CCA "ULTIMATE"

TEN CHANNEL STEREO CONSOLE

FEATURES

- Altec Stereo Faders
- Altec Plug-in Solid State Modules
- 100% Solid State
- 100% Magnetic Shielding
- Switchcraft Key Switches
- Switchable Microphone Channels to Left, Right or Center
- Center Channel can be Auditioned and Controlled
- Eighteen (18) High Level Inputs
- Six (6) Low Level Inputs
- Ten (10) High Level Inputs Switchable to Four (4) Stereo Faders
- Independent Talk Back Facilities
- Cue Position on Eight (8) Faders
- Seven (7) Stereo Faders
- Three (3) Mono Faders Switchable to Left, Right or Center Channels
- Built-in Voltage Regulated Power Supply
- Plug-in Muting Relays
- Built-in Cue and Monitor Amplifiers
- Monitor Switchable to Audition, Program and Off Air Lines
- Booster Amplifiers in Stereo Audition and Program Channels
- Front Panel Controls for Left Master, Right Master, Monitor Gain and Cue Gain Amplifiers
- Durable Wood Grain Formica
- Photo Engraved Front Panel
- No Exposed Connections — All Wiring Connections from Within
- Complete Accessibility:—
  - Tilt Down Front
  - Removable Top
  - Removable Sides and Rear

DESCRIPTION

ULTIMATE IN PARTS, CAPACITY AND FLEXIBILITY

The CCA "Ultimate Console" reflects the optimum in capacity, flexibility and reliability. The objective of this "Ultimate" board is to provide the broadcaster with maximum facilities and highest quality field proven, easily obtainable components. No expense has been spared in obtaining this objective.

A DESCRIPTION OF EACH OF THE CHANNELS FOLLOWS

CHANNELS 1 & 2 "STEREO AUXILIARIES"

These two high level stereo channels have five high level stereo inputs available which can be switched to either of the two stereo channels. It is impossible for the same input to be connected to both faders simultaneously and thus "segueing" between the two channels with the five high level inputs can be accomplished. Each stereo fader is of Altec manufacture with removeable covers for cleaning and contain a "Cue" position. The output of each channel is switched to either the stereo audition or program lines.

CHANNELS 3 & 4 "MICROPHONE CHANNELS"

Each of these channels have available 3 inputs which in turn are used to drive monaural pre-amplifiers can be used to feed either the left, right or both amplifiers in parallel. This selection can be achieved by a front panel switch.

CHANNELS 5 & 6

These high level stereo channels are recommended to be used as turntable inputs for both the conventional left and right turntables. In order to achieve the optimum in signal to noise, it is suggested that equalized pre-amps for the turntables be installed in the turntable housings.

CHANNEL 7

This high level stereo channel has three switchable inputs and is suggested as a channel for stereo cartridges. It contains a Cue position and its output is switchable to both the audition and program lines.

CHANNEL 8

This channel is available to be used as a remote high level mono channel. It contains facilities for selecting one of three inputs and feeding the output of the fader to either the "left", "right" or center channels. This versatile channel also contains facilities for "talk back".

CHANNELS 9 & 10

These two channels are similar in construction and philosophy to channels 1 & 2. They are high level stereo channels with facilities to select any one of five high level stereo inputs for either of the two channels. It is impossible for both channels to be inadvertently fed with the same input simultaneously. This philosophy provides a "fool proof" method of switching between two channels without an attendant drop in audio level.

INSULATED HIGH LEVEL INPUTS:

Transformers are used in every high level input. This presents problems associated with "ground loops".

CENTER CHANNEL CONTROLLABLE AND SWITCHABLE:

The CCA "Ultimate" console is unique in that the output of the center channel can be switched to either the audition or program channels and the levels available to both the left and right channels are controllable.

LOW LEVEL & HIGH LEVEL CENTER CHANNELS:

Controllable center channels are available not only from the low level microphone channels but also from a high level channel.

STEREO MONITORING:

The CCA "Ultimate" monitoring system has facilities for monitoring on a stereo basis, the main channel, the audition channel, and external off air programs.

FEEDS BACK PROGRAM TO REMOTE LINE:

The CCA "Ultimate" has facilities for feeding back program to the remote lines to assist in setting up the remote feed. Although this is an obvious feature for a sophisticated console, it is amazing that so many competitive units do not have this feature.

TALK BACK FACILITY:

The CCA "Ultimate" has facilities for talking back to the remote lines as well as to the other studios. Again, this is a feature not present in a number of competitive units.

AUDITIONED WITHOUT GOING TO MONITOR AMPLIFIER:

The CCA "Ultimate" console contains booster amplifiers in its audition lines. Thus, it is possible to audition a number of program sources and obtain sufficient output level that will not require going through the monitor amplifier. This addition of booster amplifiers in the audition channel adds considerable versatility to the console.

SWITCHABLE OUTPUT LINES:

The CCA "Ultimate" console has facilities to switch from the front panel, the output of the stereo console to a second pair of stereo output lines. This can serve as an emergency output in the event that the terminal equipment which the normally used output has becomes defective and the alternative output could be used to drive the proper termination for the console.

Inside view of Ultimate Console with front panel tilted forward and top removed.

SPECIFICATIONS

MIXING CHANNELS: Total — (10); (7) Stereo, (3) Mono.

AMPLIFIERS PROVIDED: (2) Program, (4) Booster, (2) Monitor, (2) Pre-amplifiers, (1) Cue Amplifier.

OPERATING MODE: Stereo.

INPUT CIRCUITS: (6) for Mics, (2) Turntables, (10) High Level Lines switchable to Four Faders, (1) External Monitor Input, (3) Remote Lines, (3) Cartridge Lines.

OUTPUT LINES: (4) Program, (6) Muted Speaker (3 pairs), (2) Intercom, (2) Headphones, (2) Audition.

IMPEDANCES: Microphones: 30/50 or 150/250 ohms. Turntable/Tape: 150/250 ohms unbalanced. Remote Lines: 500/600 ohms, balanced. Network 500/600 ohms. Utility: 500/600 ohms. Programming Output: 500/600 ohms. Audition Output: 500/600 ohms. Intercom Output: 8 ohms. Monitor Speaker Output: 24 ohms @ 10 Watts.

GAIN Turntable, Tape, Network (high level) Input to program line output, 50 db. To monitor amplifier output, 55 db. From microphone input to program line output, 102 db. Monitor Amplifier Output, 10 Watts. **Note:** All measurements ±2 db.

RESPONSE: All segments of program circuit ±1 db. 30-15,000 Hz. Monitoring circuit ±1½ db, 30-15,000 Hz. **Note:** Typical response all circuits: 20-20,000 Hz, ±2 db.

DISTORTION: Any segment of program circuit 0.5% or less between 30-15,000 Hz at ±8 dbm output level or 0.5% at +18 dbm, 15-15,000 Hz. Monitor amplifier 1% at +39 dbm (8 Watts).

NOISE: Program circuits 70 db or better below +18 dbm output, with −50 dbm input (equivalent noise input is −120 dbm). Monitor circuits, 60 db below +39 dbm output. Crosstalk: all circuits below noise level with normal gain settings for proper programming.

STEREO ISOLATION: Below Noise level all channels.

POWER: 115 Volts, 50/60 Hz, 1 Phase. Power consumption, 50 Watts at 60 Hz.

FINISH: Cabinet, Wood Veneer. Panel, Formica anodized aluminum photo engraved black. Knobs with decal color inserts.

SIZE: 48½" wide, 12" high, 18" deep.

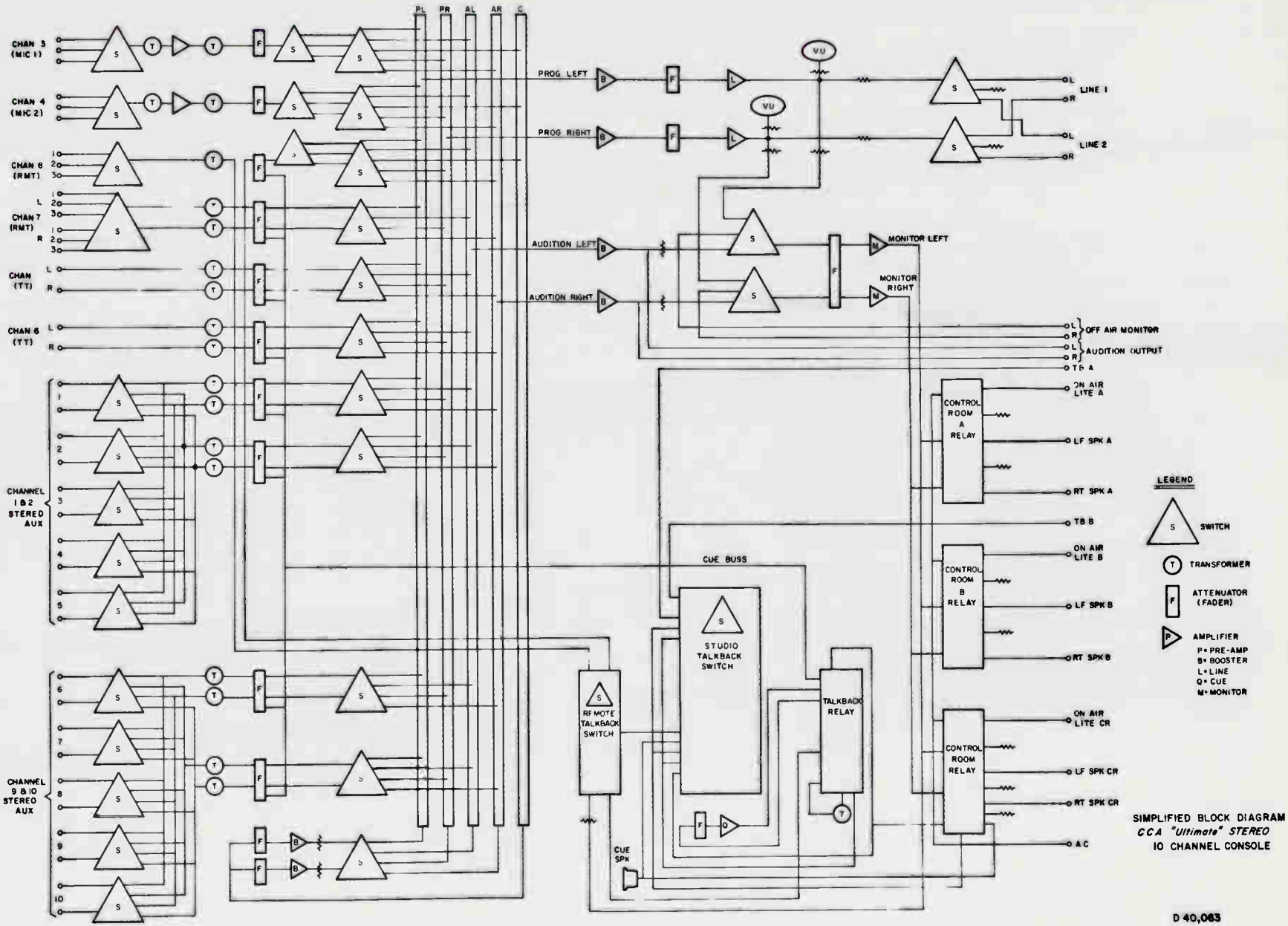
SHIPPING DATA: Packed Weight: Domestic, 220 lbs. Export, 270 lbs. Cubage: 28 cubic feet.

OPTIONAL ACCESSORIES: External pre-amplifiers, equalized pre-amps. Matching Transformers: 24 ohms to 8 ohms.

EXPORT SALES: Telesco International Corporation • 171 Madison Avenue • New York, New York 10016

CCA ELECTRONICS CORPORATION
716 JERSEY AVE., GLOUCESTER CITY, NEW JERSEY 08030

BLOCK DIAGRAM



SIMPLIFIED BLOCK DIAGRAM
CCA "Ultimate" STEREO
10 CHANNEL CONSOLE

D 40,063

CCA "EXECUTIVE"
DUAL FUNCTION
8 FADER MONO CONSOLE

FEATURES

- Altec Faders
- 100% Solid State
- Three Microphone Pre-Amps
- Transformer Inputs to All Channels
- Ten (10) High-Level Inputs, Five (5) Switchable to Two Faders
- Independent Talk-Back Switchable to 3 studios and 5 remotes
- Complete Accessibility — Tilt-Down Front — Removable Top — Removable Side and Rear
- Monitor Amplifier can be Switched From Front To Serve as Program Line Amplifier or Production Amplifier
- VU Meter Switchable to Program, Production or External Line
- Built-In Voltage-Regulated Power Supply
- Built-In Cue and Monitor Amplifier
- Durable Wood Grain Formica

DESCRIPTION

ULTIMATE IN PARTS, CAPACITY AND FLEXIBILITY

The CCA "Executive" Mono Console is designed to provide the Broadcaster with a rugged, super reliable console at an attractive price, but with facilities to achieve both production and programming techniques normally associated with a dual-channel console.

A DESCRIPTION OF EACH OF THE CHANNELS FOLLOWS

CHANNELS 1 AND 2 – MICROPHONE CHANNELS

Each of these channels have available three (3) inputs, one of which is selected to drive either the program or production channels. Each channel incorporates RF input filtering and a balanced transformer.

CHANNEL 3 – CARTRIDGE TAPE CHANNEL

This channel is available to be used as a high-level channel. It contains facilities for selecting one of three inputs and feeding the output of the fader to either the production or program channels. This channel contains an input-transformer and requires a level of -30 dbm to achieve full console output. This channel is normally used for cartridge equipment.

CHANNELS 4 AND 5 – TURNTABLE CHANNELS

These channels are used to control conventional left and right turntables. Each fader contains a cue position and the output of each channel is switchable to either the production or program channels.

CHANNEL 6 – CONTROL ROOM MICROPHONE

This low-level microphone channel contains a pre-amplifier and is suggested as a channel for the control room microphone. Its input has facilities for three (3) sources. Its output is switchable to either the production or program lines.

CHANNELS 7 AND 8 – REMOTE

These two high-level channels have five (5) high-level inputs available which can be switched to either of the two channels. It is impossible for the same input to be connected to both faders simultaneously and thus, "sequeing" between the two channels with the five high-level inputs can be accomplished. Each fader, like all of the faders in the console, is of Altec manufacture with removable covers for cleaning and contain a "Cue" position. The output of each channel can be switched to either the production or program lines. When the input selector switches are in the center position, program is fed back to that "remote" channel.

MULTI-PURPOSE MONITOR AMPLIFIER

The "Executive" console monitor amplifier has facilities to select the program, production or external lines as a driving source. It also has facilities to drive the normal program or production lines. Thus, it can serve as an emergency program line amplifier, a production line amplifier and simultaneously drive four speakers.

SWITCHABLE FRONT PANEL "VU" METER

The "Executive" console has facilities to switch the front panel "VU" meter to the program line, production line, or an external source. This meter can be used to set up the various controls for both production and programming and while both services are being achieved simultaneously, the "VU" meter may be switched between the two periodically to monitor proper levels.

TOTAL ACCESSIBILITY

The total accessibility to the CCA "Executive" console contains removable top, a tilt-down front and outside frame can be removed. In addition, the modules are all of the plug-in variety and thus, total accessibility can be achieved.

ISOLATED HIGH-LEVEL INPUTS

Transformers are used in every high-level input. This eliminates problems associated with "ground loops."

FEEDBACK PROGRAM TO FIVE REMOTE LINES

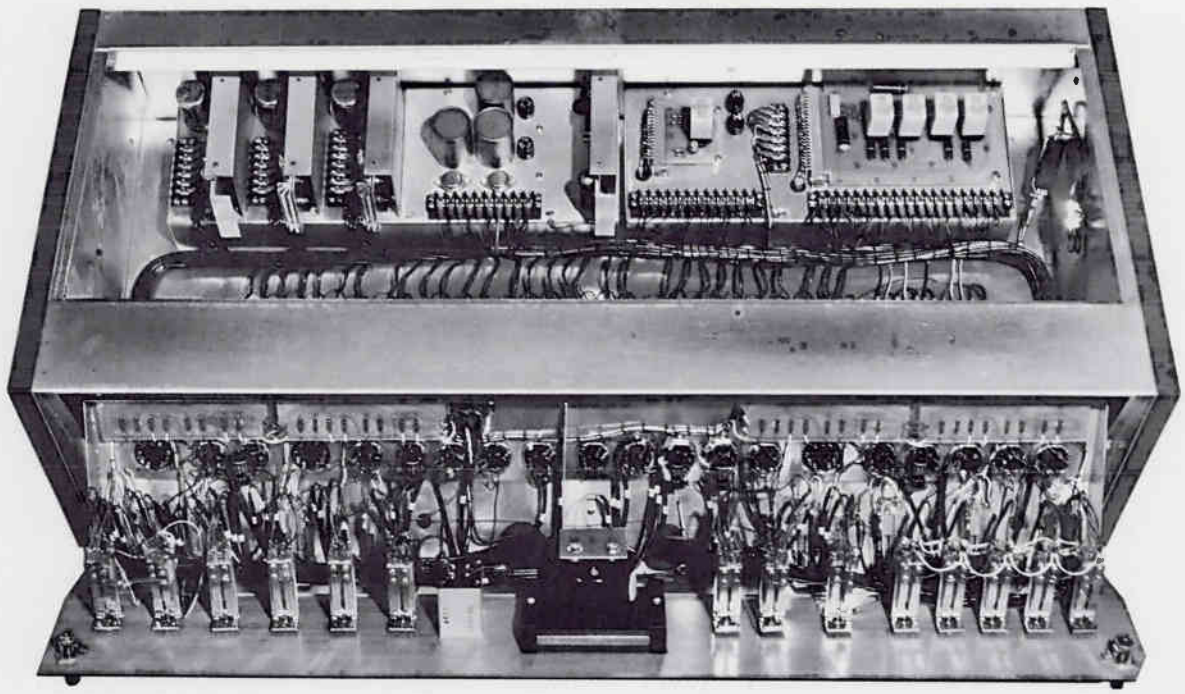
The CCA "Executive" has facilities for feeding back program to the five remote lines switchable to Channels 7 and 8, which can assist in setting up the remote feed. Although this is an obvious feature for a sophisticated console, it is amazing that so many competitive units do not have this feature.

TALK-BACK FACILITY

The CCA "Executive" has facilities for talking back to the remote lines as well as to the other studios. Again, this is a feature not present in a number of competitive units.

MUTING RELAYS WITH TRANSISTOR SWITCHING

The CCA "Executive" uses unique circuitry whereby transistors are used to operate the muting relays. These transistors draw a maximum of 1 ma and thus transients and popping are eliminated.



SPECIFICATIONS

MIXING CHANNELS: Total - (8)

AMPLIFIERS PROVIDED: (1) Program, (2) Booster, (1) Monitor, (3) Pre-amplifiers, (1) Cue Amplifier.

OPERATING MODE: Dual Function-Monaural

INPUT CIRCUITS: (9) for Mics, (2) Turntables, (5) High-Level Lines Switchable to two Faders, (1) External Monitor Input, (3) Cartridge Lines.

OUTPUT LINES: (1) Program, (4) Muted Speaker, (5) Intercom, (2) Headphones, (1) Low-Level Production Channel, (1) High-Level (+18 dbm) Production Channel.

IMPEDANCES: Microphones: 30/50 or 150/250 ohms. Turntable/Tape: 150/250 ohms, Balanced. Remote Lines: 500/600 ohms. Balanced. Network: 500/600 ohms. Utility: 500/600 ohms. Programming Output: 500/600 ohms. Audition Output: 500/600 ohms, Intercom Output:8 ohms. Monitor Speaker Output: 8 ohms @ 10 Watts.

GAIN: Turntable, Tape, Network (high-level) input to program line output, 50 db. To monitor amplifier output, 55 db. From microphone input to program line output, 102 db. Monitor Amplifier Output, 10 Watts. NOTE: All measurements ±2 db.

RESPONSE: All segments of program circuit +1 db, 30 - 15,000 Hz. Monitoring circuit +1½ db, 30 - 15,000 Hz.

Note: Typical response all Circuits: 20 - 20,000 Hz., +1 db.

DISTORTION: Any segment of program circuit 0.5% or less between 30 - 15,000 Hz. at +14 dbm output level or 0.5% at +23 dbm, 50 - 15,000 Hz. Monitor amplifier 1% at +39 dbm (8 Watts.)

NOISE: Program circuits 70 db or better below +18 dbm output, with -50 dbm input (equivalent noise input is -120 dbm) Monitor circuits, 60 db below +39 dbm output. Crosstalk: All circuits below noise level with normal gain settings for proper programming.

CHANNEL ISOLATION: Below Noise Level All Channels.

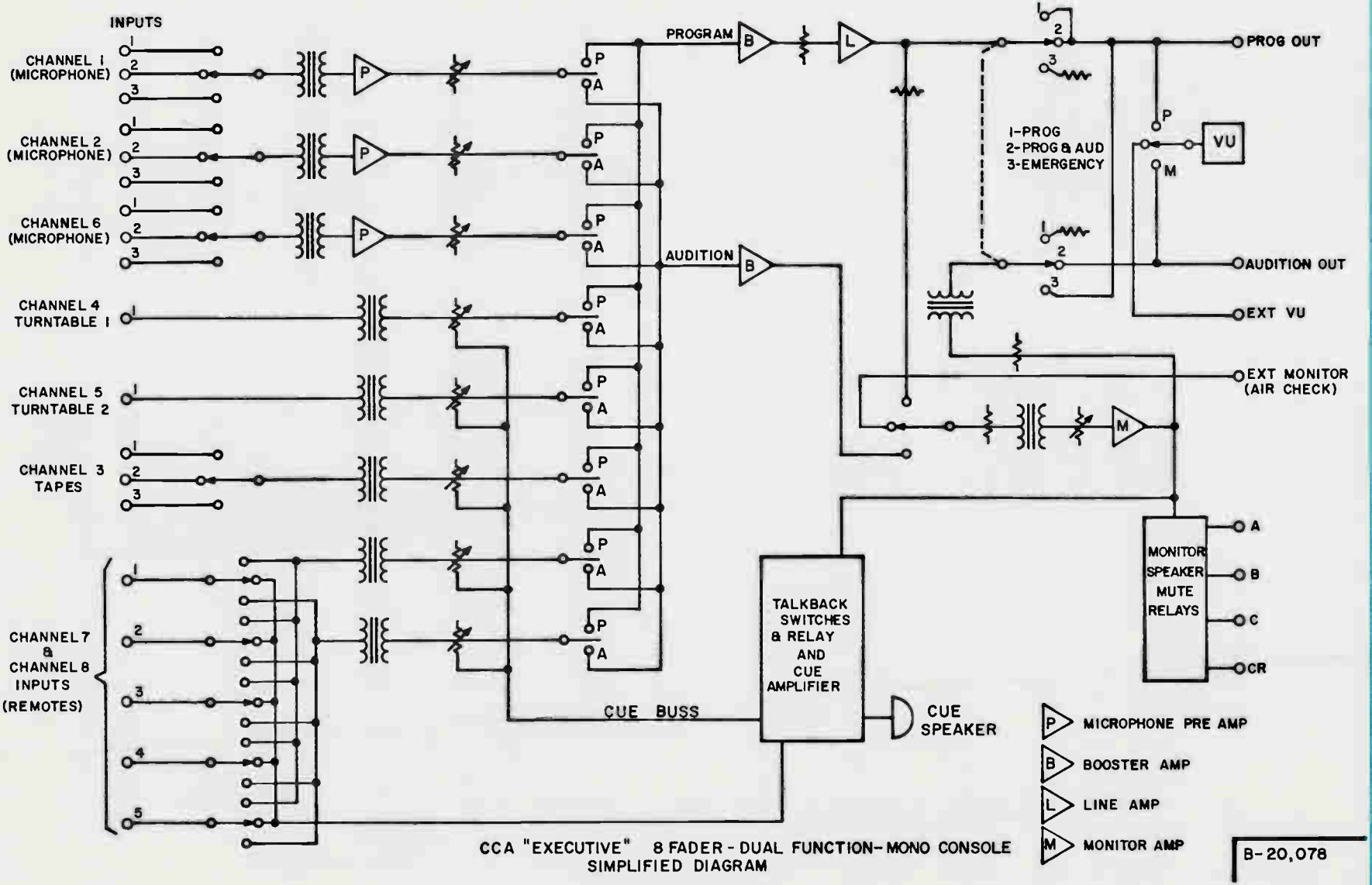
POWER: 115 Volts, 50/60 Hz, 1 Phase. Power Consumption, 50 Watts @ 60 Hz.

FINISH: Cabinet, Wood Veneer. Panel, Formica anodized aluminum photo engraved black.

SIZE: 39" Wide, 12" High, 17" Deep

SHIPPING DATA: Packed Weight: Domestic, 195 lbs. Export, 245 lbs. Cubage: 15 Cu. Ft.

OPTIONAL ACCESSORIES: External Pre-amplifiers, equalized Pre-amps.



CCA "EXECUTIVE" 8 FADER - DUAL FUNCTION - MONO CONSOLE
SIMPLIFIED DIAGRAM

B-20,078

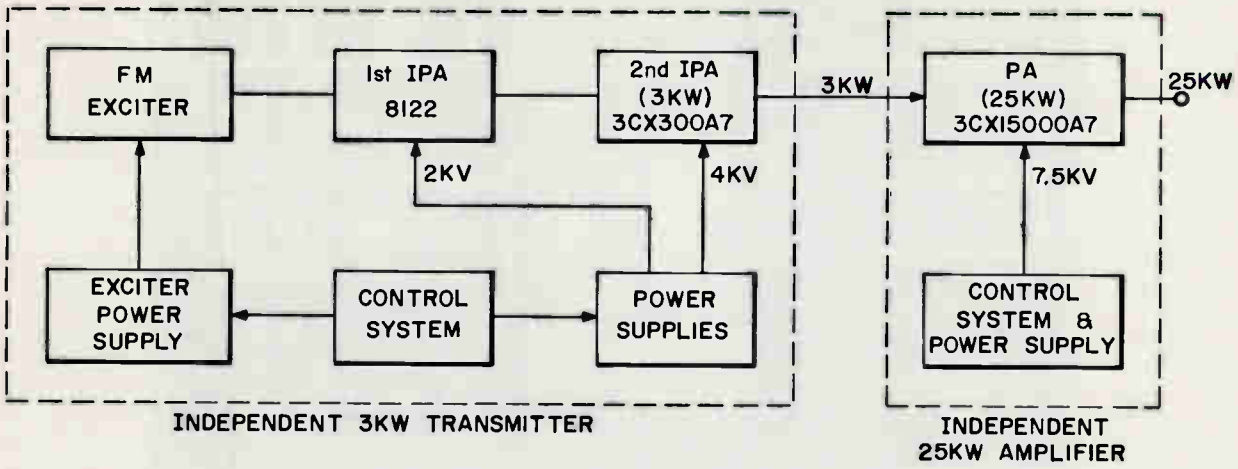
CCA ELECTRONICS CORPORATION
716 JERSEY AVE., GLOUCESTER CITY, NEW JERSEY 08030

CCA FM-25,000D/DS
25 KW FM BROADCAST TRANSMITTER

FEATURES

- Field Proven, Trouble-Free Circuitry
- Conservative - 30KW Output Capability
- Only One Modest Priced Tube in Power Amplifier
- Zero Bias Grounded Grid Triode Type 3CX15,000A7 in PA
- Independent 3.5KW Transmitter Serves as 1.5KW Driver
- Minimum Floor Space - Self-contained in Two Cabinets - No External Parts
- Independent 25KW Power Amplifier Requires Only 1.5KW of RF Drive. Contains Own Power Supply and Circuitry.
- Built-in Spare Blower Provides 200% Reserve and Can Serve as Emergency Replacement.
- Each Tuning Control Operated from the Front Panel with Direct Couplings and Calibrated Counter
- NO REQUIREMENT FOR NEUTRALIZATION of any RF Stage
- No Tuning or Bypass Capacitors in RF Circuitry. Thus, there is no drifting or instability.
- Silicon Rectifiers with 200% PIV and 400% Current Reserve
- Automatic Overload Recycling in both Driver and Power Amplifier
- Standard Parts - Available from Local Sources Used as Much as Possible
- Vertical Panel Construction and Removable Front and Rear Covers Assure Full Accessibility.
- Provided with 40KW Harmonic Filter, 3 1/8" Elbow and Bi-Directional Coupler in Output Transmission Line
- Designed for Operation @ 7500 Feet Elevation on Continuous Basis
- Guaranteed to Meet or Exceed All FCC Broadcast Specifications for Both Monaural and Stereo Transmission
- Designed for Remote Control
- 80% Plate Circuit Efficiency

