versatile Input and Output Configuration

A high-quality transformer in the input circuit allows the amplifier to match or bridge a 600-ohm balanced transmission line. The output stages offer extremely low output impedance, and the amplifier is adaptable to a wide variety of load-impedance and power-splitting arrangements.

Built-In Voltage Regulator

The BA-40 operates from either a-c or d-c power. Operated from a-c, it needs approximately 12 watts of 50-volt power at 50 or 60 Hz. Operated from an external d-c source, the amplifier needs approximately 10 W of 60-volt negative-ground power. An optional a-c power supply (see *Accessories*) offers sufficient capability to power up to ten BA-40 Amplifiers.

Amplifiers, Interchangeable

The BA-40 packaging is such that as many as ten units fit side-by-side in a Type BR-22 Shelf.

The amplifier has very little harmonic distortion even at full output. Harmonic distortion is less than 0.2% at +16 dBm output and 0.3%, or less, at maximum output, +24 dBm.

Specifications

Input:
- Impedance ..... Matching: 600 ohms; Bridging: 20k ohms
- Mode ..... Balanced or unbalanced
- Max. Input Level ..... –10 dBm matching; +20 dBm bridging

Outputs (six):
- Impedance ..... 600 ohms, load
- Maximum Level, each output ..... +24 dBm

Matching Input Gain ..... 35 ±0.5 dB

Bridging Input Gain ..... Unity ±0.5 dB

Noise Level (20-20,000 Hz) ..... –70 dBm max.

Isolation between Outputs (signal) ..... 47 dB at 1 kHz

Harmonic Distortion:
- At +16 dBm ..... 0.2% max.
- At +24 dBm ..... 0.3% max.

Frequency Response:
- 30 to 15 kHz ..... ±0.5 dB
- 20 to 20 kHz ..... ±1.0 dB

Power Requirements:
- AC ..... 40-50V, 49-62 Hz, 5-12W
- DC ..... 60-70V, Neg. gnd., 4-10W

Dimensions ..... 4-21/32" H, 1⅝" W, 13" D (118, 42, 330 mm)

Weight ..... 3½ lbs. (1.6 kg)

Accessories

Transformer 150/600 ohms to 150/600 ohms MI-11713

Rack-Mount Shelf, Type BR-22 (Holds 10 Amplifiers) MI-11597

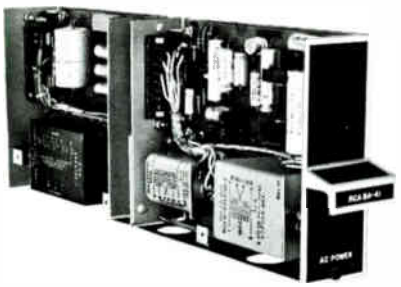
Spare Guide Assembly MI-11593-7

BX-40 Power Supply (for 1 to 10 BA-40) MI-11447

Ordering Information

Distribution Amplifier, Type BA-40:
- With guide assembly ES-11136
- Less guide assembly MI-11433

Preamplifier, Type BA-41



- High-gain, low-noise circuitry
- 40 or 46 dB gain
- Frequency response: 20-20,000 Hz
- Excellent common-mode signal rejection
- Multiple-tap input and output transformers

The Type BA-41 Preamplifier, available either with or without a guide assembly for shelf mounting, is ideal as a microphone preamplifier or as a booster amplifier.

The solid-state circuit design, coupled with the flexibility of multiple-tap input and output transformers, provide low-distortion, high-gain characteristics with excellent frequency response and low noise over a wide range of input and output impedances.

Specifications

Source Impedance ..... 37.5 ohms unbal.; 150/600 ohms bal.

Input Impedance:
- Matching ..... Unloaded input transformer
- Bridging ..... Requires externally mounted bridging gain control (approx. 20,000 ohms)

Load Impedance ..... 150/600 ohms

Maximum Input Level:
- Matching ..... (with 40 dB gain strapping) –22 dBm
- Bridging ..... 30 dBm

Matching Gain ..... 40 or 46 ±1 dB

Frequency Response ..... 20 to 20,000 Hz ±0.75 dB

Rated Output Level and Distortion ..... +18 dBm; 0.5%

Noise Level ..... –81 dBm

Maximum Ambient Temperature ..... 55° C (131° F)

Power Requirements ..... 115 or 230V, 50/60 Hz

Dimensions ..... 4-21/32" H, 1⅝" W, 13" D (118, 41, 330 mm)

Weight ..... 3½ lbs. (1590 g)

Accessories

Guide Assembly for BA-41 ..... MI-11593-6

Rack-Mount Shelf, Type BR-22 (Holds 10 amplifiers) MI-11597

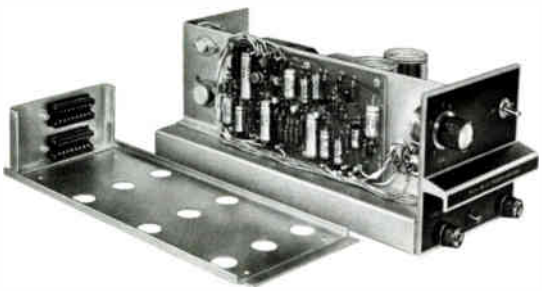
Bridging Gain Control (Panel Mount) MI-11278-E

Bridging Gain Control (Chassis Mount) MI-11278-F

Ordering Information

Preamplifier, Type BA-41:
- With guide assembly ES-11135
- Less guide assembly MI-11463

Program Amplifier, Type BA-43



- Silicon transistors and etched wiring
- Extended frequency and power bandwidth
- Self-contained, regulated power supply
- Plug-in chassis for shelf mounting

The BA-43 is a wide-band program amplifier designed for audio service by itself or in conjunction with signal processing amplifiers. The circuitry features silicon transistors, provides the advantages of compact design, uniform performance, reduced power consumption and long life. The high gain and low distortion of the unit make it ideal for use as a program or line amplifier, bridging amplifier or as an isolation unit.

The BA-43 has excellent performance, especially in the areas of bandwidth, noise and temperature stability, due largely to the use of silicon transistors.

10-Watt Monitor Amplifier, Type BA-44

- High Gain—accepts microphone input level
- 10 watt output—low distortion
- Plug-in chassis, shelf mounting, self powered
- For recording or broadcast monitoring

The BA-44 Monitor Amplifier is a high quality amplifier with 104 dB of gain and a full 10 watts of audio power output. It is particularly designed as a monitor, audition or recording amplifier. It may also be used as a program or a line amplifier. It is ideal for playback of transcriptions from the output of an equalized pickup cartridge. The BA-44 is designed for convenient plug-in installation in a mounting shelf using an optional guide assembly (see *Accessories*).

50-Watt Monitor Amplifier, Type BA-48

- Full 50-watt rms continuous power output
- Very low distortion
- Frequency response 20 Hz to 20 kHz
- Stable, solid-state design

The BA-48 50-Watt Monitor Amplifier is ideal for program-monitor facilities in professional sound studios and broadcast stations. This solid-state amplifier is capable of amplifying phono pickup, tape recorder, telephone-line sources, and the audio channels for transmitters.

The BA-48 produces 50 watts (rms) with or without an output transformer, with very low total harmonic and intermodulation distortion. It has a broad frequency response and is temperature and frequency stabilized. Complete output short-circuit, overload, and open circuit protection is provided.

Specifications

Source Impedance .....600/150 ohms, balanced
Matching Input Impedance .....600/150 ohms
Bridging Input Impedance .....20,000 ohms
Load Impedance .....600/150 ohms
Matching Input Level .....–17 dBm max.
Bridging Input Level .....+13 dBm max.
Frequency Response (20-20,000 Hz) .....±0.75 dB
Output Level .....+30 dBm max.
Harmonic Distortion (25-20,000 Hz) .....0.5% rms, max.
Matching Gain .....76 ±½ dB (Loaded), 82 ±½ dB (Unloaded)
Bridging Gain .....46 ±1 dB (Loaded), 52 ±1 dB (Unloaded)
Noise Level Referred to:
  Input (20-20,000 Hz) .....–126 dBm
  Output (20-20,000 Hz) .....–44 dBm
Ambient Temperature Range ....–20 to +75° C (–4 to +167° F)
Power Requirements .....115/230 V, 50/60 Hz, 10 W
Dimensions .....4" H, 5" W, 11⅜" D (118, 127, 284 mm)
Weight .....9½ lbs. (4.3 kg)

Accessories

Bridging Volume Control (Panel Mounting) MI-11278-E
Bridging Volume Control (Chassis Mounting) MI-11278-F
Rack-Mount Shelf, Type BR-22
  (Holds 3 amplifiers) MI-11597
BA-43 Guide Assembly (with receptacles) MI-11593-1

Ordering Information

Program Amplifier, Type BA-43:
  With guide assembly ES-11128
  Less guide assembly MI-11454

Specifications

Source Impedance .....150- or 600-ohm balanced; 37.5 ohm unbalanced (shipped connected for 150-ohm balanced)
Input Level:
  Matching .....–25 dBM max.
  Bridging .....+25 dBm max.
Gain:
  Matching .....103 ±1 dB
  Bridging .....53 ±1 dB
Load Impedance .....4/8/16/150/600 ohms balanced and 70-volt line
Average Power Output .....10 watts (40 dBm) max.
Frequency Response .....±0.5 dB, 30-20,000 Hz
Noise Level (20 to 20,000 Hz) .....–123 dBm ref. input
Harmonic Distortion (10W output) .....1.0% max.
Power Requirements .....115/230 V, 50/60 Hz, 35 W
Ambient Temperature .....55° C max. (131° F)
Dimensions .....13⅛" L, 5" W, 4-31/32" H (333, 127, 120 mm)
Weight .....12 lbs. (5440 g)
Mounting .....Plug-in mounting on BR-22 mounting shelf

Accessories

Rack-Mount Shelf, Type BR-22
  (Holds 3 amplifiers) MI-11597
Guide Assembly for BA-44 .....MI-11593-4

Ordering Information

10-Watt Monitor Amplifier, Type BA-44:
  With guide assembly ES-11134
  Less guide assembly MI-11442

Specifications

Source Impedance (Bal. or Unbal.) .....600/150 ohms
Matching Input Impedance .....Unloaded input transformer
Bridging Input Impedance .....20,000 ohms
Load Impedance .....8 ohms[1]
Matching Input Level .....–20 dBm max.
Bridging Input Level .....+22 dBm max.
Input Sensitivity (Full gain; 50 W at 1 kHz) .....–35 dBm
With Remote Volume Control Kit installed .....–30 dBm
Maximum Gain (Matching) .....82 ±1 dB
Frequency Response .....20 to 20,000 Hz ±0.25 dB
Noise Level (20-20,000 Hz) .....–124 dBm ref. input
Harmonic Distortion (30-20,000 Hz) .....0.5% max.
Power Required .....105-130/210-260 V, 50/60 Hz; 115 W
Rated Power Output .....50 watts rms (+47 dBm)
Ambient Temperature .....0 to 55° C max. (32 to 131° F)
Weight .....26 lbs. with (12 kg); 20 lbs. less transformer (9 kg)
Dimensions .....4⅝" H, 8½" W, 11⅜" D (143, 216, 284 mm)

[1]With optional transformers: 4, 8 or 16 ohms balanced and 70-volt line.

Accessories

Output Transformer (4, 8, or 16 ohms) MI-141002
Output Transformer (70-volt, 100 ohms) MI-141003
Remote Volume Control Kit MI-11499
Rack-Mount Shelf, Type BR-22
  (Holds 2 amplifiers) MI-11597
Guide Assembly MI-11593-3

Ordering Information

50-Watt Monitor Amplifier, Type BA-48:
  Complete with Guide Assembly ES-11132
  Less Guide Assembly MI-11458

AGC Program Amplifier System, Type BA-43/45

- Wide range AGC action
- Low distortion
- Input and output controls
- Provision for remote metering
- Step attenuator output

The BA-43/45 Automatic-Gain-Control Program Amplifier System automatically controls variations in audio program level. The amplifier maintains a nearly constant average output level over wide variations in input level, since it provides compression of high-level signals and expansion of low-level signals.

The AGC Program Amplifier System consists of the BA-45 Automatic Gain Control Unit used in conjunction with an RCA Type BA-43 Program Amplifier, from which it derives power and signals. The system can be used in program or preamplifier channels. The amplifier may be used with an external bias source for remote gain-control or automatic fading, to permit unattended remote-controlled operation.

Specifications

Source Impedance (balanced or unbalanced)	600/150 ohms	
Input Impedance	6000/1500 ohms	
Load Impedance	600/150 ohms	
Frequency Response	20-20,000 Hz, +0 to −¾ dB	
Operating Levels:	**Input, dBm**	**Output, dBm**
Verge of Compression	−54 (adj.)	+26 (adj.)
Verge of Expansion	−70 (adj.)	0 (adj.)
Maximum Rated	−17	+26.5 (adj.)
Maximum Uncontrolled	−17	+32 (adj.)
Expansion/Compression Range	+10/−19 dB	
Gain, Maximum below Verge of Compression	80 dB unloaded	
Compression Ratio	20 dB into 0.5 dB	
Time Constants:	**Attack**	**Recovery**
Expansion	4 sec.	6 sec.
Compression	15 μs	3 sec.
Uncontrolled	2 μs	2 μs
Harmonic Distortion (Total rms, 25 to 20,000 Hz)	0.6% max.	
Noise Level (20 to 20,000 Hz):		
Input	−125 dBm	
Output	−55 dBm	
Input Gain Control	Continuous	
Output Gain Control (15 2-dB steps)	30 dB total	
Power Requirements	115/230 V, 50/60 Hz, 10 watts	
Ambient Temperature Range	−20 to +55° C (−4 to 131° F)	
Dimensions (BA-45 only)	4-21/32" H, 3-5/16" W, 11-3/16" D (118, 84, 284 cm)	
Weight	3¾ lbs. (1.7 kg)	

Accessories

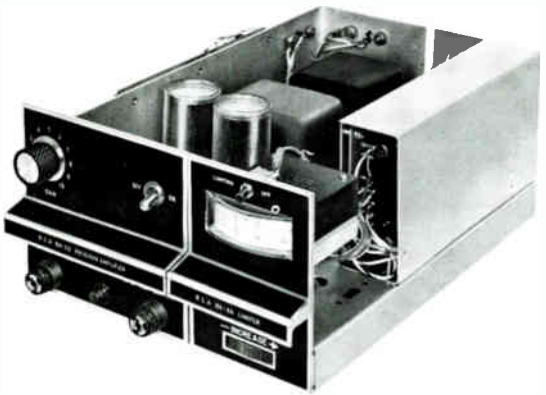
Rack-Mount Shelf Type BR-23*	MI-11564
Guide Assembly (for BA-45 only)	MI-11593-2

Ordering Information

AGC Program Amplifier System, Type BA-43/45:	
Mono	ES-11112; Stereo ES-11113
AGC Module, Type BA-45:	
Less guide assemb.	MI-11455; with guide ES-11129

*Accommodates one BA-43/45.

Limiter Amplifier System, Type BA-43/46



- 200 μs limiting action
- Low distortion
- Separate input and output controls
- Provision for remote metering
- Plug-in module

The BA-43/46 Limiter Amplifier System provides extremely fast audio limiting action for audio fed to broadcast transmitters. It automatically limits the peaks to a predetermined level to prevent overmodulation or overload.

Using a BA-43/46 permits more effective use of transmitter power by allowing the system to operate at near maximum output. It raises the average modulation percentage several dB without increasing harmonic distortion appreciably. The limiting characteristics of the system also adapt it readily to use in recording.

Specifications

Source Impedance (balanced or unbalanced) .....150/600 ohms
Input Impedance .....1500/6000 ohms
Load Impedance .....150/600 ohms
Frequency Response .....20 to 20,000 Hz, ±0.38 dB

Operating Levels:	Input, dBm	Output, dBm
Verge of Limiting	−60 (adj.)	+30 (adj.)
Maximum	−17	+30 (adj.)
Maximum Uncontrolled	−17	+32 (adj.)

Maximum Gain Through System .....90 dB
Attenuators: Input; Continuous: Output; 15 2-dB steps
Noise Level (20-20,000 Hz) .....−125 dBm
Harmonic Distortion (25-20,000 Hz):
Total rms at 20 dB limiting, slow action .....0.75% max.
Limiting Characteristic .....30 dB
Compression Ratio .....20 to 0.5 dB

Time Constants:	Attack	Recovery
Uncontrolled	2 μs	2 μs
Fast Action Limiting	200 μs	400 ms
Slow Action Limiting	200 μs	3 s.

Power Requirements .....115/230 V, 50/60 Hz, 100 W
Ambient Operating Temperature .....−20 to 50° C (−4 to 131° F)
Dimensions .....4-21/32" H, 8-5/16" W, 11-3/16" D (118, 211, 284 mm)
Weight .....13¼ lbs. (6 kg); Module 3¾ lbs. (2 kg)

Accessories

Rack-Mount Shelf, Type BR-23 .....MI-11564 & MI-11565
Spare guide assembly (BA-46 only) MI-11593-2

Ordering Information

Limiter Amplifier System, Type BA-43/46:
Mono .....ES-11114; Stereo.....ES-11115
AGC Program Amplifier and Limiter Amplifier System, Type BA-43/45 and BA-43/46:
Mono .....ES-11116; Stereo.....ES-11116S
Limiter Amplifier System and Clipper Amplifier System, Type BA-43/46 and BA-43/47:
Mono .....ES-11118, Stereo.....ES-11118S
Limiter Module Type BA-46:
Less guide assemb. .....MI-11456; with guide.....ES-11130

FM-Clipper Amplifier System, Type BA-43/47

- Prevents transmitter overmodulation with no audible signal degradation
- Built-in standard 75 μsec pre-emphasis network
- Highly sensitive monitoring circuit
- Front panel indicator light
- Reliable solid-state circuitry

The Type BA-43/47 FM-Clipper Amplifier System is a solid state unit that performs both the functions of pre-emphasis and peak clipping. When this combination is fed from a BA-43/46 Limiter Amplifier System only the signal peaks in the pre-emphasis range above 100 percent modulation are clipped. The unit provides absolute protection against overmodulation with no audible signal degradation.

Specifications

Source Impedance (balanced) .....600/150 ohms
Input Impedance .....(20 to 20,000 Hz) 150 kohms, min.
Load Impedance .....600 ohms
Frequency Response .....Standard 75 μs pre-emphasis curve
Harmonic Distortion (below clipping) .....0.5% max.
Clipping Level .....+27 dBm ±0.2 dB
Maximum Output Level .....+27 dBm
(Factory set for +10 dBm ±0.5 dB)
Noise Level (20 to 20,000 Hz referred to input) .....–127 dBm
Ambient Temperature .....–20° C to +75° C (–4° F to 167° F)
Clipping Indicator Sensitivity .....(20 to 20,000 Hz) 0.5 dB max.
Power Required .....115/230 V, 50/60 Hz, 10 W
Dimensions:
BA-43/47 .....4⅝" H, 8⁵⁄₁₆" W, 11¹³⁄₁₆" D (118, 211, 284 mm)
BA-47 Only .....4⅝" H, 3⁵⁄₁₆" W, 11¹³⁄₁₆" D (118, 84, 284 mm)
Weight (approx.):
BA-43/47 .....12½ lbs. (6 kg)
BA-47 Only .....3 lbs. (1.4 kg)

Accessories

Spare Guide Assembly (for BA-47A only) MI-11593-5
Rack-Mount Shelf, Type BR-23 .....MI-11565

Ordering Information

FM-Limiter/Clipper Amplifier System, Type BA-43/46, 43/47:
Mono .....ES-11118; Stereo.....ES-11118S
FM-Clipper Module, Type BA-47:
With guide assembly ES-11131
Less guide assembly MI-11459

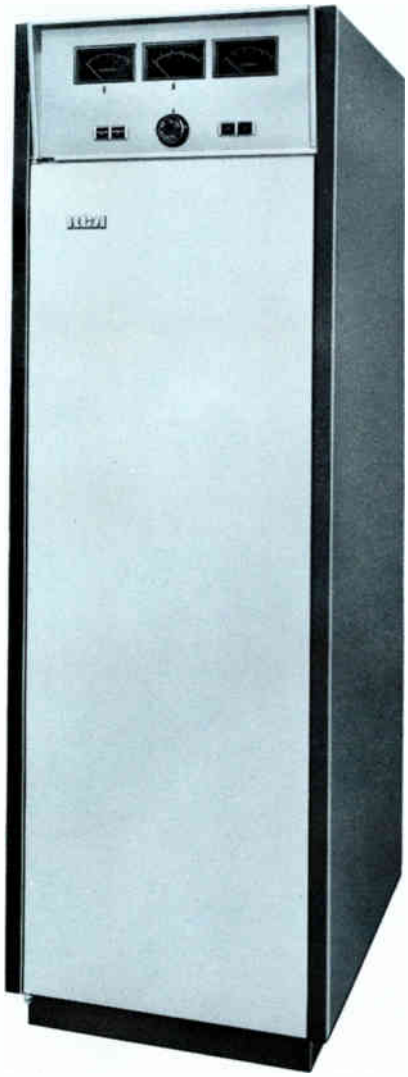
RCA

catalog RA.1011A

(Replaces B.6004)

One-Kilowatt AM Transmitter, Type BTA-1S

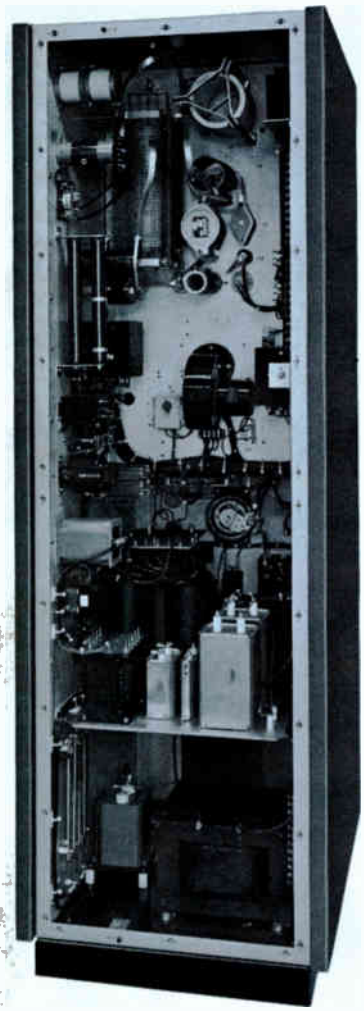
- **Excellent frequency response, low distortion**
- **Low operating costs**
- **Circuit breaker overload protection**
- **Positive peak modulation capability: 125%**



The RCA Type BTA-1S, 1-kilowatt AM Broadcast Transmitter is designed for reliability, outstanding fidelity, and economical operation. It provides a high quality amplitude modulated signal at any frequency in the 535 to 1620 kilohertz band and is capable of producing a maximum of 1100 watts.