CCA ELECTRONICS CORPORATION
716 JERSEY AVE., GLOUCESTER CITY, NEW JERSEY 08030



BLOCK DIAGRAM FM25,000D/DS

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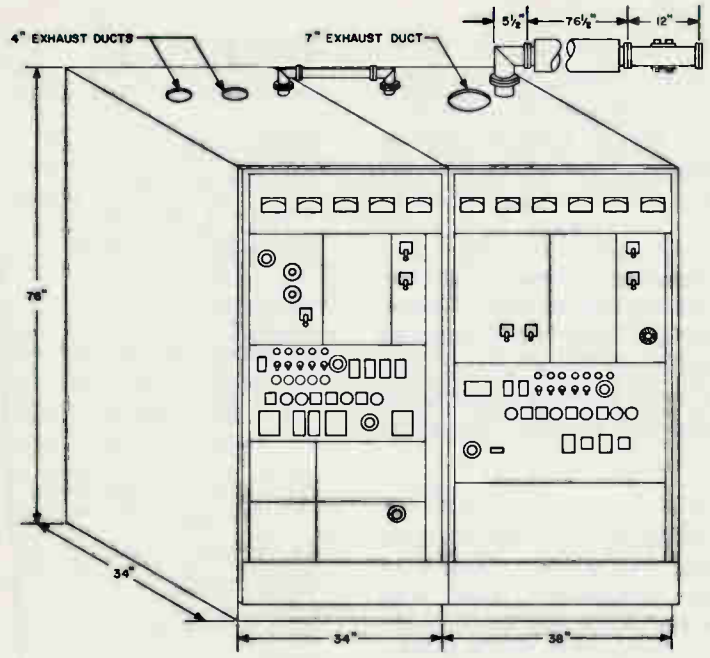
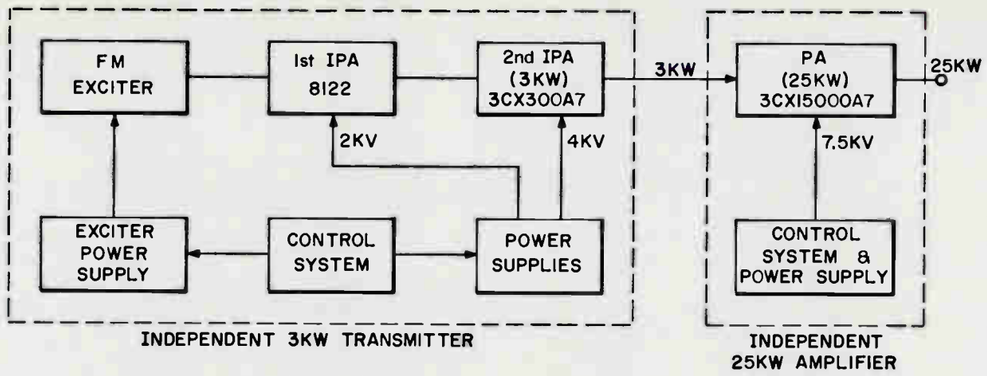


CABINET OUTLINE – FM25KW

CABINET OUTLINE

*EXPORT SALES: Telesco International Corporation * 1044 Northern Blvd. * Roslyn, L. I., New York 11576*

CCA ELECTRONICS CORPORATION
716 JERSEY AVE., GLOUCESTER CITY, NEW JERSEY 08030



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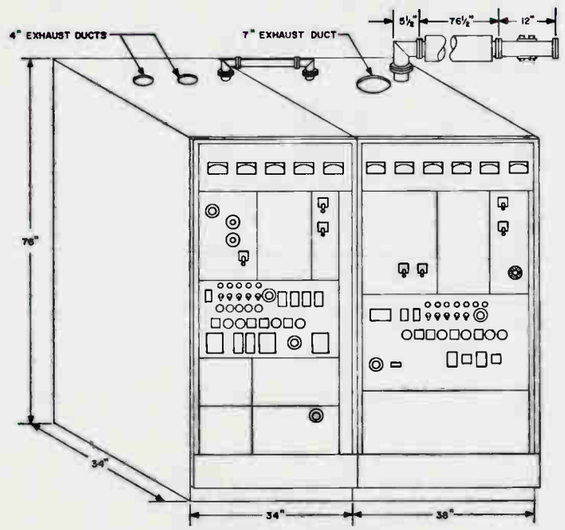

CABINET OUTLINE – FM25KW

CABINET OUTLINE

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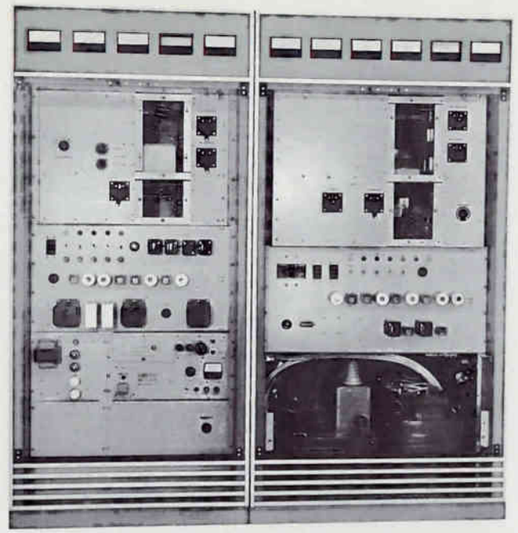
CCA ELECTRONICS CORPORATION
716 JERSEY AVE., GLOUCESTER CITY, NEW JERSEY 08030

CCA FM-25, 000D/DS 25 KW FM BROADCAST TRANSMITTER

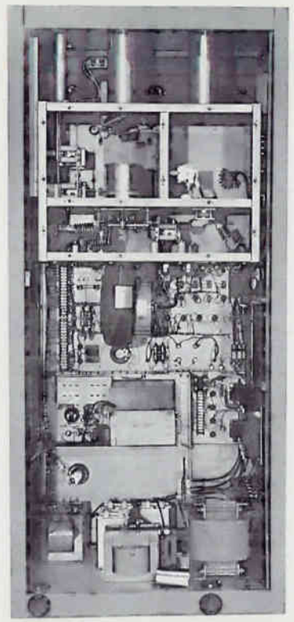
FEATURES

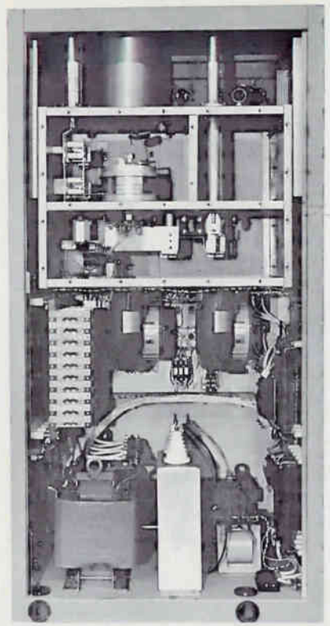
- Field Proven, Trouble-Free Circuitry
- Conservative - 30KW Output Capability
- Only One Modest Priced Tube in Power Amplifier
- Zero Bias Grounded Grid Triode Type 3CX15,000A7 in PA
- Independent 3.5KW Transmitter Serves as 1.5KW Driver
- Minimum Floor Space - Self-contained in Two Cabinets - No External Parts
- Independent 25KW Power Amplifier Requires Only 1.5KW of RF Drive. Contains Own Power Supply and Circuitry.
- Built-in Spare Blower Provides 200% Reserve and Can Serve as Emergency Replacement.
- Each Tuning Control Operated from the Front Panel with Direct Couplings and Calibrated Counter
- NO REQUIREMENT FOR NEUTRALIZATION of any RF Stage
- No Tuning or Bypass Capacitors in RF Circuitry. Thus, there is no drifting or instability.
- Silicon Rectifiers with 200% PIV and 400% Current Reserve
- Automatic Overload Recycling in both Driver and Power Amplifier
- Standard Parts - Available from Local Sources Used as Much as Possible
- Vertical Panel Construction and Removable Front and Rear Covers Assure Full Accessibility.
- Provided with 40KW Harmonic Filter, 3 1/8" Elbow and Bi-Directional Coupler in Output Transmission Line
- Designed for Operation @ 7500 Feet Elevation on Continuous Basis
- Guaranteed to Meet or Exceed All FCC Broadcast Specifications for Both Monaural and Stereo Transmission
- Designed for Remote Control
- 80% Plate Circuit Efficiency

CCA ELECTRONICS CORPORATION
716 JERSEY AVE., GLOUCESTER CITY, NEW JERSEY 08030



FRONT VIEW, DOORS REMOVED





REAR VIEW

APPLICATION

The CCA FM-25,000D/DS 25KW FM Broadcast Transmitter is designed to provide the FM broadcast industry with a super reliable high power transmitter which, in combination with an appropriate antenna, can achieve substantial radiated power. In the past, broadcasters have had to use extremely high gain antennas or parallel combinations of transmitter in order to achieve their desired radiated power. The CCA FM-25,000D/DS permits stations with 50KW ERP requirements in both horizontal and vertical planes to achieve their levels with only 4 or, in some cases, 5 bays of circularly polarized antennas. For stations with 100KW ERP in **both planes,** 8 to 10 bays would be required. Where only horizontal polarization is required, half the number of bays are required. (For example, 50KW ERP horizontal only requires only the CCA FM-25,000D/DS and a 2- or 3-bay horizontally polarized antenna.)

It should be noted, that although the transmitter can conservatively produce 30KW, it is rated at a nominal 25KW output. Thus, it can be operated by remote control in conformance with FCC regulations.

MECHANICAL DESCRIPTION

The CCA FM-25,000D/DS transmitter consists of two medium-sized cabinets interconnected by means of a 1 5/8" rigid or flexible coaxial cable. The two cabinets are essentially independent of each other, and thus there is no insistence on any particular placement of cabinets. Normally, however, the cabinets are placed adjacent to each other with the amplifier cabinet located to the left of the independent transmitter. Both cabinets are 76" high by 34" deep, but the amplifier cabinet is 4" wider (38",) than the driver (34".) The transmitter is supplied with a 3 1/8" elbow, 40KW harmonic filter and 3 1/8" directional coupler. These units are mounted externally to the transmitter in series with the output transmission line. Their positions are not critical, but they are normally positioned as illustrated in the "cabinet layout" on the rear of this folder.

ELECTRICAL DESCRIPTION

(1) ONE 3CX15,000A7, ZERO BIAS TRIODE IN POWER AMPLIFIER: The simplicity and reliability of the CCA FM-25,000D/DS is exemplified by the rugged, comparatively inexpensive power amplifier tube. The 3CX15,000A7 is a high gain triode which is operated in a grounded grid configuration in which its control grid is connected directly to D. C. ground.

There is no requirement for any bias supply since this tube cannot over-dissipate even under the condition of full plate voltage and no RF drive.

NO NEUTRALIZATION OF ANY RF STAGE: All the power tubes used in the CCA FM-25,000D/DS are either UHF tetrode or VHF, zero bias triodes operated in a grounded grid configuration. This arrangement assures perfect isolation between input and output circuits and no neutralization is required.

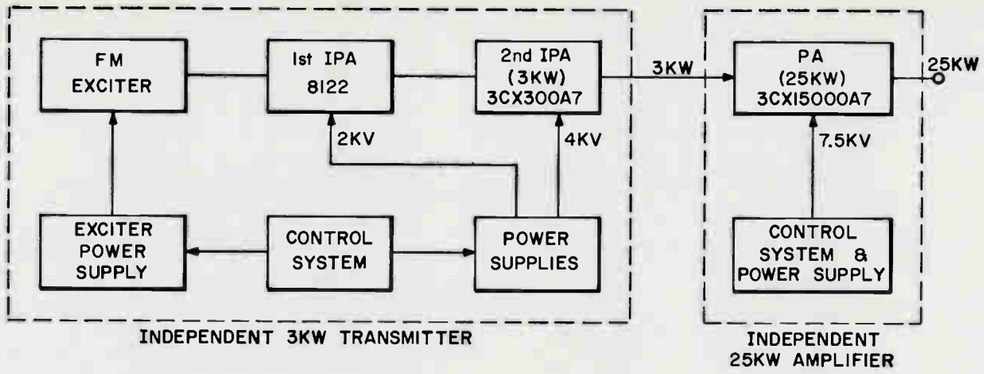
INDEPENDENT 3.5KW DRIVER: The CCA FM-25,000D/DS incorporates a substantial driver - the field-proven CCA FM-3000DS, 3.5KW FM Broadcast Transmitter. This unit, when used as a driver only, produces 1.5KW when driving the amplifier to 25KW output. With the introduction of a coaxial relay between cabinets, this driver can serve as an independent stand-by transmitter for emergency operation.

DEPENDABLE, DIRECT FM EXCITER: The CCA FM-25,000DS incorporates the FM-10DS, FCC type accepted exciter. This exciter represents the optimum features of solid state and vacuum tube components. Solid state circuitry are used in all low level, frequency determining, AFC and modulation circuitry. Three (3) dependable tubes are used in the RF power circuits. Details are available in individual catalog sheet.

CONSERVATIVE 25KW POWER OUTPUT: The CCA FM-25,000D/DS has reserve power to spare! By simply increasing the RF drive (normally operates at reduced output,) the transmitter can easily produce 30KW output power with only 35KW power input.

TECHNICAL SPECIFICATIONS

Power Output Capability	30KW
Frequency Range	50-150 MHz
Frequency Stability	.001%
RF Output Impedance	50 ohms
(Fitting)	3 1/8"
AF Input Impedance	150/600 ohms
AF Input Level @ 100% Mod.	+10 dbm Max.
AF Response (with 75 us pre-emphasis)	
50- 15,000 Hz (phase) (Mono)	±1 db
30- 15,000 Hz (direct FM) (Mono)	±1 db
AF Distortion (Maximum)	0.5%
(Typical)	0.2%
Noise (below 100% Mod.)	-65 db
Line Voltage	208/230V
Line Frequency	50/60 Hz
Phase	3
Power Consumption (Approx.)	35KW
Net Dimensions (W x H x D) inches	33" x 76" x 68"
Gross Cubage Cu. Ft.	220 Cu. Ft.
Gross Weight	2500 Lbs.
PA Tube	3CX15,000A7
Harmonic Level (below carrier)	-80 db



BLOCK DIAGRAM FM25,000D/DS

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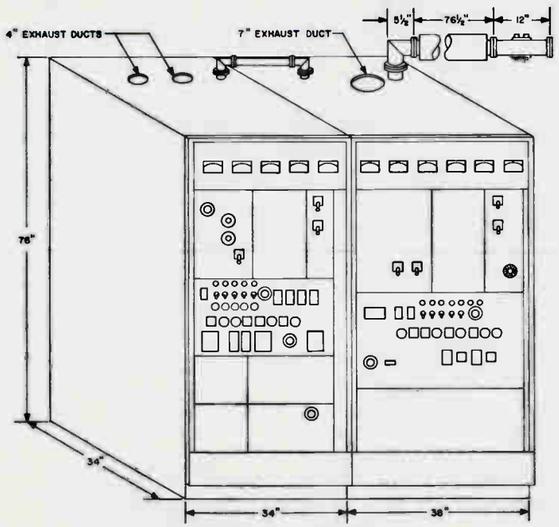

CABINET OUTLINE – FM25KW

CABINET OUTLINE

*EXPORT SALES: Telesco International Corporation * 1044 Northern Blvd. * Roslyn, L. I., New York 11576*

CCA ELECTRONICS CORPORATION
716 JERSEY AVE., GLOUCESTER CITY, NEW JERSEY 08030

CCA FM-25, 000D/DS 25 KW FM BROADCAST TRANSMITTER

FEATURES

- Field Proven, Trouble-Free Circuitry
- Conservative - 30KW Output Capability
- Only One Modest Priced Tube in Power Amplifier
- Zero Bias Grounded Grid Triode Type 3CX15,000A7 in PA
- Independent 3.5KW Transmitter Serves as 1.5KW Driver
- Minimum Floor Space - Self-contained in Two Cabinets - No External Parts
- Independent 25KW Power Amplifier Requires Only 1.5KW of RF Drive. Contains Own Power Supply and Circuitry.
- Built-in Spare Blower Provides 200% Reserve and Can Serve as Emergency Replacement.
- Each Tuning Control Operated from the Front Panel with Direct Couplings and Calibrated Counter
- NO REQUIREMENT FOR NEUTRALIZATION of any RF Stage
- No Tuning or Bypass Capacitors in RF Circuitry. Thus, there is no drifting or instability.
- Silicon Rectifiers with 200% PIV and 400% Current Reserve
- Automatic Overload Recycling in both Driver and Power Amplifier
- Standard Parts - Available from Local Sources Used as Much as Possible
- Vertical Panel Construction and Removable Front and Rear Covers Assure Full Accessibility.
- Provided with 40KW Harmonic Filter, 3 1/8" Elbow and Bi-Directional Coupler in Output Transmission Line
- Designed for Operation @ 7500 Feet Elevation on Continuous Basis
- Guaranteed to Meet or Exceed All FCC Broadcast Specifications for Both Monaural and Stereo Transmission
- Designed for Remote Control
- 80% Plate Circuit Efficiency

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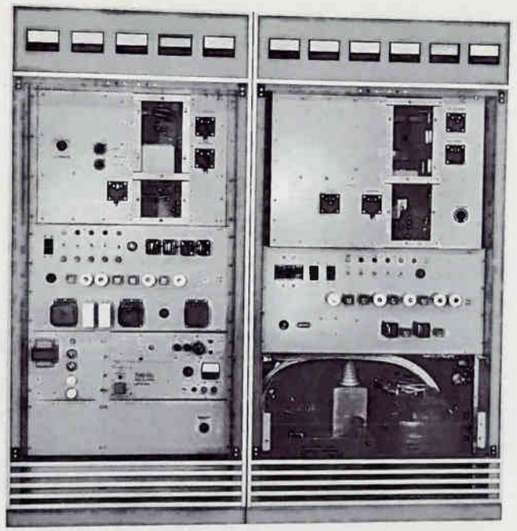
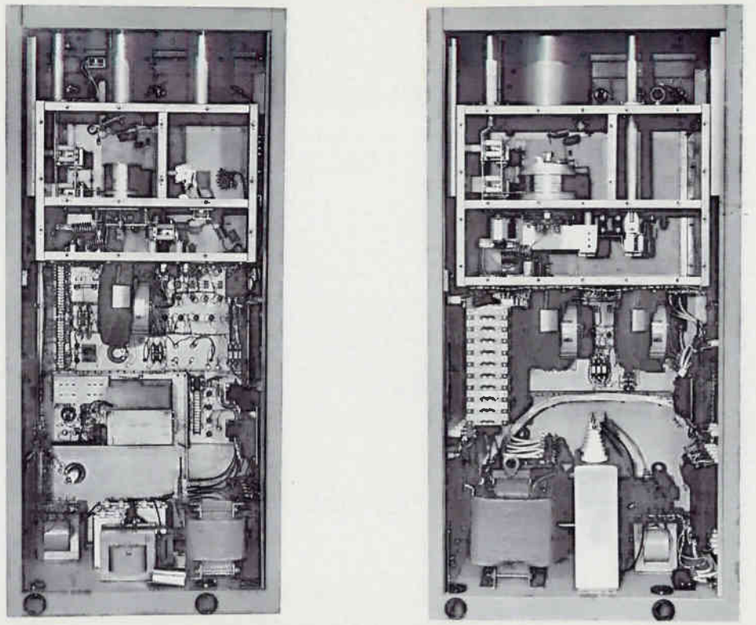


FRONT VIEW, DOORS REMOVED



REAR VIEW

APPLICATION

The CCA FM-25,000D/DS 25KW FM Broadcast Transmitter is designed to provide the FM broadcast industry with a super reliable high power transmitter which, in combination with an appropriate antenna, can achieve substantial radiated power. In the past, broadcasters have had to use extremely high gain antennas or parallel combinations of transmitter in order to achieve their desired radiated power. The CCA FM-25,000D/DS permits stations with 50KW ERP requirements in both horizontal and vertical planes to achieve their levels with only 4 or, in some cases, 5 bays of circularly polarized antennas. For stations with 100KW ERP in both planes, 8 to 10 bays would be required. Where only horizontal polarization is required, half the number of bays are required. (For example, 50KW ERP horizontal only requires only the CCA FM-25,000D/DS and a 2- or 3-bay horizontally polarized antenna.)

It should be noted, that although the transmitter can conservatively produce 30KW, it is rated at a nominal 25KW output. Thus, it can be operated by remote control in conformance with FCC regulations.

MECHANICAL DESCRIPTION

The CCA FM-25,000D/DS transmitter consists of two medium-sized cabinets interconnected by means of a 1 5/8" rigid or flexible coaxial cable. The two cabinets are essentially independent of each other, and thus there is no insistence on any particular placement of cabinets. Normally, however, the cabinets are placed adjacent to each other with the amplifier cabinet located to the left of the independent transmitter. Both cabinets are 76" high by 34" deep, but the amplifier cabinet is 4" wider (38",) than the driver (34".) The transmitter is supplied with a 3 1/8" elbow, 40KW harmonic filter and 3 1/8" directional coupler. These units are mounted externally to the transmitter in series with the output transmission line. Their positions are not critical, but they are normally positioned as illustrated in the "cabinet layout" on the rear of this folder.

ELECTRICAL DESCRIPTION

(1) ONE 3CX15,000A7, ZERO BIAS TRIODE IN POWER AMPLIFIER: The simplicity and reliability of the CCA FM-25,000D/DS is exemplified by the rugged, comparatively inexpensive power amplifier tube. The 3CX15,000A7 is a high gain triode which is operated in a grounded grid configuration in which its control grid is connected directly to D. C. ground.

There is no requirement for any bias supply since this tube cannot over-dissipate even under the condition of full plate voltage and no RF drive.

NO NEUTRALIZATION OF ANY RF STAGE: All the power tubes used in the CCA FM-25,000D/DS are either UHF tetrode or VHF, zero bias triodes operated in a grounded grid configuration. This arrangement assures perfect isolation between input and output circuits and no neutralization is required.

INDEPENDENT 3.5KW DRIVER: The CCA FM-25,000D/DS incorporates a substantial driver - the field-proven CCA FM-3000DS, 3.5KW FM Broadcast Transmitter. This unit, when used as a driver only, produces 1.5KW when driving the amplifier to 25KW output. With the introduction of a coaxial relay between cabinets, this driver can serve as an independent stand-by transmitter for emergency operation.

DEPENDABLE, DIRECT FM EXCITER: The CCA FM-25,000DS incorporates the FM-10DS, FCC type accepted exciter. This exciter represents the optimum features of solid state and vacuum tube components. Solid state circuitry are used in all low level, frequency determining, AFC and modulation circuitry. Three (3) dependable tubes are used in the RF power circuits. Details are available in individual catalog sheet.

CONSERVATIVE 25KW POWER OUTPUT: The CCA FM-25,000D/DS has reserve power to spare! By simply increasing the RF drive (normally operates at reduced output,) the transmitter can easily produce 30KW output power with only 35KW power input.

TECHNICAL SPECIFICATIONS

Power Output Capability	30KW
Frequency Range	50-150 MHz
Frequency Stability	.001%
RF Output Impedance	50 ohms
(Fitting)	3 1/8"
AF Input Impedance	150/600 ohms
AF Input Level @ 100% Mod.	+10 dbm Max.
AF Response (with 75 us pre-emphasis)	
50- 15,000 Hz (phase) (Mono)	±1 db
30- 15,000 Hz (direct FM) (Mono)	±1 db
AF Distortion (Maximum)	0.5%
(Typical)	0.2%
Noise (below 100% Mod.)	-65 db
Line Voltage	208/230V
Line Frequency	50/60 Hz
Phase	3
Power Consumption (Approx.)	35KW
Net Dimensions (W x H x D) inches	33" x 76" x 68"
Gross Cubage Cu. Ft.	220 Cu. Ft.
Gross Weight	2500 Lbs.
PA Tube	3CX15,000A7
Harmonic Level (below carrier)	-80 db

TYPE 6811 - MEDIUM POWER FM BROADCAST - CIRCULARLY POLARIZED ANTENNA

FEATURES

- Equal Radiation in Both Horizontal and Vertical Fields
- Attractive, Realistic Price
- Rugged, Stainless Steel Construction
- Minimum Windloading
- 1KW Power Rating Per Bay
- Designed for Side Mounting
- Excellent Circularity
- Broad Band — Low Q Form Factor
- Adjustable Matching Transformer Supplied at No Additional Cost
- Deicers Optional
- Guaranteed VSWR — 1.1:1 over ± 100kHz
- Tower Mounting Brackets Included within Basic Price
- Circularity ± db in Free Space

Type 6811 Element

USES

The CCA type 6811 Medium Power, Circularly Polarized, FM Broadcast Antennas are designed to provide a reliable, but comparatively inexpensive method of achieving an omni-directional pattern in the transmission of FM broadcast signals in which circular polarization is desired. They are particularly applicable to Class A and Class B stations where antenna power handling requirements are less than 1KW per bay. Thus, a Class A station can achieve 3KW ERP in both horizontal and vertical planes with the combination of a 3KW Transmitter a 3 Bay, 6811 antenna and a reasonable length of transmission line. Class B and C stations can achieve 50KW ERP in both planes with the combination of a 10KW Transmitter, a 12 Bay, 6811 antenna and a reasonable length of line. 100KW ERP in both planes can be achieved with a 14 Bay Antenna and 20KW Transmitter operating @ 15KW.

DESCRIPTION

MECHANICAL

The CCA 6811 antenna is essentially a stainless steel tubing formed in a rectangular loop configuration with vertical elements. Its RF input is a standard 1⅝" EIA flange. Each bay plugs into a standard 1⅝" transmission line which serves as a feed line.

The bays are spaced approximately 10 feet apart. The feed line is supplied with mounting brackets designed to face mount or corner mount the antenna system depending on the customer's requirement.

An adjustable transformer is supplied with each antenna. This unit is approximately 7' long and can be mounted from 1 to 5' from the bottom of the antenna.

The antenna is gas tight and thus there is no requirement for any additional gas stop.

The input connection to the matching transformer is a standard 1⅝" flange.

All antenna systems from one to eight bays are end fed. Ten bays and higher are fed from the center of the array.

The deicers are installed in such a manner that they can be replaced in position in the field.

ELECTRICAL DESCRIPTION

The CCA 6811 basic circularly polarized element has a form factor of a "fat" rectangular loop with vertical elements at its end. The radiation from both horizontal and vertical elements are of equal magnitude. Due to their positions, a 90° phase shift exists between these elements. Thus, circular polarization is achieved.

Each element is tuned to resonance and represents a pure resistance whose value is equal to 50 ohms times the number of elements in the antenna system. For example, in a five bay antenna, each element represents 250 ohms at the operating frequency.

Since each element is spaced one wave length apart, the effect is that all elements are fed in parallel. Thus, the input impedance should appear as 50 ohms.

Resonance is obtained by proper length of the vertical elements. Proper magnitude of resistance is obtained by an appropriate setting of the input strap.

The CCA type 6811 has been tested on a continuous basis at 2KW under full icing conditions. Thus, the 1KW rating per bay is conservative.

The combination of basic broadband form factor and the matching transformer assure a realistic VSWR of 1.1:1 over ± 100kHz.

The matching transformer contains two slugs which can be field adjusted to obtain minimum VSWR.

The deicers require 230 volts, single phase, with 115 volts from each side to ground. They require 300 watts per bay.

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SPECIFICATIONS

Circularity - ± 1.0db in free space
VSWR - 1.1:1 over ± 100 kHz
Transformer Length - 7 Ft.
Transformer Weight - 35 Lbs.

Input Connector - 1⅝" EIA (3⅛" above 10KW)
Deicer Wattage per Bay - 300W
Deicer Voltage - 230 volts, grounded center, Single Phase

	Max Power	*Gain		90 MHz			100 MHz		
No. Bays	Input	Power	Db	Length (Ft.)	Weight Lbs.	Windload Lbs.	Length (Ft.)	Weight Lbs.	Windload Lbs.
1	1KW	0.45	-3.0	1.5	5	15	1.5	5	15
2	2KW	.95	-0.2	11.9	23	71	10.8	21	68
3	3KW	1.5	1.7	22.3	41	127	20.1	37	121
4	4KW	2.05	3.1	32.7	59	183	29.4	53	174
5	5KW	2.60	4.1	43.1	77	239	38.7	69	227
6	6KW	3.15	5.0	53.5	95	295	48.0	85	280
7	7KW	3.65	5.6	63.9	113	351	57.3	101	333
8	8KW	4.2	6.2	74.3	131	407	66.6	117	386
10	10KW	5.25	7.2	95.1	167	519	84.2	149	492
12	12KW	6.25	8.0	115.9	203	631	98.8	181	598
14	14KW	7.3	8.6	136.7	239	743	117.4	213	704
16	15KW	8.35	9.2	157.5	275	855	136	245	810

Windload calculated on the basis of the 50/33 psf EIA standard
Calculations do not include the transformer, mounts, or de-icing cable

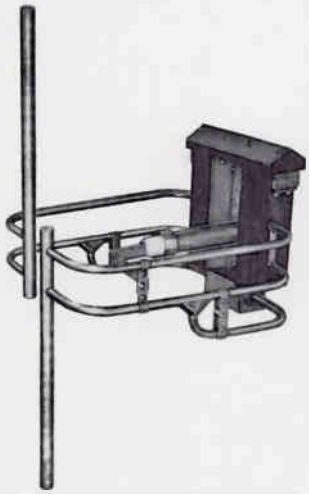
*To obtain the field gain, take the square root of the power gain

To obtain the effective free space field intensity at one mile in mv/m for one kilowatt antenna input power, multiply field gain by 138.