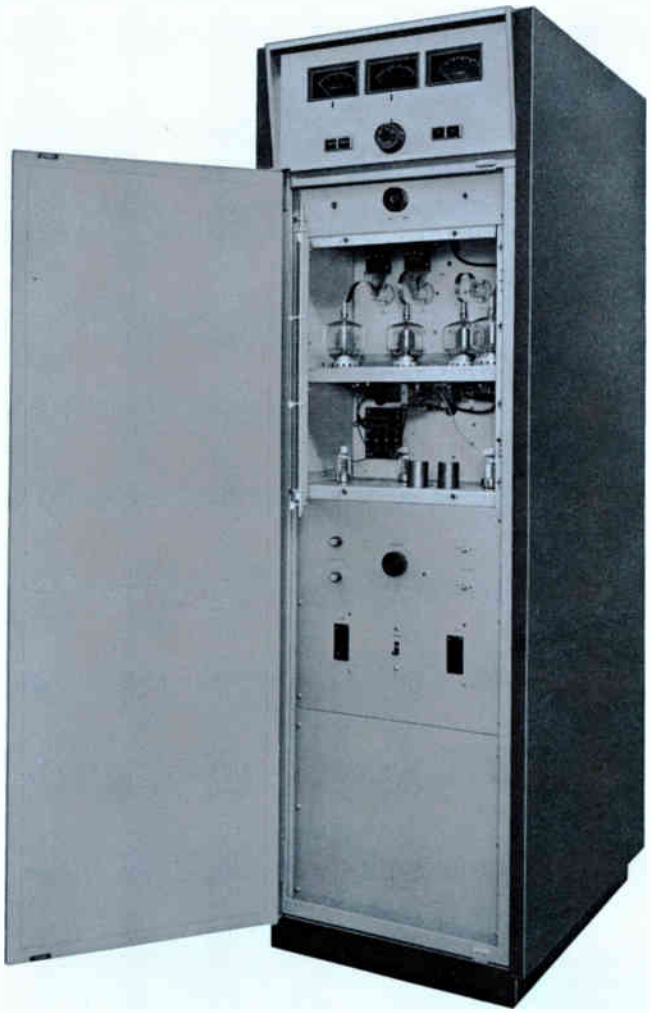
Highly perfected audio circuits together with a large, high-quality modulation transformer and reactor provide 125-percent positive-peak modulation capability and unusually high fidelity sound. Stable, long-life tubes and solid-state devices have been used throughout the transmitter. Circuit breakers, *not fuses*, provide complete overload protection.

Provision for remote control and simplified power cutback are reflected in the BTA-1S design. Front panel or remote control selection of any two power levels of 1000, 500 or 250 watts is available. No unnecessarily complicated circuitry or superfluous parts have been included and all components are easily accessible for maintenance and inspection.



Unimpeded rear access to the transmitter is afforded by the full length door and the well laid out, vertical construction. Power supply components at bottom; r-f components at top.

Type BTA-1S Transmitter with outer and inner door open to display accessibility to the tubes. Power amplifier and modulator tubes are near top while the lower chassis carries the audio-amplifier and intermediate stages.



Functional Design

Improved functional design includes RCA's new color combination. Square construction permits locating the transmitter against the wall, or it can be installed against other equipment. The vertical construction makes it accessible from both front and rear for ease of maintenance. A single front panel tuning control provides simplified operation. Remote control provisions permit unattended operation of the transmitter.

Simplified Power Cutback

The BTA-1S easily fits into operations where power reduction at night is required. For "day-night" operation an optional Power Cutback Kit may be incorporated in the transmitter. By pressing a button on the front or at a remote panel, the transmitter can be cut back in power to either 500 or 250 watts. Efficient operation at the low power levels is achieved by reducing the high voltage by primary taps on the plate transformer.

Complete Accessibility

The entire transmitter is housed in a single steel cabinet that is mounted on a sturdy welded steel base. Control components are conveniently located on the panel above the front door and all meters are at eye level. Easy access is provided by a hinged front door and two interlocked removable rear panels. Most BTA-1S components are mounted on a vertical center chassis. Tubes and overload relays are mounted on the front and the other components are mounted on the rear. Larger power components are mounted on the base.

Solid State Power Supplies

Three power supplies are used: a low voltage supply for plate and screen voltages of all low voltage tubes, a bias supply for the modulator tubes, and a high voltage supply for the modulator and power amplifier tubes. All power supplies use silicon diodes which results in low power drain, cool operation and reliable performance. Automatic relays protect the transmitter against overload. These, in turn, are backed up with automatic circuit breakers. The design avoids the use of fuses anywhere in the unit.

Power Requirements

The transmitter operates from a 208-240-volt, 50/60-hertz, single-phase power source for the main power. In addition, the crystal heaters require 115-volt power source.

Solid-State Oscillator and Buffer Stages

Adding an extra measure of transmitter stability, the BTA-1S combines its oscillator and buffer amplifier into a single, solid-state subassembly. The combination of transistorized electronics and temperature-controlled crystals make for an adjustment-free facility which, in turn, reduces routine maintenance. The oscillator is equipped with two temperature-controlled crystals arranged through a front-panel selector switch so that a "hot" spare is always at hand, even via remote control.

Simple, Straighforward Circuitry

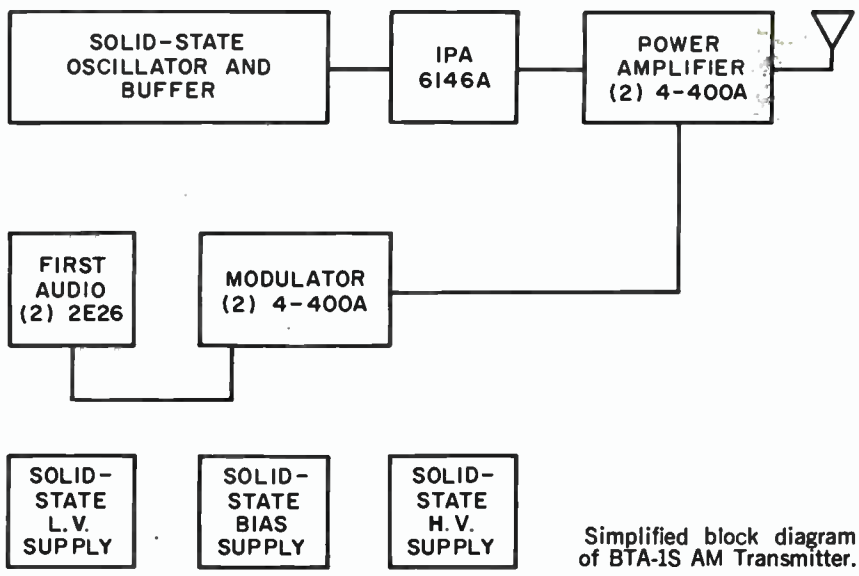
The buffer feeds a single 6146A driver tube which in turn feeds the power amplifier which consists of two 4-400A tubes connected in parallel. Tetrodes have been utilized throughout the RF section of the transmitter reducing the required stages and the power consumption. Tetrodes also eliminate the need for neutralization.

The modulator comprises two 2E26 tubes in push-pull, resistance coupled to two 4-400A modulator tubes. The modulator tubes operate as a class AB_1 amplifier without grid current which results in an overall distortion of less than 2 percent up to 10,000 Hz.

Parallel/Redundant System

The BTA-1S is available also as a parallel/redundant transmitter system. This system consists of two identical BTA-1S transmitters and a combiner. In the "parallel" mode, the twin one-kilowatt outputs are combined to provide two kilowatts of power to the antenna system; in the "redundant" mode, the system operates one of the two transmitters as a hot standby while the other feeds the antenna system.

In either operational mode, the parallel/redundant system assures greater on-air dependability. For example, an outage in one transmitter or the other automatically switches the troubled transmitter to a dummy load while the operable one feeds a full kilowatt to the antenna system. This action is the result of a special-design combiner with essentially zero insertion loss. Further details of the BTA-1S parallel/redundant transmitter system are available from Aural Broadcast Equipment Marketing, RCA Building 2-5, Camden, N. J. 08102, U.S.A.



Simplified block diagram of BTA-1S AM Transmitter.

Specifications

Performance

AF Input Impedance	150/600 ohms
AF Input Level (100% modulation)	+10 ±2 dBm
AF Response:	
50-7500 Hz	±1 dB
30-10,000 Hz	±1.5 dB
AF Distortion (95% modulation):	
50-10,000 Hz	2%
50-12,000 Hz	3%
Noise (below 100% modulation)	60 dB
Frequency Range	535-1620 kHz
Frequency Stability	±2 Hz
Type of Output	Single ended
Carrier Shift (0-100% modulation)	3%
Output Impedance	40-250 ohms

Electrical

RF Voltage (for frequency monitoring)	6/10 V rms 75 ohms
RF Voltage (for modulation monitoring)	6/10 V rms 75 ohms
Power Output (nominal)	1000 watts
Power Output Capability	1100 watts
Power Supply	208/240 volts
Line Frequency	50/60 Hz
Phase	Single
Power Consumption (Approx.):	
0% modulation	2900 watts
100% modulation	3900 watts
Average program modulation	3200 watts
Power Factor	90%
Permissible combined line voltage variation and regulation	±5%
Crystal Heater Power Supply	115 volts 50/60 Hz

Tube Complement

1	6146A	Intermediate Power Amplifier
2	2E26	Audio Frequency Amplifier
2	4-400A	Modulator
2	4-400A	Power Amplifier

Mechanical

Height	77" (1955 mm)
Width	26" (660 mm)
Depth	30" (762 mm)
Weight (net)	900 pounds (408 kg) (approx.)
Altitude Range	0.-5000 ft.* (0-1254 m)
Ambient Operating Temperature	–20 to 45°C (–4 - 113°F)
Shipping Data	1200 lbs (544 kg); 79 ft³ (2.23 m³)

Accessories

Operating Spare Tube Kit	ES-560655
Recomended Minimum Spare Tube Kit	ES-560656
Frequency and Modulation Monitor, Type BW-50	MI-560767
RF Amplifier (for BW-50)	MI-560762
Thirty-Function Remote Control, Type BTR-15	MI-561150
Sixty-Function Remote Control, Type BTR-30	MI-561440
High-Altitude Blower Kit	MI-34309-8
Spare Crystal Unit, Type TMV-130 (Specify Freq.)	MI-27493
RF Ammeters	MI-7157-F Series
Remote RF Pickup Unit (less meter)	MI-27966-B
Power Cutback Kit (Two Level)	MI-560657
Remote Power Adjust Kit	MI-560658
Oscillator-Buffer (Solid-State)	MI-27592

Ordering Information

One-Kilowatt AM Transmitter, Type BTA-1S	ES-560650
250- or 500-Watt AM Transmitter, Type BTA-1S (Specify power level)	ES-560947

*To 10,000 ft. (3048 m) with optional blower (MI-34309-8).

Front and Cooper Streets, Camden, New Jersey 08102, U.S.A.

RCA Broadcast Systems

PRINTED IN U.S.A.

On Cue
Audio and AM | FM Radio News

RCA

SPECIAL EDITION

ADVANCED PRODUCT DATA:
NEW SOLID STATE AM TRANSMITTERS

5/10 kW TRANSMITTERS . . .
100% SOLID STATE DESIGN

RCA BTA-5SS, 5kW, and BTA-10SS, 10 kW, AM broadcast transmitters will offer the modern audio performance necessary in today's competitive listener market, with the extended range to accomodate the proposed RCA AM Stereo System.

The basic design of the BTA 5/10SS transmitters is 100% solid state, with no vacuum tubes and no moving parts except for the low volume cooling blower. High reliability and a minimum maintenance requirement are inherent in this new solid state transmitter design.

Both BTA-5SS and BTA-10SS transmitters will be supplied in single self-contained 36" wide cabinets. The transmitter is tuned and tested on customer frequency (535-1620 kHz) and shipped ready for operation.

Features

- **AM stereo compatibility**
- **Designed for automatic/ unattended operation**
- **Low cost of ownership**
- **High reliability**
- **Low AC power consumption**
- **Shipped ready to operate**

Key to the RCA product design is "Low Cost of Ownership". Such costs include purchase cost, maintenance costs, and the cost of AC power. The consumption of AC power for a given power output and modulation percentage can be expected to be from 15% to 35% lower than that of any currently available AM Broadcast Transmitter which utilize vacuum tubes.

The BTA-5SS, 5 kW, and BTA-10SS, 10 kW Transmitters will be available in parallel configuration for completely redundant operation at power output levels of 10 kW and 20 kW. Higher power configurations are quite practical because of the high power capability of each RF power output module.

The modulation concept utilized in the BTA-5/10SS is inherently wide-band, permitting the addition of the proposed RCA AM Stereo system with a minimum of transmitter modification. This wide band capability also assures that the effects of contemporary Audio Processing Systems will be realized to the fullest. The design permits sustained asymmetrical modulation to 125% positive peaks with minimum audio signal degradation.

To be incorporated also in the basic BTA-5SS/10SS design are monitoring and control options for full automatic operation. Provisions for remote control of operating functions and parameters is standard.

Reliability of this new solid state design is enhanced by its requirement for a low volume of cooling air flow. The combination of low air flow and low operating voltages (+240 Volts, maximum) result in a minimum accumulation of airborne dirt, for long term circuit stability. The transmitter will, in fact, operate with a failure of its only operational moving part, the blower, in normal ambient air temperatures.

Additional operating reliability is provided by the characteristic of "Graceful Degradation". RF Power or Modulator Transistors, in the unlikely event of failure, remove themselves from the circuit, and the transmitter continues to operate, with up to a full tray failed, at full power output.

BTA-5/10SS Control Circuits will be centralized to provide convenient local operations, and instrumentation is provided to monitor operating modes and parameters and to record transient failures. Space is provided in the module area for automatic control and stereo generator options.

Further details are available from Aural Broadcast Product Management, RCA Building, 2-5, Camden, N.J.

Plug-in module tray for BTA-5/10SS transmitters.

Form 3J5973

RCA Broadcast Systems

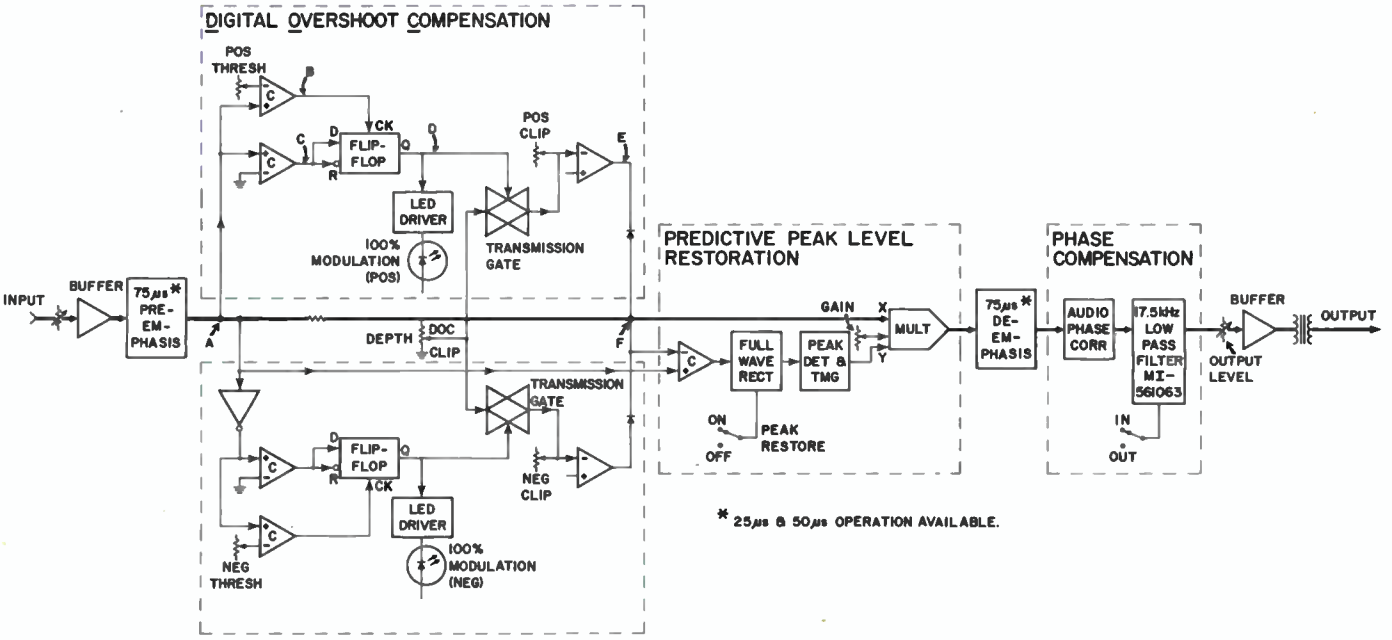


Fig. 3. BA-150 Schematic.

rected. The block diagram of the DOC (Fig. 3) shows this audio phase corrector. Phase correction is accomplished in a six-section active delay network that generates the perfect inverse of the phase delay exhibited by the plug-in low pass filter contained in the RCA BTS-101A Stereo Generator. When the DOC is used in conjunction with the BTS-101A, the 17.5 kHz plug-in LPF is deleted from the DOC. When a stereo grenerator other than the RCA BTS-101A is used, it is necessary to plug the 17.5 kHz LPF (MI-561064) into the BA-150 DOC Processor and disable the LPF from the stereo generator in use. This results in perfect phase compensation of the LPF and also allows continued use of existing equipment that may in all other respects give excellent performancce.

The Predictive Peak Level Restoration* (PPLR) circuit rids the last trace of overmodulation caused by peak level shifts resulting from AC coupling a peak-clipped signal.

The RCA Type BA-150 Digital Overshoot Control Processor is the state-of-the-art solution to the FM overshoot problem. The BA-150 allows the FM broadcaster to achieve the "peak clipping" sound preferred by listeners while avoiding the overmodulation problems which traditional peak clipping has caused.

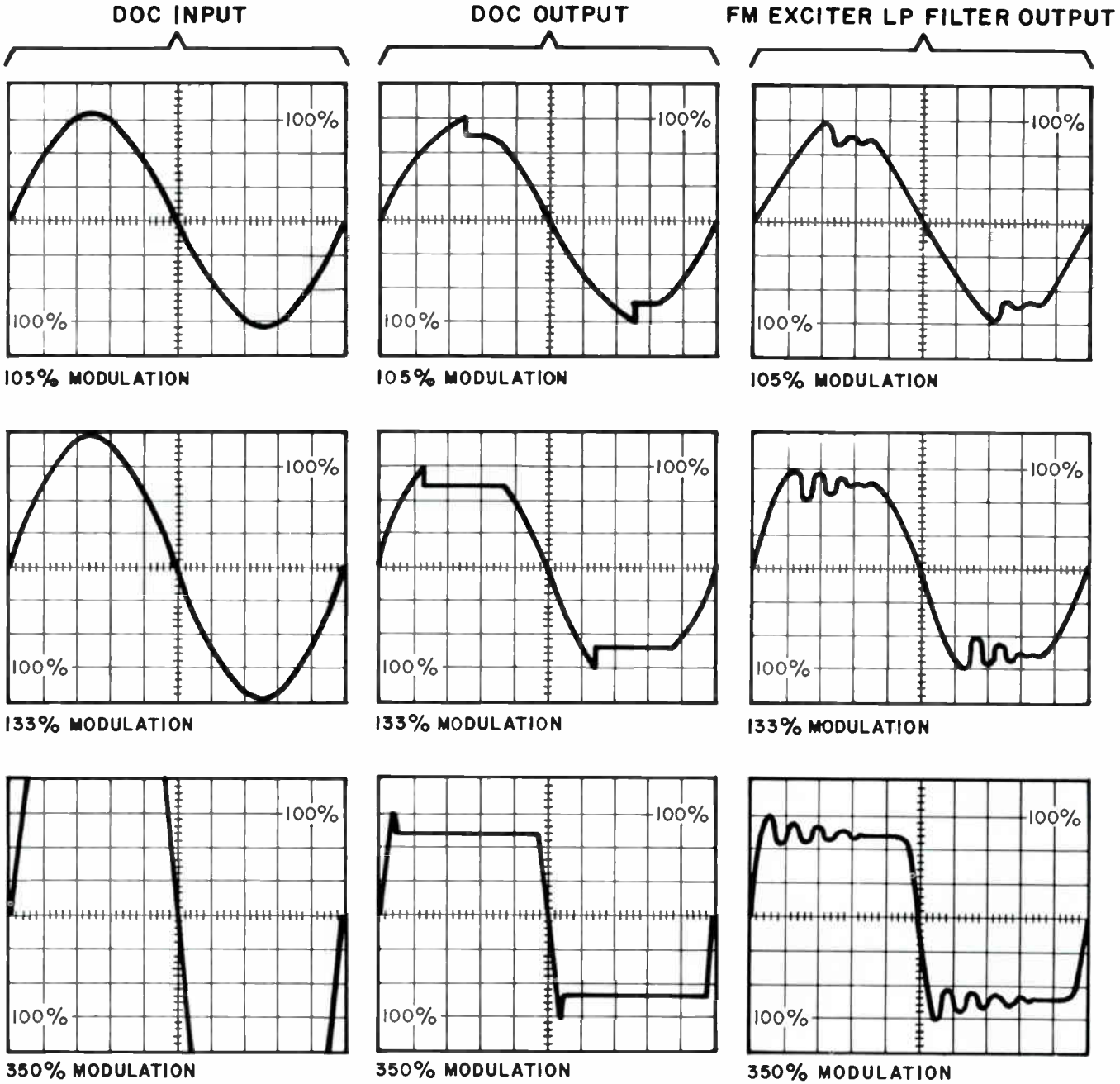


Fig. 2. BA-150 Waveforms.

The Problem

All stereo generators employ low pass filters to prevent interference with the 19 kHz pilot, limit aliasing distortion (caused by high frequencies in the L&R channel leaking into the L-R sidebands), eliminate spurious out-of-band emissions and reduce crosstalk between the stereo and SCA subcarriers. Some of these filters have transition rates of 100 dB/octave or more. The problem of overmodulation of these filters is twofold.

First, these filters often exibit large, non-linear phase shifts. When clipped audio (which can approach square waves in character) is applied to these filters, the non-linear phase shift can allow amplitudes of various frequencies to add in phase thus causing overshoots—the overshoots which often activate the peak flasher at unexpected times for seemingly no apparent reason.

Secondly, sharp cut-off low pass filters are also subject to ringing when signals approaching square waves, such as clipped audio, are applied because of the loss of harmonic content above 15 kHz necessary to reproduce the waveform (the Gibb's phenomenon). If the clipping occurs at the 100% modulation level, the ringing will exceed 100%. The BA-150 DOC Processor has been designed to solve these problems effectively, efficiently and inexpensively.