TYPE 6810 - HIGH POWER FM BROADCAST - CIRCULARLY POLARIZED ANTENNA

FEATURES

- Equal Radiation in Both Horizontal and Vertical Fields
- Attractive, Realistic Price
- Rugged, Stainless Steel Constuction
- Minimum Windloading
- 5KW Power Rating Per Bay
- Designed for Side Mounting
- Excellent Circularity
- Broad Band — Low Q Form Factor
- Adjustable Matching Transformer Supplied at No Additional Cost
- Deicers Optional
- Guaranteed VSWR — 1.1:1 over ± 150 kHz
- Tower Mounting Brackets Included Within Basic Price
- Circularity ± 1 db in Free Space



Type 6810 Element

USES

The CCA Type 6810 Medium Power, Circularly Polarized, FM Broadcast Antennas are designed to provide a reliable, but comparatively inexpensive method of achieving an omni-directional pattern in the transmission of FM broadcast signals in which circular polarization is desired. They are particularly applicable to Class B and Class C stations where antenna power handling requirements are less than 5KW per bay. Thus a Class B station can achieve 50KW ERP in both horizontal and vertical planes with the combination of a 20KW Transmitter, a 6 Bay 6810 antenna and a reasonable length of transmission line. Class C stations can achieve 100KW transmitter, a 12 Bay 6810 antenna and a reasonable length of line.

DESCRIPTION

MECHANICAL

The CCA 6810 antenna is essentially a stainless steel tubing formed in a rectangular folded loop configuration with vertical elements. Its RF input is a standard 3⅛" EIA flange. Each bay plugs into a standard 3⅛" transmission line which serves as a feed line.

The bays are spaced approximately 10 feet apart. The feed line is supplied with mounting brackets designed to face mount or corner mount the antenna system depending on the customer's requirement

An adjustable transformer is supplied with each antenna. This unit is approximately 7' long and can be mounted from 1 to 5' from the bottom of the antenna.

The antenna is gas tight and thus there is no requirement for any additional gas stop.

The input connection to the matching transformer is a standard 3⅛" flange.

All antenna systems from one to eight bays are end fed. Ten bays and higher are fed from the center of the array.

The deicers are installed in such a manner that they can be replaced in position in the field.

ELECTRICAL DESCRIPTION

The CCA 6810 basic circularly polarized element has a form factor of a "fat" rectangular folded loop with vertical elements at its end. The radiation from both horizontal and vertical elements are of equal magnitude. Due to their positions, a 90° phase shift exists between these elements. Thus circular polarization is achieved.

Each element is tuned to resonance and represents a pure resistance whose value is equal to 50 ohms times the number of elements in the antenna system. For example, in a five bay antenna, each element represents 250 ohms at the operating frequency.

Since each element is spaced one wave length apart, the effect is that all elements are fed in parallel. Thus, the input impedance should appear as 50 ohms.

Resonance is obtained by proper length of the vertical elements. Proper magnitude of resistance is obtained by an appropriate setting of the input strap.

The CCA type 6810 has been tested on a continuous basis at 20KW under full icing conditions. Thus the 5KW rating per bay is conservative.

The combination of basic broadband form factor and the matching transformer assure a realistic VSWR of 1.1:1 over ± 150kHz.

The matching transformer contains two slugs which can be field adjusted to obtain minimum VSWR.

The deicers require 230 volts, single phase, with 115 volts from each side to ground. They require 500 watts per bay.

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SPECIFICATIONS

Circularity - ± 1.0db in free space
VSWR - 1.1:1 over ± 150 kHz
Transformer Length - 7 Ft.
Transformer Weight - 155 Lbs.

Input Connector - 3⅛" EIA
Deicer Wattage per Bay - 500W
Deicer Voltage - 230 volts, grounded center, Single Phase

		*Gain		88 MHz			108 MHz		
No. Bays		Power	Db	Length (Ft.)	Weight Lbs.	Windload Lbs.	Length (Ft.)	Weight Lbs.	Windload Lbs.
1	5KW	.475	-3.0	3.0	80	55	3.0	80	55
2	10KW	1.0	0.0	14.2	131	260	12.1	125	244
3	15KW	1.55	1.9	25.4	188	388	21.2	176	356
4	20KW	2.15	3.3	36.6	246	516	30.3	227	468
5	25KW	2.70	4.3	47.8	305	644	39.4	278	580
6	30KW	3.30	5.2	59.0	362	772	48.5	329	692
7	35KW	3.75	5.9	70.2	419	900	57.6	380	804
8	40KW	4.40	6.5	81.4	476	1028	66.7	431	916
10	40KW	5.50	7.4	103.8	593	1284	84.9	536	1140
12	40KW	6.60	8.2	126.2	707	1540	103.1	638	1364
14	40KW	7.7	8.9	148.6	824	1796	121.3	740	1588
16	40KW	8.80	9.4	171.0	938	2052	139.5	842	1812

Windload calculated on the basis of the 50/33 psf EIA standard
Calculations do not include the transformer, mounts, or de-icing cable

*To obtain the field gain, take the square root of the power gain

To obtain the effective free space field intensity at one mile in mv/m for one kilowatt antenna input power, multiply field gain by 138.

FMA - 6710R FM CIRCULAR POLARIZED ANTENNAS

FEATURES

- Simultaneous Vertical and Horizontal Polarization
- Broadband Impedance Characteristics
- Built in Adjustable Polarization Divider
- Stainless Steel Rugged Construction
- All Elements at Ground Potential Assures Lighting Protection
- Wind Loading Equal to Competitive Horizontal Only Antennas
- Teflon End Seal Insulator
- 5KW Conservative Rating Per Element
- De-icing Provisions with Removable Feature
- Standard Four Bolt Mounting
- Power Gains from 1 to 20
- Low Q Design Reduces Corona at Ends
- Built in Adjustable Matching Transformer

USES

The CCA-FMA-6710R Circular Polarized Antenna was designed by Shively Laboratories — specialists in antennas — to provide CCA FM customers with a reliable, outstanding engineering design which can produce a desired radiation in both vertical and horizontal polarizations.

The Broadcaster has noted the tremendous advantages of transmitting simultaneously both horizontal and vertical polarization. This combination generally will eliminate "dead spots" which may exist when only horizontal polarization exists. In addition, vertical polarization is very effective in providing services to automobile FM radios where the receiving antenna is a vertical whip.

MECHANICAL DESCRIPTION

The CCA-FMA-6710R has an outstanding mechanical design. Its configuration is such that the windloading offered by each bay is considerably less than the "brute force" approach of individual vertical and horizontal elements.

The antenna consists essentially of a single 3⅛" transmission line with individual bays separated approximately 10 feet from each other. Each bay is extremely rugged. They are constructed of stainless steel material which make them impervious to weather corrosion. Each element fastens into its support with four bolts. Since this arrangement is standard it permits the interchanging of existing horizontal elements with the CCA-6710R with a minimum of effort. The end seal insulator is fabricated from low loss, electrically pure teflon.

The mechanical design of the CCA-FMA-6710R is such that the windloading is comparable to that offered by existing horizontal only antennas. This attractive feature, permits the broadcaster to use his existing tower when expanding from horizontal to circular polarization. It slao reduces the tower strength requirements of newer FM broadcast facilities.

De-icing provisions are available with the FMA-6710R. A unique feature permits replacement of heating elements in position by simply unscrewing the 500 watt element.

Normally the antenna is furnished with a 3⅛" flange. Systems which utilize 8 bays or less are end fed. Higher gain systems are center fed.

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ELECTRICAL DESCRIPTION

The CCA FMA-6710R Circular Polarized Antenna consists of a number of bays each spaced one wavelength apart to produce a near uniform omni-directional pattern with radiation in both the horizontal and vertical polarizations.

Each element consists of a broadband, low Q folded dipole shaped in the form of a square loop. At the ends of this loop is an adjustable folded dipole. When this dipole is in a vertical position it radiates energy in a pure vertical polarization.

The size of the adjustable dipole as well as its position results in radiation from it equal in magnitude to that radiated by the square loop. The position of the vertical dipole assures that it is fed 90° out of phase with the energy that excites the horizontal element. This combination of equal magnitude of feed to both horizontal and vertical elements and 90° phase difference results in true circular polarization.

The CCA FMA-6710R has the unique feature of having a means of adjusting the magnitude of energy radiated with vertical polarization. This is accomplished by simply rotating the vertical dipole a specific angle. The adjustment may be made in position on the tower. It serves essentially as an adjustable polarization divider. When the vertical elements are perpendicular to the horizontal plane, equal magnitudes in both polarizations occur. When the vertical elements are rotated, the ratio of power of the horizontal to vertical polarization increases until a point is reached at which all the transmitter power is radiated in horizontal polarization.

It should be further noted that the folded form factor of both horizontal and vertical elements results in a much lower "Q" than competitive elements. Thus, the voltage gradient, or arcing problem so common in high impedance loops are not present in the CCA FM antennas.

TECHNICAL DATA

CCA – FMA-6710R – CCA – (*)

(*) No. of Bays	Max. Power Gain		Power Rating	88 MHz			98 MHz			108 MHz		
	Horiz.	Vert.	Max. KW	Length Ft.	Weight Lbs.	Wind-loading Lbs.	Length Ft.	Weight Lbs.	Wind-loading Lbs.	Length Ft.	Weight Lbs.	Wind-loading Lbs.
1	.9	1.0	5	3	80	55	3	80	55	3	80	55
2	2.0	2.0	10	14.2	131	286	13	128	275	12	125	264
3	3.1	3.1	15	24.2	188	440	23	182	418	21	176	396
4	4.3	4.3	20	36.6	246	599	33	236	561	30.1	227	528
5	5.4	5.4	25	47.8	305	759	43	290	704	39.4	278	660
6	6.6	6.6	30	59.0	362	913	53	344	847	48.5	329	792
7	7.7	7.7	35	70.2	419	1079	63	398	990	57.6	380	924
8	8.8	8.8	40	81.4	476	1221	73	452	1133	66.7	431	1056
10	11.0	11.0	40	103.8	593	1540	93	560	1419	84	536	1331
12	13.2	13.2	40	126.2	707	1848	113	668	1705	103	638	1595
14	15.4	15.4	40	148.6	824	2167	133	776	1991	121.3	740	1859
16	17.6	17.6	40	171	938	2475	153	884	2277	139.5	842	2134

CCA TYPE 6601 - MEDIUM POWER FM BROADCAST HORIZONTALLY POLARIZED ANTENNA

FEATURES

- Attractive, Realistic Price
- Rugged, Stainless Steel Construction
- Winimum Windloading
- IKW Power Rating Per Bay
- Designed for Side Mounting
- Excellent Circularity
- Broad Band — Low Q Form Factor
- Adjustable Matching Transformer Supplied at No Additional Cost
- Deicers Optional
- Guaranteed VSWR — 1.1:1 over ± 100kHz
- Tower Mounting Brackets Included within Basic Price
- Circularity ± 1 db in Free Space

Type 6601 Element

USES

The CCA Type 6601, Medium Power, Horizontally Polarized, FM Broadcast Antennas are designed to provide a reliable, but comparatively inexpensive method of achieving an omni-directional pattern in the transmission of FM broadcast signals in which horizontal polarization is desired. They are particularly applicable to Class A and Class B stations where antenna power handling requirements are less than 1KW per bay. Thus a Class A station can achieve 3KW ERP in the horizontal plane with the combination of a 1KW Transmitter, a 4 Bay, 6601 antenna and a reasonable length of transmission line. Class B and C stations can achieve 100KW ERP with the combination of a 10KW Transmitter, a 12 Bay, 6601 antenna and a reasonable length of line.

DESCRIPTION

MECHANICAL

The CCA 6601 antenna is essentially a stainless steel tubing formed in a rectangular configuration. Its RF input is a standard 1⅝" EIA flange. Each Bay plugs in to a standard 1⅝" transmission line which serves as a feed line.

The bays are spaced approximately 10 feet apart. The feed line is supplied with mounting brackets designed to face mount or corner mount the antenna system depending on the customer's requirement.

An adjustable transformer is supplied with each antenna. This unit is approximately 7' long and can be mounted from 1 to 5' from the bottom of the antenna.

The antenna is gas tight and thus there is no requirement for any additional gas stop.

The input connection to the matching transformer is a standard 1⅝" flange.

All antenna systems from one to eight bays are end fed. Ten bays and higher are fed from the center of the array.

The deicers are installed in such a manner that they can be replaced in position in the field.

ELECTRICAL DESCRIPTION

The CCA 6601 basic horizontal element has a form factor of a "fat" rectangular loop. The radiation from this loop is essentially omni-directional in the horizontal plane. The polarization is horizontal.

Each element is tuned to resonance and represents a pure resistance whose value is equal to 50 ohms times the number of elements in the antenna system. For example, in a five bay antenna, each element represents 250 ohms at the operating frequency.

Since each element is spaced one wave length apart, the effect is that all elements are fed in parallel. Thus, the input impedance should appear as 50 ohms.

Resonance is obtained by proper positioning of the end capacity plates. Proper magnitude of resistance is obtained by an approxpriate setting of the input strap.

The CCA type 6601 has been tested on a continuous basis at 2KW under full icing conditions. Thus the 1KW rating per bay is conservative.
The combination of basic broadband formfactor and the matching transformer assure a realistic VSWR of 1.1:1 over ± 100kHz.

The matching transformer contains two slugs which can be field adjusted to obtain minimum VSWR.

The deicers require 230 volts, single phase, with 115 volts form each side to ground. They require 300 watts per bay.

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SPECIFICATIONS

Circularity - ± 1.0db in free space

VSWR - 1.1:1 over ± 100 kHz

Transformer Length - 7 Ft.

Transformer Weight - 35 Lbs.

Input Connector - 1⅝" EIA

Deicer Wattage per Bay - 300W

Deicer Voltage - 230 volts, grounded center, Single Phase

	Max. Power	*Gain		90 MHz			100 MHz		
No. Bays	Input	Power	Db	Length (Ft.)	Weight Lbs.	Windload Lbs.	Length (Ft.)	Weight Lbs.	Windload Lbs.
1	1KW	0.95	0	0.5	5	14	0.5	5	14
2	2KW	1.9	2.8	10.3	22	64	9.3	20.5	60
3	3KW	3.0	4.7	21.1	39	114	18.1	36	106
4	4KW	4.1	6.1	31	56	164	26.9	51.5	152
5	5KW	5.2	7.1	41	73	214	35.7	67	198
6	6KW	6.3	8.0	51.5	95	279	46.5	84	264
7	7KW	7.3	8.6	62	113	332	55.8	100	312
8	8KW	8.4	9.2	72	131	385	65	116	360
10	10KW	10.5	10.2	93	167	491	83.5	148	456
12	12KW	12.5	11.0	114	203	597	102	180	552
14	14KW	14.6	11.6	134	239	703	120.5	212	648
16	15KW	16.7	12.2	155.5	275	809	139	244	744

Windload calculated on the basis of the 50/33 psf EIA standard
Calculations do not include the transformer, mounts, or de-icing cable

*To obtain the field gain, take the square root of the power gain

To obtain the effective free space field intensity at one mile in mv/m for one kilowatt antenna input power, multiply field gain by 138

CCA TYPE FMA-( )D - HIGH POWER FM BROADCAST HORIZONTALLY POLARIZED ANTENNA

FEATURES

- Attractive, Realistic Price
- Rugged, Stanless Steel Construction
- Minimum Windloading
- 5KW Power Rating Per Bay
- Designed for Side Mounting
- Excellent Circularity
- Broad Band — Low Q Form Factor
- Adjustable Matching Transformer Supplies At No Additional Cost
- Deicers Optional
- Guaranteed VSWR — 1.1:1 over ± 180 kHz
- Tower Mounting Brackets Included within Basic Price
- Circularity ± 1 db in Free Space

USES

The CCA Type FMA-( ) D, High Power, Horizontally Polarized, FM Broadcast Antennas are designed to provide a reliable, but comparatively inexpensive method of achieving an omni-directional pattern in the transmission of FM broadcast signals in which horizontal polarization is desired. They are particularly applicable to Class B and Class C stations where antenna power handling requirements are less than 5KW per bay. Thus a Class B station can achieve 50KW ERP in the horizontal plane with the combination of a 10KW Transmitter, a 6 Bay, FMA-( ) D antenna and a reasonable length of transmission line. Class B and C stations can achieve 100KW ERP with the combination of a 10KW Transmitter, a 12 Bay FMA-( ) D antenna and a reasonable length of line.

DESCRIPTION

MECHANICAL

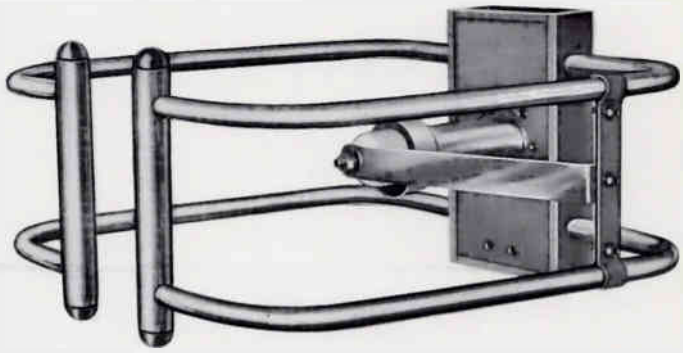
The CCA FMA-( ) D antenna is essentially a stainless steel tubing formed in a folded rectangular configuration. Its RF input is standard 3⅛" EIA flange. Each Bay plugs in to a standard 3⅛" ' transmission line which serves as a feed line.

The bays are space approximately 10 feet apart. The feed line is supplied with mounting brackets designed to face mount or corner mount the antenna system depending on the customers requirement.

An adjustable transformer is supplied with each antenna. This unit is approximately 7' long and can be mounted from 1 to 5' from the bottom of the antenna.

The antenna is gas tight and thus there is no requirement for any additional gas stop.

The input connection to the matching transformer is a standard 3⅛" flange.



Type FMA-( ) Element

All antenna systems from one to eight bays are end fed. Ten bays and higher are fed from the center of the array.

The deicers are installed in such a manner that they can be replaced in position in the field.

ELECTRICAL DESCRIPTION

The CCA FMA-( ) D basic horizontal element has a form factor of a "fat" rectangular loop. The radiation from this loop is essentially omni-directional in the horizontal plane. The polarization is horizontal.

Each element is tuned to resonance and represents a pure resistance whose value is equal to 50 ohms times the number of elements in the antenna system. For example, in a five bay antenna, each element represents 250 ohms at the operating frequency.

Since each element is spaced one wave length apart, the effect is that all elements are fed in parallel. Thus, the input impedance should appear as 50 ohms.

Resonance is obtained by proper positioning of the end capacity plates. Porper magnitude of resistance is obtained by an appropriate setting of the input strap.

The CCA type FMA-( ) D has been tested on a continuous basis at 20KW under full icing conditions. Thus the 5KW rating per bay is conservative.

The combination of basic broadband formfactor and the matching transformer assure a realistic VSWR of 1.1:1 over ± 180 kHz.

The matching transformer contains two slugs which can be field adjusted to obtain minimum VSWR.

The deicers require 230 volts, single phase, with 115 volts from each side to ground. They require 500 watts per bay.

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SPECIFICATIONS

Circularity - ± 1.0db in free space
VSWR - 1.1:1 over ± 180 kHz
Transformer Length - 7 Ft.
Transformer Weight - 155 Lbs.

Input Connector - 3⅛" EIA
Deicer Wattage per Bay - 500W
Deicer Voltage - 230 volts, grounded center, Single Phase

	Max.	*Gain		88 MHz			108 MHz		
No. Bays	Power Input	Power	Db	Length (Ft.)	Weight Lbs.	Windload Lbs.	Length (Ft.)	Weight Lbs.	Windload Lbs.
1	5KW	0.95	0	1.0	30	30	1.0	30	30
2	10KW	1.9	2.8	11.0	72	136	9.2	63	119
3	15KW	3.0	4.7	21.0	114	242	17.4	96	208
4	20KW	4.1	6.1	31	156	348	25.6	129	297
5	25KW	5.2	7.1	41	198	454	33.8	162	386
6	30KW	6.3	8.0	54	245	590	44.0	215	575
7	35KW	7.3	8.6	64.6	288	702	52.6	252	684
8	40KW	8.4	9.2	75.2	331	814	61.2	289	793
10	40KW	10.5	10.2	96.4	415	1038	78.4	363	1011
12	40KW	12.5	11.0	117.6	499	1262	95.6	437	1229
14	40KW	14.6	11.6	138.8	583	1490	112.8	511	1447
16	40KW	16.7	12.2	160.0	667	1714	130.0	585	1665

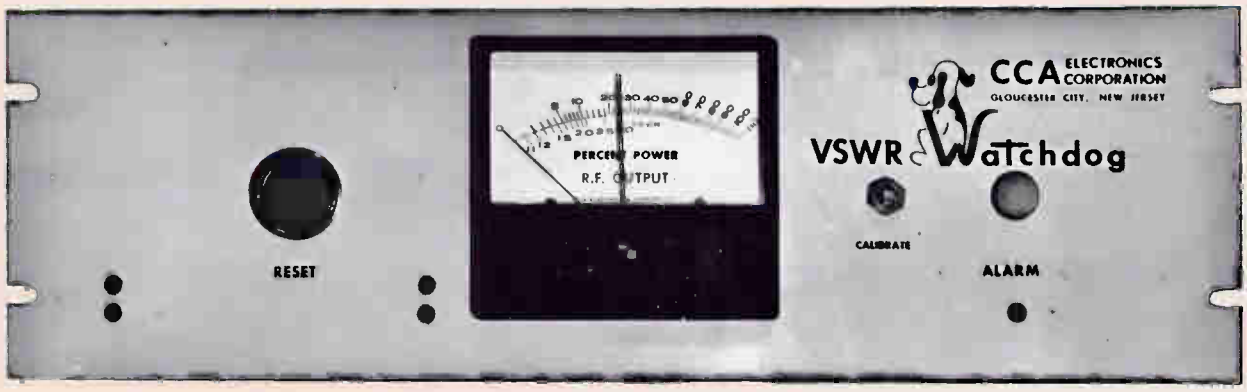
Windload calculated on the basis of the 50/33 psf EIA standard
Calculations do not include the transformer, mounts, or de-icing cable

*To obtain the field gain, take the square root of the power gain

To obtain the effective free space field intensity at one mile in mv/m for one kilowatt antenna input power, multiply field gain by 138.

CCA

VSWR Watchdog



Protect your FM or TV Antenna, Transmission Line and Transmitter only $345.

CCA ELECTRONICS CORPORATION
716 JERSEY AVE., GLOUCESTER CITY, NEW JERSEY 08030

PURPOSE

FM and TV Broadcasters have a substantial investment in their Antenna, Transmission line, and Transmitter Systems.

There exists a number of natural and man-made causes that create substantial mismatches in the antenna-transmission line systems. Some of them are:—

- **Icing of Antenna**
- **Loss of Air Pressure**
- **Self Oscillation of Transmitter**
- **Defective Connection**
- **Incorrect Antenna or Line Installation**
- **Loss of Deicers**

When they do occur, they can create substantial stresses in the system which, if permitted to exist only a few minutes can cause thousands of dollars of equipment damage in addition to substantial loss of air time.

The CCA VSWR Watchdog will, in a fraction of a second, turn off the transmitter when the VSWR achieves any value in excess of a pre-determined value. In addition, a front panel light will operate to advise personnel. A front panel reset button exists for restoring the equipment to operation.

THE CCA "VSWR WATCHDOG" IS ESSENTIAL IN ALL FM AND TV INSTALLATIONS

SPECIFICATIONS

VSWR Protection Range	1.1 to Infinite
VSWR Protection Speed	10 microseconds

INTERLOCK SYSTEM: Standard arrangement—115VAC, one side grounded. If your transmitter has different control voltage, specify voltage, transmitter type number and whether it has provisions for external interlock.

DC MONITORING SOURCE: Must be capable of supplying 1 volt dc across 5K ohms in the event of 100% reflected power. This amount is normal for conventional directional couplers.

METERING: Front panel meter indicates actual reflected power.

STATUS LIGHTS: Describes VSWR Alarm.

RESET FACILITIES: For both Local and Remote Operation.

MECHANICAL: Fits standard 19" Rack, occupies 5¼" of panel space. Maximum depth 7". Weight less than 10 lbs.

OPTIONAL ACCESSORIES: Directional Coupler—Specify power and flange sizes. Not required for CCA Transmitters, since CCA Transmitters contain bi-directional couplers.

AGC-1D-AUDIO AUTOMATIC GAIN CONTROL AMPLIFIER

FEATURES

- **Maintains Constant Average Output Level with Extreme Variations of Input Level**
- **Wide Frequency Response — 20 to 20,000 Hz ±1 db from 0 to 50 db Compression**
- **Distortion Less Than 1%, 30 to 20,000 Hz with 0 to 25 db Compression at +20 dbm Output**
- **Attack Time — .025 Seconds**
- **Can Be Used as Linear Amplifier with 60 db of Gain**

USES

The CCA-AGC-1D Automatic Gain Control Program Amplifier is an automatic level control unit designed to automatically control variations in audio program level. The unit is capable of maintaining a nearly constant average output level over wide variations of input level, often encountered when switching between the output of projectors, turntables, and other sound sources.

The AGC-1D can also be used as a microphone input audio control, as an automatic fader control, or as a straight program amplifier by disabling the automatic level control circuit.

DESCRIPTION

The CCA AGC-1D is a compact amplifier mounted on a chassis with hinged down front panel for easy maintenance and service. The circuitry of the AGC-1D is straightforward and consists of three stages of amplification.

The input signal is applied to an input transformer through an attenuator. The first stage consists of a 6386 acting as a variable gain control amplifier. The signal is then applied to a voltage amplifier consisting of 12AT7, and then to the output stage, which is a 12BH7A.

AGC action is obtained by applying a bias to the grids of the gain control amplifier. This bias is filtered through a resistance capacitance network having a fast charge and slow discharge time constant.

As supplied, the AGC-1D recovers 2/3 rds level in 5 seconds, and 90 percent in about 15 seconds. Recovery time can be adjusted to other values by changing the resistance capacitance network.

PERFORMANCE SPECIFICATIONS

Input Impedance	600 ohms
Output Impedance	600 ohms
Max. Gain below Threshold of Compression	60 db
Gain with Normal Input Atenuator	30 db
Maximum Input Level	+35 dbm
Output at Threshold of Compression	+20 dbm
Compression Slope	7/1
Distortion	1% or less, 30-20,000 Hz at any input up to 25 db compression
Frequency Response	±1 db, 20-20,000 Hz
Attack Time	25 milliseconds
Recovery Time —63%	5 seconds
90%	12 seconds
Total Hum & Noise	70 db below +20 dbm output at maximum gain

TUBE COMPLEMENT

Quantity	Type	Quantity	Type
1	6386	1	OC2
1	12AT7	1	5Y3
1	12BH7		

MECHANICAL SPECIFICATIONS

Width	19"
Depth	7¾"
Height	5¼"
Weight	35 lbs. domestic packing 44 lbs. export packing
Cubage	1'

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LA-1D AUDIO LIMITING AMPLIFIER

FEATURES

- Prevents Overmodulation of Transmitter
- Instant Control – Attack Time .001 seconds
- 30 db Compression with 1.5% Maximum Distortion
- Broad Frequency Response 20 to 20,000 Hz
- Sensitivity 65 db
- Conservatively Rated for Continuous Service
- Standard Parts Used Throughout

USES

In normal broadcast and recording operations average program content contains occasional peaks of abnormally high levels. These levels are of fairly short duration. If they were permitted to feed a transmitter, audio amplifier, or speaker, in addition to causing severe distortion this might also cause secondary damage to the electronic equipment. The CCA LA-1D Limiting Amplifier is used to eliminate all peaks above a preset level from the program in a distortion-free manner.

DESCRIPTION

Mechanical:

The CCA LA-1D Limiting Amplifier is a completely self-contained unit. It is installed in a rack mounted cabinet with a hinged front cover. This design provides maximum accessibility for ease of servicing. All replaceable components (tubes and fuses) are mounted on the rear panel and are clearly labeled. The LA-1D occupies only 5¼" of a standard 19" rack.

Electrical:

The CCA LA-1D is a compact amplifier mounted on a chassis with hinged down front panel for easy maintenance and service. The circuitry of the LA-1D is straightforward and consists of three stages of amplification. Control voltage is applied to the variable release time network which can be adjusted to provide recovery times from .2 to 20 seconds depending on the nature of the program material. The amplifier section utilizes dual feedback networks to insure a flat, virtually distortionless amplifier section. The variable input and output attenuators are controlled from the front panel. The input has an 18 db fixed H pad and a variable H pad, having minimum attenuation of 1.5 db.

PERFORMANCE SPECIFICATIONS

Output Impedance	600 ohms
Input Impedance	600 ohms
Maximum Gain	65 db
Gain with Supplied Input Attenuator	45 db
Limiting Threshold	±20 dbm±.5 db, 50-15,000 Hz
Input at Threshold	-25 dbm
Maximum Input	+10 dbm
Compression Slope (.2 Sec Recovery)	10:1.5
Frequency Response (any level)	±1.0 db, 20-20,000 Hz

Distortion

Below Threshold (0 db compression)

1.5%, 30-20,000 Hz
1.0%, 40-15,000 Hz

Above Threshold

Max. Distortion Conditions (.2 Sec Recovery Time)

10 db compression	1.5%, 50-20,000 Hz
	1.0%, 100-20,000 Hz
20 db compression	1.5%, 60-20,000 Hz
	1.0%, 100-20,000 Hz
30 db compression	2.0%, 100-15,000 Hz

Typical Operation (1.4 Sec. Recovery Time)

10 db compression	1.5%, 35-20,000 Hz
	1.0%, 45-20,000 Hz
20 db compression	1.5%, 40-20,000 Hz
	1.0%, 50-20,000 Hz
30 db compression	2.0%, 30-20,000 Hz
	1.5%, 35-10,000 Hz

Attack Time	.001 seconds
Recovery Time	Switch Selected, .2 to 20 seconds
Total Hum and Noise	65 db below Threshold
Input Attenuator	Fixed - 18 db, Variable - 1.5 db min.
Output Attenuator	Variable 0-20 db in 1 db steps
Power Input	105-125V, 50-60 Hz, 70W

MECHANICAL SPECIFICATIONS

Height	5¼"
Width	19"
Depth	7¾"
Weight	40 lbs.
Cubage	80 lbs.