It should be recognized that amplitude overshoot does not occur only in the input audio low pass filter circuitry but may occur as an anomaly due to effects distributed throughout the FM exciter system. The BA-150 was designed to cure the overshoot problem other than in the exciter and stereo generator. The result is that the BA-150 may be used with any exciter and stereo generator.

The Solution

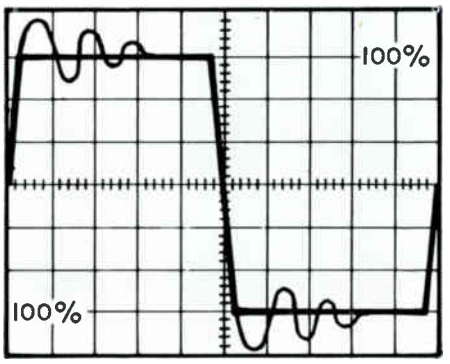
Figure 1 shows the ringing output of a conventional 15 kHz low pass filter with a clipped audio signal applied. In an FM exciter, this figure is typical of the output of a series of distributed low pass filters within the exciter, each with a different cutoff frequency. To eliminate the ringing overshoots in such a situation, it is necessary to modify the processing circuitry which produces the square top waveforms —the peak clipper—so that it retains the clean audio full frequency response advantages of peak clipping yet does not produce overshoots above 100% modulation. Also, the processor must leave signals with modulation levels of 100% or less completely unaffected. As a further requirement, to be truly cost-effective and useful, the processor must be able to operate downstream of any type of signal processing equipment (AGC, limiters, etc.) and upstream of any type of FM exciter system. The RCA Type BA-150 Digital Overshoot Control Processor meets all these requirements.

Operation

The BA-150 is operated between any audio gain controlling stage and the input to the FM Stereo Generator. It employs a form of shaped, bi-level clipping* to precisely control and maintain the high frequency peaks. As expected, the shaped peaks will produce a ringing response from the low pass filters. The BA-150 however, will constrain the ringing amplitude to the 100% modulation level or less (as the ring decays during the period of the peak overdrive). This is shown in Figure 2. With a signal that would result in a 5% overmodulation, the BA-150 allows the peak energy to reach 100% modulation at which time a DC voltage is subtracted from the signal during a precisely gated aperture generated by a digital control loop. This condition persists for the period of the peak overload. As the overload amplitude falls to 100% modulation, the BA-150 instantly and imperceptibly disconnects itself from the signal path. As shown in Figure 2, the exciter system response always achieves 100% modulation on the initial wavefront. Thus the percussive attack of the music is preserved while the transient distortion is eliminated.

Installation and set up are simple. Since every FM exciter system will have different low pass filter characteristics and distributed phase delays, the required depth of the gated aperture will vary from system to system. A front panel adjustment is provided to make this adjustment. Front panel LED indicators are used to set the 100% modulation level. Audio drive level is also front panel adjustable for maximum "loudness".

Since the bi-level clipper in the DOC serves only to eliminate overmodulation caused by the so-called Gibb's phenomenon, the second cause of overmodulation —non-linear phase response—must be cor-



DARK TRACE - SQUAREWAVE INPUT TO LP FILTER
LIGHT TRACE - LP FILTER RESPONSE

Fig. 1. LP Filter Response to Squarewave Input.

Specifications

Input Impedance	600 Ohms balanced or unbalanced
Output Load Impedance	600 or 150 Ohms balanced or unbalanced
Input Level	+14 dBm max.
Output Level	+18 dBm (adjustable)
Signal/Noise Ratio	>75 dB, 20 Hz-15 kHz (with 75 µs de-emphasis)
Frequency Response	±1 dB, 20 Hz-15 kHz[1]
Attack Time	50 µs
Harmonic Distortion	<1%[2]
System Crosstalk	<−46 dB, 20 Hz-15 kHz
Ambient Operating Temperature	55°C (131°F) max.
Power Requirements	117/234 VAC, 50/60 Hz 25 W
Dimensions	19" W x 15" D x 3.5" H (48.3 x 38.1 x 8.8 cm)
Weight	14 lbs. (6.35 kg)

Ordering Information

BA-150 Digital Overshoot Control Processor MI-141467

Accessory

Plug-in 15 kHz Filter (Matched pair) ..... MI-561064[3]

[1]Supplied with 75µ pre-emphasis and de-emphasis. 50µ seconds and 25µ seconds also available.
[2]THD 20 Hz–15,000 Hz at any level below 100% modulation. Typically less than 0.1%.
[3]Order one pair for use with stereo system when other than RCA Exciter System is employed
*Patent Pending

RCA

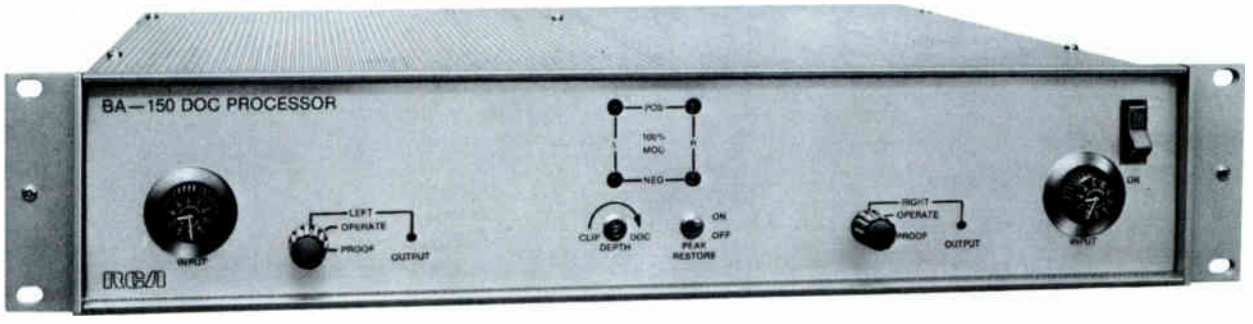
catalog AU.6500B

(Replaces AU.6500A)

Digital Overshoot Control Processor, Type BA-150

- 100% modulation without overshoot
- Inaudible action
- Universal. Use with any FM exciter/Stereo generator system

The RCA Type BA-150 Digital Overshoot Control Processor (DOC) is a unique audio processing system which allows the FM broadcaster to achieve the consistently high modulation levels he desires without being plagued by the overshoots which occur even when fast peak limiters are used. Essentially a sophisticated peak clipper, the DOC provides the pleasing sound desired yet the actual processing operation is completely inaudible. It is useable with any FM exciter or stereo generator.

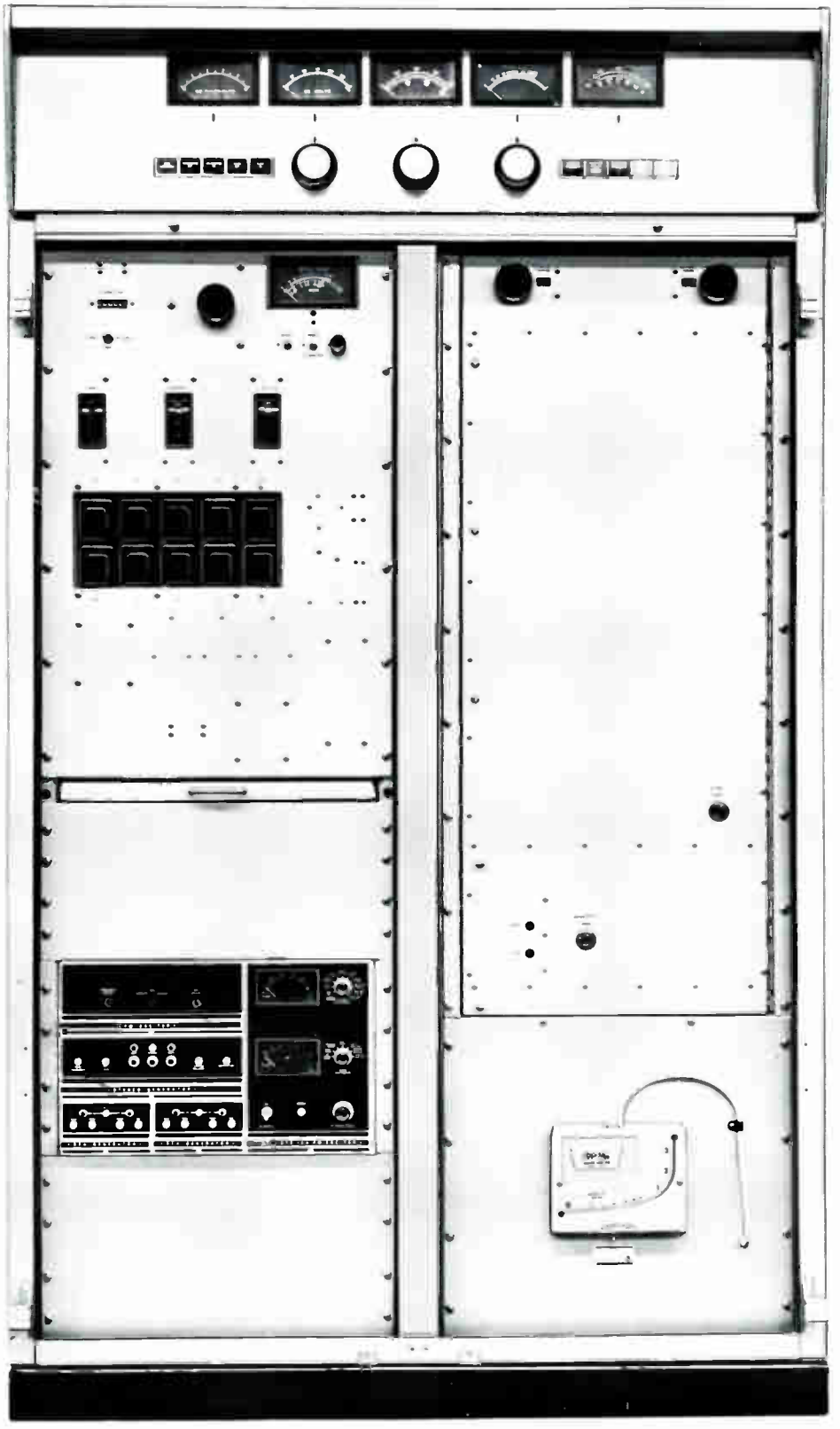


catalog B.6520

RCA 20-KW FM Transmitter, Type BTF-20E1

- New solid-state exciter
- Ultra stable—easy to tune
- Available for mono or stereo —with or without SCA
- 100 KW ERP with 6-section antenna
- Ready for remote control

20-KW FM Broadcast Transmitter



Centralized Controls

Eye-level metering

Ready for remote control

Self-protected against overload

Complete Accessibility

Tilt down chassis for easy maintenance

Two Stages Follow Exciter—IPA and PA

Direct-FM Exciter

"Filter-Minder" Manometer

Rack Space for Optional Stereo Sub-Carrier Generator

Fully Air Cooled

Full-Fidelity FM Transmitter, Type BTF-20E1

The RCA Type BTF-20E1 20-kW FM Broadcast Transmitter is designed for high-power operation in the standard FM band, 88-108 MHz, and is specifically engineered to meet and exceed the stringent requirements of multiplex service transmission and stereo programming as specified by the FCC.

The BTF-20E1 employs a new Type BTE-15A Exciter that uses the time-tested and field-proven *direct FM* system. The circuits employ all solid-state components. Their inherent long-life and cool operation assure extended reliability and lend themselves particularly to unattended, remote operation.

The transmitter features a Type 4CX-15000A Power Amplifier driven by two 7203/4CX250B tubes in the IPA stage. Silicon-rectifier power supplies also provide long life and dependability. All RF circuits are single tuned for utmost tuning simplicity. Except for the high voltage power supply, the transmitter is housed in a single, modern-styled, two-door cabinet.

Frequency response of the transmitter's main channel is 30 to 15,000 Hz (±1 dB maximum) and distortion over the same range is 0.5 percent or less.

A useful feature of the transmitter is the built-in manometer. This device indicates air filter efficiency and warns of reduced cooling-air supply over the power tubes. Properly used, this device can add hundreds of hours to tube life.

Description

Mono or Stereo

The transmitter features a new exciter designed for stereo and multiplex. The exciter, including its self-contained power supply, is mounted on a single vertical chassis.

Two Stages Follow Exciter

From the output of the exciter, only three tubes, two in the IPA and a ceramic-tetrode 4CX-15000A PA generate the full 20-kW signal. A harmonic filter is furnished to reduce spurious radiation.

Vacuum capacitors are used to tune the IPA plate and PA grid. In the power amplifier, all adjustments are at ground potential.

Ready for Remote Control

The transmitter has been designed and built for remote controlled operation. Terminals are provided for remote control of transmitter on/off, raise/lower power and overload reset, while remote metering connections for the PA include cathode current, plate voltage and power output.

New Styling

Functional styling together with fewer tubes and components has permitted the new BTF-20E1 transmitter to be housed in a single, double-door cabinet, in a new midnight blue and shadow blue finish, set off with aluminum meter panel and trim. Maximum accessibility is afforded by swing-out doors on the front and rear of the cabinet. All operating controls and meters used for rapid check of transmitter functions are located on a panel above the front doors. A separate unitized high-voltage power supply may be located anywhere in the FM station.

BTE-15A FM Exciter

Excellent monaural, stereo and SCA performance that more than meets industry and FCC standards are achieved by the new RCA modular, solid-state "Direct FM" exciter.

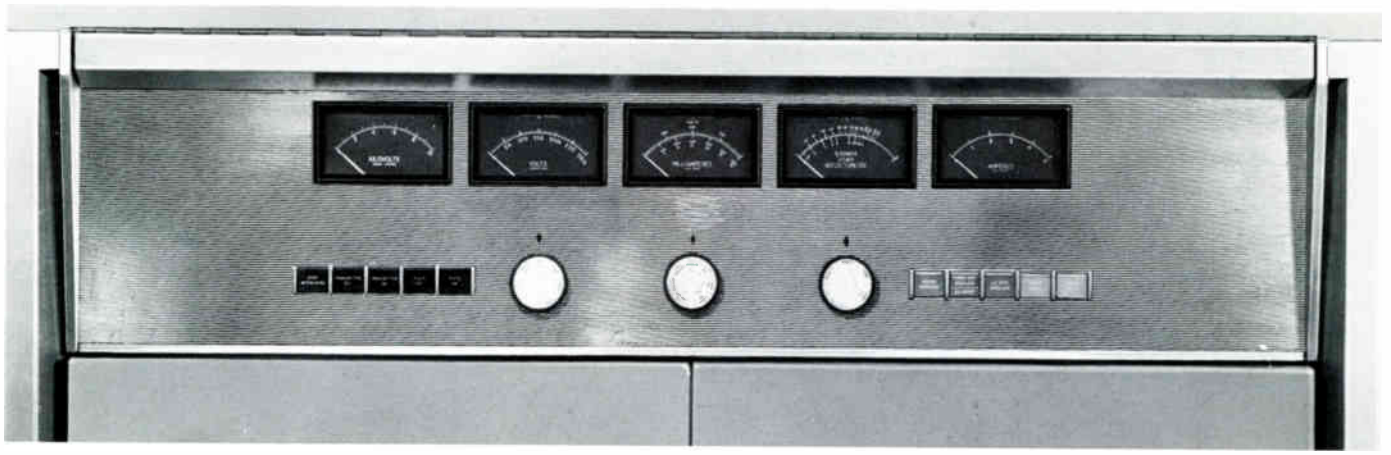
Simplified Circuits

Modulation of the temperature compensated basic on-frequency oscillator is achieved by applying the composite stereo or SCA signals from the BTS-1B and BTX-1B Generators, respectively, to a pair of push-pull varicap diodes which are coupled to the basic oscillator frequency determining resonant circuit. The output of the basic oscillator is isolated from the following buffer amplifier by a 10 dB resistive attenuator. Thus, the stability and modulation characteristics of the basic direct FM oscillator are not disturbed by following RF power amplifiers.

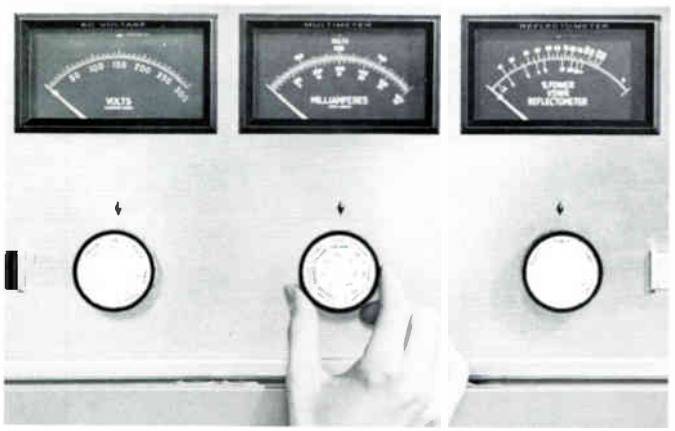
The output of the buffer amplifier, approximately 500 mW, is used to drive the 15-Watt, three-stage RF amplifier as well as the binary divider chain in the AFC circuit. The basic oscillator, buffer amplifier, and AFC circuit are mounted inside a shielded enclosure. The RF power amplifier is also completely shielded.

Automatic frequency control (AFC) for the on-frequency basic oscillator is achieved by taking a sample of the buffer output frequency and dividing it by two, 14 times. A low-frequency reference crystal operating at 1/1024th of the desired

Select Features



BTF-20E1 Control Panel. Tally lights and push-button controls simplify operation.



The large-diameter multimeter knobs speed log-keeping and minimize error.

New solid-state FM Exciter system, Type BTE-15A, showing "Direct FM" exciter housed with optional stereo generator and SCA generator units.

output frequency is divided by two, 4 times. Integrated circuits operating in the saturated mode are used in both binary dividing chains. The outputs from the reference and basic oscillator binary dividers are phase compared in a time-sharing IC comparator. The output of the circuit, which represents the AFC error voltage, is filtered and applied to another pair of varicap diodes coupled to the basic oscillator tuned circuit. Thus, the basic oscillator is phase locked to the 1024th harmonic of the oven controlled reference crystal.

An off-frequency detector is incorporated in the design of the BTE-15A FM Exciter. When the basic oscillator frequency is not phase locked to the reference crystal, an AC component appears at the AFC output. This voltage is rectified to operate a relay whose contacts can be used to turn off the FM transmitter.

Two multimeters are located on the hinged door in front of the regulated power supply section. One of these meters is used to indicate power supply and operating voltages within the exciter and 15-Watt RF Amplifier. The second meter is a peak-reading voltmeter that is used to indicate all modulating signal levels.

The RF power output of the BTE-15A can be continuously adjusted from the front panel control from 7 to 15 Watts. The primary power is turned on with a circuit breaker. RF output is turned on with a front panel switch or by jumping contacts available on the rear of the unit. The exciter will tolerate load mismatches from short circuit to open circuit for a reasonable time without damaging the output transistor. Another safety feature prevents turning on the 41 kHz SCA sub-

carrier when the BTS-1B Stereo Generator is in the stereo mode.

Single-Ended Driver Amplifier

Two simplified, single-ended amplifiers (operating Class "C") follow the exciter. The IPA stage consists of two ceramic 7203/4CX250B tetrodes operating in parallel, and the final power amplifier is Type 4CX15000A tube. Variable vacuum capacitors are used to tune the interstage network between driver and PA.

20-kW Class "C" Final Amplifier

The power amplifier also uses pi-network circuitry, however, the tuning of this stage is accomplished by variable inductors operating at ground potential. The output tube is designed for very high power gain with little drive. Power output is controlled by means of a motor-driven variable transformer connected in the primary of the low voltage power supply for the driver amplifier. This controls the IPA-plate and the PA-screen voltages simultaneously.

For increased transmitter stability and reliability, a separate grid bias supply is incorporated in the BTF-20E1. This supply, too, uses semi-conductor rectifiers.

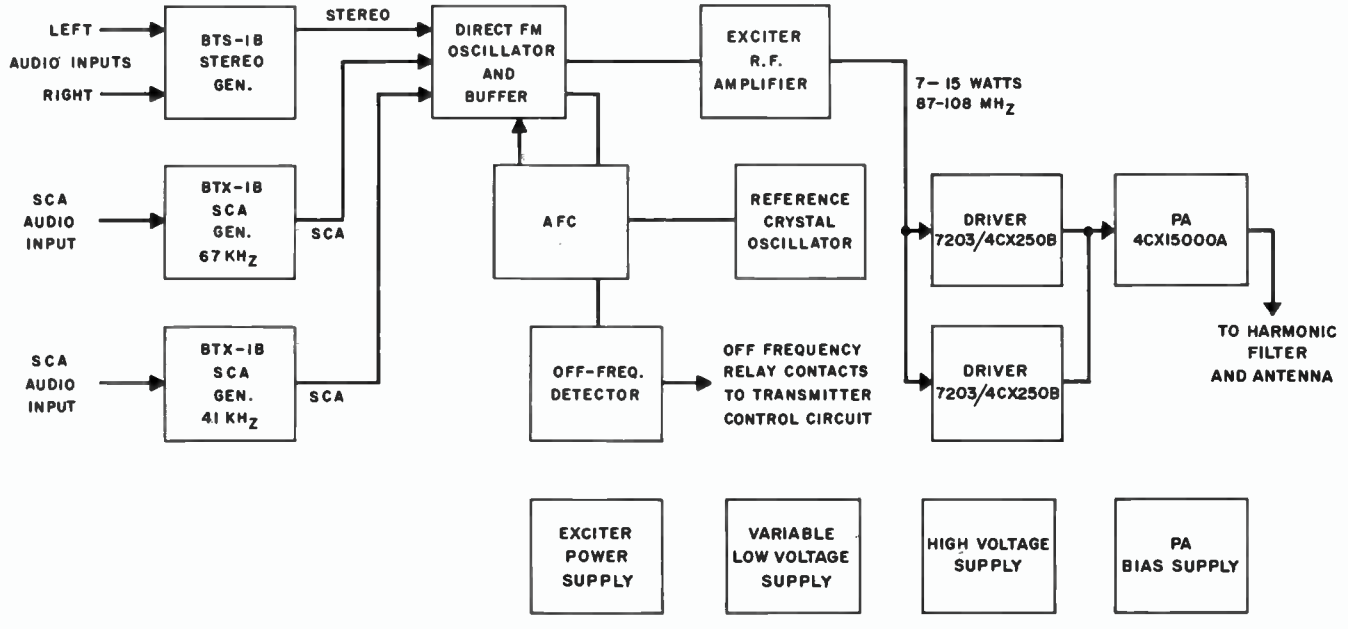
Harmonic Filter Standard Equipment

To keep spurious emission at a minimum, the transmitter is furnished with a 6⅛-inch harmonic filter as standard equipment. The filter consists of a series of transmission line elements with a uniform outer diameter conductor, a stepped inner conductor, and a shunt stub. The conductors are fabricated of a high-grade copper alloy. Attenuation of all harmonic radiation above channel limits is accomplished in an "M-derived" section, and a series of "constant-K" T-sections. This design provides a broad passband with a sharp high-frequency cut-off and excellent attenuation of frequencies above the passband.