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CCA "MONO ULTIMATE"

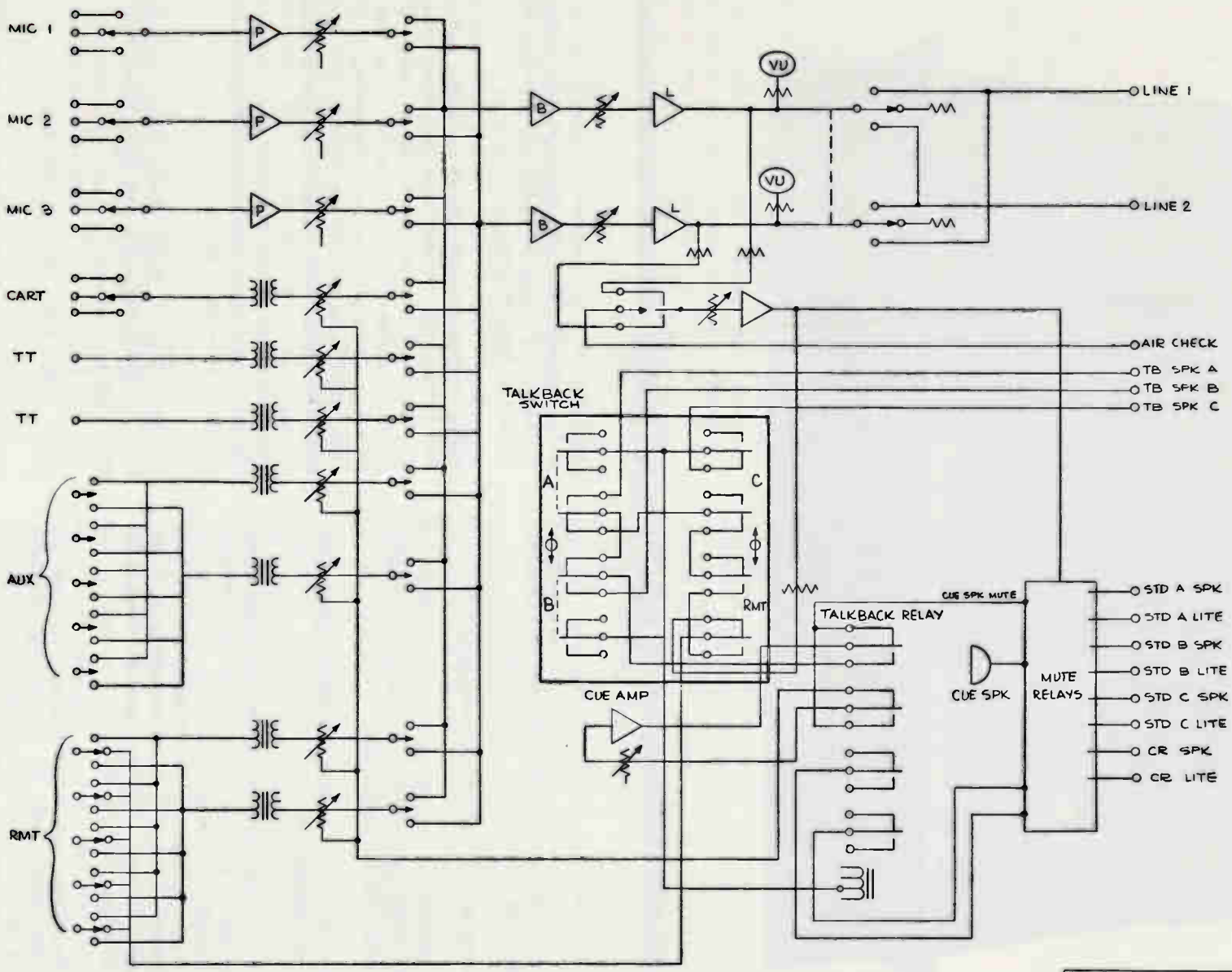
DUAL CHANNEL MONAURAL CONSOLE

FEATURES

- Altec Faders
- Altec Plug-in Solid State Modules
- 100% Solid State
- 100% Magnetic Shielding
- Switchcraft Key Switches
- Three Microphone Channels with three inputs to each
- All Inputs Balanced eliminates ground loops
- Fifteen (15) High Level Inputs
- Nine (9) Low Level Inputs
- Ten (10) High Level Inputs Switchable to Four (4) Faders
- Independent Talk Back Facilities Switchable to 3 studios and five Remote Lines
- Cue Position on Seven (7) Faders
- Ten (10) Faders
- Two (2) Independent Line Amplifiers
- Built-in Voltage Regulated Power Supply
- Plug-in Muting Relays with non-popping transistor switching
- Built-in Cue and Monitor Amplifiers
- Monitor Switchable to Production, Program and Off Air Lines
- Booster Amplifiers in Production and Program Channels
- Front Panel Controls for Production Master, Program Master, Monitor Gain and Cue Gain Amplifiers
- Durable Wood Grain Formica
- Photo Engraved Front Panel
- No Exposed Connections — All Wiring Connections from Within
- Complete Accessibility: —
  Tilt Down Front
  Removable Top
  Removable Sides and Rear

CCA ELECTRONICS CORPORATION
716 JERSEY AVE., GLOUCESTER CITY, NEW JERSEY 08030

BLOCK DIAGRAM



10 FADER DUAL CHANNEL
MONO ULTIMATE CONSOLE

MARCH 19, 1969

C 30,056

CCA "MONO ULTIMATE"

DUAL CHANNEL MONAURAL CONSOLE

FEATURES

- Altec Faders
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  Tilt Down Front
  Removable Top
  Removable Sides and Rear

DESCRIPTION

ULTIMATE IN PARTS, CAPACITY AND FLEXIBILITY

The CCA "Mono-Ultimate Console" reflects the optimum in capacity, flexibility and reliability. The object of this "Ultimate" board is to provide the broadcaster with maximum facilities and highest-quality, field-proven, easily obtainable components. No expense has been spared in obtaining this objective.

A DESCRIPTION OF EACH OF THE CHANNELS FOLLOWS

CHANNELS 1 & 2 "AUXILIARIES"

These two high-level channels have five high-level inputs available which can be switched to either of the two channels. It is impossible for the same input to be connected to both faders simultaneously and thus "segueing" between the two channels with the five high-level inputs can be accomplished. Each fader is of Altec manufacture with removeable covers for cleaning and contain a "Cue" position. The output of each channel is switched to either the production or program lines.

CHANNELS 3 & 4 "MICROPHONE CHANNELS"

Each of these channels have available 3 inputs which inturn are used to drive monaural pre-amplifiers can be used to feed either the left, right or both amplifiers in parallel. This selection can be achieved by a front panel switch.

CHANNELS 5 & 6

These high-level channels are recommended to be used as turntable inputs for both the conventional left and right turntables. In order to achieve the optimum in signal to noise, it is suggested that equalized pre-amps for the turntables be installed in the turntable housings.

CHANNEL 7 – CONTROL ROOM MICROPHONE

This low-level microphone channel has three switchable inputs and is suggested as a channel for the control room microphone. Its output is switchable to both the production and program lines.

CHANNEL 8

This channel is available to be used as a remote high-level mono channel. It contains facilities for selecting one of three inputs and feeding the output of the fader to either the production or program channels. This versatile channel is recommended for cartridge machine inputs.

CHANNELS 9 and 10 – REMOTES

These two channels are similar in construction and philosophy to channels 1 & 2. They are high-level channels with facilities to select any one of five high-level stereo inputs for either of the two channels. It is impossible for both channels to be inadvertently fed with the same input simultaneously. This philosophy provides a "fool-proof" method of switching between two channels without an attendant drop in audio level. In addition, talk back can be achieved to any of the five remote channels. When the input selector switches are in the center position, the monitor will automatically feed the remote lines.

INSULATED HIGH LEVEL INPUTS

Transformers are used in every high-level input. This eliminates problems associated with "ground loops."

FEED BACK PROGRAM TO FIVE REMOTE LINES

The CCA "Mono-Ultimate" has facilities for feeding back program to the five remote lines switchable to channels 9 and 10 which can assist in setting up the remote feed. Although this is an obvious feature for a sophisticated console, it is amazing that so many competitive units do not have this feature.

TALK BACK FACILITY

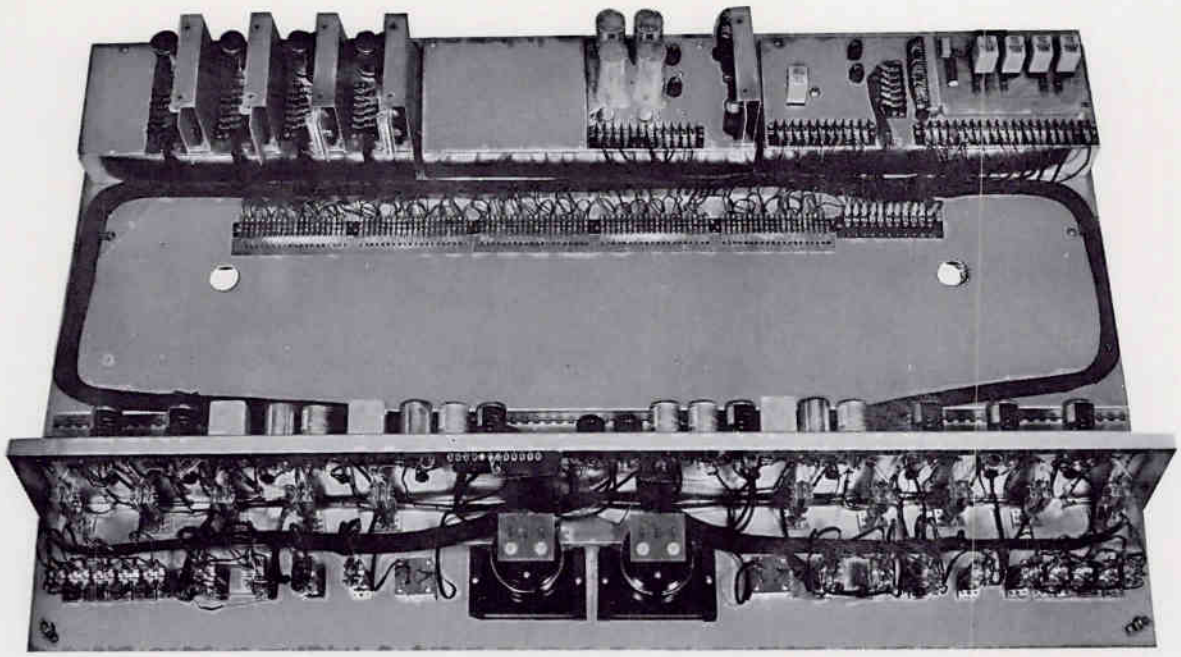
The CCA "Mono-Ultimate" has facilities for talking back to the remote lines as well as to the other studios. Again, this is a feature not present in a number of competitive units.

SWITCHABLE OUTPUT LINES

The CCA "Mono-Ultimate" console has facilities to switch from the front panel, the output of the console from a "normal" to a "reverse" condition. This can serve as an emergency in the event that the program line becomes defective and the "production" output could be used to drive the normal termination for the console.

MUTING RELAYS WITH TRANSISTOR SWITCHING

The CCA "Mono-Ultimate" uses unique circuitry whereby transistors are used to operate the muting relays. These transistors draw a maximum of 1 ma and thus transients and popping are eliminated.



SPECIFICATIONS

MIXING CHANNELS: Total - (10)

AMPLIFIERS PROVIDED: (2) Program, (2) Booster, (1) Monitor, (3) Pre-amplifiers, (1) Cue Amplifier.

OPERATING MODE: Dual Channel-Monaural

INPUT CIRCUITS: (9) for Mics, (2) Turntables, (10) High-Level Lines switchable to Four Faders, (1) External Monitor Input, (3) Cartridge Lines.

OUTPUT LINES: (2) Program, (4) Muted Speaker, (8) Intercom, (2) Headphones

IMPEDANCES: Microphones: 30/50 or 150/250 ohms. Turntable/Tape: 150/250 ohms unbalanced. Remote Lines: 500/600 ohms, balanced. Network: 500/600 ohms. Utility: 500/600 ohms. Programming Output: 500/600 ohms. Audition Output: 500/600 ohms. Intercom Output: 8 ohms. Monitor Speaker Output: 24 ohms @ 10 Watts.

GAIN: Turntable, Tape, Network (high level) Input to program line output, 50 db. To monitor amplifier output, 55 db. From microphone input to program line output, 102 db. Monitor Amplifier Output, 10 Watts. NOTE: All measurements ± 2 db.

RESPONSE: All segments of program circuit ±1 db, 30-15,000 Hz. Monitoring circuit ±1½ db, 30-15,000 Hz. NOTE: Typical response all Circuits: 20-20,000 Hz., ±1 db.

DISTORTION: Any segment of program circuit 0.5% or less between 30-15,000 Hz. at +8 dbm output level or 0.5% at +8 dbm, 50-15,000 Hz. Monitor amplifier 1% at +39 dbm (8 Watts.)

NOISE: Program circuits 70 db or better below +18 dbm output, with -50 dbm input (equivalent noise input is - 120 dbm.) Monitor circuits, 60 db below +39 dbm output. Crosstalk: All circuits below noise level with normal gain settings for proper programming.

CHANNEL ISOLATION: Below Noise level all channels.

POWER: 115 Volts, 50/60 Hz., 1 Phase. Power consumption, 50 watts at 60 Hz.

FINISH: Cabinet, Wood Veneer. Panel, Formica anodized aluminum photo engraved black. Knobs with decal color inserts.

SIZE: 48½" wide, 12" high, 18" deep.

SHIPPING DATA: Packed Weight: Domestic, 220 lbs. Export, 270 lbs. Cubage: 27 cubic feet

OPTIONAL ACCESSORIES: External pre-amplifiers, equalized pre-amps. Matching Transformers: 24 ohms to 8 ohms.

EXPORT SALES: Telesco International Corporation • 171 Madison Avenue • New York, New York 10016

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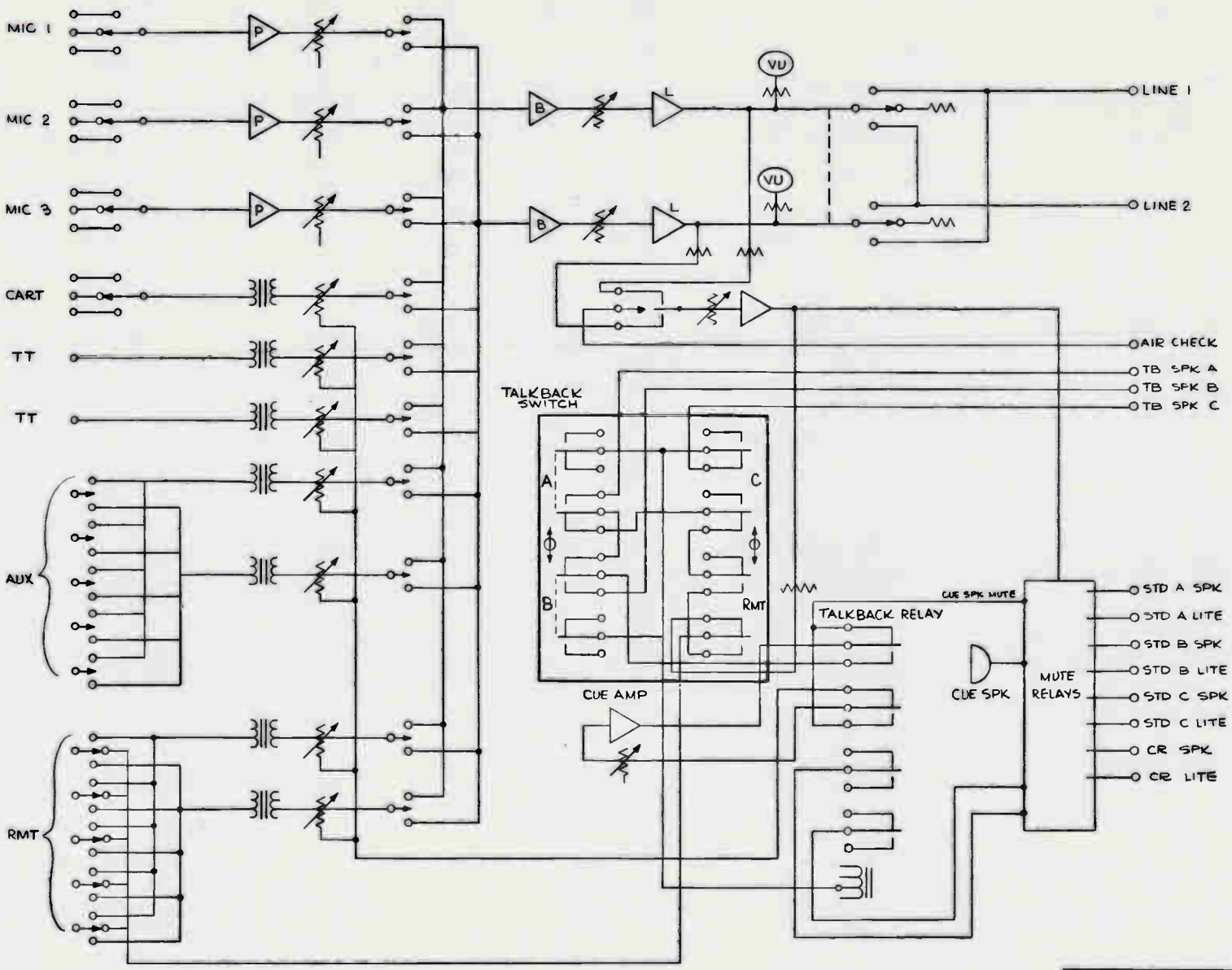
BLOCK DIAGRAM



10 FADER DUAL CHANNEL
MONO ULTIMATE CONSOLE

MARCH 19, 1969

C 30.056

AM BROADCAST ANTENNA PHASING EQUIPMENT

FEATURES

- Custom Built to Meet Consultants Requirements
- All Powers — 25W to 100KW
- All Capacities — Two to Eight Towers
- Single or Multi Patterns
- Front Panel Tuning with Calibrated Controls
- Conservative Components Assure Stability
- Aluminum Shelves provide 100% Shielding Between Branches
- Supplied in Matching Transmitter Cabinets

USES

CCA Electronics phasing systems are used by a host of Broadcasters to achieve their desired antenna radiation patterns. This is accomplished by dividing the transmitter output power into desired magnitudes and phases and distributing these RF energies to particular antennas.

Pictured above is Front View of 3 tower, 5KW, 1 Pattern Phasor presently in service. Note individual calibrated tower controls.

DESCRIPTION

MECHANICAL

CCA phasing equipment is constructed in rugged cabinetry which matches that of the popular CCA transmitters. Generally, one cabinet 77" H x 31" D x 34" W is sufficient for a 3 Tower, 5KW, Single Pattern Phasor. Systems of greater complexities may require more cabinets

All CCA phasors utilize front panel phase and amplitude controls with dials to assist personnel in their settings. Meters are prominently displayed in accordance with design specifications.

Access to all parts can be obtained by opening the rear interlocked door.

Branches of the system are mounted on individual aluminum shelves. These shelves are secured to the aluminum front panel as well as to the sides of the cabinet. This arrangement eliminates all stray couplings between circuits and permits simple adjustment of controls without parasitic coupling to other circuits; which is a common problem when these shields are not used.

Cables may enter the equipment from either the top or base of the cabinet dependent on the custom requirements of the customer.

ELECTRICAL

All CCA Phasors are designed on a custom basis in accordance with the customer's requirements. No production is initiated until the proposed design is approved by the broadcaster's technical consultant.

Desired amplitude and phase parameters are achieved by using conventional circuitry, (generally suggested by the consultant). Normally, phase parameters are attained by utilizing lagging tee networks. The variable induances in the series arms of this network are ganged together and driven from a front panel calibrated control.

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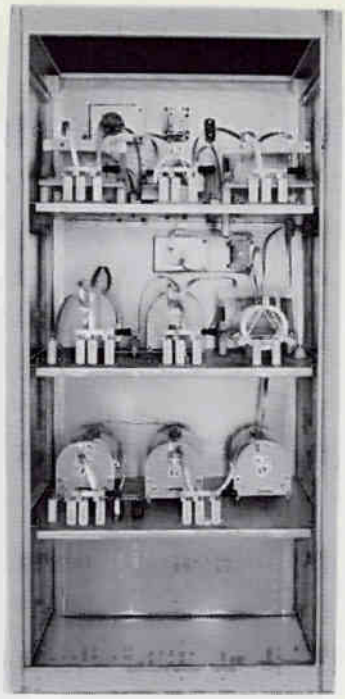
Generally, there exists one independent phase and one amplitude front panel control for each tower in the antenna system.

All coils and capacitors are operated well below their normal ratings. This assures stability of the pattern during actual operation.

CCA mounts all components, where possible, on ⅛" thick aluminum shelves. This arrangement serves to isolate one circuit from another. This form factor is in contrast to the old approaches where parts were mounted on the side walls of the cabinetry, thus allowing for electrostatic and magnetic couplings between circuits. In CCA's more costly type of construction negligible cross coupling exists between circuits. This fact permits rapid initial tune up and stability of operation.

CCA phasing systems are also available in multi-pattern form factors. In these systems independent networks are used for each pattern and dependable "antenna transfer relays" switch in the appropriate circuit. These relays may be operated by remote control.



Rear View - 3 Tower - 5KW - 1 Pattern. Note mounting shelves which shield branches from each other.

CCA – PHASING ACCESSORIES

LTU-D, LINE TERMINATING UNIT

CCA offers a complete line of weatherproof antenna tuning units from 1 KW to 100KW rating. These units are normally included in the basic phasor quotation. For more details, consult the individual catalog sheet on the CCA-LTU.

PHASE SAMPLING LOOPS

In order to monitor the energy supplied to each tower, sampling loops are available as optional items. Cat. No. 173-11-1 is a non-insulated three sided loop which is designed for grounding to the tower leg which serves as the fourth side. The sensitivity is adjusted by varying the distance between the outside leg of the loop and the tower.

Cat. No. 173-11-2 is an insulated loop which can be used with solid outside conductor sampling line. Fully insulated to permit phase sampling without the use of an isolation filter on simple arrays and low impedance towers. Sensitivity adjustment is achieved by varying the loop position in its mounting clamps.

PHASE MONITOR – 108-E

An entire family of monitors is manufactured by Vitro and offered in CCA phasing packages. These instruments, when driven by the sampling loops and transmission line, can provide accurate indications of phase and amplitude of RF energy at each tower. When ordering specify the number of towers.

REMOTE PICK UP DIODE

CCA offers a choice of solid state or vacuum tube diodes with pick up loops which are available for mounting in critical positions of the phasing system to provide monitoring information.

REMOTE METER PANEL

Remote meter panels are available which mount in standard 19" racks. They contain DC meters with special scales. These meters are driven by the remote pick up diodes. Each meter has a calibration potentiometer. Specify the number of meters and full scale calibration when ordering.

AM FIELD INTENSITY METER – NO. 120E

CCA offers a field strength meter manufactured by Vitro. This unit is portable and is necessary to prove that the desired field pattern is achieved.

ISOLATOR – SAMPLING LOOP

Provides high efficiency transfer of a sampling current across tower base insulator. Used on sampling line when tower is ¼ wave or higher, they present a high shunting impedance at the tower base.

CCA-FM-10D, 10 WATT FM BROADCAST TRANSMITTER

FEATURES

- **Designed for Continuous Unattended Service**
- **Wide Frequency Response ± 1 DB - 50 to 15,000 Hz**
- **Low Distortion - 1% maximum**
- **Injection Circuit for Multiplex**
- **No Requirement for Neutralization**
- **Compact - Less than 6 cu. ft.**
- **Semi-Portable - Less than 75 lbs.**
- **No Requirement for Frequency Monitor**

USES

The FM-10D is designed to serve as a Broadcast Transmitter for low power educational facilities in the United States or as a reliable, inexpensive stand-by exciter for higher power Broadcast Transmitters.

The FM-10D, with an appropriate receiver and antenna also, has wide application to serve as a high fidelity interconnection between the studio and transmitter of our international customers. This approach is, in many cases, a more economical, technically superior, and more reliable approach than existing land lines. With the addition of a Subsidiary Generator, a second high fidelity signal can be simultaneously transmitted.

DESCRIPTION

MECHANICAL

The CCA FM-10D is supplied in a modern, table top cabinet. All tuning controls are available from the front panel.

ELECTRICAL

The FM-10D is a crystal controlled phase modulated exciter. This super stable, high fidelity unit incorporates the most popular of all FM Broadcast Transmitters. Frequency stability of .001% is assured by utilizing conventional pulse shaping and phase modulating circuits.

The RF frequency multipliers are driven into saturation thus reducing the AM hum to a negligible value. It should be noted that no RF stage operates as an on frequency amplifier. This eliminates the problem of neutralization and assures freedom from parasitics and continuity of programming. All circuits of the exciter can be tuned from the front by simply adjusting the coils for a peak reading indication on their respective stages. A front panel meter is available for analyzing this tuning. After the initial adjustment, it is very unlikely that any retuning will be required. The output of the transmitter is a minimum ten watts at the carrier frequency of the transmitter.

Front View of FM-10D

SPECIFICATIONS

Type of Emission - FM; **Frequency Range** - 50 - 160 MHz; **Rated Power Output** - 10 Watts; **Output Impedance** - 50 - 160 MHz; **Audio Input Impedance** - 600 ohms; **Audio Input Level** - 10 dbm ±2; **Frequency Response** - ±1 db 50 to 15,000 Hz; Frequency Stability - .001%; **Modulation Capability** - ±100 KHz; **Audio Distortion** - 1% Max.; **FM Noise Below** - ±75 KHz - 65 db; **Harmonic Attenuation** - 65 db; **Line Voltage** - 115/230, 50/60 Hz (Specify;) **Power Consumption** - 125 Watts, Max.; **Width** - 23¼", **Depth** - 25¼", **Height** - 25", **Gross Weight** - 100 lbs.; **Gross Cubage** - 8 Cu. Ft.

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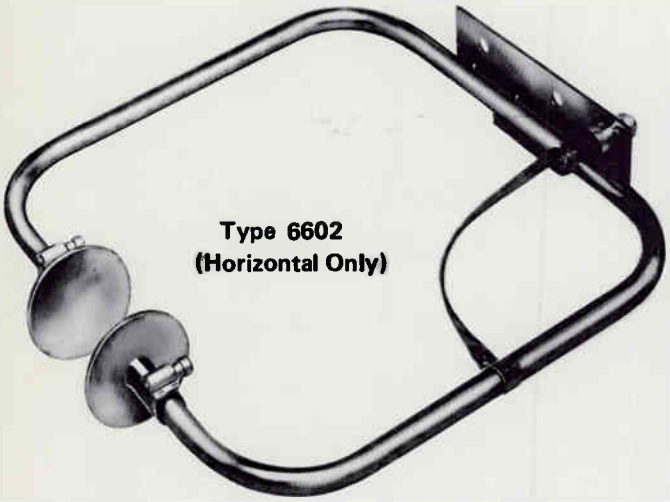
CCA - FM EDUCATIONAL BROADCAST ANTENNAS



Type 6602
(Horizontal Only)

- Attractively Priced
- Available for Horizontal Only (Type 6602) or Circular (Type 6812) Polarization
- Minimum Tower Loading
- Simplicity of Installation
- Available 1 to 16 Byas
- Can Handle 1 KW Input
- Stainless Steel Construction

Type 6812
(Circular Only)

DESCRIPTION

The CCA FM Antennas are designed to provide the Educational Broadcaster with a rugged, reliable, professional antenna for their FM Broadcast facility. These elements are attractively priced, represent a minimum of windloading and can be installed in a minimum of time with inexperienced personnel.

Antennas are available in combinations of 1 to 16 Bays.

Each element is supplied with **"U" Bolts for mounting to** conventional 2" or 3" pipes.

They are spaced approximately 10 feet apart and are interconnected with RG-8AU cable when fed with powers up to 500 Watts, and with teflon cable when the power is greater than 500 Watts. These antennas are fed from the bottom when the system is 8 Bays or less and from the center above 8 Bays. Normal fittings are type "N."