Self-Protected Against Overload

Power circuits are protected by magnetically-tripped circuit breakers in addition to overload relays. An interlocked system prevents turn-on of plate power until all filaments have heated and the exciter has reached a proper operating condition. In addition, a latching relay automatically re-applies power to the transmitter once before locking-out in the event of brief overloads or power interruptions. The overload relays are reset by illuminated push-button switches on the front panel. Separate tally-light indicators are provided for overloads in the driver, power amplifier and low voltage rectifier circuits.

Simplified Block Diagram of BTF-20E1 FM Transmitter, showing optional stereo and SCA.

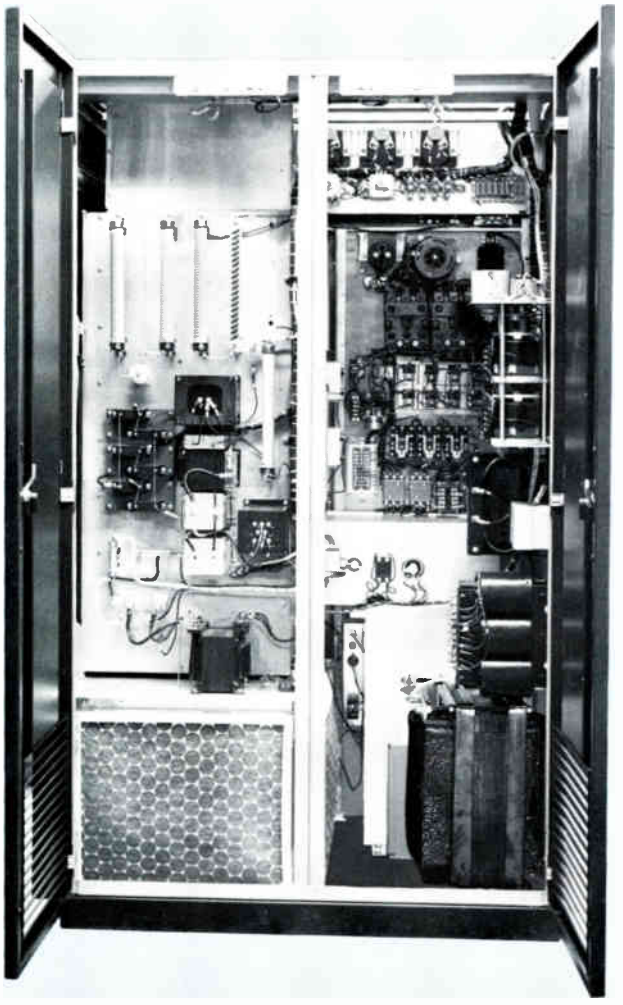


Fully Air-Cooled

Cooling air for the BTF-20E1 is supplied by means of a blower mounted below the amplifier stages. A manometer indicates the efficiency of the fiber-glass filter at the inlet and heavy sound insulation reduces blower noise to a minimum. The blower supplies forced air to both the IPA and PA stages.

Simplified Control

The transmitter has all operating controls and meters located on a panel just above the front doors. The push-button controls include: transmitter on/off, plate on/off, overload reset and power raise/lower. A cabinet disconnect switch, low-voltage circuit-breaker, and filament- and control-circuit breakers are located behind the left-hand door. The main- and low-power circuit breakers are located in the rectifier unitized cabinet. When servicing the BTF-20E1, operation of the "disconnect" switch removes all voltages from the transmitter cabinet. Personnel are protected by fully interlocked rear doors, in addition to interlocked doors on the RF PA cubicle.



COMPLETE ACCESSIBILITY—Rear view of the BTF-20E1 revealing the clean, vertical construction of PA cavity to left and control panel to right.

Full Metering

Six easy-to-read front-panel meters are provided for each amplifier. One for PA-plate voltage, another for PA-plate current, and a third for AC-line and filament voltage. The remaining three are a reflectometer indicating output, a multimeter and VSWR meter. Separate meters are used to measure the forward power and VSWR. The multimeter reads the grid current, the screen current and the screen voltage of both power tubes. In addition, the exciter has its own self-contained multimeter. This one provides complete information on operating conditions in the exciter.

Ready for Remote Control

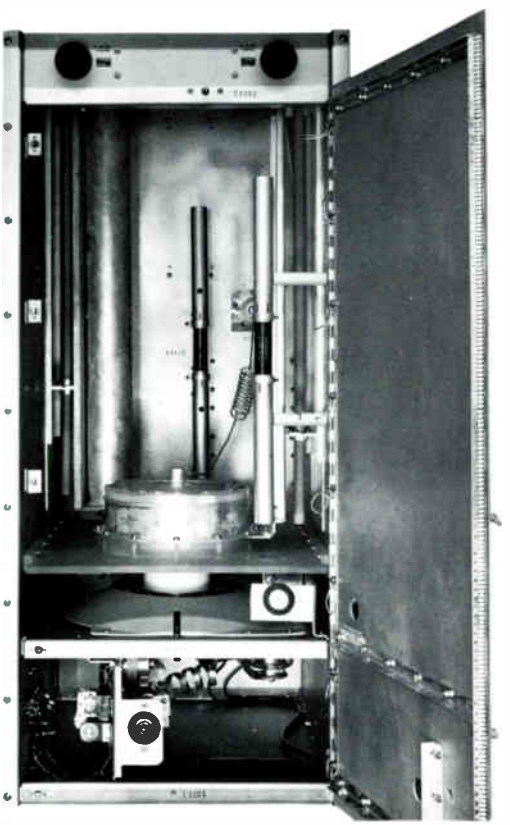
Remote control provisions are included in the transmitter and terminals are provided for use with remote control units such as the Type BTR-11B (or BTR-20E) and Automatic Logging Equipment. Additional terminals are provided for remote control of transmitter on/off, plate on/off, raise/lower power, and overload reset. Remote metering connections in the final amplifier for plate current, plate voltage, and power output are also provided.

High-Voltage Power Supply

The high-voltage power supply is housed in a unitized cabinet measuring 32 inches wide, 23 inches deep and 49 inches high. It can be installed at any convenient place in the station. The cabinet houses the high-voltage-plate transformer, a bank of plug-in semiconductor rectifiers, a line-circuit breaker, a low-power circuit breaker, and the plate contactor. Personnel are fully protected from shock through interlock and grounding switches.

The rectifier section comprises silicon-junction diodes (with equalizing resistors and capacitors) in a three-phase, full-wave-bridge circuit. Circuit breakers are used instead of fuses in the transmitter adding to the dependability particularly when operating by remote control.

UNITIZED HIGH VOLTAGE POWER SUPPLY—With location not tied to the transmitter, the unitized power supply affords many installation and operating economies.



ONLY THREE TUBES BETWEEN EXCITER AND OUTPUT—View showing interior of PA and IPA cabinet with the 4CX15000A ceramic tetrode and two IPA tubes below shelf.

Specifications

Performance

Type of Emission	F3 and F9
Frequency Range	88 to 108 MHz
Power Output	20 kW
Output Impedance (3⅛" O.D. Line)	50 Ohms
Frequency Deviation 100% modulation	±75 kHz
Modulation Capability	±100 kHz
Carrier Frequency Stability	±1000 Hz max.
Audio Input Impedance	Resistive, 600/150 Ohms
Audio Input Level—*(100% mod.)	+10 ±2 dBm
Audio Frequency Response—**(50-15,000 Hz)	±1 dB max.
Pre-emphasis Network Time Constant	75 or 50 μs, as desired
Harmonic Distortion—***(50-15,000 Hz)	0.5% or less
FM Noise Level (referred to 100% FM mod.)	—65 dB max.
AM Noise Level (referred to 100% AM mod.)	—50 dB max.
Subcarrier Input Level (100% mod.)	—15 to +10 dBm adjustable
Subcarrier Input Impedance	600/150 Ohms bal.
Subcarrier Frequency	20-67 kHz

Main-to-Subchannel Crosstalk....—55 dB referred to ±7.5 kHz deviation of the subcarrier by a 400 Hz tone. Main channel modulation 70% by 50-15,000 Hz tones.

Sub-to-Main-Channel Crosstalk....—60 dB referred to ±75 kHz deviation of the main carrier by a 400 Hz tone. Subchannel modulation 100% (±7.5 kHz) by 50-6000 Hz tones. Subcarrier modulated 30% on main carrier.

Electrical

Power Line Requirements:	
Line	240/208 Volt, 3 phase, 50/60 Hz
Combined Line Voltage Variation and Regulation	±5%
Power Consumption	36,000 Watts (approx.)
Power Factor (approx.)	90%

Tube Complement

Driver:
2—7203/4CX250B

Power Amplifier:
1—4CX15000A

Mechanical

Dimensions (overall):	Transmitter	High-Voltage Power Supply
Width	48½" (123 cm)	32" (81.3 cm)
Height	77" (195.6 cm)	49" (124.5 cm)
Depth	32½" (82.5 cm)	23" (58.5 cm)
Weight (approx.)	1425 lbs. (646.4 kg.)	1025 lbs. (164.9 kg.)

Finish	Textured Vinyl in midnight blue and shadow blue, satin-aluminum trim.
Altitude	7500 ft.† (2290 M)
Ambient Temperature Range	—20° to +45°C

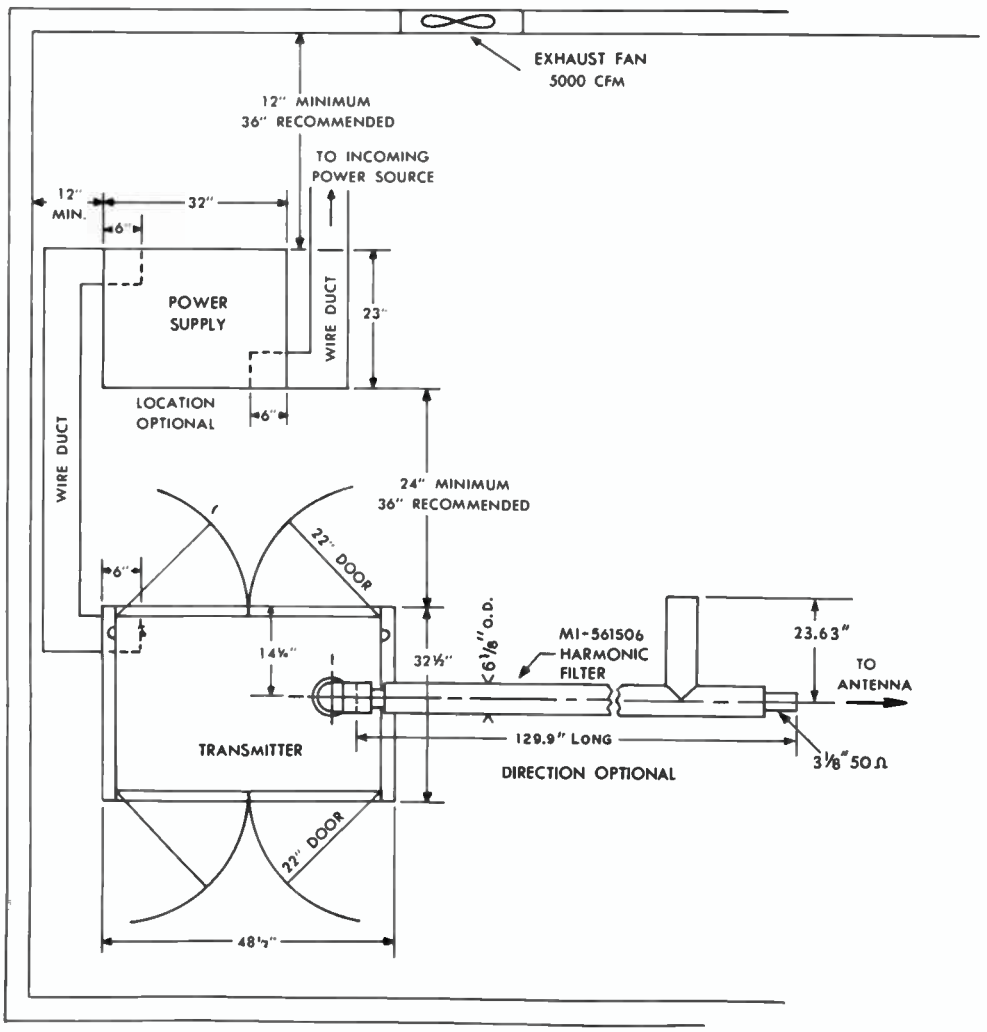
* Level measured at input terminal J1.

** Audio Frequency response referred to 50- or 75-microsecond pre-emphasis curve.

*** Distortion includes all harmonics up to 30 kHz and is measured following a standard 50- or 75-microsecond de-emphasis network.

† Blowers can be provided for operation at higher altitudes.

Specifications subject to change without notice.



Space-saving floor plan of the BTF-20E1. The separate, unitized power supply may be installed in a basement, attic, closet or other convenient place. (Wire duct and fan shown are not furnished.)

Accessories

Recommended Spare RF Transistors for Exciter MI-560718
Spare Crystal and Oven
(Specify operating frequency) MI-560717
Complete Set of Spare Tubes ES-560609
20-kW RF Load and Wattmeter (water-cooled) MI-19267-L/H
Type BTR-11B Remote Control System
(10-function) ES-34280
Type BTR-20D Remote Control System
(20-function) ES-34274-C
Type BW-75A FM Frequency and
Modulation Monitor MI-560735
Type BW-85A FM Stereo Frequency and
Modulation Monitor MI-560740
Type BW-95A SCA Frequency and
Modulation Monitor MI-560745

Ordering Information

Type BTF-20E1 20-kW FM Transmitter ES-560602

Please specify assigned frequency, power-line frequency and altitude of installation and select BTE-15A Exciter System from the following:

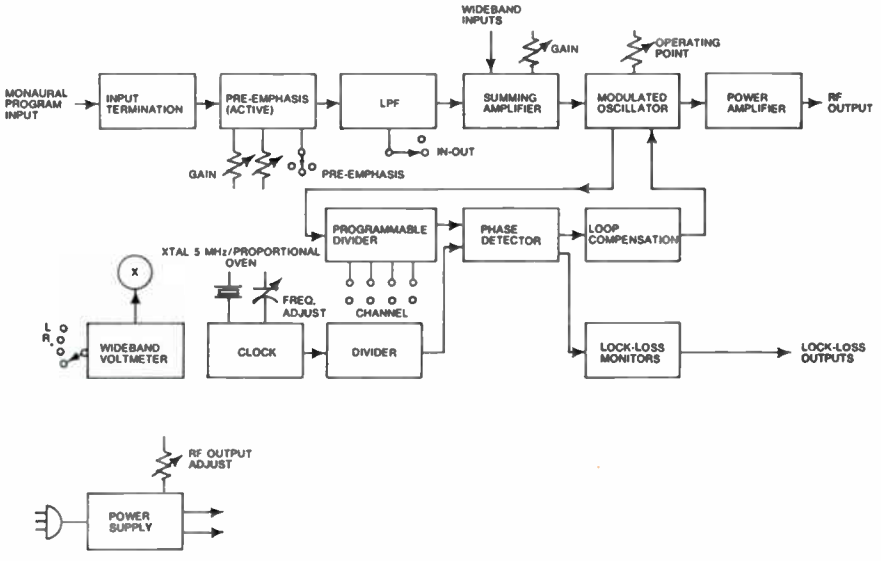
Mono ES-560631
Mono and one SCA Channel ES-560632
Mono and two SCA Channels ES-560633
Stereo ES-560634
Stereo and one SCA Channel ES-560635
Stereo and two SCA Channels ES-560636

Commercial Electronic Systems Division
Front and Cooper Streets, Camden, New Jersey, U.S.A. 08102

RCA Broadcast Equipment

BTE-115 FM Exciter System, BTS-101A Stereo Generator; BTX-101 SCA Generator

BTE-115 FM Exciter System with
BTS-101A Stereo and BTX-101 SCA Generator.



BTE-115 Mono FM Exciter.

The RCA BTE-115 FM Exciter is an advanced "state-of-the-art" solid state design. The overall circuitry is simple and permits easy alignment with a front panel meter eliminating the need except for a terminating load for further test equipment during alignment. Discrete crystals have been eliminated by providing programmable synthesized AFC using a standard 5 MHz proportional oven temperature controlled reference crystal for superior carrier stability. The stability of the frequency modulated oscillator is temperature compensated for operation over a wide range of ambient temperatures. The FMO, a voltage controlled oscillator, can be switched to the "free running" position and controlled manually from the front panel.

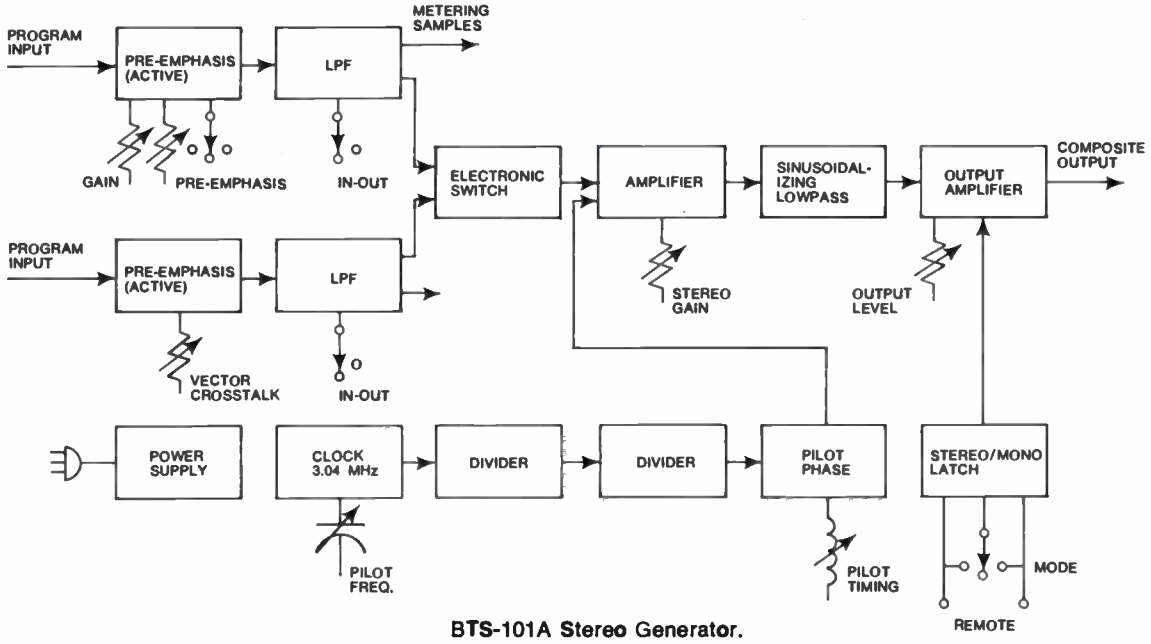
The buffer and PA amplifiers are wide band over the FM broadcast band of 88 to 108 MHz with only peak trimming required to achive full 15 watts output.

Extensive metering on the BTE-115 allows monitoring of all major parameters, adjustment of power supply voltages, AFC readings, buffer and output power, reflected VSWR, audio levels and multiplexing injection and deviation. Provision for remote selection for mono or stereo operation is provided. All system combinations of the RCA BTE-115 are retrofitable into most RCA line of FM transmitters.

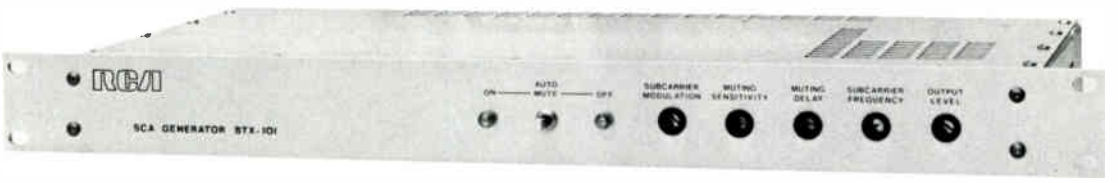
Stereo Generator BTS-101A

The RCA BTS-101A Stereo Generator has a self-contained power supply. Characteristic of noise, separation, cross-talk and intermodulation distortion have been improved. The BTS-101A also uses active circuitry for pre-emphasis with generous adjustments to provide optimum operation. The low pass filtering is switchable to allow use with external audio processors which contain built-in low pass filters. An improved 3.04 MHz crystal controlled generator divided down to 19 kHz pilot and 38 kHz switching yields greater stability.

The stereo switching uses IC techniques to produce low harmonic 2nd and 3rd generation, providing greater separation, noise and cross-talk with conventional easy-to-service stereo circuitry. Mono or stereo modes are selectable manually or by remote control using solid state latching.



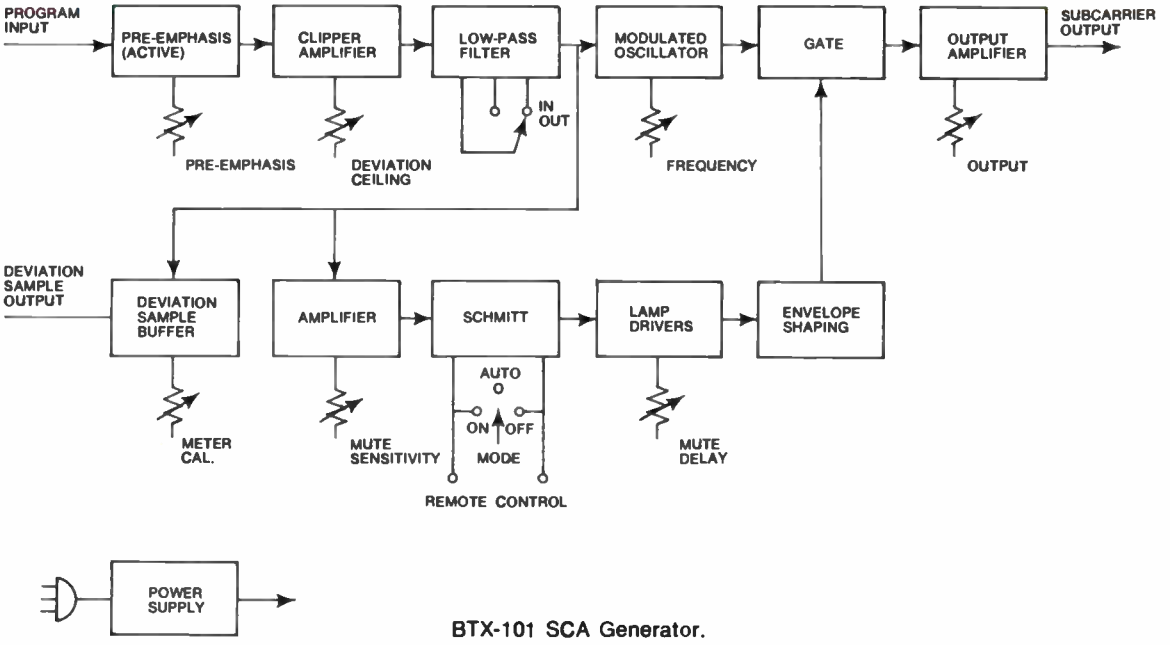
BTS-101A Stereo Generator.