TECHNICAL SPECIFICATIONS (at 90 MHz)

Maximum Gain @ 90 MHz										
No. of Bays	6602		6812		6602			6812		
	Power	DB	Power	DB	Length	Weight	Windload	Length	Weight	Windload
1	.95	0	.475	-3	0.5	5	8	1.5	5	15
2	1.9	2.8	.95	-0.2	10.3	10	31	11.9	10	40
3	3.0	4.7	1.5	1.7	21.1	15	54	22.3	15	65
4	4.1	6.1	2.05	3.1	31.0	20	77	32.7	20	90
5	5.2	7.1	2.6	4.1	41.0	25	100	43.1	25	115
6	6.3	8.0	3.15	5.0	51.5	30	123	53.5	30	140
7	7.3	8.6	3.65	5.6	62.0	35	146	63.9	35	165
8	8.4	9.2	4.2	6.2	72.0	40	169	74.3	40	190
10	10.5	10.2	5.25	7.2	93.0	50	215	95.1	50	240
12	12.5	11.0	6.25	8.0	114.0	60	261	115.9	60	290
14	14.6	11.6	7.3	8.6	134.0	70	307	136.7	70	340
16	16.7	12.2	8.35	9.2	155.5	80	353	157.5	80	390

Windload calculated on basis of 50/33 PST EIA circuits.

Connector - Type N, Female; -

Polarization - Type 6602 - Horizontal
Type 6812 - Circular

VSWR - 1.2:1 over ±100 KHz on mast; 1.5:1 on Tower

Circularity - ±1.5 db in free space.

De-icers Available - Optional.

FM-250D/DS, 250 WATT FM BROADCAST TRANSMITTER

FEATURES

- FCC Type Accepted
- Modern 8122 in PA
- Conventional, Standard Components
- Conservatively Rated For Continuous Duty
- Automatic Overload Recycling
- Solid State Silicon Rectifiers
- Occupies Only 4 Square Feet of Floor Area
- Designed for Remote Control
- Multiplex and Stereo Operation
- Minimum Tube Costs
- Maximum Accessibility

USES:

The CCA FM-250D/DS is a conservatively rated 250 Watt FM Broadcast Transmitter. This transmitter combined with a modest antenna gain, can adequately service a small city. It can also be used by our international customers as a long distance STL Transmitter.

The FM-250D/DS is also attractive to the higher power broadcaster who desires a reliable, inexpensive standby transmitter.

FM-250D/DS FRONT VIEW
(With Monaural Exciter)

DESCRIPTION

MECHANICAL

The FM-250D/DS is self contained in an attractive custom cabinet. The entire unit is only 76" H x 23" W x 24" D.

Due to vertical panel construction, all parts can be easily seen at a glance.

The transmitter contains all front panel controls required to tune and operate the equipment. The normal operating controls are located at shoulder level on the meter panel. In addition, individual switches are available on the control panel for preliminary tune up and engineering analysis.

The transmitter has meters for monitoring every circuit. This includes a front panel meter for monitoring both incident and reflected power.

Front Panel lights describe the status of every major function of the control system.

Forced air cooling of the final power amplifier provides ten times the air recommended by the tube manufacturer. This fact, together with conservative operation assures excellent tube life.

The exhaust air is ducted to the top of the equipment. Generally, no additional ducting is required providing that fresh air is available to the transmitter.

ELECTRICAL

Control:

The control circuit of the FM-250D/DS has been designed with the remote control in mind. Although the major circuits are protected by circuit breakers and fuses, the actual application of filament and plate voltages are accomplished by contactors. Although facilities exist for independent operation of exciter and PA, in normal practice, the engineer need only turn the shoulder high two main control switches. An automatic overload recycling circuit exists which restores the equipment to operation in the event of a fault due to some transient nature. In the event of a major fault the plate voltage will be removed unless restored by the operator.

Exciter:

The FM-250D/DS is available with two models of exciters. The less expensive but substantial unit is essentially a conventional phase modulated exciter which can be utilized for low distortion, high fidelity and monaural operation with simultaneous subsidiary service. A somewhat more expensive exciter is available in the stereo version of this transmitter. Customers may purchase the monaural exciter and will be given substantial credit

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for the exchange of same in the event that they should desire the direct FM unit for stereo operation at any future date providing they purchase the CCA stereo generator.

PA:

A modern, inexpensive ceramic tetrode—the 8122 is used as a power amplifier. This 400 Watt dissipation tube can easily produce the desired 250 Watt output. Pi networks exist in both the input and output circuits of this stage. Each network contains an independent tuning and loading control. The 8122 is designed for UHF operation. Thus, the tube requires no neutralization at the comparatively low FM broadcast frequencies.

Power Supplies:

All power supplies within the FM-250D/DS use solid state silicon rectifiers. Special care has been given in selecting silicons with proven performance and with extremely conservative ratings. In addition, the transmitter incorporates circuitry which assures protection against line surges.

ACCESSORY EQUIPMENT

SC-1D SUBSIDIARY GENERATOR

CCA offers as an accessory item an inexpensive but reliable multiplex generator. This unit can be used with any modern FM transmitter to produce an auxiliary audio channel which can simultaneously be operated with the main audio channel. With only a modest reduction of modulation of the main carrier, two CCA type SC-1D generators may be used to produce a high quality system with simultaneous main and two auxiliary channel capacity. When ordering, specify frequency of subcarriers.

SG-1D STEREO GENERATOR

Designed to be used in conjunction with a direct FM exciter to produce high fidelity, super performing stereo operation. An individual catalog sheet is available which describes the generator in detail.

LA-1D AUDIO LIMITER

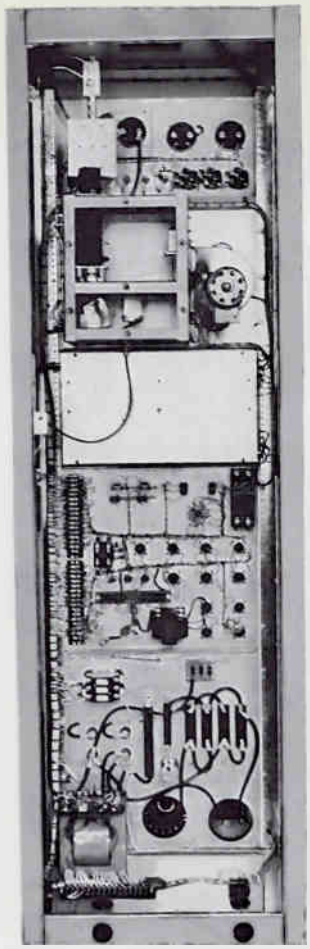
An essential unit in every broadcast facility is a device to prevent overmodulation of the carrier. The CCA LA-1D efficiently and inexpensively performs this task by preventing audio peaks from modulating the transmitter. Details available in a separate catalog sheet.

AGC-1D AUDIO AGC AMPLIFIER

The CCA AGC-1D is designed to maintain the average level of broadcast programming to a relatively constant high value. This device eliminates the requirement for constant operation of console controls when switching from one program source to another.

RC-1D REMOTE CONTROL

The CCA-RC-1D is available to those broadcasters who desire to operate their transmitter from a remote point. It provides ten control functions and ten metering positions—more than adequate for the most complicated station facility.



FM-250D/DS REAR VIEW

Note full accessibility, 100% RF Shielding, Silicon Rectifiers, Substantial Blower.

TECHNICAL SPECIFICATIONS

Power Output	275W
Frequency Range	50 - 150 MHz
Frequency Stability	.001%
RF Output Impedance	50 ohms
(fitting)	Type N
AF Input Impedance	600 ohms
AF Input Level @ 100% Modulation	+ 10 dbm Max.
AF Response (50 - 15,000 cycles monaural)	±1 db
AF Distortion (50 - 15,000 cycles monaural)	1%
FM Noise (below 100% Modulation)	-65 db
AM Noise	-55 db
Line Voltage	208V/230V
Line Frequency	50/60 cycles
Phase	1
Power Consumption	750 Watts
Dimensions	23" W x 24" D x 76" H
Gross Cubage	48 Cu. Ft.
Gross Weight	650 lbs.
PA Tube	8122
Harmonic Level (below corver)	- 70 db

FM-5,000D/DS 5KW FM BROADCAST TRANSMITTER

FEATURES

- High Mu Zero Bias Triode in PA
- True Grounded Grid Circuitry
- No Requirement for Neutralization
- Modern Ceramic PA & IPA Tubes
- Conservatively Rated — Tube Capability is 7.5KW Output
- Available with Monaural or Stereo Exciters
- Designed for Subsidiary Service
- Solid State Silicon Rectifiers
- Automatic Overload Recycling
- Minimum Floor Space — One Cabinet
- Full Accessibility — Hinged Meter Panel

MECHANICAL DESCRIPTION

The FM-5000D/DS is self-contained in a medium sized cabinet. Full access to all parts is assured by entering either the front or rear doors, the interlocked RF covers or the hinged meter and control panel. No other FM Transmitter offers as much accessibility as the CCA FM-5000D/DS Transmitter. Forced air cooling with 200% reserve is utilized for maintaining the components well below 50% of the maximum ratings of the tube manufacturer. All operating controls are at convenient hip level. All tuning controls are with calibrated knobs. There is no requirement to enter the equipment for tuning or adjustments. Front panel lights indicate the status of all circuits. A directional coupler and harmonic filter are mounted external to the equipment but are supplied with the original price.

ELECTRICAL DESCRIPTION

EXCITER

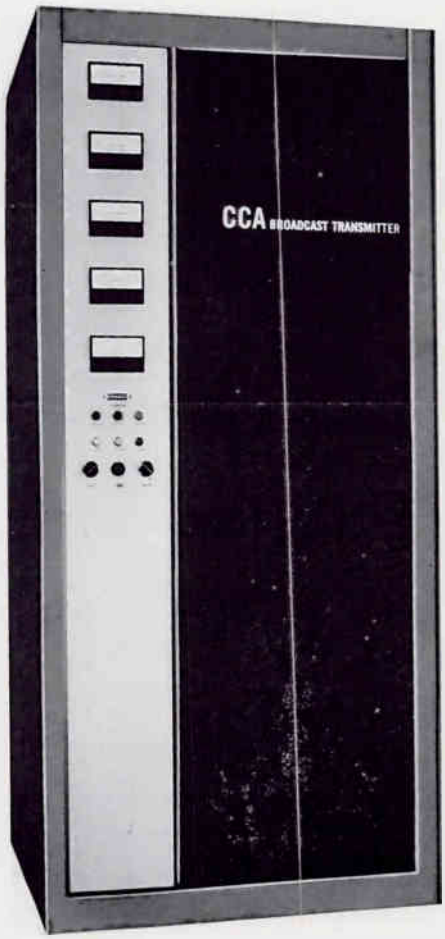
The FM-5000D/DS is available with two models of exciters. The less expensive but substantial unit is essentially a conventional phase modulated exciter which can be utilized for low distortion, high fidelity and monaural operation with simultaneous subsidiary service. A somewhat more expensive exciter is available in the stereo version of this transmitter. Customers may purchase the monaural exciter and will be given substantial credit for the exchange of same in the event that they should desire the direct FM unit for stereo operation.

IPA

A 4CX1000K tetrode is used as an intermediate power amplifier. This stage requires less than 2 watts of drive to achieve 1500w output—much greater than the 250 watts required from this stage. No requirement for neutralization exists.

PA

The modern ceramic 3CX3000A7 serves as the final power amplifier. This high MU triode has a power gain of 20 and is operated with its grid connected directly to dc ground. This true grounded grid configuration achieves perfect isolation between input and output circuits and eliminates any possibility of instability and requirement for neutralization. The output circuit of this stage is a modified pi network with independent calibrated controls for tuning and loading



FM-5,000D/DS — FRONT VIEW

POWER SUPPLIES—All power supplies utilize field proven solid state rectifiers, with PIV safety factors of 200% and current reserve of 2000%.

CONTROL CIRCUIT—The FM-5000D/DS is desired to be operated unattended and by remote control. All major supplies are protected by circuit breakers and fast acting overload relays. A three cycle automatic recycling system with an "electronic brain" as well as "after cooling" are additional features of this superior control system.

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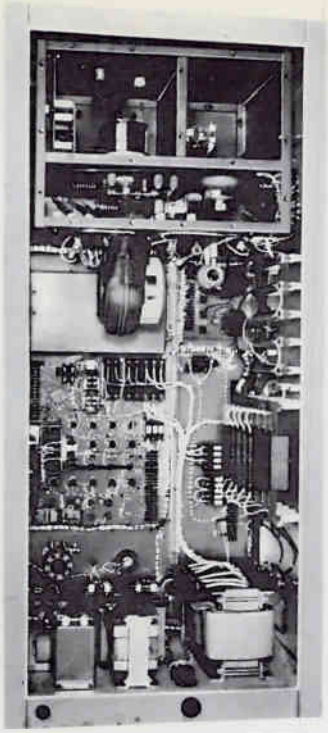

Rear View — Note Full Accessibility, Complete RF Shielding, Silicon Rectifiers, and Rugged, Substantial Power Supply Components.

ACCESSORY EQUIPMENT

SC-1D SUBSIDIARY GENERATOR

CCA offers as an accessory item an inexpensive but reliable multiplex generator. This unit can be used with any modern FM transmitter to produce an auxiliary audio channel which can simultaneously be operated with the main audio channel. With only a modest reduction of modulation of the main carrier, two CCA type SC-1D generators may be used to produce a high quality system with simultaneous main and two auxiliary channel capacity. When ordering, specify frequency of subcarriers.

SG-1D STEREO GENERATOR

Designed to be used in conjunction with a direct FM exciter to produce high fidelity, super performing stereo operation. An individual catalog sheet is available which describes the generator in detail.

CBS FM VOLUMAX

An essential unit in every broadcast facility is a device to prevent overmodulation of the carrier. The CBS Volumax efficiently and inexpensively performs this task by preventing audio peaks from modulating the transmitter. Details available in a separate catalog sheet.

AGC-1D AUDIO AGC AMPLIFIER

The CCA AGC-1D is designed to maintain the average level of broadcast programming to a relatively constant high value. This device eliminates the requirement for constant operation of console controls when switching from one program source to another.

RC-1D REMOTE CONTROL

The CCA-RC-1D is available to those broadcasters who desire to operate their transmitter from a remote point. It provides ten control functions and ten metering positions—more than adequate for the most complicated station facility.

"THIRD GENERATION" FM BROADCAST TRANSMITTER

CCA is the only major equipment supplier who can provide today FM high power transmitters which contain high mu-zero bias triodes—"Third Generation FM Design".

Originally, when the "First Generation" of broadcast transmitters were produced in 1948, they utilized low mu, grounded grid triodes. These designs, in general, were very stable due to the grounded grid configuration. However, the use of the low mu triodes required excessive drive to achieve rated power output. Thus, a 1KW driver was required to produce 3KW; a 3KW driver for 10KW output, etc.

The "Second Generation" designs that were introduced in 1958 utilize high gain tetrodes in their final stages. They required a minimum of RF drive but the necessity for neutralizing these tetrodes and their attendant instabilities have represented a constant source of technical problems for the modern FM operator.

CCA "Third Generation" FM designs solve the problems present in its predecessors. True, grounded grid circuitry with the grid connected directly to DC ground assures perfect stability. The use of "high mu" triodes with power gains of 20 require modest RF drives. The elimination of by pass capacitors, bias and screen supplies results in the most simple, reliable, trouble free 5KW FM transmitter commercially available.

TECHNICAL SPECIFICATIONS

Power Output Capability	6000W
Frequency Range	50 - 150 MHz
Frequency Stability	.001%
RF Output Impedance	50 ohms
(fitting)	1⅝"
AF Input Impedance	150/600 ohms
AF Input Level @ 100% Mod	+10 dbm Max.
AF Response (with 75 us pre-emphasis)	
50 - 15,000 Hz (phase) (Mono)	±1 db
30 - 15,000 Hz (direct FM) (Mono)	±1 db
AF Distortion (Maximum)	1%
Noise (below 100% Mod.)	-65 db
Line Voltage	230/380V
Line Frequency	50/60 Hz
Phase	3
Power Consumption (Approx.)	8KW
Net Dimensions (W x H x D) inches	34 x 76 x 31
Gross Cubeage Cu. Ft.	100
Gross Weight Lbs.	1700
PA Tube	3CX3000A7
Harmonic Level (below carrier)	-80 db

FM-10,000D/DS, 10KW FM BROADCAST TRANSMITTER

FEATURES

- High Mu Zero Bias Triode in PA
- True Grounded Grid Circuitry
- No Requirement for Neutralization
- Modern Ceramic PA & IPA Tubes
- Conservatively Rated — Tube Capability is 15KW Output
- Available with Monaural or Stereo Exciters
- Designed for Subsidiary Service
- Solid State Silicon Rectifiers
- Automatic Overload Recycling
- Minimum Floor Space — One Cabinet
- Full Accessibility — Hinged Meter Panel

MECHANICAL DESCRIPTION

The FM-10,000D/DS is self-contained in a medium sized cabinet. Full access to all parts is assured by entering either the front or rear doors, the interlocked RF covers or the hinged meter and control panel. No other FM Transmitter offers as much accessibility as the CCA FM-10,000D/DS Transmitter. Forced air cooling with 200% reserve is utilized for maintaining the components well below 50% of the maximum ratings of the tube manufacturer. All operating controls are at convenient hip level. All tuning controls are with calibrated knobs. There is no requirement to enter the equipment for tuning or adjustments. Front panel lights indicate the status of all circuits. A directional coupler and harmonic filter are mounted external to the equipment but are supplied with the original price.

ELECTRICAL DESCRIPTION

EXCITER

The FM-10,000D/DS is available with two models of exciters. The less expensive but substantial unit is essentially a conventional phase modulated exciter which can be utilized for low distortion, high fidelity and monaural operation with simultaneous subsidiary service. A somewhat more expensive exciter is available in the stereo version of this transmitter. Customers may purchase the monaural exciter and will be given substantial credit for the exchange of same in the event that they should desire the direct FM unit for stereo operation.

IPA

A 4CX1000K tetrode is used as an intermediate power amplifier. This stage requires less than 2 watts of drive to achieve 1KW output—much greater than the 500 watts required from this stage. Since its screen grid is connected directly to dc ground no requirement for neutralization exists.

PA

The modern ceramic 3CX10,000A7 serves as the final power amplifier. This high MU triode has a power gain of 20 and

FM-10,000D/DS — Front View

is operated with its grid connected directly to dc ground. This true grounded grid configuration achieves perfect isolation between input and output circuits and eliminates any possibility of instability and requirement for neutralization. The PA tube operates with a dissipation of only 30% of its maximum rating. Thus, substantial tube life and minimum tube expense can be assured. The output circuit of this stage is a modified pi network with independent calibrated controls for tuning and loading.

POWER SUPPLIES—All power supplies utilize field proven solid state rectifiers, with PIV safety factors of 200% and current reserve of 2000%.

CONTROL CIRCUIT—The FM-10,000D/DS is designed to be operated unattended and by remote control. All major supplies are protected by circuit breakers and fast acting overload relays. A three cycle automatic recycling system with an "electronic brain" as well as "after cooling" are additional features of this superior control system.

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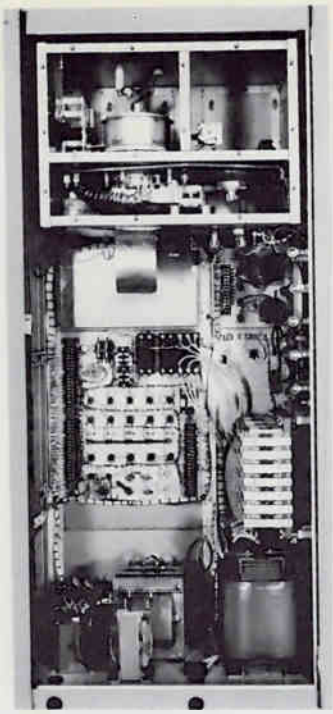
"THIRD GENERATION" FM BROADCAST TRANSMITTER

CCA is the only major equipment supplier who can provide today FM high power transmitters which contain high mu-zero bias triodes—"Third Generation FM Design".

Originally, when the "First Generation" of broadcast transmitters were produced in 1948, they utilized low mu, grounded grid triodes. These designs, in general, were very stable due to the grounded grid configuration. However, the use of the low mu triodes required excessive drive to achieve rated power output. Thus, a 1KW driver was required to produce 3KW; a 3KW driver for 10KW output, etc.

The "Second Generation" designs that were introduced in 1958 utilize high gain tetrodes in their final stages. They required a minimum of RF drive but the necessity for neutralizing these tetrodes and their attendant instabilities have represented a constant source of technical problems for the modern FM operator.

CCA "Third Generation" FM designs solve the problems present in its predecessors. True, grounded grid circuitry with the grid connected directly to DC ground assures perfect stability. The use of "high mu" triodes with power gains of 20 require modest RF drives. The elimination of by pass capacitors, bias and screen supplies results in the most simple, reliable, trouble free 10KW FM Transmitter commercially available.



Rear View — Note Full Accessibility, Complete RF Shielding, Silicon Rectifiers, and Rugged, Substantial Power Supply Components.

ACCESSORY EQUIPMENT

SC-1D SUBSIDIARY GENERATOR

CCA offers as an accessory item an inexpensive but reliable multiplex generator. This unit can be used with any modern FM transmitter to produce an auxiliary audio channel which can simultaneously be operated with the main audio channel. With only a modest reduction of modulation of the main carrier, two CCA type SC-1D generators may be used to produce a high quality system with simultaneous main and two auxiliary channel capacity. When ordering, specify frequency of subcarriers.

SG-1D STEREO GENERATOR

Designed to be used in conjunction with a direct FM exciter to produce high fidelity, super performing stereo operation. An individual catalog sheet is available which describes the generator in detail.

CBS FM VOLUMAX

An essential unit in every broadcast facility is a device to prevent overmodulation of the carrier. The CBS Volumax efficiently and inexpensively performs this task by preventing audio peaks from modulating the transmitter. Details available in a separate catalog sheet.

AGC-1D AUDIO AGC AMPLIFIER

The CCA AGC-1D is designed to maintain the average level of broadcast programming to a relatively constant high value. This device eliminates the requirement for constant operation of console controls when switching from one program source to another.

RC-1D REMOTE CONTROL

The CCA-RC-1D is available to those broadcasters who desire to operate their transmitter from a remote point. It provides ten control functions and ten metering positions—more than adequate for the most complicated station facility.

TECHNICAL SPECIFICATIONS

Power Output Capability	12,000W
Frequency Range	50 - 150MHz
Frequency Stability	.001%
RF Output Impedance	50 ohms
(fitting)	3⅛"
AF Input Impedance	150/600 ohms
AF Input Level @ 100% Mod.	+10 dbm Max.
AF Response (with 75 us pre-emphasis)	
50 - 15,000 Hz (Mono)	±1 db
AF Distortion (Maximum) (Mono)	1%
Noise (below 100% Mod.)	-65 db
Line Voltage	208/230V
Line Frequency	50/60 Hz
Phase	3
Power Consumption (Approx.)	15KW
Net Dimensions (W x H x D) inches	34 x 76 x 32
Gross Cubeage Cu. Ft.	110
Gross Weight Lbs.	2000
PA Tube	3CX10, 000A7
Harmonic Level	
(below carrier)	-80 db

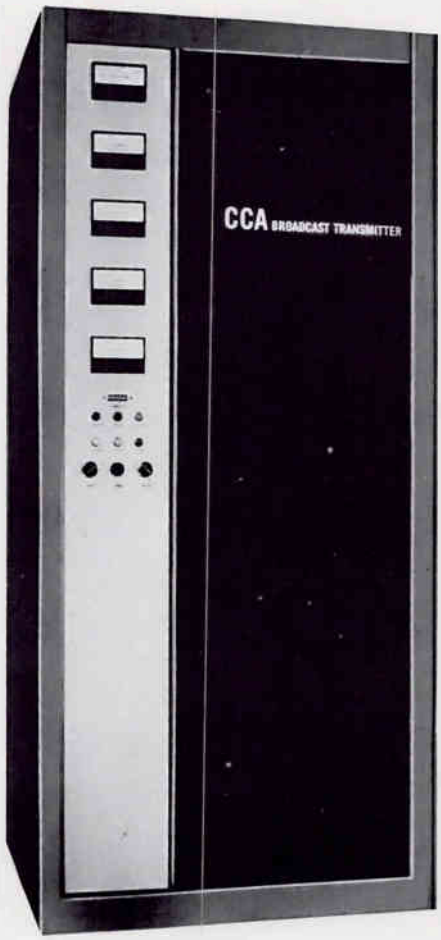
FM-20,000D/DS, 20KW FM BROADCAST TRANSMITTER

FEATURES

- High Mu Zero Bias Triode in PA
- True Grounded Grid Circuitry
- No Requirement for Neutralization
- Modern Ceramic PA & IPA Tubes
- Conservatively Rated — Tube Capability is 24KW Output
- Available with Monaural or Stereo Exciters
- Designed for Subsidiary Service
- Solid State Silicon Rectifiers
- Automatic Overload Recycling
- Full Accessibility — Hinged Meter Panel

MECHANICAL DESCRIPTION

The FM-20,000D/DS occupies one cabinet and an external vault. Full access to all parts is assured by entering either the front or rear doors, the interlocked RF covers or the hinged meter and control panel. No other FM Transmitter offers as much accessibility as the CCA FM-20,000D/DS Transmitter. Forced air cooling with 200% reserve is utilized for maintaining the components well below 50% of the maximum ratings of the tube manufacturer. All operating controls are at convenient hip level. All tuning controls are with calibrated knobs. There is no requirement to enter the equipment for tuning or adjustments. Front panel lights indicate the status of all circuits. A directional coupler and harmonic filter are mounted external to the equipment but are supplied with the original price.



FM-20,000D/DS — FRONT VIEW

ELECTRICAL DESCRIPTION

EXCITER

The FM-20,000D/DS is available with two models of exciters. The less expensive but substantial unit is essentially a conventional phase modulated exciter which can be utilized for low distortion, high fidelity and monaural operation with simultaneous subsidiary service. A somewhat more expensive exciter is available in the stereo version of this transmitter. Customers may purchase the monaural exciter and will be given substantial credit for the exchange of same in the event that they should desire the direct FM unit for stereo operation.

INTERMEDIATE POWER AMPLIFIERS

An 8122 and 5CX1500A are used as an intermediate power amplifier. This combination requires less than 2 watts of drive to achieve 2.5KW output—much greater than the 1000 watts required from this stage. No requirement for neutralization exists.

PA

The modern ceramic 3CX10,000A7 serves as the final power amplifier. This high MU triode has a power gain of 20 and is operated with its grid connected directly to dc ground. This true grounded grid configuration achieves perfect isolation between input and output circuits and eliminates any possibility of instability and requirement for neutralization. The PA tube operates with a dissipation of only 70% of its maximum rating. Thus, substantial tube life and minimum tube expense can be assured. The output circuit of this stage is a modified pi network with independent calibrated controls for tuning and loading.

POWER SUPPLIES—All power supplies utilize field proven solid state rectifiers, with PIV safety factors of 200% and current reserve of 1000%.

CONTROL CIRCUIT—The FM-20,000D/DS is designed to be operated unattended and by remote control. All major supplies are protected by circuit breakers and fast acting overload relays. A three cycle automatic recycling system with an "electronic brain" as well as total protection are additional features of this superior control system.

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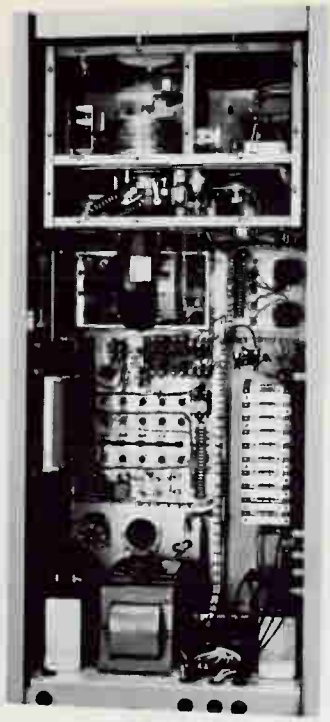


Rear View — Note Full Accessibility, Complete RF Shielding, Silicon Rectifiers, and Rugged, Substantial Power Supply Components.

ACCESSORY EQUIPMENT

SC-1D SUBSIDIARY GENERATOR

CCA offers as an accessory item an inexpensive but reliable multiplex generator. This unit can be used with any modern FM transmitter to produce an auxiliary audio channel which can simultaneously be operated with the main audio channel. With only a modest reduction of modulation of the main carrier, two CCA type SC-1D generators may be used to produce a high quality system with simultaneous main and two auxiliary channel capacity. When ordering, specify frequency of subcarriers.

SG-1D STEREO GENERATOR

Designed to be used in conjunction with a direct FM exciter to produce high fidelity, super performing stereo operation. An individual catalog sheet is available which describes the generator in detail.

CBS FM VOLUMAX

An essential unit in every broadcast facility is a device to prevent overmodulation of the carrier. The CBS Volumax efficiently and inexpensibely performs this task by preventing audio peaks from modulating the transmitter. Details available in a separate catalog sheet.

AGC-1D AUDIO AGC AMPLIFIER

The CCA AGC-1D is designed to maintain the average level of broadcast programming to a relatively constant high value. This device eliminates the requirement for constant operation of console controls when switching from one program source to another.

RC-1D REMOTE CONTROL

The CCA-RC-1D is available to those broadcasters who desire to operate their transmitter from a remote point. It provides ten control functions and ten metering positions—more than adequate for the most complicated station facility.

"THIRD GENERATION" FM BROADCAST TRANSMITTER

CCA is the only major equipment supplier who can provide today FM high power transmitters which contain high mu-zero bias triodes — "Third Generation FM Design"

Originally, when the "First Generation" of broadcast transmitters were produced in 1948, they utilized low mu, grounded grid triodes. These designs, in general, were very stable due to the grounded grid configuration. However, the use of the low mu triodes required excessive drive to achieve rated power output. Thus, a 1KW driver was required to produce 3KW; a 3KW driver for 10KW output, etc.

The "Second Generation" designs that were introduced in 1958 utilize high gain tetrodes in their final stages. They required a minimum of RF drive but the necessity for neutralizing these tetrodes and their attendant instabilities have represented a constant source of technical problems for the modern FM operator.

CCA "Third Generation" FM designs solve the problems present in its predecessors. True, grounded grid circuitry with the grid connected directly to DC ground assures perfect stability. The use of "high mu" triodes with power gains of 20 require modest RF drives. The elimination of by pass capacitors, bias and screen supplies results in the most simple, reliable, trouble free 20KW FM Transmitter commercially available.

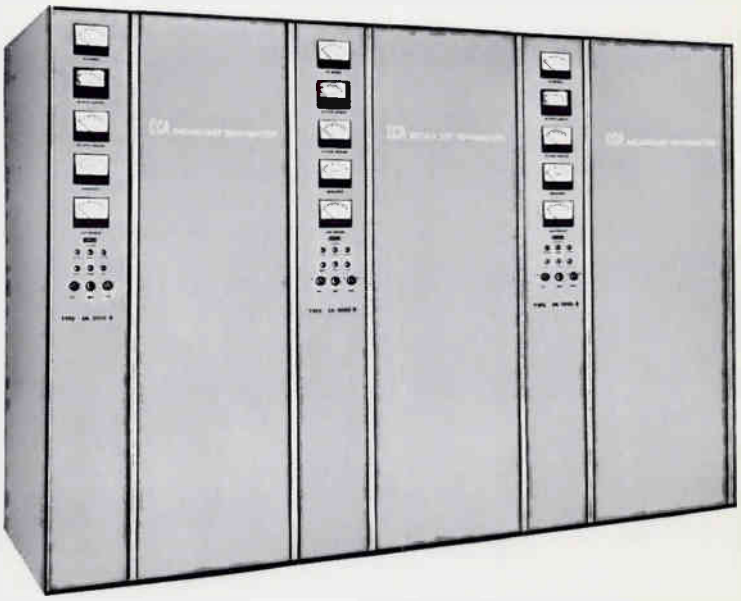
TECHNICAL SPECIFICATIONS

Power Output Capability	22,000W
Frequency Range	50 - 150 MHz
Frequency Stability	.001%
RF Output Impedance	50 ohms
(fitting)	3⅛"
AF Input Impedance	150/600 ohms
AF Input Level @ 100% Mod	+10 dbm Max.
AF Response (with 75 us pre-emphasis) 50 - 15,000 Hz (Mono)	±1 db
AF Distortion (Maximum) (Mono)	1%
Noise (below 100% Mod.)	-65 db
Line Voltage	208/230V
Line Frequency	50/60 Hz
Phase	3
Power Consumption (Approx.)	30KW
Net Dimensions (W x H x D) Cabinet	34" x 76" x 32"
Gross Cubeage Cu. Ft.	110
Gross Weight Lbs.	2700
PA Tube	3CX10, 000A7
Harmonic Level (below carrier)	-80 db

AM-50,000D, 50KW AM BROADCAST TRANSMITTER

FEATURES

- Modern 4CX35000C in PA
- Conventional Standard High Level Modulation
- Lowest Tube Costs
- Silicon Power Supply
- Minimum Floor Space
- Standard Circuitry — Can be operated by average personnel
- Minimum Operating Voltages only 9KV on Plate
- Minimum Sensitivity to Antenna Impedance Changes
- Full Accessibility to all parts in seconds



USES

The CCA AM-50,000D, 50KW AM Transmitter is a high power, reliable broadcast transmitter which has been designed to be operated by comparatively untrained personnel. Its basic design is such that its operation is not dependent on critical settings or tuning procedures and the transmitter is essentially independent of antenna impedance changes. These basic characteristics of a high level, plate modulated transmitter such as the CCA AM-50,000D is not available in competitive phase type, or lineal systems.

DESCRIPTION

MECHANICAL

The AM-50,000D is housed in three medium sized cabinets. This rather small size is unusual for transmitters of this power level but the AM-50,000D incorporates contemporary tube designs that require a minimum of RF drive and occupy relatively small space. In addition, the transmitter is air-cooled and thus a tremendous reduction in floor space is achieved by eliminating the requirement for water cooling.

Access to all parts can be easily obtained by entrance through the rear interlocked doors, the front doors and the hinged interlocked RF compartment door.

Construction of the transmitter has been such that vertical panel construction is emphasized. Thus, blind spots caused by shelf type assembly is reduced to a minimum. In practically all cases, every part can be seen at a glance by simply opening the appropriate interlocked entrance.

Attractive, rugged, full-sized meters are prominently displayed on the front of the cabinet. These meters indicate the status of every major circuit in the equipment.

Access to all circuits which contain exposed terminals with 300 volts or greater is accomplished through interlocked doors. This fact, together with fast acting bleeder circuitry and automatic shorting of the power supplies to ground protect personnel from unintentionally harming themselves from electrical potentials. In addition to the meters, panel lights exist which describe the status of the control ladder as well as the operation of any specific overload light. For example, in the event of an overload the automatic recycling will restore the equipment instantaneously to operation and if the fault does not persist the equipment will continue in operation. Nevertheless, an indicator light associated with the particular circuit which caused the overload will remain lit to advise the operator that a fault had occurred, and to point out the specific circuit in which this fault occurred. The indicator lights for overload are restored by an independent restoration button.

All the cooling for the AM-50,000D is accomplished by utilizing high volume high pressure blowers. This blower is located in a central cabinet and provides air for both the modulator and the RF circuitry. All the air that enters this blower system is ducted through filters to prevent any foreign particles from entering the air system. The cooling of the transmitter is three times the recommended value of the tube manufacturers. This assures reserve and long life for the PA and modulator tubes. Dependent on the customer's request, the input air for the system can be obtained from either the rear of the control cabinet or from the top of the cabinet. This is an option which is available to the customer at no additional cost.

ELECTRICAL

Referring to the block diagram of the AM-50,000D it can be seen that it consists of a conventional crystal oscillator with provisions for selecting any one of two crystals. The output of the stage is amplified to a sufficient level to drive a 3KW driver. Although the IPA is capable of developing 3KW, the actual power required to drive the final amplifier utilizes one 4CX35000C tetrode to provide the necessary output power.

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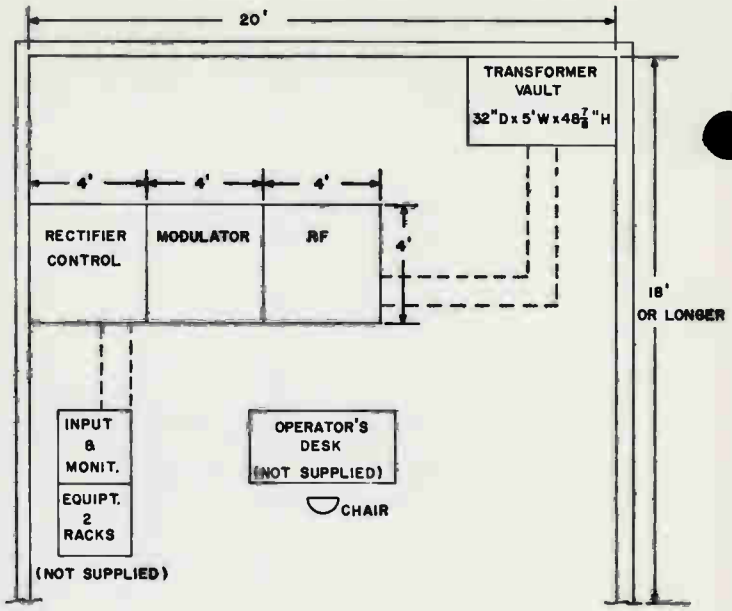
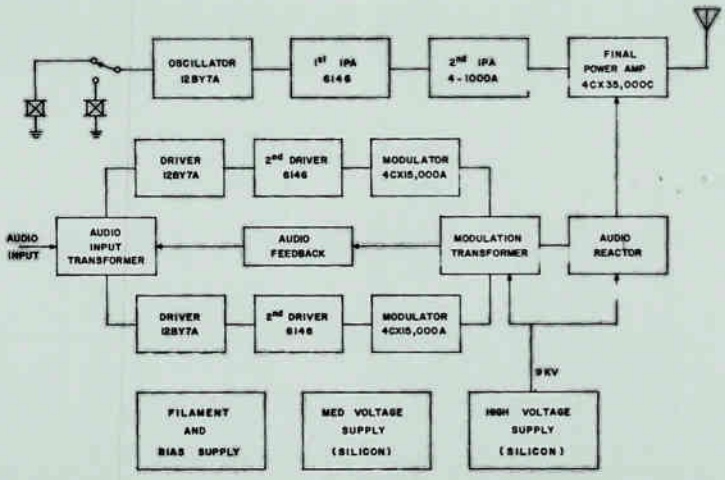
The audio circuitry of the transmitter consists of conventional push-pull circuitry whose output power is developed across a modulation transformer. The secondary of this transformer is terminated in an audio reactor which is in series with the plate supply. This combination of circuitry achieves conventional plate modulation. The 4CX15,000A modulators are the least expensive, but extremely conservative approach towards achieving high level, conventional plate modulation.

The control ladder is so designed that operation of the equipment is achieved by simply operating the front panel switches. This circuitry can also be actuated by utilizing a conventional remote control system. Sampling resistors with wires brought out to accessible terminal boards, permit remote control monitoring of meters without any modification to the basic transmitter.

All power supplies within the equipment utilize conservatively rated silicons which are operated at one-third of thier current and voltage ratings. Special precautions have been taken to protect these components from damage due to line surges or transients. A maximum plate voltage of 9,000 volts is required to achieve rated power output. This voltage is extremely low compared to the 50KW transmitters in the field utilizing older type PA tubes and circuitry.



TYPICAL FLOOR PLAN FOR
CCA AM 50,000D BROADCAST TRANSMITTER



AM 50,000D SIMPLIFIED BLOCK DIAGRAM

SPECIFICATIONS

Frequency Range	500 to 1600kHz
Frequency Stability	±5 Hz
AF Input Impedance	150/600 ohms
AF Input Level	+10 dbm±2dbm (for 100% modulation)
AF Response:	
50 - 10,000 Hz @ 95% Modulation	±1.5 db
AF Distortion (90% Modulation)	3%, 50-7500 Hz
Noise Unweighted (below 100% Modulation)	55 db
Modulation	High Level
Type of Emission	A3
Type of Output	Unbalanced
Output Impedance (unbalanced)	50 - 300 ohms
Carrier Shift, 100% Modulation	5% or less
RF Voltage (frequency Monitor)	10V, RMS, 75 ohms
RF Voltage (modulation monitor)	10V, RMS, 75 ohms
Power Output Capability	55KW
Power Supply (Specify)	
Line Voltage	380/460V, 3 phase
Line Frequency	50/60 Hz

Power Consumption:	
0% Modulation	95KW
Average Program	103KW
100% Modulation	140KW
Power Factor	0.9
Voltage Variation and Regulation	±5%
Spurious Emission (2nd Harmonic & above)	-80db
Operating Ambient Temperature Range	10°F to 110°F
Operating Relative Humidity	100% maximum
Operating Altitude (specify for higher)	8500 ft. max.
Storage Temperature	-35° to 60°C

MECHANICAL SPECIFICATIONS

Single Cabinet Size (for cabinets in transmitter)	48" x 48" x 86"
Transformer Vault	60" x 48" x 32"
Floor Space Required	68 sq. ft.
Overall Weight (approx.)	15,000 lbs.
Shipping Weight (approx.)	16,000 lbs.

TECHNICAL SPECIFICATIONS CCA "DUAL RELIABLE" TRANSMITTER

CCA TYPE NO.	AM-1000DX	AM-2000DX	AM-5000DX	AM-10,000DX	AM-25,000DX	AM-50,000DX
Power Output Capability	1500W	2500W	7500W	15KW	30KW	60KW
Frequency Range	150kHz - 10MHz	150kHz - 10MHz	150kHz - 10MHz	150kHz - 10MHz	150kHz - 10MHz	150kHz - 10MHz
Frequency Stability	±5 Hz	±5 Hz	±5 Hz	±5 Hz	±5 Hz	±5 Hz
Carrier Shift @ 100% Mod.	3% Max.	3% Max.	3% Max.	3% Max.	3% Max.	3% Max.
RF Output Impedance	40-250 ohms	40-250 ohms	40-250 ohms	40-250 ohms	40-250 ohms	40-250 ohms
AF Input Impedance	150/600 ohms	150/600 ohms	150/600 ohms	150/600 ohms	150/600 ohms	150/600 ohms
AF Input Level @ 100% Mod.	10 dbm Max.	10 dbm Max.	10 dbm Max.	10 dbm Max.	10 dbm Max.	10 dbm Max
AF Response						
50-7500 Hz	±1 db	±1 db	±1 db	±1 db	±1 db	±1 db
30-10,000 Hz	±1.5 db	±1.5 db	±1.5 db	±1.5 db	±1.5 db	±1.5 db
AF Distortion						
50-10,000 Hz	2.5% Max.	2.5% Max.	2.0% Max.	2.0% Max.	2.0% Max.	3.0% Max.
Noise (below 100% Mod.)	55 db	55 db	60 db	60 db	60 db	60 db
Line Voltage (specify)	230/380V	230/380V	230/380V	230/380V	230/380/460V	230/380/460V
Line Frequency (specify)	50/60 Hz	50/60 Hz	50/60 Hz	50/60 Hz	50/60 Hz	50/60 Hz
Phase	1	3	3	3	3	3
Power Consumption (100% Mod.)	5000W	10KW	15KW	30KW	70KW	140KW
Net Dimensions (W x H x D inches)	112 x 76 x 31	112 x 76 x 31	122 x 76 x 31	170 x 76 x 31	170 x 76 x 31	240 x 76 x 48
Tubes						
PA	(4) 4-400A	(4) 4-400A	(4) 1000A	(4) 1-1000A	(2) 3CX2500F3	(2) 3CX10,000A3
Modulator	(4) 4-400A	(4) 4-400A	(4) 1000A	(4) 1-1000A	(4) 4CX3000A	(4) 4CX10000D
Harmonic Attenuation (2nd)	-90 db	-90 db	-90 db	-90 db	-90 db	-90 db
3rd	-73 db	-80 db	-80 db	-80 db	-80 db	-90 db
Others	-73 db	-80 db	-80 db	-80 db	-80 db	-80 db

*EXPORT SALES: Telesco International Corporation * 171 Madison Avenue * New York, New York 10016*

CCA "DUAL RELIABLE" AM BROADCAST TRANSMITTERS

CCA *Electronics proudly announces a new and field proven concept of AM Transmitters for the broadcasting industry.*

This approach embodies design reserve unequalled by any equipment supplier.

We are confident that the attached facts will substantiate our claim of:-

- **Maximum Anticipated Off Air Time - Five Seconds.**
- **No Tube Replacements For Two Years.**
- **Maintenance Time - Five Minutes Per Week.**

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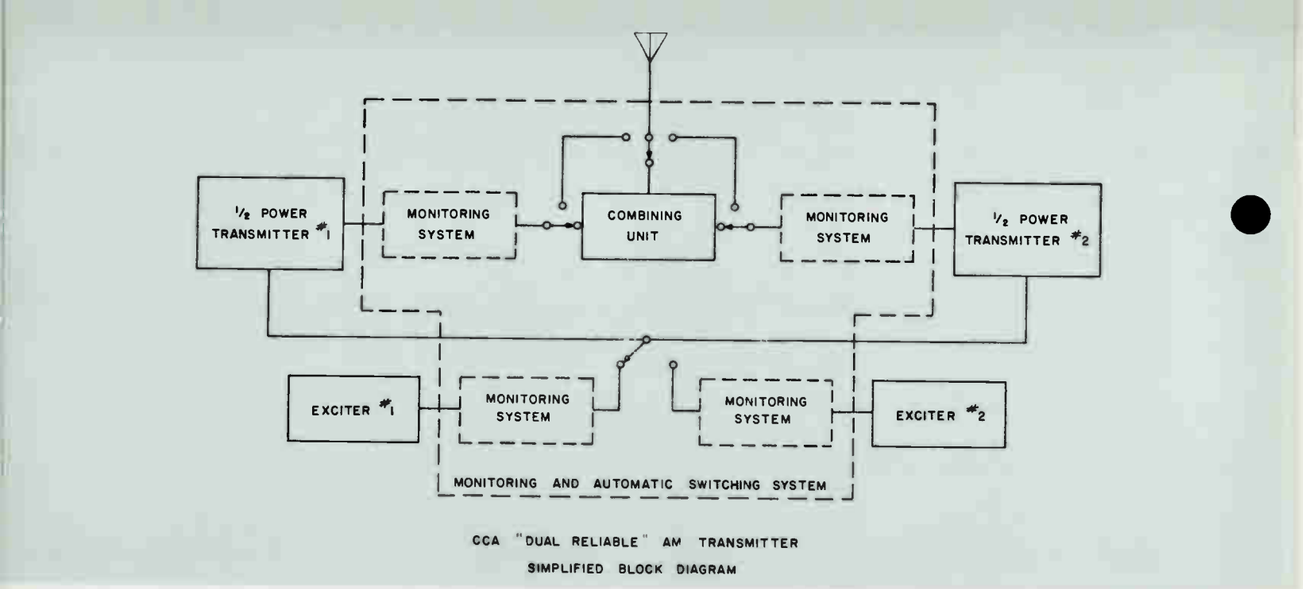

Simplified Block Diagram "Dual Reliable" AM Transmitter

Referring to the simplified block diagram it can be seen that the basic CCA "Dual Reliable" transmitter system consists of two independent transmitters each of which operates at one half of the desired system output. A combining system is used to produce the rated power output.

An electronic monitoring system constantly evaluates the performance of each of the independent transmitters. In the unlikely event of distortion, audio or RF degradation, the monitoring system will detect the fault, turn off the defective transmitter, by pass the combining system and permit the second transmitter to operate directly into the antenna.

This entire switching sequence takes less than 5 seconds and results in a reduction of power output of only 50%. This reduction, in general, will not effect station coverage.

The likelihood of failure in either transmitter is very remote —since all components, including tubes, are operated at least at one half of their ratings.

DESCRIPTION

TWO INDEPENDENT TRANSMITTERS

All CCA "Dual Reliable" transmitting systems contain two independent transmitters. Each transmitter section is identical and produces one half the desired output power.

BUILT IN EMERGENCY TRANSMITTER

Since the system contains two transmitters, and there is practically no probability of both transmitters failing simultaneously, there always exists one useable transmitter to insure continuity of transmission. This feature of having the operating system contain the standby transmitter has the following advantages over the approach of having a low power, non-operating standby transmitter:

1. Operating "Standby" is constantly producing revenue for the user rather than sitting in an idle condition.
2. Operating "Standby" is obviously functioning and there is no question that it will function when "Standby" operation is required.
3. Operating "Standby" eliminates necessity of setting up maintenance schedule for testing inoperative standby transmitters.

STANDBY POWER – 50%

All CCA "Dual Reliable" transmitting systems contain switching logic which, in the event of a fault, results in continuity of service at 50% power output. This reduction in power will cause little, if any, effect on station coverage.

TWO INDEPENDENT RF EXCITERS

All CCA "Dual Reliable" Systems contain two independent RF exciters. Only one common exciter is used as an RF source for both transmitters. The second exciter is automatically switched into operation in the unlikely event of a malfunction of the first unit.

TUBES OPERATE AT 50% RATING – ANTICIPATED LIFE – 10,000 HOURS MINIMUM

All tubes used in CCA dual reliable transmitter systems operate at 50% of their output capability. Thus, the CCA anticipated 10,000 hour minimum tube life is quite consistent with the extremely conservative use of all tubes.

CAPACITORS – RESISTORS – 200% RESERVE

All resistors and capacitors in CCA "Dual Reliable" transmitter systems are operated at approximately 50% of their nominal ratings. This safety factor includes filter capacitors and power resistors which equipment suppliers normally operate at manufacturer's ratings. Thus, the probability of component failure in the CCA "Dual Reliable" systems is very remote.

SILICON RECTIFIERS WITH 300% RESERVE

All power supplies in CCA "Dual Reliable" systems utilize silicon rectifiers. These units operate at ⅓ of their maximum current and voltage ratings. In addition, proven techniques are used to protect these solid state devices from transients.

Pictured above is the front view of the CCA AM-5000DX, 5KW "Dual Reliable" AM Broadcast Transmitter. The left and right hand cabinets are individual 2.5KW Transmitters. The center cabinet contains the electronic monitoring, combining and automatic switching systems.

DUST PROOF CABINETRY

CCA "Dual Reliable" systems have special air tight gasketed front and rear doors. This arrangement insures that the only opportunity for air to enter the cabinet is through the filters on the rear doors. This approach towards "super clean air" reduces the maintenance effort required on their systems.

CONSTANT ELECTRONIC MONITORING

All CCA "Dual Reliable" broadcast systems incorporate an electronic monitoring system which constantly evaluates the performance of the common exciter and each of the independent RF transmitters and modulators. This system senses both audio and RF degradation. This constant electronic supervision is especially attractive to those stations that can only provide a minimum of transmitter operation supervision. The FCC insists on meter readings every half hour. These readings do not analyze transmitter distortion. They are also too infrequent to produce effective preventative actions and still require a highly trained technician for interpertation. The CCA "Dual Reliable" monitoring system provides constant analysis and instantaneous, correct, preventative actions.

100% SPARE PARTS

The CCA "Dual Reliable" transmitting systems contain two independent, half power, identical transmitters. It is sincerely felt that likelihood of any failure in this conservatively designed system is very remote. Nevertheless, if a fault did occur that would disable both transmitters, it would be extremely unlikely that an identical component would not fail in both half power transmitters. Thus, the customer can be assured of immediate replacement parts even in the event of a most unpredictable combination of events.

INCREDIBLE SUPERIOR PERFORMANCE SPECIFICATIONS

Each half power transmitter in the system has extremely low distortion and noise. Since the distortion and AM Hum of both units will not, in general, be in phase, the distortion of the combination—the dual reliable output will be substantially below the distortion and noise of one unit. Thus, distortions of 1 percent and noise levels of -60db are very normal from CCA dual reliable transmitters.

CONVENTIONAL HIGH LEVEL PLATE MODULATION

All CCA Dual Reliable Transmitters utilize conventional, high level plate modulation. This is the most popular method of achieving amplitude modulation and is well known to the average station technician.

A number of other methods have been recently introduced to achieve amplitude modulation. These include—amplitude phase methods; low level—linear amplification; and screen grid modulation. These methods all protend to have distinct advantages but only some can meet, while none can surpass conventional high level modulation in:

(a) Simplicity of Tuning.
(b) Stability — with changing antenna impedance.
(c) Minimum Audio Distortion.
(d) Efficiency and lowest power consumptions.
(e) Lowest Tube Costs.
(f) Not requiring special instructions for technical people.

IDEAL FOR UNATTENDED OPERATION

The initial production of 15 systems were supplied to an outstanding user whose application requires unattended, unsupervised operation with maintenance that consisted of one visit every three months.

AM-1000DX - 1KW "DUAL RELIABLE" AM BROADCAST TRANSMITTER

FEATURES

- Max. Anticipated Off Air Time — 5 Seconds
- 500W Built In Standby
- Automatic Switch Over System To Standby
- One Tube Type (4-400A) in PA and Modulators
- Tube Power Output Capability — 2KW
- Anticipated Tube Life @ 1KW Output — 10,000 Hours Minimum
- Constant Electronic Monitoring
- All Parts, Including Tubes, Operate At 50 Percent Of Ratings
- Conventional High Level Plate Modulation
- Silicon Rectifiers With 300% Margin

USES

The CCA 1KW "Dual Reliable" Transmitter is designed to serve as a super reliable 1KW AM Transmitter which permits truly unattended operation, requires negligible maintenance and eliminates, for all practical purposes, "off air" time.

DESCRIPTION

MECHANICAL

The CCA AM-1000DX occupies three medium sized cabinets. The left and right hand cabinets contain identical, independent 500W Transmitters. The center cabinet houses two RF Exciters, and Electronics Monitoring System, and RF Combining System and an Automatic Switching System.

Each cabinet of the "Dual Reliable" Transmitter contains independent forced air cooling systems which provide 300% greater cooling than that recommended by the tube manufacturer. This reserve cooling, together with the fact that all tubes are operated at 50% of rating, assures average tube life of 10,000 hours.

Special gasketed front and rear doors guarantee that all air enters the equipment through the rear door filters. This fact keeps dirt precipitation to a minimum and reduces the requirement for maintenance.

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Meters are available for monitoring every circuit in the system. They are displayed in a prominent position on the top of each cabinet.

All controls for the equipment are available from the front panel. These controls permit independent or dual automatic operation of the system. In addition, the few tuning controls that exist, have associated with them counters for easy reference.

ELECTRICAL

RF CIRCUITS

The AM-1000DX contains two independent RF crystal oscillators. Only one oscillator is used to drive both 500W Transmitters simultaneously. The second oscillator is automatically switched into the system in the unlikely event that a fault should occur in the first oscillator.

Each of the RF chains of the half power transmitters contain a buffer (12BY7A), IPA (6146) and PA ((2) 4-400A). The final power amplifier of each section produces only 500watts but actually these tubes are capable of producing 2KW output power.

The output of each of the 500W Transmitters are combined in a modified, super stable, low Q "Egyptian T" network. This combined output power is a minimum of 1KW.

The combination of pi and L network in each 500W output as well as the RF components in the combining circuits attenuate harmonics of the carrier substantially below the FCC requirements.

There are no sliding contacts in any of the RF circuits, thus stability of the circuitry is assured.

AUDIO CIRCUITS

The audio system of each half power transmitter consists of three stages operating in "push pull" The modulators of each 500W Transmitter are 4-400A tetrodes. (Identical tubes in the PA)

The entire audio system of each 500W Transmitter is capable of providing audio power to plate modulate 1KW RF Carrier. Thus the audio modulation required to modulate a 500W Carrier is considerably below the power output capability of the tubes and circuits and thus reliable trouble free, extended tube life can be expected.

An aperiodic divider provides degenerative feedback which compensates for tube aging, achieves low distortion, high fidelity frequency response, and extremely low noise. The phase of the distortion in both half power transmitters are rarely in phase, thus the combined output power of the 1KW "Dual Reliable" Transmitter is substantially below that of conventional, competitive 1KW AM Transmitters.

MONITORING & AUTOMATIC SWITCHING CIRCUITS

The CCA AM-1000DX contains circuitry which constantly monitors the audio and RF circuitry of both half power transmitters. In the event of any of the following faults, the monitoring system will detect the fault, instantly turn off the defective transmitter, bypass the combining system, and feed the operating transmitter directly into the antenna. The maximum time for all these actions to occur is 5 seconds.