SCA Generator BTX-101

The RCA BTX-101 SCA generator with its own power supply will tune from 30 to 110 kHz. A built-in limiter amplifier prevents extreme audio excursions. The generator circuits use IC techniques and carefully control the deviation to limit cross-talk into the main and stereo channels. In the "automatic" mode muting occurs in the absence of audio and the delay time to mute is adjustable.

In the "on" position the SCA carrier remains on continuously. Selection of SCA carrier "on" or "off" may be selected manually on the front panel or by remote control. Front panel adjustments include subcarrier injection level, muting sensitivity, muting delay, subcarrier frequency adjust and output level.



BTX-101 SCA Generator.

Specifications

Performance

Type of Emission ..... F3 and F9
Frequency Range (programmable in 50 kHz steps) ..... 87.5 to 108 MHz
Power Output (adjustable from front panel) .... 4 to 15 watts
VSWR ..... Open or direct short
Output Impedance ..... 50 ohms
Output Connector ..... Type BNC
Frequency Deviation—100% modulation ..... ±75 kHz
Modulation Capability ..... ±100 kHz
Carrier Frequency Stability (−20° to +70°C) ... ±500 Hz max.
Modulation ..... Direct FM
Altitude ..... 7,500 ft.
Ambient Temperature Range ..... −20° to +70°C
Modulation and Test Meter ..... 19 positions

Monaural Operation

Audio Input Impedance ..... Resistive 600 ohms, balanced
Audio Input Level (100% modulation) ..... +10 dBm, referred to 400 Hz
Audio Frequency Response (30-15000 Hz) .... ±1.0 dB max.
Harmonic Distortion ..... 0.3% or less
Intermodulation Distortion ..... 0.2% or less
FM Noise Level (referred to 100% modulation) ..... −70 dB
AM Noise Level (referred to 100% modulation) ..... −60 dB
Pre-emphasis Network Time Constant ... 0, 25, 50 or 75 µsec as desired

Stereo Operation

Audio Input Impedance ..... Resistive 600 ohms, balanced
Audio Input Level (100% modulation) ..... +10 dBm, referred to 400 Hz
Audio Frequency Response (30-15000 Hz) .... ±1.0 dB max.
Harmonic Distortion ..... 0.4% or less
Intermodulation Distortion ..... 0.3% or less
FM Noise Level (referred to 100% modulation) ..... −70 dB
AM Noise Level (referred to 100% modulation) ..... −60 dB
Pilot Oscillator ..... 3.04 MHz crystal
Pilot Phase ..... Adjustable
Separation ..... 43 dB
Subcarrier Suppression (referred to 100% modulation) .. 50 dB
Crosstalk (due to non-linearities):
L + R to L − R ..... 45 dB
L − R to L + R ..... 45 dB
Pre-emphasis Network Time Constant ... 0, 25, 50 or 75 µsec as desired
Stereo or Mono Mode ..... Remote or locally controlled

SCA Operation

Modulation ..... FM modulation
Frequency ..... 30 to 110 kHz
Frequency Stability ..... ±400 Hz (30 to 75 kHz) ±500 Hz (75 to 110 kHz)
Modulation Capability ..... ±15% carrier
Audio Input Impedance ..... Resistive 600 ohms, balanced
Audio Input Level ..... −15 to +10 dBm (400 Hz)
Subcarrier Output Level ..... Up to 3 volts, p-p
Harmonic Distortion (using wideband detector) ... 1% or less
Pre-emphasis Network Time Constant .. Continuously variable to 150 µsec
Audio Frequency Response ..... Within 1 dB of prechosen pre-emphasis
FM Noise Level ..... −55 dB below peak deviation of ±10% of carrier frequency
AM Noise Level ..... −55 dB below unmodulated carrier
Muting Delay ..... 0.5 to 5 sec., adjustable
Automatic Mute Level ..... 0 to −40 dB
Carrier Envelope Rise and Fall Time ..... 70 ms. ±20 ms.
Injection Level ..... 9 to 30%
Mono-to-Subchannel Crosstalk (SCA) .... −50 dB referred to ±6.0 kHz deviation of the subcarrier by a 400 Hz tone. Main channel modulation 70% by 50-15,000 Hz tone, and 30% by subcarrier measured using narrow band detector.
SCA-to-Mono Crosstalk ..... −60 dB referred to 100% modulation of main carrier by 400 Hz, subcarrier deviated by ±6.0 kHz by 30 to 5 kHz tones. Main carrier modulated 30% by subcarrier, measured by narrow band detector.
SCA-to-Stereo Crosstalk ..... −60 dB referred to 100% modulation of main carrier by 400 Hz tone, subcarrier deviated by ±4.0 kHz by 30 to 5 kHz tones. Main carrier modulated 10% by subcarrier, measured using narrow band detector.

Wide Band Operation

Input Connector ..... Type BNC
Input Impedance ..... > 5000 ohms resistive, unbalanced
Input Level ..... 3.5 P-P nominal for 100% modulation referred to 400 Hz

Electrical

Power Line Requirements ..... 120, 208 or 240 volts, single phase, 50/60 cycles
Combined Line Voltage Variation and Regulation ..... ±10%
Power Consumption ..... 110 watts max.

Mechanical

Dimensions (overall):

	Exciter	Stereo Gen.	SCA Gen.
Width	19″ (483 mm)	19″ (483 mm)	19″ (483 mm)
Height	3¾″ (95 mm)	1⅞″ (48 mm)	1⅞″ (48 mm)
Depth	9″ (229 mm)	9″ (229 mm)	9″ (229 mm)
Weight	40 lbs. (88 kg)	9 lbs. (20 kg)	8 lbs. (18 kg)

Altitude ..... 7,500 ft. max (3355 m)
Ambient Temperature ... −20°C to + 70°C (−4F° to + 140°F)

Front and Cooper Streets, Camden, New Jersey 08102, U.S.A.

RCA Broadcast Systems

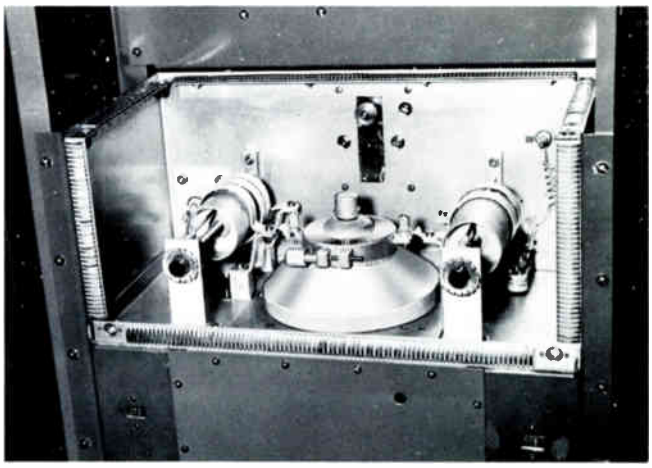
catalog B.6500

RCA 1-KW FM Broadcast Transmitter, Type BTF-1E2

- New solid-state exciter
- Available for mono or stereo —with or without SCA
- Designed for remote control
- Direct FM exciter

3TB

New solid-state FM Exciter system, Type BTE-15A, showing "Direct FM" exciter housed with optional stereo generator and SCA generator units.



RF cavity with shielded cover removed.

Description

RCA's Type BTF-1E2 FM Transmitter provides 1,000 Watts output for stations operating in the 88 to 108 MHz band. It is designed to provide the finest possible performance and reliability, and is specifically built to meet the stringent requirements of multiplex and stereo service transmission. It is a simple and compact unit easy to install.

The BTF-1E2 Transmitter supplies the latest in FM broadcast techniques. Only one tube beyond the exciter is required to supply 1000 Watts output. No IPA stage is required. The transmitter is extremely stable because it incorporates RCA's time-proven "Direct FM" Exciter. This exciter requires no special tuning or setting up for standard or for multiplex operations. It has all solid-state components. Cross-talk and noise are kept to an absolute minimum.

Easy to Install and Operate

Other features incorporated in the BTF-1E2 include silicon rectifiers which provide long life with a minimum of maintenance. Accessibility is assured both front and rear by vertical chassis construction, surface mounting of components, and hinged mounting of the exciter. Mechanical and electrical overload protection is provided. To assure performance in accordance with FCC requirements, the transmitter is supplied with harmonic filter. Provisions for remote control have been provided in the transmitter.

High quality FM stereo transmission can be obtained by the addition of an RCA BTS-1B Stereo Generator. SCA programming may be transmitted simultaneously with stereo by the use of the optional BTX-1B subcarrier generator. The BTF-1E2 is type accepted for such simultaneous program transmission.

Single Cabinet

The Type BTF-1E2 FM Transmitter is completely housed in one cabinet with total floor dimensions of only 26 by 21 inches. The cabinet is functionally styled to present a pleasing appearance. All meters and operating controls are conveniently located. Front and rear hinged doors give easy access to all portions of the transmitter.

Located at the front are the overload relays, the 1 kW amplifier and RF box containing tuning dials for the amplifier. A control panel and screen supply are located next, followed by the hinged mounted exciter. Concealed in the bottom of the transmitter are the high voltage rectifier and power transformer. The rear of the transmitter gives access to the bias resistors, metering circuitry and blower, followed by the rear of the control panel and screen supply. A voltage regulating filament transformer is mounted on the control panel.

Solid-State FM Exciter

Excellent monaural, stereo and SCA performance that more than meets industry and FCC standards are achieved by the new RCA modular, solid-state "Direct FM" exciter.

Simplified Circuits

Modulation of the temperature compensated basic on-frequency oscillator is achieved by applying the composite stereo or SCA signals from the BTS-1B and BTX-1B Generators, respectively, to a pair of push-pull varicap diodes which are coupled to the basic oscillator frequency determining resonant circuit. The output of the basic oscillator is isolated from the following buffer amplifier by a 10 dB resistive attenuator. Thus, the stability and modulation characteristics of the basic direct FM oscillator are not disturbed by following RF power amplifiers.

The output of the buffer amplifier, approximately 500 mW, is used to drive the 15-Watt, three-stage RF amplifier as well as the binary divider chain in the AFC circuit. The basic oscillator, buffer amplifier, and AFC circuit are mounted inside a shielded enclosure. The RF power amplifier is also completely shielded.

Automatic frequency control (AFC) for the on-frequency basic oscillator is achieved by taking a sample of the buffer output frequency and dividing it by two, 14 times. A low-frequency reference crystal operating at 1/1024th of the de-

sired output frequency is divided by two, 4 times. Integrated circuits operating in the saturated mode are used in both binary dividing chains. The outputs from the reference and basic oscillator binary dividers are phase compared in a time-sharing IC comparator. The output of the circuit, which represents the AFC error voltage, is filtered and applied to another pair of varicap diodes coupled to the basic oscillator tuned circuit. Thus, the basic oscillator is phase locked to the 1024th harmonic of the oven controlled reference crystal.

An off-frequency detector is incorporated in the design of the BTE-15A FM Exciter. When the basic oscillator frequency is not phase locked to the reference crystal, an AC component appears at the AFC output. This voltage is rectified to operate a relay whose contacts can be used to turn off the FM transmitter.

Two multimeters are located on the hinged door of the exciter in front of the regulated power supply section. One of these meters is used to indicate power supply and operating voltages within the exciter and 15-Watt RF Amplifier. The second meter is a peak-reading voltmeter that is used to indicate all modulating signal levels.

The RF power output of the BTE-15A can be continuously adjusted from the front panel control from 7 to 15 Watts. The primary power is turned on with a circuit breaker. RF output is turned on with a front panel switch or by jumping contacts available on the rear of the unit. The exciter will tolerate load mismatches from short circuit to open circuit for a reasonable time without damaging the output transistor. Another safety feature prevents turning on the 41 kHz SCA subcarrier when the BTS-1B Stereo Generator is in the stereo mode.

Power Amplifier

The output of the exciter is fed to the input of the ceramic 4CX-1000A amplifier tube. The amplifier input circuit is a simple parallel resonant circuit, tuned by a variable inductance with resistance swamping for stability of operation. This stage is neutralized by varying inductance in series with the screen. The output circuit is a modified pi network, having a variable inductance across the tube capacity—which is used to adjust the loading. All capacitors in the final stage are of the fixed ceramic type. A blower mounted on the back of the RF compartment provides sufficient filtered air for cooling at stations operating below 7500 feet. The filament transformer is of the automatic regulator type and keeps filament voltage constant within one percent.

The power amplifier is new in many respects. The variable inductors use no sliding contacts. There are no variable capacitors in the power amplifier. A single tube, the 4CX1000A, is used in the BTF-1E2 power amplifier and it is driven directly by the output of the exciter in an exclusive RCA circuit.

Neutralizing Probe

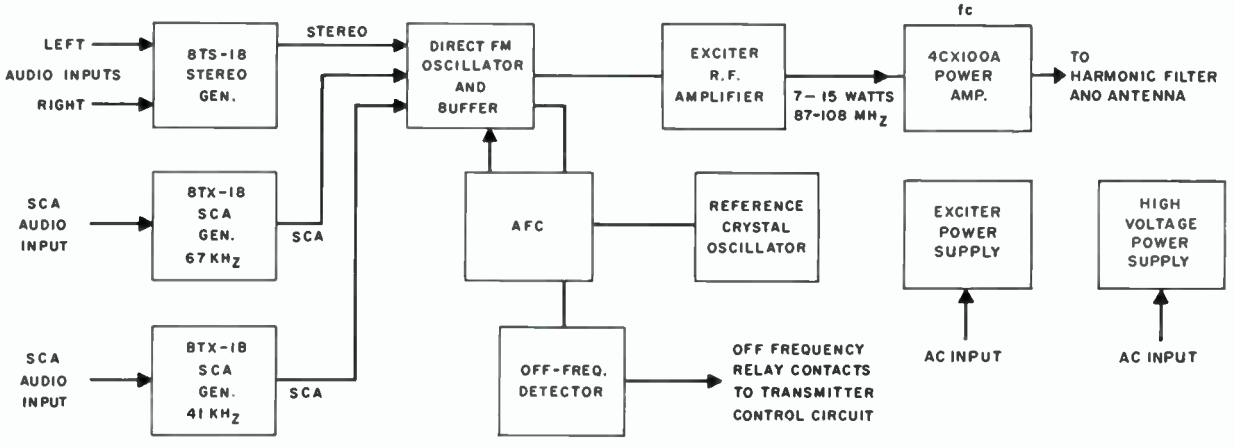
A neutralizing probe is furnished with the transmitter. It utilizes the multimeter to indicate correct neutralization of the power amplifier.

The high voltage and screen power supplies make use of silicon rectifiers in a bridge circuit. This combined with choke input and adequate filtering results in an excellent well-regulated power source. A variable transformer is used in the primary of the screen power supply to control power output of the transmitter. Filament voltage regulation is provided for the 4CX1000A power amplifier tube.

Harmonic Filter

The harmonic filter supplied with all RCA FM transmitters is not a simple harmonic trap. The filter consists of an M-derived half-T section, several low-pass filter sections, and a constant-K, half-T section. The M-derived section provides rapid cut-off in the second harmonic region, and a termination impedance at one end of the filter of 50 Ohms. Attenuation of the harmonics is accomplished by the low-pass filter sections, while the constant-K, half-T section serves to give a termination impedance of 50 Ohms at the other end of the unit. The use of such a filter assures compliance with FCC requirements regarding spurious radiation, as all harmonics through the seventh are effectively attenuated.

Simplified Block Diagram of BTF-1E2 Transmitter, showing optional stereo and SCA.



Protective Circuits

Power circuits are protected by magnetically tripped circuit breakers as well as overload relays. An interlock relay prevents application of plate power until the 4CX1000A filament has heated and the exciter has reached a stable operating condition. Overload relays are used in the high voltage and screen power supplies. There is also an interlock in the air blower circuit. If the blower should fail or air-flow be reduced below the proper level, the transmitter is taken off the air thus avoiding possible damage.

The overload relays are reset remotely or by means of an instantaneous key switch on the front panel. An overload indicator lamp signals when an overload has taken place. All relays are easily accessible. Access to high voltage areas is protected by built-in high voltage shorting devices.

Control Features

The BTE-15A exciter has a self-contained multimeter. In the amplifier of the transmitter, provision is made for metering PA plate current, plate voltage, output power and VSWR; a probe is furnished for neutralizing the transmitter and is used in connection with the multimeter. All tuning controls are located on the front panel for easy accessibility. They include key switches for filament on-off, plate on-off, and overload reset. The variable power control is also mounted on the front as are the overload indicator and plate power-on lights. The use of latching relays make it possible to control the transmitter with one button.

Remote Control Provisions

The BTF-1E2 transmitter incorporates connections for remote control and remote meter reading when combined with a remote control system such as the BTR-11B or BTR-20E. Terminals for transmitter on-off, plate on-off, overload reset, plate voltage, cathode current, and power output are provided. To control transmitter power output remotely, an accessory motor drive may be connected to the screen supply control.

Specifications

Performance

Type of Emission	F3 and F9
Frequency Range	88 to 108 MHz
Power Output	250-1000 Watts
Output Impedance (1⅝" O.D. Line)	50/51.5 Ohms
Frequency Deviation, 100% modulation	±75 kHz
Modulation Capability	±100 kHz
Carrier Frequency Stability	±1000 Hz max.
Audio Input Impedance	600/150 Ohms
Audio Input Level—[1](100% mod.)	+10±2 dBm
Audio Frequency Response—[2](50 Hz-15 kHz)	±1 dB max.
Pre-emphasis Network Time Constant	75 or 50 μs or flat as desired
Harmonic Distortion—[3](50 Hz-15 kHz)	0.5% or less
FM Noise Level (referred to 100% FM mod.)	−65 dB max.
AM Noise Level (referred to 100% AM mod.)	−50 dB max.
Subcarrier Input Level (100% mod.)	−15 to +10 dBm adjustable
Subcarrier Input Impedance	600/150 Ohms bal.
Subcarrier Frequency	20-67 kHz
Main-to-Subchannel Crosstalk	−50 dB referred to ±7.5 kHz deviation of the subcarrier by a 400 Hz tone. Main channel modulation 70% by 50-15,000 Hz tones.
Sub-to-Main-Channel Crosstalk	−60 dB referred to ±75 kHz deviation of the main carrier by a 400 Hz tone. Subchannel modulated 100% (±7.5 kHz/s) by 50-6000 Hz tones. Subcarrier modulated 30% on main carrier.

Electrical

Power Line Requirements:	
Line	240/208 Volts, single phase, 60 Hz[4]
Slow Voltage Variation	±5%
Power Consumption	2800 Watts (approx.)
Power Factor (approx.)	80%

Tube Complement

Power Amplifier:
1—4CX1000A

Mechanical

Dimensions (overall)	26" wide, 77" high, 20⅝" deep (66.04 cm, 195.58 cm, 52.23 cm)
Weight	790 lbs. (3.58 kg.)
Finish	Textured vinyl in midnight blue and shadow blue, satin aluminum trim
Altitude	7500 ft. max. (2290 m)
Ambient Temperature Range	−20° to +45°C

Accessories

Recommended Spare RF Transistors for Exciter	MI-560718
Spare Crystal and Oven (Specify operating frequency)	MI-560717
Spare Transmitter Tube	MI-34709
1-kW RF Load and Wattmeter	MI-19196L/H
Type BTR-11B Remote Control System (10-function)	ES-34280
Type BW-75A FM Frequency and Modulation Monitor	MI-560735
Type BW-85A FM Stereo Frequency and Modulation Monitor	MI-560740
Type BW-95A SCA Frequency and Modulation Monitor	MI-560745

[1] Level measured at input to pre-emphasis network.
[2] Audio Frequency response referred to 75 or 50 micro-second pre-emphasis curve.
[3] Distortion includes all harmonics up to 30 kHz and is measured following a standard 75 or 50 micro-second de-emphasis network.
[4] 50-Hz operation requires MI-34316-20 regulator.

Ordering Information

Type BTF-1E2 1-kW FM Broadcast Transmitter ES-27279-C*
*Please specify assigned frequency, power-line frequency and altitude of installation and select a BTE-15A Exciter System from the following:

Mono	ES-560631
Mono and one SCA Channel	ES-560632
Mono and two SCA Channels	ES-560633
Stereo	ES-560634
Stereo and one SCA Channel	ES-560635
Stereo and two SCA Channels	ES-560636

Commercial Electronic Systems Division
Front and Cooper Streets, Camden, New Jersey, U.S.A. 08102

RCA Broadcast Equipment

- Excellent bandwidth — 1.1:1 VSWR after field trim
- High power handling capability
- Lower initial installation and maintenance costs
- Efficient, factory replaceable deicers
- Lower windload

RCA Circularly Polarized FM Antenna, BFC Series

Description

The RCA BFC Series of Circularly Polarized FM Antennas is designed for use in monaural, stereo and multiplex FM broadcast service. These antennas provide a low standing wave ratio over a 200 kHz channel providing optimum conditions for stereo or multiplex operation.

The BFC Antenna radiates a circularly polarized wave intended to provide improved reception in FM automobile radios employing vertical whip antennas and in home receivers employing built-in or "line cord" antennas. The BFC Antenna can be used to advantage in any application which previously required the use of separate vertically and horizontally polarized antennas of equal power gain and equal power input requirements. Use of the BFC Antenna provides the advantages of lower windload and weight plus reduced complexity and simplified installation requirements.

Power Gain

The new antenna features time proven sectionalized construction and materials and can be supplied with as many sections as are required for a given application. The BFC Antenna radiates a circularly polarized wave, thus the power gain in the horizontally polarized plane or in the vertically polarized plane is approximately equal to the number of sections divided by two (the number of equivalent planes of polarization). When using circular polarization in place of simple horizontal polarization, the transmitter power can be doubled without exceeding the licensed horizontal effective radiated power since the additional power radiated is in other planes of polarization; or conversely, for a given

transmitter power, the antenna gain can be doubled for the same reason. An external power splitter is not required. The antennas are designated BFC-1B, BFC-2B, BFC-3B, etc., depending on the number of stacked sections required.

Rugged Construction

Mechanically, the antenna is designed for rugged service in all types of weather conditions, and will withstand wind velocities up to 110 miles per hour. Radiating elements are made of durable stainless steel that eliminates electrolysis and corrosion when bolted to the copper feed system. The design is flexible and permits ease of installation on the side of an existing tower, or pole mounting on top of towers or buildings. Mounting brackets are supplied with antennas for standard or conventional installations at no extra cost. Custom brackets can be supplied at extra cost for special or unusual types of installations. The antenna can be supplied with standard poles using either pedestal or socket mounts.

De-icing Provisions

De-icing equipment is an accessory item which must be ordered with the antenna. The de-icing equipment is recommended for most areas and especially where icing and sleet conditions are common. Radomes are available for use in areas where severe conditions exist. The de-icing equipment is designed to provide long life and trouble free operation and is factory replaceable.

Each bay of a BFC Antenna with de-icers has a current transformer which is mounted either on the pole or on a leg of the tower. This transformer, fed with 208/240 Volt single phase, delivers 3.0 Volts at about 250 Amperes. The output of this transformer is fed via a heavy teflon insulated wire which has high heat handling capability through each of the arms of the antenna and is grounded internally at the ends of the arms. The current passing back through the stainless steel arms heats the arms directly.

Sectionalized Construction

The RCA Type BFC Circularly Polarized FM Antenna is of sectionalized construction; each section consisting essentially of two crossed semi-circular radiators attached to a supporting frame and a section of 3⅛-inch transmission line. The antenna input is provided with a 50 Ohm EIA flange for connection to other 3⅛-inch transmission lines. Adaptors are available for other transmission line types and sizes. Standard antennas have power gains from approximately 6.5 to 8.0. Special designs are available on application. An adjustable transformer section is located near the input fitting. A voltage standing wave ratio of 1.1:1 or better can be achieved with a minimum of field trimming.

Radiation Pattern

The horizontally polarized azimuthal radiation pattern of the BFC antenna is essentially omnidirectional for top mounting. The extent of deviation from a circular pattern for a side mounted array is dependent on type and size of the tower. It is recommended that the array be mounted, if possible, above the top set of guys on a guyed tower. Where this is not possible the guys in the immediate area of the antenna should be broken by insulators every 3½ feet for a distance of at least 14 feet. In addition, each guy in the vicinity of the antenna should be insulated at the point where it connects to the tower.

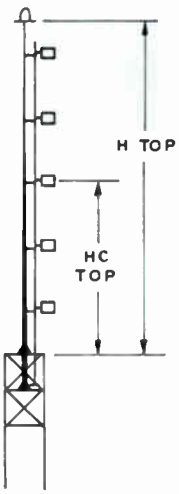
Mechanical Features

Each section consisting of two crossed semi-circular radiators is mounted on a short horizontal section of 1⅝-inch transmission line fitted with an insulated central feed point and supported from the 3⅛-inch feed system. Only one coaxial transmission line is used to feed all sections of the antenna, and the individual radiating sections are identical mechanically and electrically. The radiators are both shunt fed and mechanically supported by the interconnecting feed system which consists of modified lengths of RCA 3⅛-inch rigid coaxial transmission line. The BFC-1B through BFC-7B Antennas terminate mechanically in a pressurized top cap with bleed valve and a bottom input flange for connection to the desired type of transmission line.

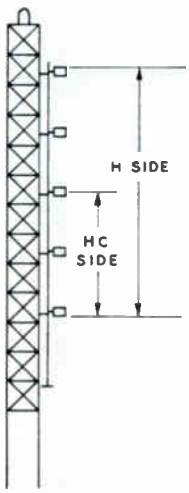
The type BFC-8B through BFC-16B Antennas are center fed through a matching tee and the lower and top radiators terminate mechanically in pressurized caps.

Mounting Dimensions and Feed Line Locations, BFC Series FM Antennas.

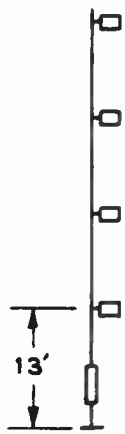
(See Table on opposite page)



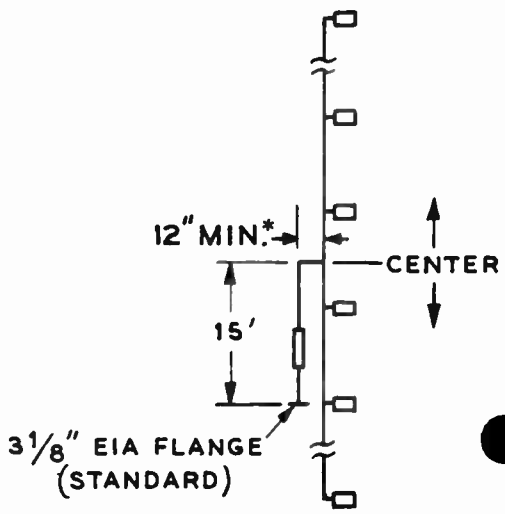
Pole Mounting



Side Mounting



End Feed 1-7 Sections



Center Feed 8-16 Sections

* Can be made to dimension desired to bring input line to correct support position.

Specifications

ELECTRICAL DATA											
RCA Type	Gain						Field Intensity[1]	Power Rating[2]			
	Horizontal			Vertical				With Radomes		Without Radomes	
	Power	dB	Field	Power	dB	Field		kW	dBk	kW	dBk
BFC-1B	0.46	–3.37	0.678	0.46	–3.37	0.678	93.2	10.0	10.0	4.0	6.02
BFC-2B	1.0	0	1.0	1.0	0	1.0	137.5	20.0	13.01	8.0	9.03
BFC-3B	1.5	1.76	1.23	1.5	1.76	1.23	168.4	30.0	14.77	12.0	10.79
BFC-4B	2.1	3.22	1.45	2.1	3.22	1.45	199.2	40.0	16.02	16.0	12.04
BFC-5B	2.7	4.31	1.64	2.7	4.31	1.64	225.2	40.0	16.02	20.0	13.01
BFC-6B	3.2	5.05	1.79	3.2	5.05	1.79	246.0	40.0	16.02	24.0	13.80
BFC-7B	3.8	5.80	1.95	3.8	5.80	1.95	268.0	40.0	16.02	28.0	14.47
BFC-8B	4.3	6.34	2.07	4.3	6.34	2.07	285.2	40.0	16.02	32.0	15.05
BFC-10B	5.5	7.40	2.35	5.5	7.40	2.35	322.4	40.0	16.02	40.0	16.02
BFC-12B	6.6	8.20	2.57	6.6	8.20	2.57	353.2	40.0	16.02	40.0	16.02
BFC-14B	7.8	8.92	2.79	7.8	8.92	2.79	383.9	40.0	16.02	40.0	16.02
BFC-16B	8.9	9.49	2.98	8.9	9.49	2.98	410.2	40.0	16.02	40.0	16.02

MECHANICAL DATA								
	Dimension in Feet					Windload at 50/33 PSF		
Freq.[3] MHz	Hc Top	Hc Side	H Top	H Side		Less De-Icers	With De-Icers	With Radomes
88	5.0	.60	5.8	1.4		178	198	332
98	5.0	.60	5.8	1.4		178	198	332
108	5.0	.60	5.8	1.4		178	198	332
88	10.6	6.2	17.0	12.5		337	377	645
98	10.0	5.6	15.8	11.4		327	367	635
108	9.5	5.1	14.9	10.4		319	359	627
88	16.2	11.8	28.1	23.7		495	555	957
98	15.0	10.6	25.8	21.4		475	535	937
108	14.1	9.7	24.0	19.5		459	519	921
88	21.7	17.3	39.3	34.8		653	723	1269
98	20.0	15.6	35.9	31.4		623	703	1239
108	18.6	14.2	33.1	28.6		599	679	1215
88	27.3	22.9	50.4	46.0		810	911	1581
98	25.0	20.6	45.9	41.4		791	871	1541
108	23.2	18.8	42.2	37.7		763	839	1510
88	32.9	28.5	61.6	57.1		970	1090	1874
98	30.0	25.6	55.9	51.4		920	1040	1824
108	27.7	23.3	51.2	46.8		882	1000	1784
88	38.5	34.1	72.7	68.3		1128	1268	2183
98	35.1	30.7	65.9	61.5		1068	1208	2123
108	32.3	27.9	60.3	55.9		1020	1160	2075
88	44.0	39.6	83.9	79.4		1308	1468	2514
98	40.1	35.7	75.9	71.5		1238	1398	2454
108	36.8	32.4	69.4	68.0		1182	1342	2390
88	55.2	50.8	106.2	101.7		1625	1875	3165
98	50.1	45.7	96.0	91.5		1535	1735	3075
108	45.9	41.5	87.6	83.2		1483	1663	3003
88	66.4	62.0	128.5	124.0		1942	2182	3790
98	60.1	55.7	116.0	111.5		1832	2072	3680
108	55.0	50.6	105.8	101.3		1744	1984	3592
88	77.5	73.1	150.8	146.4		2258	2538	4414
98	70.1	65.7	136.0	131.6		2128	2408	4284
108	64.1	59.7	124.0	119.5		2088	2304	4244
88	88.7	84.3	173.1	168.7		2575	2895	5039
98	80.1	75.7	156.1	151.6		2425	2745	4889
108	73.2	68.8	142.1	137.7		2205	2625	4669

[1] Effective free space field intensity at one mile in mV/m for one kilowatt antenna input power for either equivalent horizontally polarized component or equivalent vertically polarized component.

[2] Based on a 40° C. ambient. Multiply values by 0.8 for 50° C. ambient. BFC-5 and larger antennas with higher power input ratings can be made available on application.

[3] Interpolate for in-between frequencies.

Specifications

Electrical:

Frequency range ..... Factory tuned to any channel in the 88 to 108 MHz band

Polarization ..... Circular, clockwise

Power Gain (over dipole)

Horizontal Polarization: Approximately equal to half the number of sections stacked (see table)

Vertical Polarization: Approximately equal to half the number of sections stacked (see table)

Azimuthal Pattern

Horizontal Polarization: Circularity ±1.0 dB in free space

Vertical Polarization: Circularity ±1.0 dB in free space

VSWR at input (without field trimming)

Top Mounting ..... 1.2:1 or better

Side Mounting ..... 1.5:1 or better

VSWR at input (with field trimming)

Top or Side Mounting 1.1:1 or better can be achieved over entire 200 kHz channel

Input Connection ..... 3⅛", 50 Ohm EIA flange

Power Input Rating ..... See table

Mechanical:

Windload ..... 50 psf for flat surfaces: 33 psf for cylindrical surfaces (based on true extreme velocity of 110 mph. (see table of specific antenna windloads)

Section Dimensions:

Height ..... 20" (50.80 cm)

Diameter ..... 20.7" (52.58 cm)

Feed Point:

BFC-1B through BFC-7B ..... Approx. 13' below #1 radiator

BFC-8B through BFC-16B ..... Center fed

Feed point approx. 15' below center

Approximate Weight in Pounds:*

Type	Less Deicers	With Deicers	With Radome
BFC-1B	76	136	118
BFC-2B	137	257	221
BFC-3B	198	378	334
BFC-4B	259	499	427
BFC-5B	320	620	530
BFC-6B	381	741	633
BFC-7B	442	862	736
BFC-8B	513	993	849
BFC-10B	635	1235	1055
BFC-12B	757	1477	1261
BFC-14B	879	1719	1467
BFC-16B	1001	1961	1673

* Weight includes BFC Elements, Feed System to Input & Mounting Brackets (13" to 18" extension).

Ordering Information

Type BFC Circularly Polarized FM Antenna with standard support brackets for mounting on conventional towers (specify type or furnish tower drawings). Order by stock number as follows:

	Less Deicers	With Deicers	With Radomes
BFC-1B Single sec. FM antenna	ES-561921-A	ES-561921-B	ES-561921-C
BFC-2B Two sec. FM antenna	ES-561922-A	ES-561922-B	ES-561922-C
BFC-3B Three sec. FM antenna	ES-561923-A	ES-561923-B	ES-561923-C
BFC-4B Four sec. FM antenna	ES-561924-A	ES-561924-B	ES-561924-C
BFC-5B Five sec. FM antenna	ES-561925-A	ES-561925-B	ES-561925-C
BFC-6B Six sec. antenna	ES-561926-A	ES-561926-B	ES-561926-C
BFC-7B Seven sec. FM antenna	ES-561927-A	ES-561927-B	ES-561927-C
BFC-8B Eight sec. FM antenna	ES-561928-A	ES-561928-B	ES-561928-C
BFC-10B Ten sec. FM antenna	ES-561929-A	ES-561929-B	ES-561929-C
BFC-12B Twelve sec. FM antenna	ES-561930-A	ES-561930-B	ES-561930-C
BFC-14B Fourteen sec. FM antenna	ES-561931-A	ES-561931-B	ES-561931-C
BFC-16B Sixteen sec. FM antenna	ES-561932-A	ES-561932-B	ES-561932-C

Commercial Electronic Systems Division
Front and Cooper Streets, Camden, New Jersey, U.S.A. 08102

RCA Broadcast Equipment

- Latest modular design employing solid-state integrated circuits
- "Direct FM" modulation
- Excellent frequency response—low distortion and noise
- Simplified operation—easy to service
- Automatic muting of subcarrier
- Fully metered
- Off-frequency detector

RCA FM Exciter System, Type BTE-15A

Description

RCA's new FM Exciter Stereo System Type BTE-15A, with optional Stereo and SCA generator units provides on-air FM stations with an inexpensive means of broadcasting two or more services simultaneously over their regularly assigned broadcast channel. Stations can offer background music or other services while retaining presently scheduled FM mono or stereo broadcast programming. The use of the equipment for SCA and stereo is type accepted by the FCC.

The heart of the system is the new Type BTE-15A Exciter, an all solid-state unit utilizing integrated circuits, and employing RCA's "Direct FM" principle of operation. An important feature of the new exciter system is that it is fully metered using two meters to measure not only operating parameters but also modulating signals.

Stereophonic programming requires the use of an optional plug-in Stereo Generator, Type BTS-1B. One or two Type BTX-1B Subcarrier Generators permit one or two additional program channels to be transmitted along with the regular FM mono program channel. This is accomplished by transferring the subchannel programs into the supersonic frequency range and frequency modulating the subchannel program on 41-67 kHz subcarriers. The FM supersonic carriers are then used to modulate the RF carrier. When a BTS-1B Stereo Generator is switched into the system only one BTX-1B SCA Generator on 67 kHz can be used.

BTE-15A FM Exciter

Excellent monaural, stereo and SCA performance that more than meets industry and FCC standards are achieved by the new RCA modular, solid-state, "Direct FM" exciter. This exciter can be substituted directly for the BTE-10C Exciter in present BTF-1E1 or BTF-5/10/20E FM Transmitters and can be operated into either short circuit or open circuit without damage to the output transistor.

New design features include a modular design that plugs into a frame accommodating the Exciter, Power Supply and Switching, BTS-1B Stereo and one or two BTS-1B SCA Generator modules. When operating monaural only, the BTS-1B Stereo Generator is replaced with another module. The exciter frame is 19 inches wide and designed for standard rack mounting. A module extender is provided to permit easy servicing of modules outside the main frame.

BTE-15A FM Exciter.

Circuits

Modulation of the temperature compensated basic on-frequency oscillator is achieved by applying the composite stereo or SCA signals from the BTS-1B and BTX-1B Generators, respectively, to a pair of push-pull varicap diodes which are coupled to the basic oscillator frequency determining resonant circuit. The output of the basic oscillator is isolated from the following buffer amplifier by a 10 dB resistive attenuator. Thus, the stability and modulation characteristics of the basic direct FM oscillator are not disturbed by the following RF power amplifiers.

The output of the buffer amplifier, approximately 500 mW, is used to drive the 15-Watt, three-stage RF amplifier as well as the binary divider chain in the AFC circuit. The basic oscillator, buffer amplifier, and AFC circuit are mounted inside a shielded enclosure. The RF power amplifier is also completely shielded.

Automatic frequency control (AFC) for the on-frequency basic oscillator is achieved by taking a sample of the buffer output frequency and dividing it by two, 14 times. A low-frequency reference crystal operating at 1/1024th of the desired output frequency is also frequency divided by 16 in a binary chain. Integrated circuits operating in the saturated mode are used in both binary dividing chains. The outputs from the reference and basic oscillator binary dividers are phase compared in a time-sharing IC comparator. The output of the circuit, which represents the AFC error voltage, is filtered and applied to another pair of varicap diodes coupled to the basic oscillator tuned circuit. Thus, the basic oscillator is phase locked to the 1024th harmonic of the oven controlled reference crystal.

An off-frequency detector is incorporated in the design of the BTE-15A FM Exciter. When the basic oscillator frequency is not phase locked to the reference crystal, an AC component appears at the AFC output. This voltage is rectified to operate a relay whose contacts can be used to turn off the FM transmitter.

Two multimeters are located on the hinged door in front of the regulated power supply section. One of these meters is used to indicate power supply and operating voltages within the exciter and 15-Watt RF Amplifier. The second meter is a peak-reading voltmeter that is used to indicate key modulating signals.

The RF power output of the BTE-15A can be continuously adjusted from the front panel control from 7 to 15 Watts. The primary power is turned on with a circuit breaker. RF output is turned on with a front panel switch or by jumping contacts available on the rear of the unit. The exciter will tolerate load mismatches from short circuit to open circuit without damaging the output transistor. Another safety feature prevents turning on the 41 kHz SCA subcarrier when the BTS-1B Stereo Generator is in the stereo mode.

BTS-1B Stereo Generator

In the Model BTS-1B Stereo Generator, latest techniques have been employed to obtain the finest possible stereo operation. The LEFT and RIGHT input channels are identical, each having resistive input terminations, isolating transformers, 15-kHz low-pass filters, and an operational amplifier for obtaining pre-emphasis. The pre-emphasis is convertible from 75 to 50 microseconds in the field, or can be removed entirely. The LEFT and RIGHT channels can be matched to within ½ percent gain difference and ½ degree phase difference from 30 to 15,000 Hz, including the 15-kHz low-pass filters. These filters are less than 0.5 dB down at 15-kHz, and greater than 50 dB down at 19 kHz and above. This insures an absolute minimum of disturbance to the pilot carrier and subcarrier regions by the program material.

The pre-emphasized and filtered LEFT and RIGHT audio signals are applied to a switching modulator which alternately switches between the two audio channels. The balanced and symmetrical 38-kHz switching signal is derived from a buffered 38-kHz output of a bi-stable multivibrator. The negligible amount of second harmonic (76 kHz) in the 38 kHz switching signal assures a minimum of interference to a 67 kHz SCA channel. The 76 kHz crystal-controlled signal driving the binary divider assures a frequency stable 38-kHz stereo subcarrier.

The output of the switching modulator, along with the sinusoidal pilot (less than 1 percent distortion) is applied to a phase linear filter to remove the third and all higher order harmonic components of the switching signal. The complete composite stereo signal, or a LEFT or RIGHT monaural signal, is selected by relays and applied to the input of an operational amplifier. The output of this amplifier is then applied to the wide-band input of the BTE-15A FM Exciter.

Switching between monaural right, monaural left, or stereo may be accomplished by front panel pushbuttons on

the BTS-1B or by momentary remote control contact closures. The selected mode is indicated by front panel lamps. Left, Right and Composite program outputs are also applied to a peak reading meter on the main frame of the BTE-15A FM Exciter.

BTX-1B SCA Generator

The Model BTX-1B SCA Generator, using all hermetically sealed metal cased integrated circuits and transistors, is a high performance unit designed to operate on either the 41-kHz or 67-kHz SCA channels. The audio input is applied to a resistive terminating pad and then to an isolating transformer before being amplified. An accessory 5-kHz low-pass filter must be inserted in the input to prevent higher order lower sidebands of the 67-kHz subcarrier from penetrating the upper regions of the stereophonic spectrum.

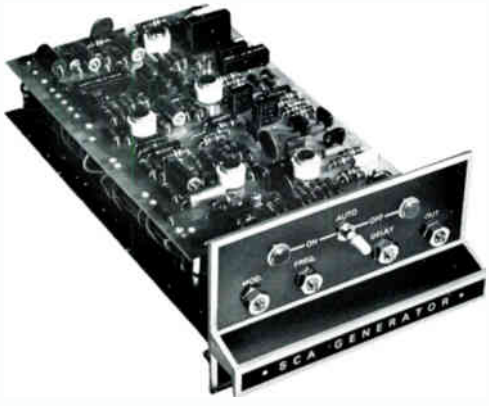
The audio amplifier includes an active pre-emphasis network outdating earlier passive schemes, and may be easily changed from 75 microsecond to 50 or 150 microsecond or adjusted for a flat response. The audio sensitivity of the BTX-1B is sufficiently high that line amplifiers are not required.

The processed audio input signal is then applied as modulation to a direct FM SCA generator, that includes a temperature compensating circuit for extreme frequency stability. A vernier center frequency control is available on the front panel.

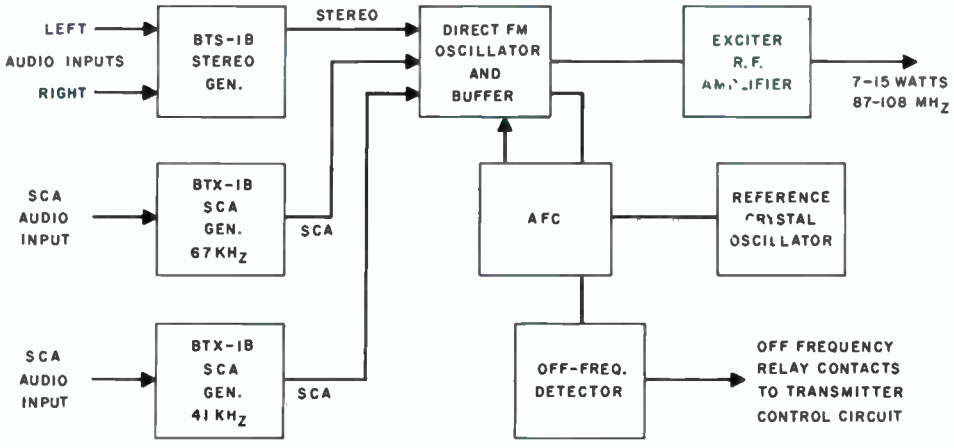
Following this generator is a series diode muting gate, a buffer amplifier, and a wide-band low-pass filter to remove subcarrier harmonics. The total harmonic content of the subcarrier output is less than 1 percent and the incidental AM is less than 5 percent peak with 10 percent subcarrier modulation. The output of the low-pass filter is applied to another buffer amplifier and output level control for application to the multiplex input of the BTE-15A FM Exciter.