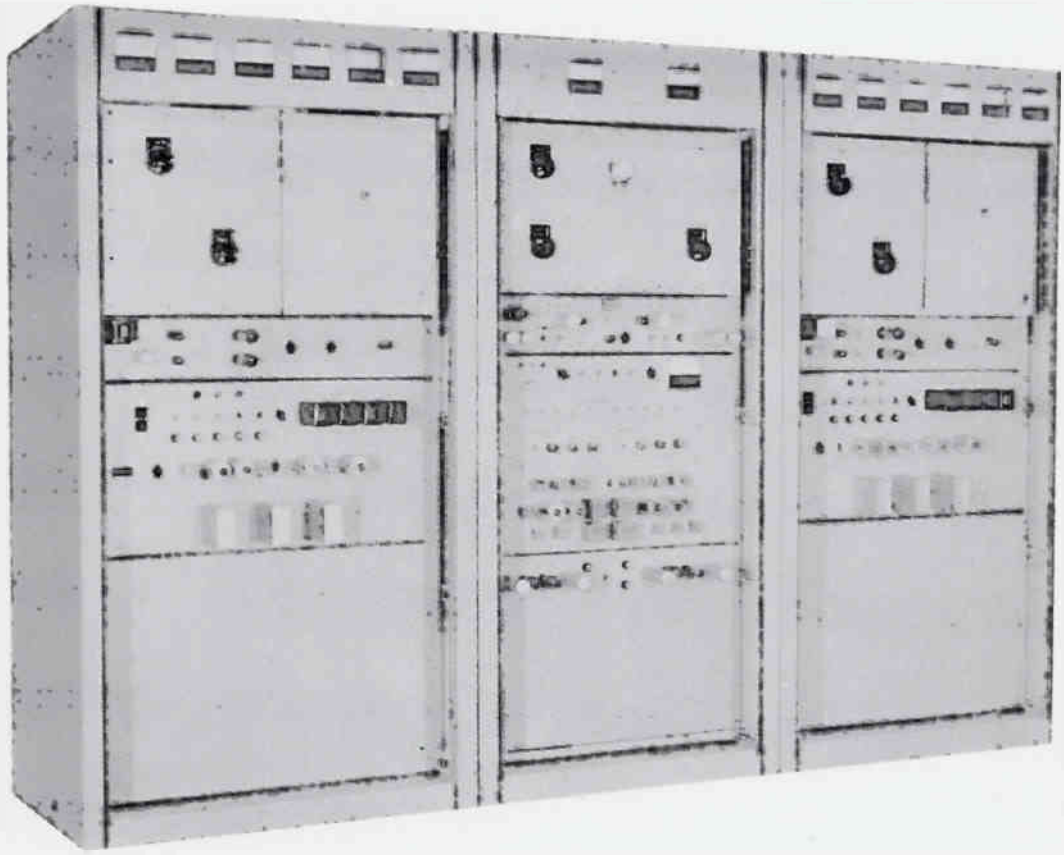
SYSTEM CONSTANTLY MONITORS:

- Performance of common exciter
- RF Power output of each half power transmitter
- Audio quality of each half power transmitter
- Audio output of each modulator

TECHNICAL SPECIFICATIONS

Power Output Capability	1500W
Frequency Range	150kHz - 10MHz
Frequency Stability	5 Hz
Carrier Shift @ 100% Mod.	3% Max.
RF Output Impedance	40-250 ohms
AF Input Impedance	150/600 ohms
AF Input Level @ 100% Mod.	10 dbm Max.
AF Response	
50-7500 Hz	1 db
30-10,000 Hz	1.5 db
AF Distortion	
50-10,000 Hz	2.5% Max.
Noise (below 100% Mod.)	55 db
Line Voltage (specify)	230/380V
Line Frequency (specify)	50/60 Hz
Phase	1
Power Consumption (100% Mod.)	5KW
Net Dimensions (W x H x D inches)	112 x 76 x 31
Tubes	
PA	(4) 4-400A
Modulator	(4) 4-400A
Harmonic Attenuation (2nd)	-90 db
3rd	-73 db
Others	-73 db

AM-5000DX, 5KW "DUAL RELIABLE" AM BROADCAST TRANSMITTER



FEATURES

- Max. Anticipated Off Air Time — 5 Seconds
- 2.5KW Built In Standby
- Automatic Switch Over System To Standby
- One Tube Type (4-1000A) in PA and Modulators
- Tube Power Output Capability — 10KW
- Anticipated Tube Life @ 5KW Output — 10,000 Hours Minimum
- Constant Electronic Monitoring
- All Parts, Including Tubes, Operate At 50 Percent Of Ratings
- Conventional High Level Plate Modulation
- Silicon Rectifiers With 300% Margin

USES

The CCA 5KW "Dual Reliable" Transmitter is designed to serve as a super reliable 5KW AM Transmitter which permits truly unattended operation, requires negligible maintenance and eliminates, for all practical purposes, "off air" time.

DESCRIPTION

MECHANICAL

The CCA AM-5000DX occupies three medium sized cabinets. The left and right hand cabinets contain identical, independent 2.5KW Transmitters. The center cabinet houses two RF Exciters, and Electronics Monitoring System, an RF Combining System and an Automatic Switching System.

Each cabinet of the "Dual Reliable" Transmitter contains independent forced air cooling systems which provide 300% greater cooling than that recommended by the tube manufacturer. This reserve cooling, together with the fact that all tubes are operated at 50% of rating, assures average tube life of at 10,000 hours.

Special gasketed front and rear doors guarantee that all air enters the equipment through the rear door filters. This fact keeps dirt precipitation to a minimum and reduces the requirement for maintenance.

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Meters are available for monitoring every circuit in the system. They are displayed in a prominent position on the top of each cabinet.

All controls for the equipment are available from the front panel. These controls permit independent or dual automatic operation of the system. In addition, the few tuning controls that exist, have associated with them counters for easy reference.

ELECTRICAL

RF CIRCUITS

The AM-5000DX contains two independent RF crystal oscillators. Only one oscillator is used to drive both 2.5KW Transmitters simultaneously. The second oscillator is automatically switched into the system in the unlikely event that a fault should occur in the first oscillator.

Each of the RF chains of the half power transmitters contain a buffer (12BY7A), IPA (6146) and PA ((2) 4-1000A). The final power amplifier of each section produces only 2.5 KW but actually these tubes are capable of producing 5KW output power.

The output of each of the 2.5 KW Transmitters are combined in a modified, super stable, low Q "Egyptian T" network. This combined output power is a minimum of 5KW.

The combination of pi and L network in each 2.5KW output as well as the RF components in the combining circuits attenuated harmonics of the carrier substantially below the FCC requirements.

There are no sliding contacts in any of the RF circuits, thus stability of the circuitry is assured.

AUDIO CIRCUITS

The audio system of each half power transmitter consists of three stages operating in "push pull". The modulators of each 2.5KW Transmitter are 4-1000A tetrodes. (Identical tubes in the PA)

The entire audio system of each 2.5KW Transmitter is capable of providing audio power to plate modulate 5KW RF Carrier. Thus the audio modulation required to modulate a 2.5KW Carrier is considerably below the power output capability of the tubes and circuits and thus reliable trouble free, extended tube life can be expected.

An aperiodic divider provides degenerative feedback which compensates for tube aging, achieves low distortion, high fidelity frequency response, and extremely low noise. The phase of the distortion in both half power transmitters are rarely in phase, thus the combined output power of the 5KW "Dual Reliable" Transmitter is substantially below that of conventional, competitive 5KW AM Transmitters.

MONITORING & AUTOMATIC SWITCHING CIRCUITS

The CCA AM-5000DX contains circuitry which constantly monitors the audio and RF circuitry of both half power transmitters. In the event of any of the following faults, the monitoring system will detect the fault, instantly turn off the defective transmitter, bypass the combining system, and feed the operating transmitter directly into the antenna. The maximum time for all these actions to occur is 5 seconds.

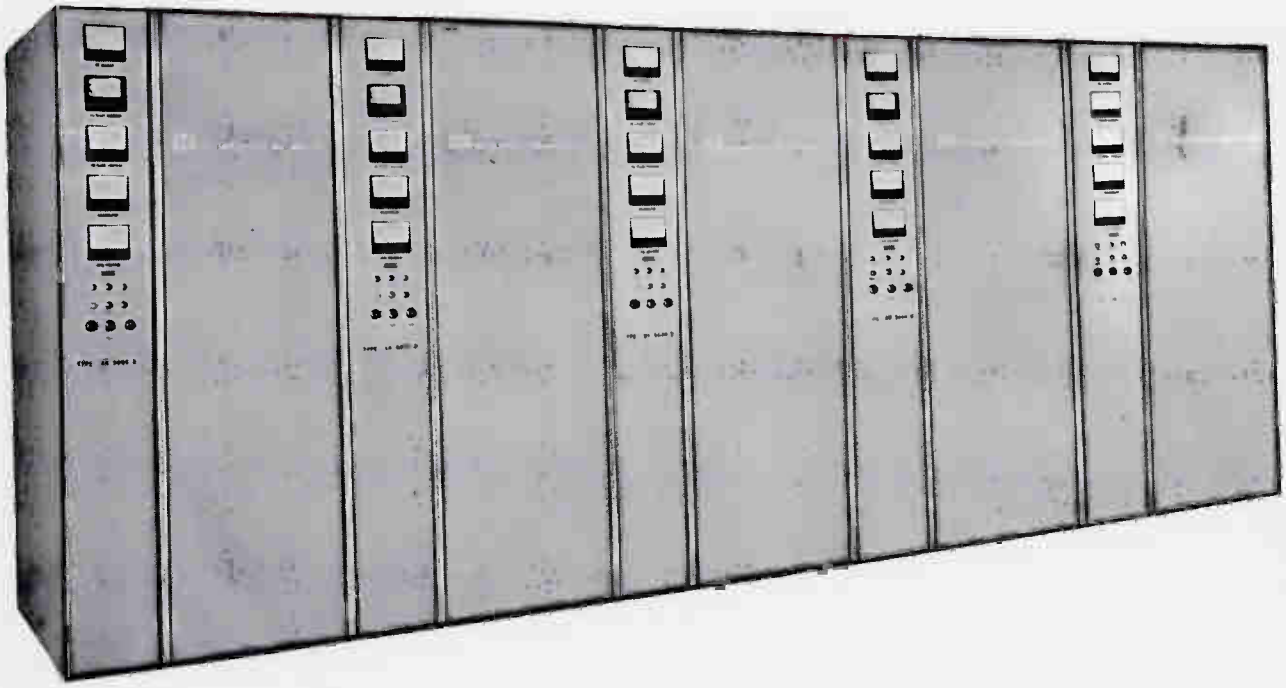
SYSTEM CONSTANTLY MONITORS

- Performance of common exciter
- RF Power output of each half power transmitter
- Audio quality of each half power transmitter
- Audio output of each modulator

TECHNICAL SPECIFICATIONS

Power Output Capability	7500W
Frequency Range	150kHz - 10MHz
Frequency Stability	5Hz
Carrier Shift @ 100% Mod.	3% Max.
RF Output Impedance	40-250 ohms
AF Input Impedance	150/600 ohms
AF Input Level @ 100% Mod.	10 dbm Max.
AF Response	
50-7500 Hz	1 db
30-10,000 Hz	1.5 db
AF Distortion	
50-10,000 Hz	2.0% Max.
Noise (below 100% Mod.)	60 db
Line Voltage (specify)	230/380V
Line Frequency (specify)	50/60
Phase	3
Power Consumption (100% Mod.)	15KW
Net Dimensions (W x H x D inches)	122 x 76 x 31
Tubes	
PA	(4) 4-1000A
Modulator	(4) 4-1000A
Harmonic Attenuation (2nd)	-90 db
3rd	-80 db
Others	-80 db

AM-10,000DX-10KW "DUAL RELIABLE" AM BROADCAST TRANSMITTER



FEATURES

- Max. Anticipated Off Air Time — 5 Seconds
- 5.0KW Built In Standby
- Automatic Switch Over System To Standby
- Field Proven 3CX2500F3 In PA
- Anticipated Tube Life @ 10KW Output — 10,000 Hours Minimum
- Constant Electronic Monitoring
- All Parts Operate At 50 Percent Of Ratings
- Conventional High Level Plate Modulation
- Silicon Rectifiers With 300% Margin

USES

The CCA 10KW "Dual Reliable" Transmitter is designed to serve as a super reliable 10KW AM Transmitter which permits truly unattended operation, requires negligible maintenance and eliminates, for all practical purposes, "off air" time.

DESCRIPTION

MECHANICAL

The CCA AM-10,000DX occupies three medium sized cabinets. The left and right hand cabinets contain identical, independent 5.0KW Transmitters. The center cabinet houses two RF Exciters, and Electronics Monitoring System, and RF Combining System and an Automatic Switching System.

Each cabinet of the "Dual Reliable" Transmitter contains independent forced air cooling systems which provide 300% greater cooling than that recommended by the tube manufacturer.

Special gasketed front and rear doors guarantee that all air enters the equipment through the rear door filters. This fact keeps dirt precipitation to a minimum and reduces the requirement for maintenance.

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Meters are available for monitoring every circuit in the system. They are displayed in a prominent position on the top of each cabinet.

All controls for the equipment are available from the front panel. These controls permit independent or dual automatic operation of the system. In addition, the few tuning controls that exist, have associated with them counters for easy reference.

ELECTRICAL

RF CIRCUITS

The AM-10,000DX contains two independent RF crystal oscillators. Only one oscillator is used to drive both 5.0KW Transmitters simultaneously. The second oscillator is automatically switched into the system in the unlikely event that a fault should occur in the first oscillator.

Each of the RF chains of the half power transmitters contain a buffer (12BY7A), IPA (4-400A) and PA ((1) 3CX2500F3). The final power amplifier of each section produces only 5.0KW but actually these tubes are capable of producing 6KW output power.

The output of each of the 5.0KW Transmitters are combined in a modified, super stable, low Q "Egyptian T" network. This combined output power is a minimum of 10KW.

The combination of pi and L network in each 5.0KW output as well as the RF components in the combining circuits attenuate harmonics of the carrier substantially below the FCC requirements.

There are no sliding contacts in any of the RF circuits, thus stability of the circuitry is assured.

AUDIO CIRCUITS

The audio system of each half power transmitter consists of three stages operating in "push pull". The modulators of each 5.0KW Transmitter are 4-1000A tetrodes.

The entire audio system of each 5.0KW Transmitter is capable of providing audio power to plate modulate 5.5KW RF Carrier. Thus the audio modulation required to modulate a 5.0KW Carrier is considerably below the power output capability of the tubes and circuits and thus reliable trouble free, extended tube life can be expected.

An aperiodic divider provides degenerative feedback which compensates for tube aging, achieves low distortion, high fidelity frequency response, and extremely low noise. The phase of the distortion in both half power transmitters are rarely in phase, thus the combined output power of the 10KW "Dual Reliable" Transmitter is substantially below that of conventional, competitive 10KW AM Transmitters.

MONITORING & AUTOMATIC SWITCHING CIRCUITS

The CCA AM-10,000DX contains circuitry which constantly monitors the audio and RF circuitry of both half power transmitters. In the event of any of the following faults, the monitoring system will detect the fault instantly turn off the defective transmitter, bypass the combining system, and feed the operating transmitter directly into the antenna. The maximum time for all these actions to occur is 5 seconds.

SYSTEM CONSTANTLY MONITORS

- Performance of common exciter
- RF Power output of each half power transmitter
- Audio quality of each half power transmitter
- Audio output of each modulator

TECHNICAL SPECIFICATIONS

Power Output Capability	11,000W
Frequency Range	150kHz - 10MHz
Frequency Stability	5 Hz
Carrier Shift @ 100% Mod.	3% Max.
RF Output Impedance	40-250 ohms
AF Input Impedance	150/600 ohms
AF Input Level @ 100% Mod.	10 dbm Max.
AF Response	
50 - 7500 Hz	1 db
30-10,000 Hz	1.5 db
AF Distortion	
50-10,000 Hz	2.0% Max.
Noise (below 100% Mod.)	60 db
Line Voltage (specify)	230/380V
Line Frequency (specify)	50/60 Hz
Phase	3
Power Consumption (100% Mod.)	30KW
Net Dimensions (W x H x D inches)	170 x 76 x 31
Tubes	
PA	(2) 3CX2500F3
Modulator	(4) 4-1000A
Harmonic Attenuation (2nd)	-90 db
3rd	-80 db
Others	-80 db

AM-25,000DX - 25KW "DUAL RELIABLE" AM BROADCAST TRANSMITTER

FEATURES

- Max. Anticipated Off Air Time – 5 Seconds
- 12.5KW Built In Standby
- Modern 3CX10000A3 in PA
- Anticipated Tube Life @ 25KW Output – 10,000 Hours Minimum
- Constant Electronic Monitoring
- All Parts Operate at 50 Percent of Ratings
- Conventional High Level Plate Modulation
- Silicon Rectifiers With 300% Margin

USES

The CCA 25KW "Dual Reliable" Transmitter is designed to serve as a super reliable 25KW AM Transmitter which permits truly unattended operation, requires negligible maintenance and eliminates, for all practical purposes, "off air" time.

DESCRIPTION

MECHANICAL

The CCA AM-25,000DX occupies three medium sized cabinets. The left and right hand cabinets contain identical, independent 25KW Transmitters. The center cabinet houses two RF Exciters, and Electronics Monitoring System, and RF Combining System and an Automatic Switching System.

Each cabinet of the "Dual Reliable" Transmitter contains independent forced air cooling systems which provide 300% greater cooling than that recommended by the tube manufacturer.

Special gasketed front and rear doors guarantee that all air enters the equipment through the rear door filters. This fact keeps dirt precipitation to a minimum and reduces the requirement for maintenance.

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Meters are available for monitoring every circuit in the system. They are displayed in a prominent position on the top of each cabinet.

All controls for the equipment are available from the front panel. These controls permit independent or dual automatic operation of the system. In addition, the few tuning controls that exist, have associated with them counters for easy reference.

ELECTRICAL

RF CIRCUITS

The AM-25,000DX contains two independent RF crystal oscillators. Only one oscillator is used to drive both 12.5KW Transmitters simultaneously. The second oscillator is automatically switched into the system in the unlikely event that a fault should occur in the first oscillator.

Each of the RF chains of the half power transmitters contain a buffer (12BY7A), IPA (4-400A) and PA ((1) 3CX10000A3). The final power amplifier of each section produces only 12.5KW but actually these tubes are capable of producing 15KW output power.

The output of each of the 12.5KW Transmitters are combined in a modified, super stable, low Q "Egyptian T" network. This combined output power is a minimum of 25KW.

The combination of pi and L network in each 12.5KW output as well as the RF components in the combining circuits attenuate harmonics of the carrier substantially below the FCC requirements.

There are no sliding contacts in any of the RF circuits, thus stability of the circuitry is assured.

AUDIO CIRCUITS

The audio system of each half power transmitter consists of three stages operating in "push pull" The modulators of each 12.5KW Transmitter are 4CX3000A tetrodes.

The entire audio system of each 12.5KW Transmitter is capable of providing audio power to plate modulate 20KW RF Carrier. Thus the audio modulation required to modulate a 12.5KW Carrier is considerably below the power output capability of the tubes and circuits and thus reliable trouble free, extended tube life can be expected.

An aperiodic divider provides degenerative feedback which compensates for tube aging, achieves low distortion, high fidelity frequency response, and extremely low noise. The phase of the distortion in both half power transmitters are rarely in phase, thus the combined output power of the 25KW "Dual Reliable" Transmitter is substantially below that of conventional, competitive 25KW AM Transmitters.

MONITORING & AUTOMATIC SWITCHING CIRCUITS

The CCA AM-25,000DX contains circuitry which constantly monitors the audio and RF circuitry of both half power transmitters. In the event of any of the following faults, the monitoring system will detect the fault, instantly turn off the defective transmitter, bypass the combining system, and feed the operating transmitter directly into the antenna. The maximum time for all these actions to occur is 5 seconds.

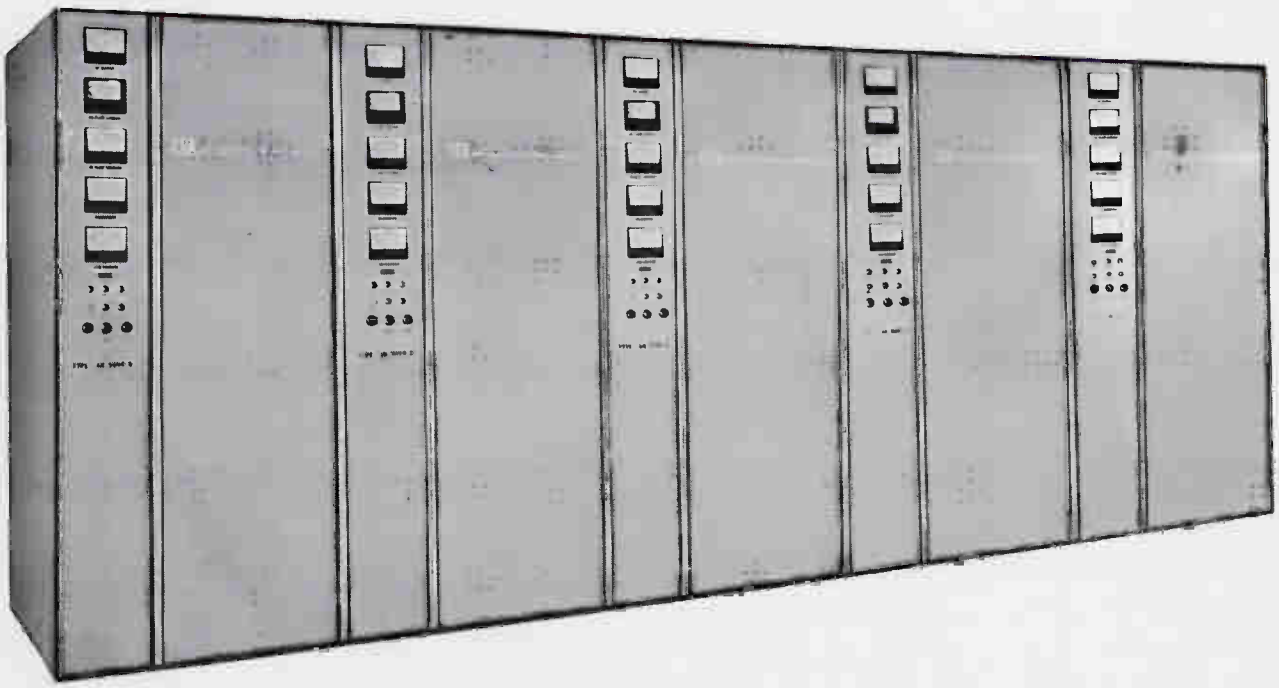
SYSTEM CONSTANTLY MONITORS:

- Performance of common exciter
- RF Power output of each half power transmitter
- Audio quality of each half power transmitter
- Audio output of each modulator

TECHNICAL SPECIFICATIONS

Power Output Capability	30KW
Frequency Range	150kHz - 10MHz
Frequency Stability	5 Hz
Carrier Shift @ 100% Mod.	3% Max.
RF Output Impedance	40-250 ohms
AF Input Impedance	150/600 ohms
AF Input Level @ 100% Mod.	10 dbm Max.
AF Response	
50-7500 Hz	1 db
30-10,000 Hz	1.5 db
AF Distortion	
50-10,000 Hz	2.0% Max.
Noise (below 100% Mod.)	60 db
Line Voltage (specify)	230/380/460V
Line Frequency (specify)	50/60 Hz
Phase	3
Power Consumption (100% Mod.)	60KW
Net Dimensions (W x H x D inches)	170 x 76 x 33
Tubes	
PA	(2) 3CX10000A3
Modulator	(4) 4CX3000A
Harmonic Attenuation (2nd)	-90 db
3rd	-80 db
Others	-80 db

AM-50,000DX-50KW "DUAL RELIABLE" AM BROADCAST TRANSMITTER



FEATURES

- Max. Anticipated Off Air Time – 5 Seconds
- 25KW Built In Standby
- Automatic Switch Over System to Standby
- Modern 3CX20,000A3 in PA
- Tube Power Output Capability – 80KW
- Anticipated Tube Life @ 50KW Output – 10,000 Hours Minimum
- Constant Electronic Monitoring
- All Parts, Including Tubes, Operate at 50 Percent of Ratings
- Conventional High Level Plate Modulation
- Silicon Rectifiers with 300% Margin

USES

The CCA 50KW "Dual Reliable" Transmitter is designed to serve as a super reliable 50KW AM Transmitter which permits truly unattended operation, requires negligible maintenance and eliminates, for all practical purposes, "off air" time.

DESCRIPTION

MECHANICAL

The CCA AM-50,000DX occupies five medium sized cabinets. The left and right hand pairs contain identical, independent 25KW Transmitters. The center cabinet houses two RF Exciters, and Electronics Monitoring System, and RF Combining System and an Automatic Switching System

Each transmitter of the "Dual Reliable" TR System contains independent forced air cooling systems which provide 300% greater cooling than that recommended by the tube manufacturer. This reserve cooling, together with the fact that all tubes are operated at conservative ratings assures average tube life of 10,000 hours.

Special gasketed front and rear doors guarantee that all air enters the equipment through the rear door filters. This fact keeps dirt precipitation to a minimum and reduces the requirement for maintenance.

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Meters are available for monitoring every circuit in the system. They are displayed in a prominent position on the top of each cabinet.

All controls for the equipment are available from the front panel. These controls permit independent or dual automatic operation of the system. In addition, the few tuning controls that exist, have associated with them counters for easy reference.

ELECTRICAL

RF CIRCUITS

The AM-50,000DX contains two independent RF crystal oscillators. Only one oscillator is used to drive both 25KW Transmitters simultaneously. The second oscillator is automatically switched into the system in the unlikely event that a fault should occur in the first oscillator.

Each of the RF chains of the half power transmitters contains a buffer (12BY7A) amplifier 6146, IPA (4-1000A) and PA 3CX20,000A3. The final power amplifier of each section produces only 25KW but actually this tube is capable of producing 35KW output power.

The output of each of the 25KW Transmitters are combined in a modified, super stable, low Q "Egyptian T" network. This combined output power is a minimum of 50KW.

The combination of pi and L netowrk in each 25KW output as well as the RF components in the combining circuits attenuate harmonics of the carrier substantially below the FCC requirements.

There are no sliding contacts in any of the RF circuits, thus stability of circuitry is assured.

AUDIO CIRCUITS

The audio system of each half power transmitter consists of three stages operating in "push pull". The modulators of each 25KW Transmitter are 4CX10,000D tetrodes.

The entire audio system of each 25KW Transmitter is capable of providing audio power to plate modulate 40KW RF Carrier. Thus the audio modulation required to modulate a 25KW Carrier is considerably below the power output capability of the tubes and circuits and thus reliable trouble free, extended tube life can be expected.

An aperiodic divider provides degenerative feedback which compensates for tube aging, achieves low distortion, high fidelity frequency response, and extremely low noise. The phase of the distortion in both half power transmitters are rarely in phase, thus the combined output power of the 50KW "Dual Reliable" Transmitter is substantially below that of conventional, competitive 50KW AM Transmitters.

MONITORING & AUTOMATIC SWITCHING CIRCUITS

The CCA AM-50,000DX contains circuitry which constantly monitors the audio and RF circuitry of both half power transmitters. In the event of any of the following faults, the monitoring system will detect the fault, instantly turn off the defective transmitter, bypass the combining system, and feed the operating transmitter directly into the antenna. The maximum time for all these actions to occur is 5 seconds.

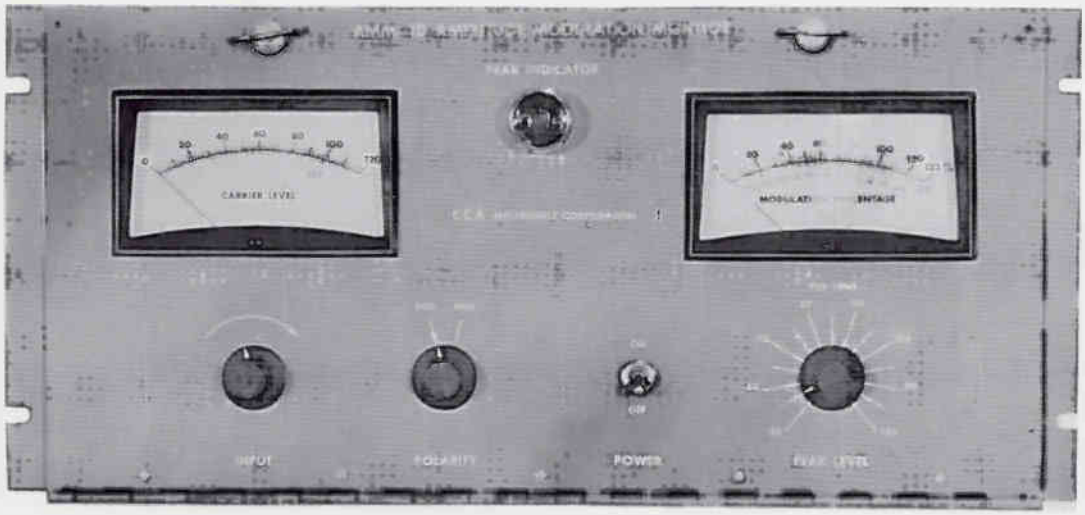
SYSTEM CONSTANTLY MONITORS:

- Performance of common exciter
- RF Power output of each half power transmitter
- Audio quality of each half power transmitter
- Audio output of each modulator

TECHNICAL SPECIFICATIONS

Power Output Capability	60KW
Frequency Range	150kHz - 10MHz
Frequency Stability	5 Hz
Carrier Shift @ 100% Mod.	3% Max.
RF Output Impedance	40-250 ohms
AF Input Impedance	150/600 ohms
AF Input Level @ 100% Mod.	10 dbm Max.
AF Response	
50-7500 Hz	1 db
30-10,000 Hz	1.5 db
AF Distortion	
50-10,000 Hz	2.0% Max.
Noise (below 100% Mod.)	60 db
Line Voltage (specify)	230/380/460V
Line Frequency (specify)	50/60 Hz
Phase	3
Power Consumption (0% Mod.)	96KW
Net Dimensions (W x H x D inches)	240 x 76 x 48
Tubes	
PA	(2) 3CX20,000A3
Modulator	(4) 4CX10,000D
Harmonic Attenuation (2nd)	-90 db
3rd	-90 db
Others	-80 db

MODEL AMM-1D AM MODULATION MONITOR



FEATURES

- **FCC Type Approved**
- **Continuous Indication of Modulation Percentage**
- **Operates on Either Positive or Negative Peaks**
- **Over-Modulation Alarm**
- **Program Level Monitoring**
- **Measures Carrier Shift**
- **Provides Transmitter Audio Monitoring**
- **Demodulator Built-in For Distortion Measurements**
- **Self-contained Power Supply**

USES

The CCA AM Modulation Monitor is designed to give continuous direct reading indications of percentage modulation of the carriers of AM broadcast transmitters. This unit also provides constant indication of carrier shift in the transmitter.

DESCRIPTION

The AM Modulation Monitor consists of four essential elements: (1) a linear diode rectifier to give an instantaneous output voltage proportional to the carrier envelope, and a DC voltage proportional to the carrier level, (2) a peak voltmeter to give a continuous indication of the peak modulation, (3) a trigger circuit which flashes a light whenever the modulation momentarily exceeds any previously set value from 50% to 120% and (4) a monitoring circuit for transmitter monitoring and audio measurements.