A sample of the pre-emphasized audio is used to drive a peak reading multimeter on the main frame of the BTE-15A. Automatic muting of the subcarrier is accomplished in the following manner. A portion of the pre-emphasized audio is applied to a variable gain amplifier and using an adjustable time constant, peak detected to operate a Schmitt trigger circuit. The output of the Schmitt trigger is shaped with a low-pass filter and used to turn on or off the series diode muting gate. When audio is applied to the input of the BTX-1B, the muting diode gate is turned on to allow the subcarrier output to appear. In the absence of audio, the Schmitt trigger pauses for a selected time interval before turning off the diode muting gate. The subcarrier envelope rise and fall times are constant and so chosen to minimize "clicks and pops" in a SCA multiplex receiver. The amount of Schmitt trigger delay is adjustable with a front panel control. With this control, subcarrier muting can be adjusted to occur from 0.5 to 5 seconds after the audio input is removed. Two transistors are used to operate front panel lamps to indicate the on-off status of the subcarrier. Also, a front panel switch provides manual control of the subcarrier output, or the use of the automatic muting feature. The subcarrier also can be turned on or off remotely.

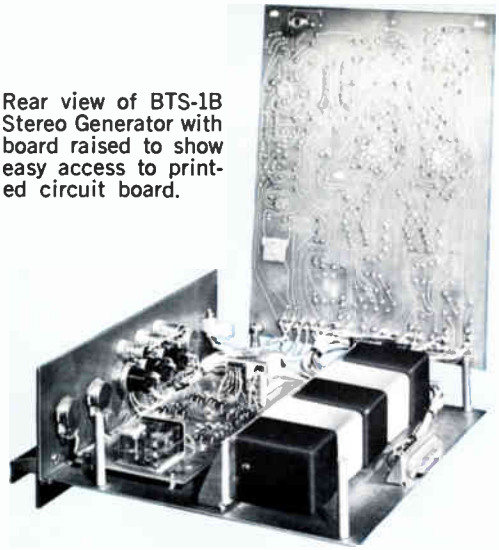
BTS-1B Stereo Generator.



BTX-1B SCA Generator.



BTE-15A System.



Rear view of BTS-1B Stereo Generator with board raised to show easy access to printed circuit board.

Specifications

TYPE BTE-15A EXCITER

Performance

Type of Emission	F3-F9
Frequency Range	87-108 MHz
Power Output	15 Watts
Output Impedance (BNC Connector)	50 Ohms
Frequency Deviation for 100% Modulation	±75 kHz
Modulation Capability	±125 kHz
Carrier Frequency Stability	±1000 Hz
Audio Input Impedance	600/150 Ohm resistive
Audio Input Level (100% Modulation)	+10 ±2 dBm at 400 Hz
Audio Frequency Response: 50 Hz-10 kHz—pre-emphasis 75 µs	±0.5 dB max.
10 kHz-15 kHz—pre-emphasis 75 µs	±1.0 dB max.
Pre-emphasis Network Time Constant	75 or 50 µsec. as desired
Harmonic Distortion (50 Hz-15 kHz)	0.5% max.
FM Noise Level (referred to 100% FM mod. at 400 Hz)	−68 dB max.
AM Noise Level (referred to carrier voltage)	−60 dB max.

Electrical

Power Line Requirements:

Exciter:

Line	240/208 or 117 V, AC, 50/60 Hz, single phase
Slow Voltage Variations	±5%
Power Consumption (Including Stereo & SCA)	80 Watts max.

Mechanical

Overall Dimensions	19" wide, 10½" high, 9" deep
Weight	40 lbs.
Maximum Altitude	7500 ft.
Ambient Temperature Range	−20°C to +60°C
Finish	Black Background with Aluminum Epoxy Trim

STEREO SUBCARRIER GENERATOR, TYPE BTS-1B

Performance

Pilot Carrier Stability	19 kHz ±1 Hz
Subcarrier Suppression	−45 dB or better
Frequency Response, 30-10 kHz	±0.5 dB max.
Frequency Response, 10 kHz-15 kHz	±1.0 dB max.
Pre-emphasis	75 or 50 µsec.
Left-Right Channel Separation	35 dB or better
Crosstalk-Stereophonic (main channel to subchannel)	45 dB
Crosstalk (subchannel to main channel)	45 dB
Harmonic Distortion (100% modulation by composite stereo)	1% or less

Mechanical

Obtains power from BTE-15A
Plugs into BTE-15A Exciter
41 kHz SCA Lockout when using Stereo
Stereo-Mono Remote Switching—Either Left or Right Channel can be Remotely Switched to give Mono Operation

TYPE BTX-1B SUBCARRIER GENERATOR

Performance

Type of Modulation	FM
Center Frequency Range of Subcarrier	30 kHz to 75 kHz
Output Voltage	4.0 Volts RMS into 10K Ohms
Frequency Deviation (100% subcarrier modulation)	±10% of center frequency
Modulation Capability	±15% of center frequency
Carrier Frequency Stability	±0.2%
Audio Input Impedance	600 Ohms bal.
Audio Input Level (100% modulation)	−15 to +10 dBm adjustable
Audio Frequency Response (30 Hz-10 kHz)*	±1 dB†
Harmonic Distortion (50 Hz-10 kHz)	Less than 1%†
FM Noise Level (referred to 100% modulation)	−65 dB max.
AM Noise Level (referred to carrier)	−50 dB max.

*50 or 150 µs pre-emphasis optional
†Without low pass filter, measured on a wideband detector.

Mechanical

Plugs into BTE-15A Exciter
Obtains Power from BTE-15A Exciter

All specifications subject to change without notice.

Ordering Information

Main Frame for FM Exciter/Stereo/SCA (Includes integral Power Supply and Metering)	MI-560710
Main Frame for Stereo (Includes integral Power Supply)	MI-560711
Main Frame for SCA (Includes integral Power Supply)	MI-560720
BTE-15A FM Exciter	MI-560712
BTS-1B Stereo Generator	MI-560713
BTX-1B SCA Generator (Specify SCA Frequency)	MI-560714
Blank Panel (To replace BTX-1B SCA)	MI-560715
Monaural Input Adapter (Replaces BTS-1B Stereo Generator)	MI-560716
Oven with Crystal for BTE-15A Exciter (Specify operating Frequency)	MI-560717
Recommended Spare RF Transistors	MI-560718
Module Extender	MI-560719
5 kHz Low Pass Filter (for SCA)	MI-560721

Commercial Electronic Systems Division
Front and Cooper Streets, Camden, New Jersey, U.S.A. 08102

RCA Broadcast Equipment

- **Economical—combines functions of sideband filter and diplexer**
- **Suitable for color transmission**
- **Insertion loss less than ½ dB at both the visual and aural carrier frequency**
- **Pretuned—no adjustments necessary**
- **TV power rating from 1 to 30 kW**
- **Invar temperature compensation**
- **Constant input impedance**

UHF Filterplexers

Description

The RCA UHF Filterplexers connect the aural and visual transmitters to a common antenna feedline with negligible interaction or crosstalk, and shape the transmitter frequency response to conform to vestigial sideband television transmission standards. Power ratings from 1 to 30 kilowatts can be achieved by the three units offered.

All the filterplexers are assembled on an open frame. This provides maximum ventilation and is suitable for convenient table, floor or ceiling mounting. The filterplexers should be mounted upright on their base and a clearance of at least one foot should be allowed from surrounding walls. The units are ruggedly constructed and employ Invar for temperature compensation.

RCA Filterplexers consist essentially of two bridge-baluns connected to two equal lengths of interconnecting coaxial transmission line and filter circuits (cavities) on each of the two interconnecting coaxial lines. The units are pressurized as shown under specifications with nitrogen or sulphur hexafluoride gas to prevent deterioration and reduce changes in tuning.

The filterplexers combine the high quality performance characteristics of both a sideband filter and a diplexer. The vestigial sideband characteristics are obtained by having the lower sideband frequencies attenuated to more than 20 dB from the low edge of the channel (1.25 megahertz) to 4.25 megahertz below the picture carrier. The inputs are designed to have a constant input impedance over the band of frequencies produced.

Channel frequency must be specified when ordering the unit. The size of the filterplexer is determined by the frequency. The minimum dimensions (equipments supplied for 890 megahertz) and maximum dimensions (units supplied for 470 megahertz) are shown in the specifications under dimensions. Units used on other frequencies vary in size between these two extremes. A blower kit is included with each filterplexer to cool the coaxial and spherical cavities.

Specifications

Description	MI-19086-HM	MI-19086-J	MI-19086-F
Frequency	470-890 MHz	470-890 MHz	470-890 MHz
Power Rating (Peak Visual)	2 kW	12.5 kW	30 kW
Visual to Aural ratio	25% or less	25% or less	25% or less
Minimum Efficiency (visual but not aural losses are included in transmitter peak power rating):			
Aural	90% (0.46 dB loss)	90% (0.46 dB loss)	90% (0.46 dB loss)
Visual	90% (0.46 dB loss)	90% (0.46 dB loss)	90% (0.46 dB loss)
Output Impedance	50 ohms	50 ohms	75 ohms
Input Impedance (aural and visual)	50 ohms	50 ohms	50 ohms
Maximum Visual Input VSWR (Referred to visual carrier frequency):			
−4.5 MHz to −1.25 MHz	1.3/1	1.3/1	1.3/1
−1.25 MHz to +4.2 MHz	1.15/1	1.15/1	1.15/1
+4.2 MHz to +4.5 MHz	1.3/1	1.3/1	1.3/1
Maximum Aural Input VSWR (Referred to visual carrier frequency):			
4.5 MHz to ±100 kHz	1.3/1	1.3/1	1.3/1
Maximum Ambient Temperature	45°C	45°C	45°C
Minimum Ambient Temperature	15°C	15°C	15°C
Gas	Nitrogen	Sulphur hexafluoride	Sulphur hexafluoride
Gas Pressure	12 psi	24 psi	28 psi
Blower Line Requirements	230 V, 1 ph, 50/60 Hz	230 V, 1 ph, 50/60 Hz	230 V, 1 ph, 50/60 Hz
Dimensions Overall (approx.)			
Length	68 to 74 inches 1.73 to 1.88 m	68 to 74 inches 1.73 to 1.88 m	76 to 87 inches 1.93 to 2.21 m
Width	38 to 48 inches 0.97 to 1.22 m	38 to 48 inches 0.97 to 1.22 m	38 to 48 inches 0.97 to 1.22 m
Height	36 to 43 inches 0.91 to 1.09 m	36 to 43 inches 0.91 to 1.09 m	49 to 58 inches 1.24 to 1.47 m
Mounting	Upright; table or ceiling	Upright; table or ceiling	Upright; table or ceiling
Connections:			
Input (aural and visual)	3⅛", 50 ohm flanged (MI-19089)	3⅛", 50 ohm flanged (MI-19089)	3⅛", 50 ohm flanged (MI-19089)
Output	3⅛", 50 ohm flanged (MI-19089)	3⅛", 50 ohm flanged (MI-19089)	6⅛", 75 ohm flanged (MI-19387)
Weight (approx.)	950 lbs. 435 kg	950 lbs. 435 kg	1000 lbs. 455 kg

Ordering Information

2 kW Filterplexer, nitrogen gassed 12 psi, with blower, 80 Watt reject load MI-19086-HM*

12.5 kW Filterplexer, SF6 gassed 24 psi, with blower, 1200 Watt reject load MI-19086-J

30 kW Filterplexer, SF6 gassed 28 psi, with blower, 1200 Watt reject load MI-19086-F

* Specify channel frequency when ordering.

RADIO CORPORATION OF AMERICA

PRINTED IN U.S.A.

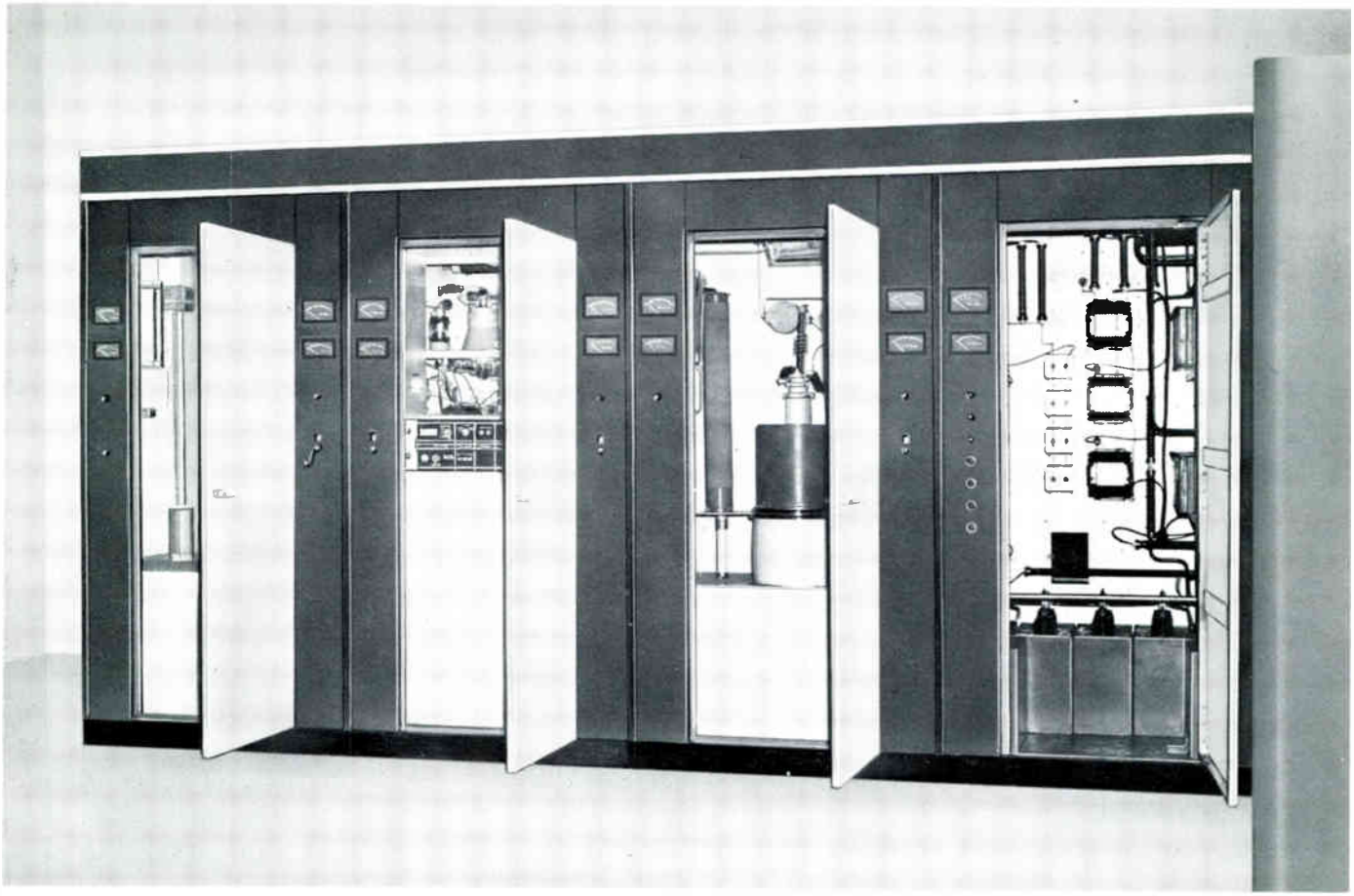
BROADCAST AND COMMUNICATIONS PRODUCTS DIVISION, CAMDEN, N. J. 08102 • RCA INTERNATIONAL DIVISION, CENTRAL and TERMINAL AVENUES, CLARK, NEW JERSEY, U.S.A. 07066

catalog B.6050

RCA 50 KW "Ampliphase" AM Transmitter, Type BTA-50J

- Excellent audio quality
- Wide range frequency response
- Only six tubes in transmitting circuits
- Proven stability
- Designed for remote control
- Over 110 percent positive modulation capability

3TB



Compact in-line construction of BTA-50J showing left to right, left hand power amplifier, exciter, right hand power amplifier, and rectifier-control cubicle.

Description

The RCA Type BTA-50J AM Broadcast Transmitter is a completely air-cooled, 50-kW phase-to-amplitude modulated transmitter designed for high fidelity transmission in the standard broadcast band (535 kHz to 1620 kHz). It provides a signal containing exceptionally low distortion and extended frequency response. Measured response is flat within ±3 dB from 35 Hz to 25,000 Hz. The equipment is capable of being modulated over the frequency range of 10 Hz to 30,000 Hz. Frequency response has been extended largely through the elimination of unnecessary transformers in the audio system as well as improved circuitry.

Low harmonic distortion with negligible carrier shift at maximum signal output has been achieved in the BTA-50J by selection of adequate power tube types and advanced solid state circuits in the exciter-modulator-drive regulator design throughout the entire equipment. The design features an inherently linear system capable of continuous high modulation levels impervious to inadvertent overmodulation. For example, the transmitter may be modulated 100 percent at any frequency between 30 and 15,000 Hz continuously for many hours without detrimental effects to any of the component parts. A small amount of overall feedback is incorporated to provide the exceptional performance. With the feedback circuit removed, the BTA-50J will still meet the FCC specifications for audio frequency response, harmonic distortion and noise.

Lowest Operating Cost in 50-KW Transmitters

A number of new refinements as well as time tested features which have proven their worth are incorporated in RCA's latest 50-kW transmitter. Power requirements are moderate for the equipment. Power amplifier plate efficiency of the order of 76 to 80 percent is obtained. Total power consumption for 50-kW carrier power will run approximately 94 kW, approximately 100 kW will be required for average levels of modulation, and approximately 130 kW will be required for 100 percent modulation.

Fewer major components, as compared to those required by many 50-kW transmitters, are used in the BTA-50J. In addition to the low cost of operation of the transmitter a Power Cutback Kit, MI-27688-B can be added which will permit operation at 10 kW.

Dual RF Chains

Two identical RF chains, each developing a power of 25 kW, are incorporated in this equipment. Since they are identi-

cal, servicing is made easy by comparison of the two chains. Components are directly interchangeable, which allows substitution for comparison purposes. All components are easily accessible which results in a minimum schedule for maintenance. In addition, fewer replacement parts are required for adequate protection against lost air time should a failure occur. Low power consumption, fewer major components and a reduced maintenance schedule make the BTA-50J operation cost the lowest in the 50-kW field.

Remote Control Operation

The transmitter has been designed with remote control operation in mind. Ready for use with standard RCA remote control equipment, all transmitter components and wiring are standard in the equipment for FCC required metering and control facilities. In addition, other optional metering and control facilities may be incorporated by utilizing components and wiring that is supplied with the equipment. Details relative to incorporating remote switching to an auxiliary transmitter, dummy load and auxiliary power supplies can be supplied according to the needs of the individual customer.

Lightweight Type 6697 Tubes in Final PA

One Type 6697 power amplifier tube is used in each of the two RF chains. Each amplifier tube is capable of delivering in excess of the normal 25 kW of modulated power to the common load. The Type 6697 is rated at 35 kW dissipation and under average modulation conditions it is only required to dissipate approximately 14 kW. Operation of the PA tubes so far below their maximum ratings assures the user of long tube life. In addition to providing long life, the 6697 is physically small in size and weighs only 29 pounds. One person, without the aid of mechanical assistance can quickly and easily replace any tube in the transmitter.

One Type 4CX5000A tube is used in each of the driver stages in the two RF chains. The 4CX5000A is also operated well below its maximum ratings and will give long trouble free service. The only other tubes used in the transmitter are the two 4-250A Intermediate Power Amplifier tubes. There are also four tubes in the monitor circuits. These are of the small, low cost variety. Tube complement is such that inventory cost for required spares is kept at a minimum while adequate protection to the broadcaster is maintained.

Solid State Rectifiers Used Throughout

All power supplies utilize solid state rectifiers. The plate supplies, bias supply and low voltage supply use silicon units which are very conservatively rated to assure long life. The current rating of the units is such that any conceivable load fault is cleared without jeopardizing the diode units. The use of solid state rectifiers permit the transmitter to operate in ambient temperatures as low as −20 degrees centigrade.

Meets FCC Harmonic Suppression

A completely shielded two section low pass filter is incorporated in the BTA-50J. It consists of one pi (π) section and one T section and each inductive series element is completely shielded. Two series-tuned, shunt-connected traps are used to provide added attenuation of the second harmonic.

Transmitter Equipment

Type BTA-50J AM Broadcast Transmitter consists of four equipment cabinets, two of which house the power amplifiers, one the exciter unit and the fourth cabinet the rectifier and control unit. The high-voltage reactor is housed in the lower rear compartment of the exciter cabinet, and the IHV plate transformer in the lower rear compartment of the rectifier and control cabinet.

Each of the four transmitter cabinets measure 44 inches wide by 60 inches deep by 84 inches high, and consists of an all aluminum cubicle erected on a welded steel base. This cubicle consists of a series of panels fabricated and assembled to form a rigid structure. The use of aluminum eliminates unnecessary weight and provides excellent shielding to assure effective confinement of spurious energy. Maximum accessibility to all transmitter components are afforded by 28-inch wide, full-length front doors, while rear access is through two covers attached with quick-disconnect fasteners for easy removal.

A center vertical panel separates the cabinet into a front compartment and rear compartment which is further divided by a rear horizontal shelf into upper and lower compartments, giving each cabinet three basic totally shielded compartments in which to mount the electrical components. The eye-level meters, pilot lights and interlocks, mounted on eight-inch wide panels flanking each of the front doors, are also shielded.

In the rear at the top of each cabinet there is a built-in wire duct which joins similar ducts of the adjacent cabinets to form a continuous duct on the four cabinets. This duct has a divider down the center on which the interconnection terminal boards are mounted. The rear half of the duct is used for interconnection wiring while the front half is used for internal cabinet wiring from the terminal boards. The internal wiring is carried through conduits to its destination in the cabinet thus shielding all power and control wiring from RF fields. Provision is also made at the top of the cabinets for the addition of an exhaust air duct.

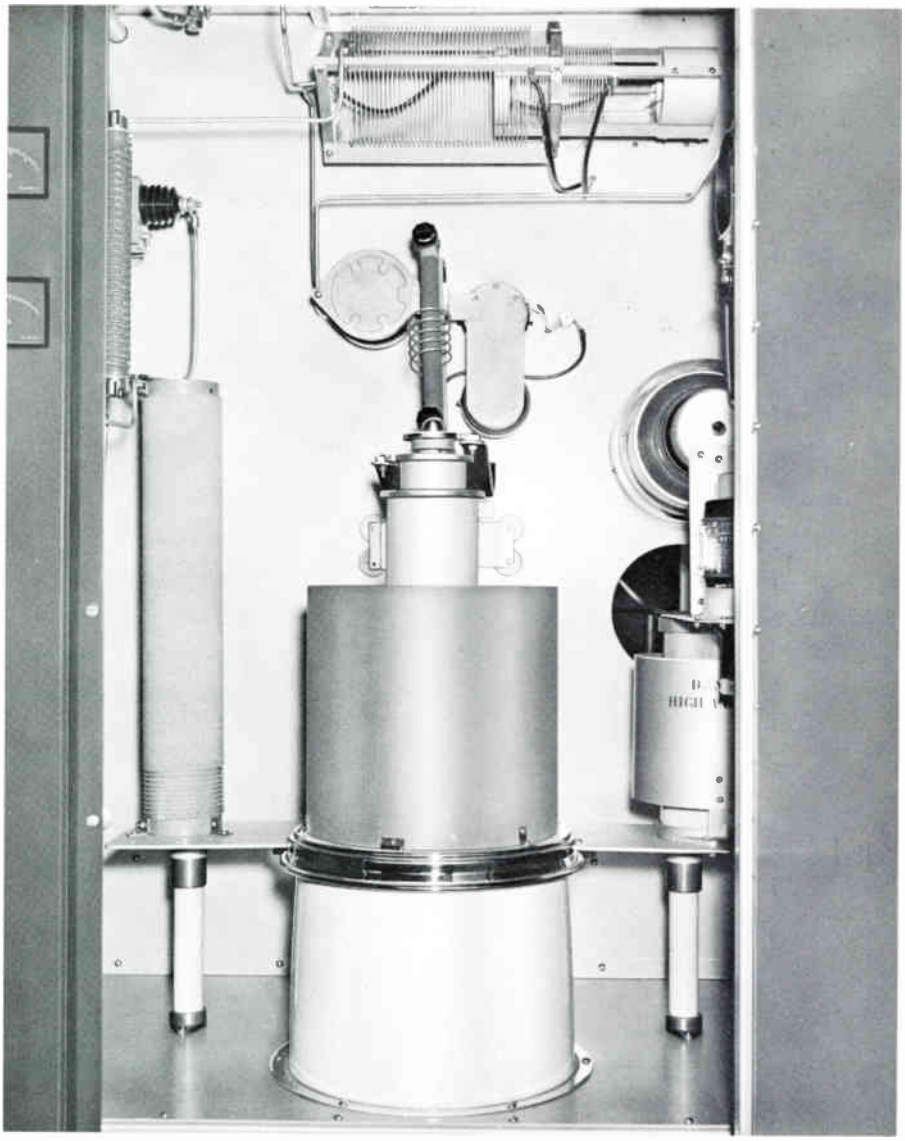
Power Amplifiers

The left end cabinet and the third cabinet from the left end are identical and contain the final power amplifier stages. The 6697 tube and its grid circuits and part of the plate circuits are contained in the front portion of the cabinet. The upper rear section contains the plate tank coil, filament transformer and grid leak resistors. The lower rear section contains a low noise blower which cools the 6697 tube and its cabinet and the adjacent half of the exciter cabinet. The two 6697 power amplifiers are designed to supply equal amounts of power to the output network. Because of the balanced dissipation in the two 6697 PA tubes, less air pressure with resultant lower air flow is required for adequate cooling of the power amplifier cubicles. The lower rear panel contains an impingement type air filter for the blower. The PA cabinets are constructed so that the blowers and filters can be mounted externally to the cabinets, if so desired.

Solid State Exciter-Modulator

Located directly between the two power amplifier units is a cabinet that houses in its front section all the solid state components from the oscillator through the driver stages. The separate branches are assembled as mirror images for symmetrical feed to the PA units at left and right. The rear cabinet section contains the 50 kW common output circuit, harmonic filter, and reflectometer protective circuits.

Above are two vertical sub-compartments behind interlocked doors which contain the 4-250 and 4CX5000A stages. A meter panel for these stages is located at the bottom of these sub-compartments.



Close-up view of one of the dual final power amplifier stages. The new type 6697 tube together with grid circuits and part of the plate circuits are readily accessible from the front of the transmitter.

The common output capacitors of the two PA tanks and the harmonic filter are located in the upper rear of the cabinet. Sub-partitions are so arranged in this section that complete isolation and shielding is effected between the various sections of the filter and the output capacitor. The lower rear section of this cabinet contains high voltage filter reactor and driver DC filament supplies.

Provisions for Standby Operation

Space is provided in the exciter-modulator cabinet for the mounting of a second exciter-modulator unit. Each of the modulator-exciter units are complete and arranged so that either may be selected instantly by means of cutover switches. Thus while modulator #1 is in operation, modulator #2 is in standby condition. These provisions with the extreme reliability designed into the high power stages essentially provides a second 50-kW transmitter for standby service.

Rectifier and Control Unit

The right hand cabinet contains the high power rectifiers, low power distribution components, and the majority of the control components. The front of the cabinet contains the solid state 15-kV, 5-kV, and low-voltage bias supplies. Also included here are the high voltage grounding switches and the 15-kV filter capacitors. The top rear section of the cabinet contains the control relays, overload relays, distribution contactors, and the low power distribution circuit breakers. The distribution breakers and overload relays are readily accessible, even though recessed so that they will not be damaged or improperly operated. The bottom rear of the cabinet contains the 5-kV rectifier components including plate transformer.

The PA output circuit is a conventional pi-network type of tank circuit. Each tube has its own tank circuit, with a common output shunt element. Each network is adjusted to provide the proper load to the power amplifiers.

Drive Regulator

The drive regulator samples the audio signal, amplifies it, and applies a desired value to the grids of the second IPA, providing adequate drive to the final amplifiers as required by the level of audio input applied to the equipment. This technique contributes considerably to the overall linearity during modulation.

During periods of 100 percent modulation, the 6697 power amplifier tubes require 15-kV DC at 7.5 Amperes, which is obtained by using RCA silicon power rectifiers in a three phase full wave rectifier circuit. Two other plate voltages, 5-kV and 1-kV, are provided by separate silicon supplies. Bias voltages for all tubes are supplied by an additional supply. The high power distribution equipment for the transmitter consists of an electrically operated air circuit breaker, and a manually operated delta-wye switch for the 15-kV rectifier. The remaining transmitter power is distributed through a manually operated distribution circuit breaker to a 460 to 230-Volt distribution transformer to voltage regulators and thence to the various low power distribution circuit breakers.

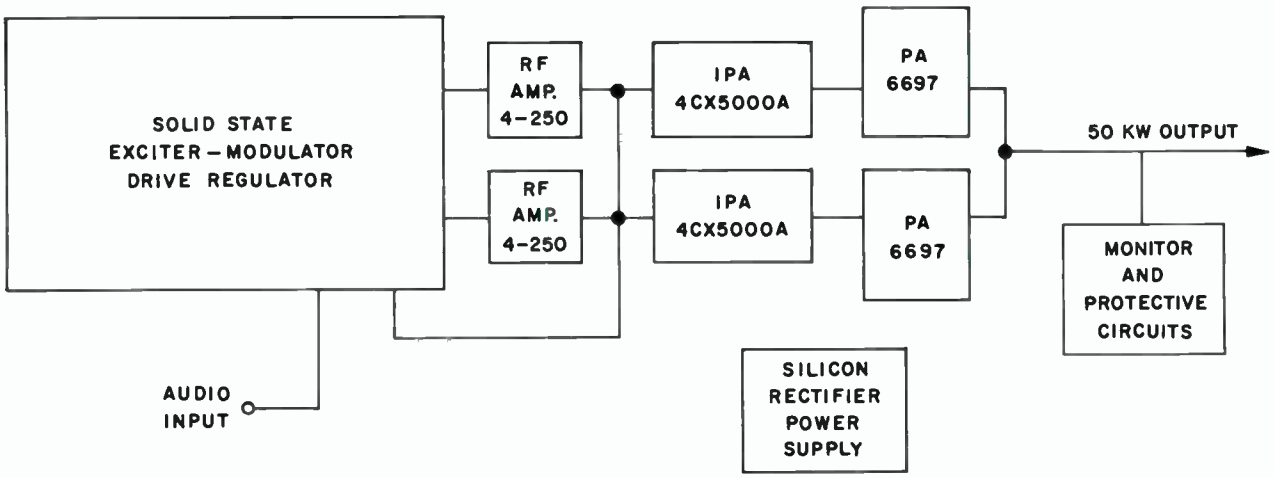
Transmitter Control

Control circuits in the BTA-50J contain a number of features which are designed to provide maximum flexibility in control, protection and operation. Among these are choice of single-button or step-by-step starting, automatic timing and sequencing of starting operations, and location of transmitter faults by a system of indicators. Protection of the operator is achieved by a system of interlocking grounding devices; protection of the equipment by conventional relays and circuit breakers.

There are provisions for the protection of the equipment against transmission line irregularities and air failure. A reflectometer is incorporated in the BTA-50J that is sensitive to the changes in voltage to current ratio on the output transmission line to the antenna. A great change in transmitter load acts to remove the carrier by removing drive momentarily to allow any RF fault to clear. If, however, the fault persists after removing carrier several times, the plate power is automatically removed.

Control of the transmitter is accomplished from the front of the rectifier and control cabinet. All necessary wiring to allow control from a remote location or console has been provided. Lamps which show the status of the transmitter control circuits are also mounted on the front of this cabinet. The control ladder is arranged and interlocked so that the BTA-50J can either be turned on by operating the control switches in sequence or by leaving all control switches in the ON position with the exception of the start switch, which when operated to the ON position allows the transmitter to automatically come on.

Upper rear of exciter portion of the BTA-50J showing the combining and output networks.



Simplified block diagram of the BTA-50J.

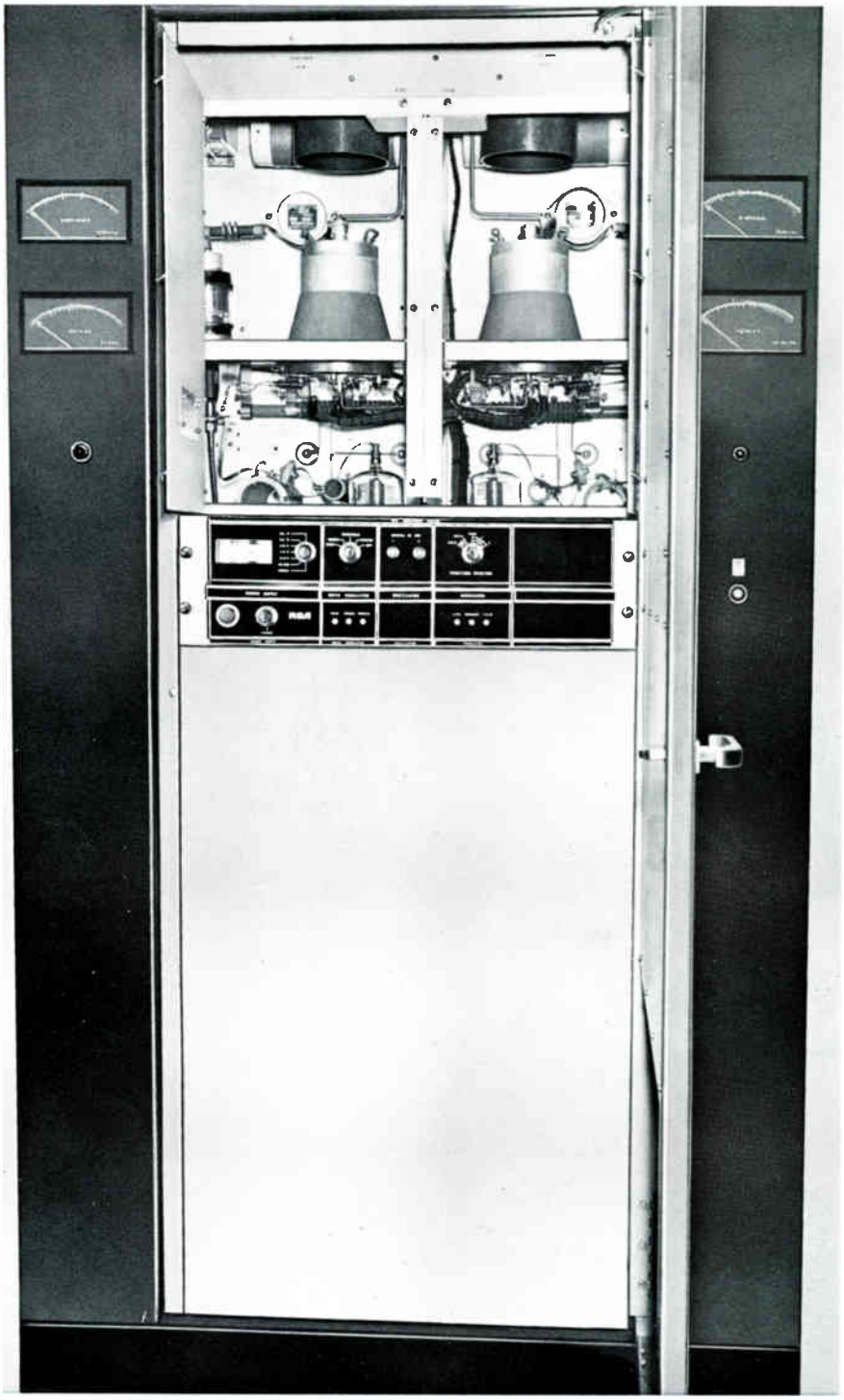
The two types of overload circuits used in this transmitter are the current type, instantaneous or time delay, that are connected directly in the tube circuit and rectifier ground leads, and the thermal magnetic circuit breakers connected in the AC power leads used as back up protection and disconnect switches. The transmitter circuitry is arranged so that an overload will either lock out the plate circuit or allow a single reclosure that will reset if there are no further overloads. In either case, when a lockout position has been reached, the transmitter can be reset by means of an overload reset control. The principal overload relays have indicating flags so that even after the overload has been cleared there is a record of which overload has operated. Another feature of the control circuit is provision of indication lamps on each cabinet that indicate the status of the interlock in that particular cabinet.

Installation and Layout

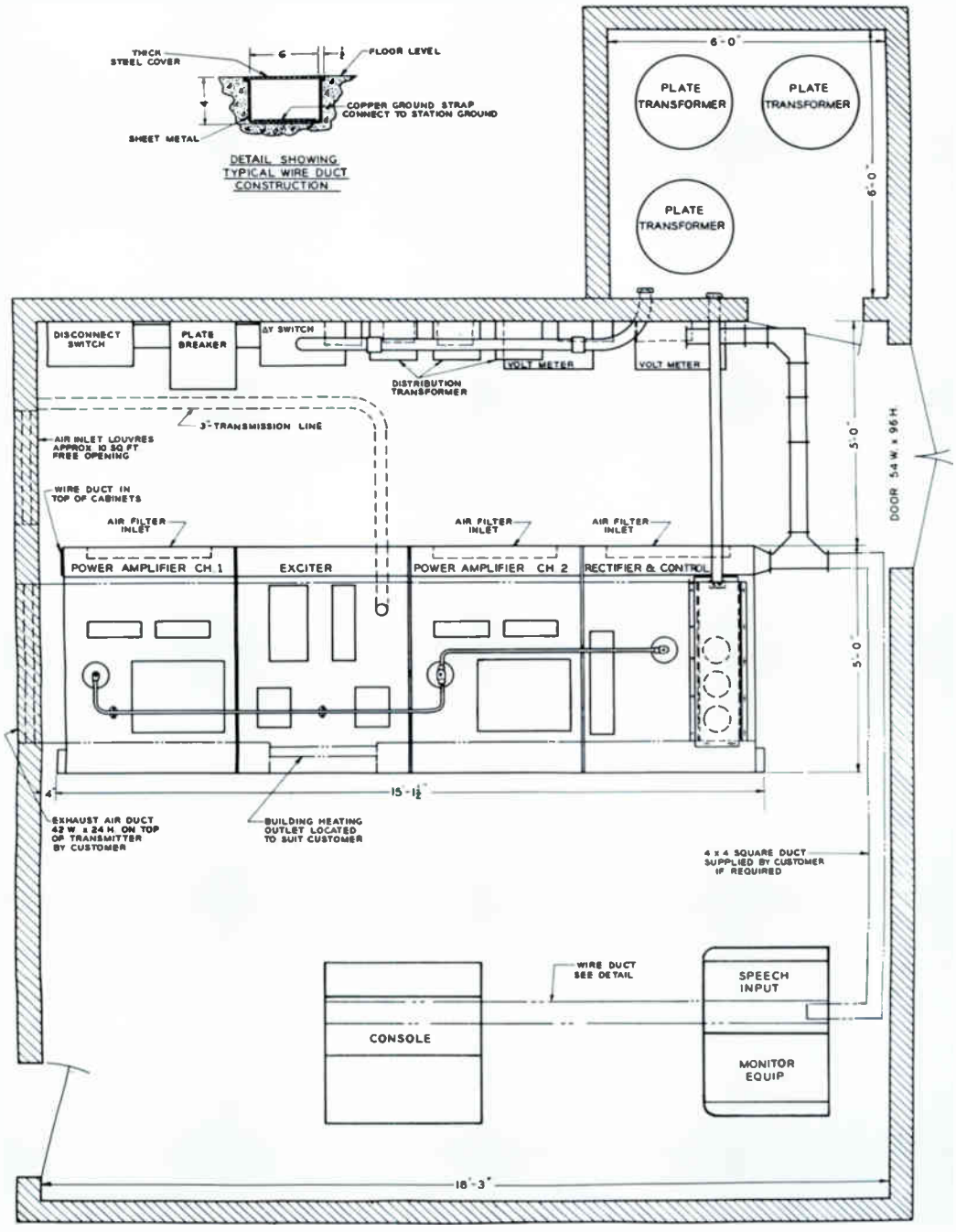
Outstanding features of the BTA-50J are the small floor space requirements and ease of installation of the transmitter. In general, the transmitter layout consists of three basic parts: the four in-line cabinets which contain the major part of the transmitter; the wall mounted switchgear components; and the main plate transformers. The floor plan illustrates a typical layout of the complete equipment. Elimination of the need for under-floor cable trenches and considerable reduction in external air ducts, simplifies installation and reduces costs.

As shown in the layout, it is desirable to leave a passageway at the right end of the frontline cabinets since the circuit breakers and overload relays are most accessible from this end of the transmitter. The layout of the front line cabinets is such that a common exhaust duct can be used to carry off heated air from the transmitter.

Wall mounting as shown on the overall floor plan is suggested to make the BTA-50J most adaptable to existing transmitter buildings. The mounting of these components, however, is not critical as to location. They can be mounted in existing power distribution areas if desired. These components include the main plate circuit breaker, a delta-wye switch, a distribution circuit breaker, a 460 to 230-Volt bank of distribution transformers, and two single phase open delta connected regulators with their control panels. These components are wired through conduit and overhead ductwork to the main plate transformers and the transmitter cabinets.



Front section of the exciter-modulator containing all components from oscillator through the driver stages.



Typical floor plan for the BTA-50J Transmitter.

Specifications

General

Power Line Requirements:
Line ..... 460 Volts, 50/60 Hertz, 3 phase
Combined Regulation and Variation .... Not more than ±5%

Power Consumption ..... 94 kW (approx.) at zero modulation

Power Consumption .... 100 kW (approx.) at average modulation

Power Factor ..... Better than 90%

Crystal Heaters ..... 110 Volts

Type of Emission A3

Power Output (at transmitter terminals) ..... 56 kW (max.)

Frequency ..... Any specified between 535 and 1620 kHz

Frequency Stability ..... Assigned frequency ±5 Hertz

Type Modulation ..... Phase to amplitude

AF Input Impedance ..... 150/600 Ohms

Audio Input Level ..... +10 ±2 dBm

Audio Response ..... ±1.5 dB 30–10,000 Hz

AF Distortion ..... Less than 3% RMS 50–7500 Hz

Noise Level ..... 60 dB below 100% modulation

Carrier Shift ..... Less than 5% neg. 100% modulation

Type Output ..... Unbalanced

Output Impedance ..... 51.5 Ohms or others specified

Spurious Emission (2nd Harmonic and above) .... 83 dB down

Mechanical

Cabinet Size ..... 44" wide, 84" high, 63" deep
(111.8 cm wide, 213.4 cm high, 160 cm deep)

Overall Weight ..... 12,000 lbs. approx. (545 kg)

Maximum Altitude ..... 7500 ft. (2286 m)

Ambient Temperature ..... –20°C +45°C

Maximum Cabinet Weight ..... 3,093 lbs., approx. (1403 kg)

PA Cabinet Weights (each) ..... 953 lbs., approx. (432 kg)

Plate Transformer Weight (total) ..... 820 lbs., approx. (372 kg)

Rectifier Weight ..... 3,093 lbs., approx. (1403 kg)

Exciter Weight ..... 1,241 lbs., approx. (563 kg)

Filter Reactor ..... 570 lbs., approx. (259 kg)

Tube Complement

RF Amplifier Section:

2	4-250A	Intermediate Power Amplifier
2	4CX5000A	Driver Amplifier
2	6697	Power Amplifier

Monitor Circuits:

1	1614	Frequency Monitor Amplifier
2	6AL5	Reflectometer
1	2D21	Thyratron Control

Accessories

Complete Set of Operating Tubes ES-27222-D

Recommended Spare Set of Tubes ES-27223-D

Type BTR-11B Remote Control Equipment (10 Functions) ES-34280

Type BTR-20D Remote Control Equipment (20 Functions) ES-561415

BTRX-40A—20 Position Extension for BTR-20C MI-27556

50/10-kW Cutback Kit for BTA-50J Transmitter MI-27688-B

Dummy Load Schedule of Parts and Instructions ES-34234

BPA-50 Antenna Tuning Unit MI-28903-A/B

BPA-50 Antenna Tuner (230 Ohms) ES-28903-A

BPA-50 Antenna Tuner (70/51.5 Ohms) ES-28903-B

RF Ammeter (for BPA-50) MI-7147-Series

Remote RF Pickup Unit (less Meter) MI-28027-C

Remote Antenna Meter MI-7157-Series

Type BW-11A Frequency Monitor ES-34042

Type BW-66F Modulation Monitor MI-30066-B

Automatic Logging Equipment ..... On Application

Ordering Information

Type BTA-50J 50-kW AM Broadcast Transmitter with two crystals, remote meter, one set of operating tubes, silicon rectifiers, and one exciter. Does not include antenna tuning unit. (Specify operating frequency and output impedance) ES-27221-D

Commercial Electronic Systems Division
Front and Cooper Streets, Camden, New Jersey, U.S.A. 08102

RCA Broadcast Equipment