The linear rectifier is designed for operation at a low power level, which greatly simplifies the coupling to the transmitter. In the output of the linear rectifier is a dc meter that indicates the carrier level. It also shows any carrier shift during modulation. Two auxiliary audio output circuits operating from a separate diode rectifier are provided. One of these is for audible monitoring and consists of a cathode follower designed to drive a remote monitoring amplifier; the other, a high impedance circuit, gives a faithful reproduction with less than 0.2 percent distortion. The high impedance output circuit can be connected directly to a distortion and noise meter, enabling overall fidelity and noise measurements to be made on the transmitter.

The AMM-1D is designed for standard rack mounting. Panel meters indicate both the modulation percentage and the carrier level. Provision is made for connecting a remote alarm, or a counter for recording the periods when the percentage modulation exceeds that desired to be maintained by the station. An over-modulation flashing lamp is provided to give instant warning when the modulation exceeds the established level.

The instrument has four convenient controls mounted on the front panel. The controls are: the RF input control to adjust the signal input to the monitor, the polarity switch which allows either positive or negative peaks to be measured, a power switch, and the peak level control calibrated from 50 to 120 percent modulation. The peak level control is used for setting the lowest value of percent modulation at which it is desired to have the over-modulation alarm operate.

Two illuminated panel mounting meters are provided. The carrier meter includes a scale calibrated from -0 to +120 with a set mark at 100. Normal operation is obtained when the pointer is set at this mark and denotes the correct radio frequency input level. The modulation percentage meter has a range of zero to 133 percent and is also calibrated in decibels using 100 percent modulation as zero db. A polarity switch is provided so that either the positive or negative peak values may be measured.

The modulation monitor power supply is self-contained and self-regulated. A sola type transmformer provides regulated plate and filament voltages. This results in a drift-free monitor and prevents loss of calbration.

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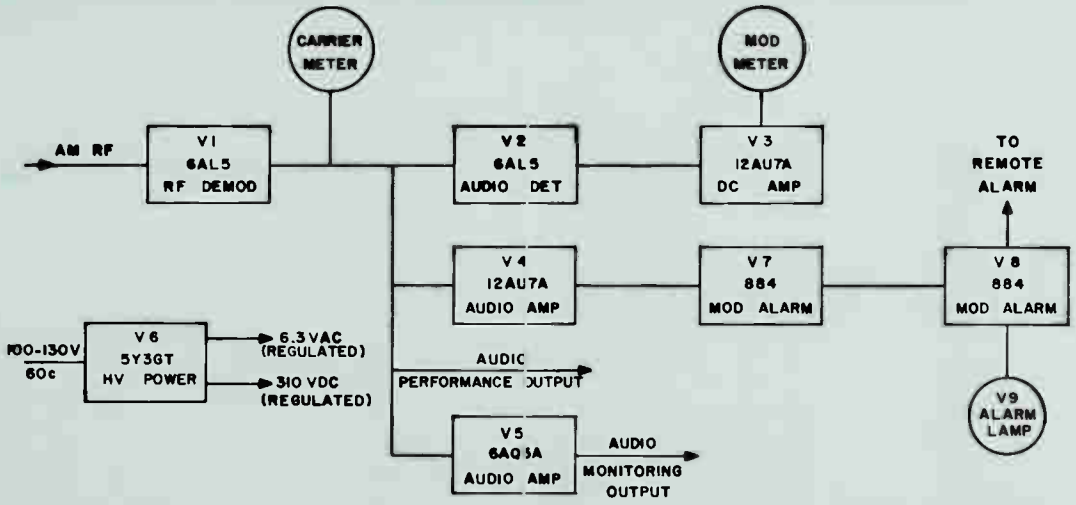

SPECIFICATIONS

POWER REQUIRED

105V to 125V AC, 60 Hz, 80 watts
Fuse 1 AMP, type 3AG

RF INPUT

Input Impedance: 75 ohms (nominal)
RF Input Power Required: 0.5 to 4 watts
Frequency Range: 500kHz to 2000 kHz

DISTORTION METER CIRCUIT

Source Impedance: 10,000 ohms (unbalanced)
Output Level for 100% Modulation: 4 V RMS (minimum)
Frequency Response: 30 Hz to 25,000 Hz ± 0.5 db
Distortion: 0.2%
Noise Level (below 100% Modulation): less than — 70 db

MONITORING CIRCUIT

Output Impedance: 600 ohms (unbalanced)
Output Level (at 100% Modulation): 2 V RMS (minimum)
Frequency Response: 30 to 25,000 Hz ± 0.5 db
Distortion (high impedance load): 0.3%
Distortion (600 ohm load): less than 1%
Noise Level (below 100% modulation): less than — 60 db

ALARM CIRCUIT

5% to 120% (50% to 100% on negative peaks) in 5% steps
Frequency Response: 30 to 15,000 Hz ± 0.5 db
Remote Alarm Contact Rating: 2 AMPS at 115V ac

MODULATION RANGE

0 to 100% on negative peaks
0 to 133% on positive peaks

ACCURACY OF MODULATION INDICATION

± 2% at 100% Modulation
± 4% at 0 to 100% Modulation
Frequency Response: 30 to 15,000 Hz ± 0.5 db

MECHANICAL SPECIFICATIONS

Height	8¾"
Width	19"
Depth	11"
Weight	30 lbs. domestic packing 60 lbs. export packing
Cubage	2'

EXPORT SALES: Telesco International Corporation • 171 Madison Avenue • New York, New York 10016

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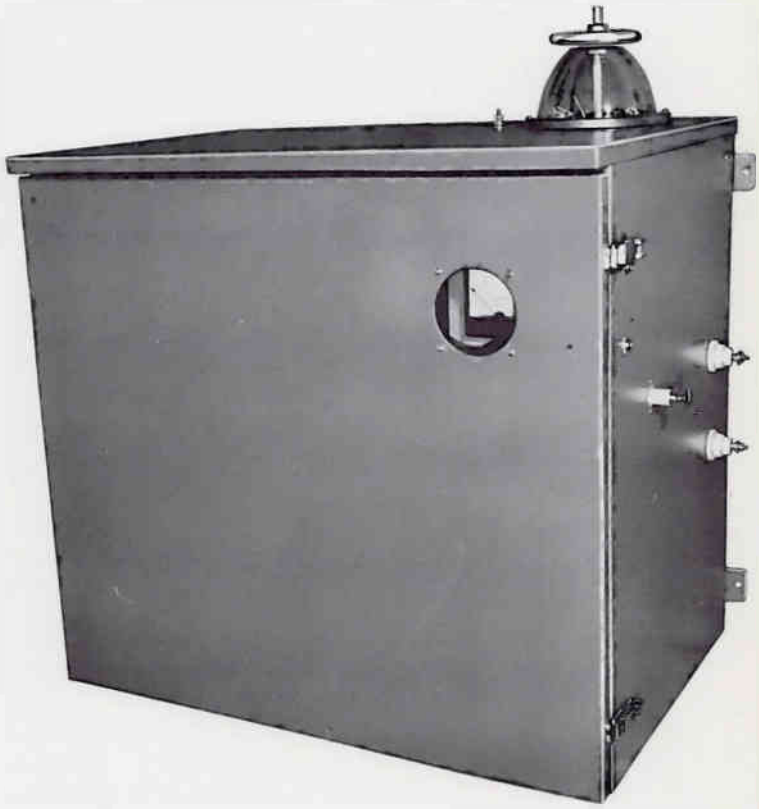
MEDIUM WAVE ANTENNA LINE TERMINATING UNIT

FEATURES

- Rugged Weatherproof Housing
- Authentic "Full Tee" Network Assures Stability
- Full Accessibility through Higned Door
- Meter Shorting Switch for Lightning Protection
- RF Ammeter visible through Housing "Window"
- Rated for Continuous Service
- Ample Room for Optional Items such as Lightning Chokes
- Remote Pick-up Diodes
- Plug In Meter Jack

USES

The CCA LTU family line terminating units are used to provide a stable, efficient transfer of the transmitter output power to the AM tower.



Front View
LTU-1D, 1KW ANTENNA COUPLER

Note: Rugged meter switch, spark gap, windowed meter, hinged door, mounting brackets, substantial weatherproof housing.

DESCRIPTION

MECHANICAL

All CCA Line Terminating units up to and including 50KW are constructed in weatherproof housings. At 100KW and higher, the components are of such size that they are normally mounted in a small building constructed at the base of the tower.

Access to all parts can be had by simply opening the hinged door. Each standard tuning unit contains an RF ammeter and a facility for shorting out this meter. This shorting is accomplished by a front panel switch and does not require entering the tuning unit. A plastic covered hole permits viewing the deflection.

Mounting flanges are associated with each housing to permit ease of installation.

Entrance holes exist on the bottom of the cabinet for the transmission line, remote pick-up lines, and AC power line for the tower lights.

A feed thru bowl insulator is used to provide a terminal for interconnection between the antenna tower and the tuning unit. Separate feed thru insulators are also available for the tower lights.

ELECTRICAL

CCA standard line terminating units are authentic "Full Tee" networks. Two independent inductances are used, one for each series arm of the "Tee". They are physically mounted perpendicular to each other so that there is no mutual coupling between them. Some tuners utilize tapped inductances to achieve a Tee network. This arrangement is much less stable than the CCA method and is much more difficult to originally tune.

The inductances and capacitors that are used have been selected such that minimum Q's exist. This fact

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results in an extremely stable network and an optimum transfer efficiency for all normal variations in AM tower impedances.

Each tuner contains an RF ammeter which is permanently connected in series with the output terminal to the antenna. A rugged, reliable RF switch, which is operated from the outside of the tuner, is used to remove the meter from the circuit and substitute a short in its place. This protects the meter against excessive currents due to static charges and lightning.

A plug in meter jack is provided in the input to permit analysis of the transmission line current. In addition, a wide copper ground strap is used within the tuner to interconnect common points and assure stability.

A substantial feed through bowl insulator is located on the top of the weatherproof housing. Associated with the stud of this feed thru is a lightning spark gap.

ACCESSORIES

RF Lightning Choke

Required to isolate tower light power lines from insulated AM tower. Rated at 20 amperes. One required for each line (ie. — two for single phase, three for three phase). Generally mounted inside tuner housing.

Remote Pick Up Diode

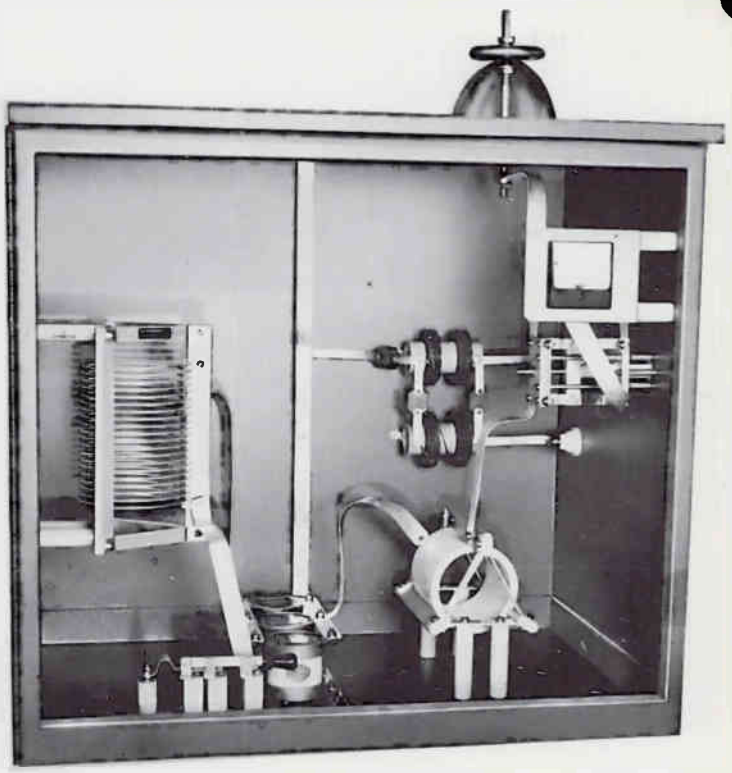
Available in either vacuum tube or solid state version. Supplied with pick up loop to monitor antenna current. Output of diode is D. C. voltage of sufficient level to drive external remote meter.

Remote Meter Panel

Contains meter which is driven by remote pick up diode. Mounts in standard 19" relay rack. Available in one, two, three and four meter panel versions.

Meter and Plug

RF ammeter with appropriate fittings which mate into meter jack supplied with Tuner.



Internal View

LTU-1D, 1KW COUPLING UNIT

Note: "Tune Tee" network, rugged meter switch, lightning chokes, meter jack, ground strap and lug.

TECHNICAL DATA

Type #	LTU-1D*	LTU-5D	LTU-10D	LTU-50D
Carrier Power (100% Mod.)	1250W	6000W	12KW	55KW
Input Impedance	40 to 370	40 to 370	40 to 370	40 to 370
Antenna Impedance				
Resistance	10 to 1000	20 to 1000	20 to 1000	25 to 1000
Reactance	+J600 to -J500	+J600 to -J500	+J600 to -J500	+J600 to -J500
Circuit	Full T Network	Full T Network	Full T Network	Full T Network
Dimensions " (W x H x D)	20 x 23 x 31	36 x 23 x 32	36 x 23 x 32	48 x 76 x 48
Net Weight	85 lbs.	130 lbs.	150 lbs.	750 lbs.
Gross Weight	170 lbs.	250 lbs.	250 lbs.	1000 lbs.

***Note:** Economy version of LTU-1D, identified by the type number LTU-1DS is available in weatherproof housing but less meter shorting switch and with modified "Tee" network.

EXPORT SALES: Telesco International Corporation • 171 Madison Avenue • New York, New York 10016

AM-5000D 5000 WATT AM BROADCAST TRANSMITTER

FEATURES

- High Efficiency PA Circuitry
- Economically Priced
- Long Life 3CX2500F3 PA
- Silicon Power Supply
- Only Five Tube Types
- Conventional High Level Modulation
- Simplified Standard Circuitry
- Conservatively Rated
- Provisions for 1KW and 500 Watt Cutback
- Designed for Remote Control
- Full Accessibility – Only Two Cabinets
- Automatic Recycling
- Hinged Meter Panels
- Lowest Tube Costs

AM-5000D – Front View

MECHANICAL DESCRIPTION

The CCA AM-5000D is a conservatively rated 5000 watt AM broadcast transmitter. It incorporates all time proven, straight forward circuitry with modern field tested tubes.

Although the transmitter includes high quality, conservative components, the utilization of modern techniques measurably reduces the volume requirements of the equipment and thus the complete transmitter can be housed in two cabinets each of which is only 34" wide, 33" deep and 76" high.

Access to all components of the equipment is readily obtained by entering the transmitter through either the front or rear interlocked doors, the interlocked RF and Modulator enclosures, and the interlocked hinged meter panels.

ELECTRICAL DESCRIPTION

CONTROL LADDER—The AM-5000D contains a conventional control ladder which requires only the application of front panel switches for its operation. It incorporates time delays, individual contactors, fast acting overload relays, and an automatic recycling system. The control ladder is interrupted at convenient points to permit remote control operation. "After cooling" automatically cools the transmetter after the filaments are turned off.

POWER SUPPLIES—All power supplies of the AM-5000D utilize conservatively rated long life dependable silicons. The utilization of these components eliminates the age old problem of vacuum tube arc back and generation of cabinet heat due to filament power. An adidtional feature of silicon supplies is that the equipment can be operated at extremes in temperature without rectifier pre-heating.

RF CIRCUITRY—The AM-5000D utilizes a highly stable vacuum crystal oscillator. The 4-400A, IPA, provides more than adequate driving power for the power amplifier. Although 500 watts is available from this stage, only slightly more than 100 watts is used.

The final amplifier in the AM-5000D is a 3CX2500F3 triode. This tube is operated as a plate modulated power amplifier, and can very easily achieve a carrier output power of 5500 watts.

MODULATOR CIRCUITRY—The modulator of the AM-5000D contains popular, inexpensive 4-1000A tetrodes with sufficient reserve to assure adequate audio power to modulate the final stage to well over 100%. Negative feedback circuitry is used to assure excellent frequency response and low distortion. The 4-1000A modulators operate in Class AB2 and are driven by cathode followers.

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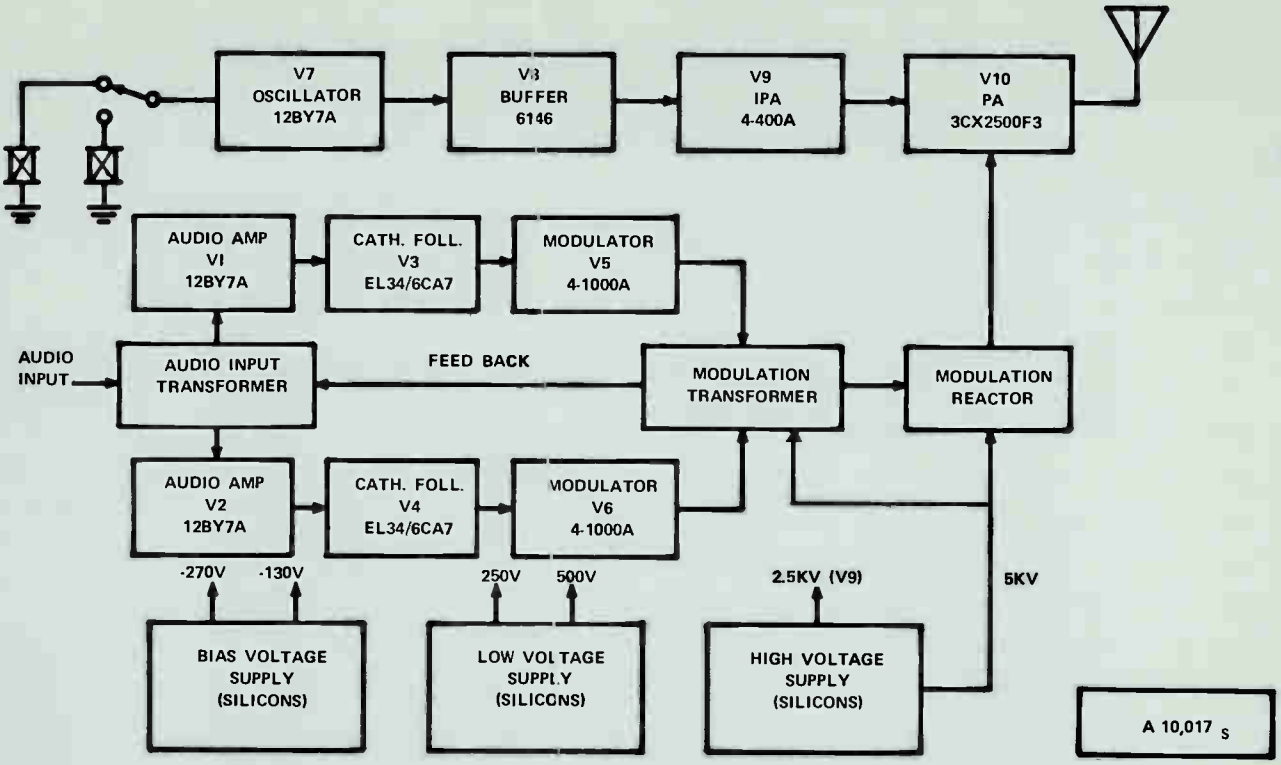
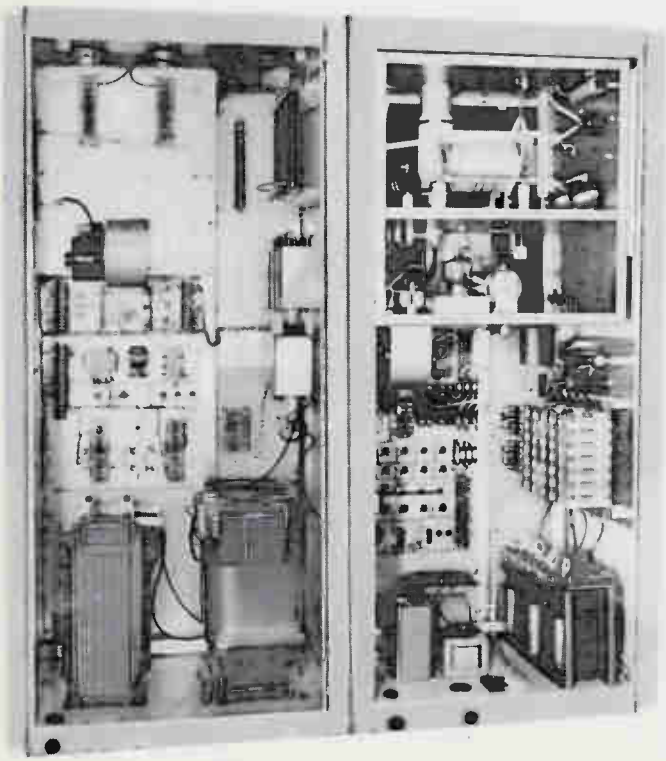


AM 5000 D BLOCK DIAGRAM



AM-5000D Rear View
RF Cover and Door Removed
Note: Full Accessibility, 100% RF Shielding, and Substantial 30 Hz Response Modulation Components.

TECHNICAL SPECIFICATIONS

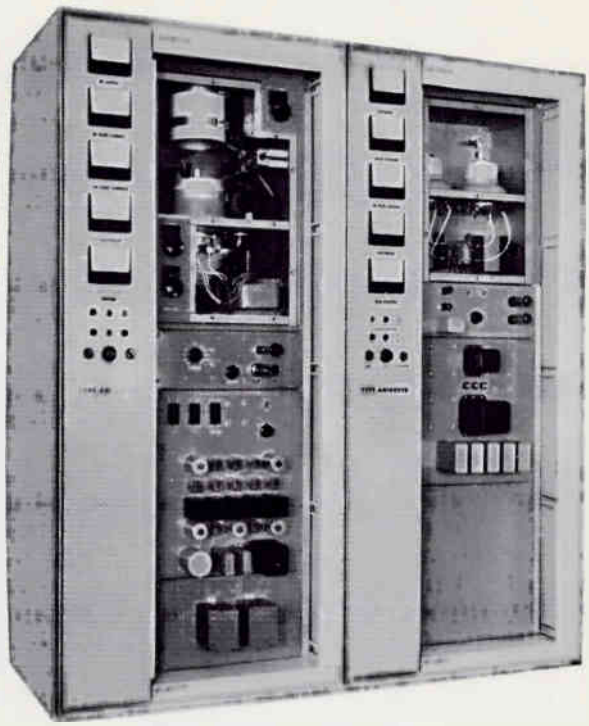
Power Output Capability	5500W
Frequency Range	150kHz - 10MHz
Frequency Stability	±5 Hz
Carrier Shift @ 100% Mod.	3% Max.
RF Output Impedance	40 - 250 ohms
AF Input Impedance	150/600 ohms
AF Input Level @ 100% Mod.	+10 dbm Max.
AF Response	
50 - 7500 Hz	±1 db
30 - 10,000 Hz	±1.5 db
AF Distortion	
50 - 100 Hz	2.0%
100 - 7500 Hz	1.5%
Noise (below 100% Mod.)	-55 db
Line Voltage	208/230V
Line Frequency	50/60 Hz
Phase	3
Power Consumption (100% Mod.)	14KW Max.
Net Dimensions (W x H x D) inches	68 x 76 x 33
Gross Cubeage Cu. Ft.	210
Gross Weight Lbs.	3500
PA Tube	(1) 3CX2500F3
Modulators	(2) 4-1000A
Harmonic Attenuation (2nd)	-90 db
3rd	-80 db
Others	-80 db

*EXPORT SALES: Telesco International Corporation * 171 Madison Avenue * New York, New York 10016*

AM-10,000D 10,000 WATT AM BROADCAST TRANSMITTER

FEATURES

- High Efficiency PA Circuitry
- Economically Priced
- Long Life, Modern Ceramic, 3CX10, 000A3 PA
- Silicon Power Supply
- Only Six Tube Types
- Conventional High Level Modulation
- Simplified Standard Circuitry
- Conservatively Rated 4CX3000A Modulators
- Provisions for 1KW Cut-back
- Designed for Remote Control
- Minimum Floor Space – Only Cabinets
- Automatic Recycling



AM-10,000D – Front View
Front Door and Cover Removed

DESCRIPTION

The CCA AM-10,000D is a conservatively rated 10,000 watt AM broadcast transmitter. It incorporates all time proven, straight forward circuitry with modern field tested tubes.

Although the transmitter includes high quality, conservative components, the utilization of modern techniques measurably reduces the volume requirements of the equipment and thus, the complete transmitter can be housed in two cabinets each only 34" wide, 33" deep and 76" high.

Access to all components of the equipment is readily had by entering the transmitter through either the front or rear interlocked doors, or the hinged, interlocked meter and control panels.

ELECTRICAL DESCRIPTION

CONTROL LADDER—The AM-10,000D contains a conventional control ladder which requires only the application of a front switch for its operation. It incorporates time delays, individual contactors, fast acting overload relays, and an automatic recycling system. The control ladder is interrupted at convenient points to permit remote control operation. "After cooling" is included as a standard feature.

POWER SUPPLIES—All power supplies of the AM-10,000D utilize conservatively rated long life dependable silicons. The utilization of these components eliminates the age old problem of vacuum tube arc back and generation of cabinet heat due to filament power. An additional feature of silicon supplies is that the equipment can be operated at extremes in temperature without rectifier pre-heating. A PIV of 200% in voltage and 1,000% in current is used.

RF CIRCUITRY—The AM-10,000D utilizes a highly stable vacuum crystal oscillator. The 4-400A, IPA, provides more than adequate driving power for the power amplifier. Although 500 watts is available at this stage, only slightly more than 200 watts is used.

The final amplifier in the AM-10,000D is a 3CX10,000A3 triode. This tube is operated as a plate modulated plate amplifier, and can very easily achieve a carrier output power of 13,000 watts. Thus, the 11,000 watts is a very conservative rating.

MODULATOR CIRCUITRY—The modulator of the AM-10,000D contains popular tubes in circuitry with sufficient reserve to assure adequate audio power to modulate the final stage to well over 100%. Negative feedback circuitry is used to assure excellent frequency response and low distortion. The 4CX3000A tetrodes which act as modulators can produce 12KW of audio power as compared to the 7.0KW required.

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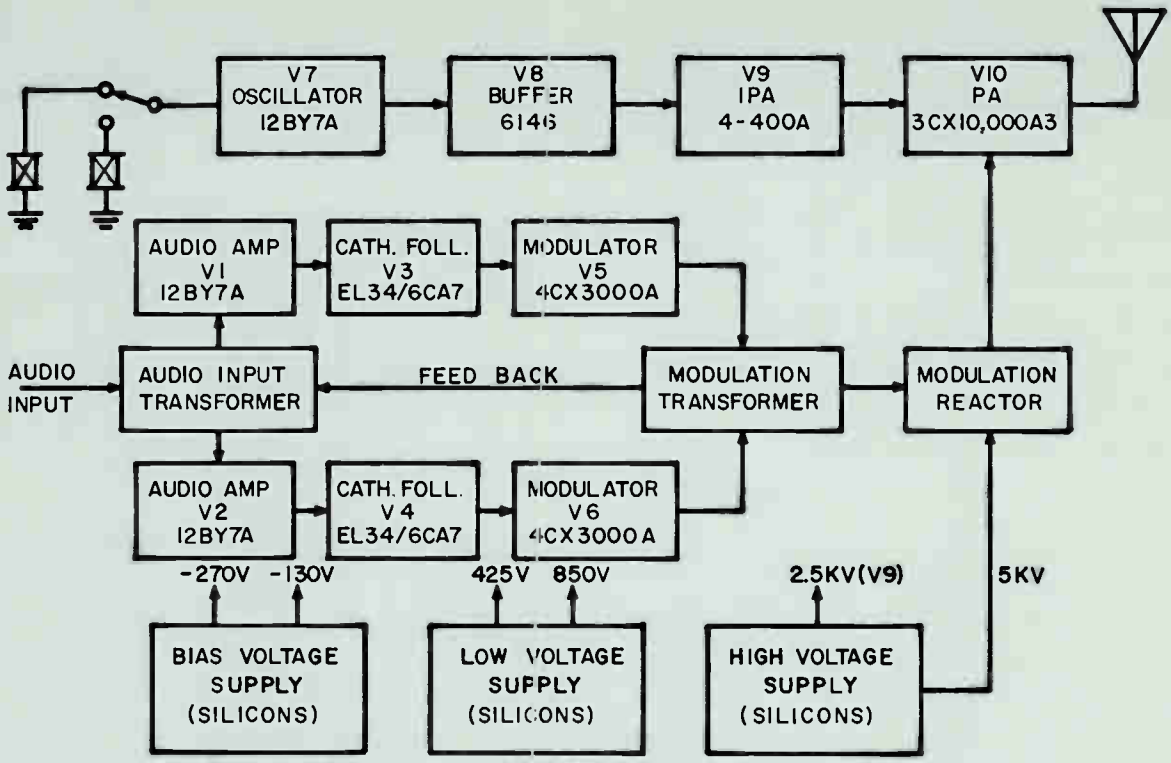
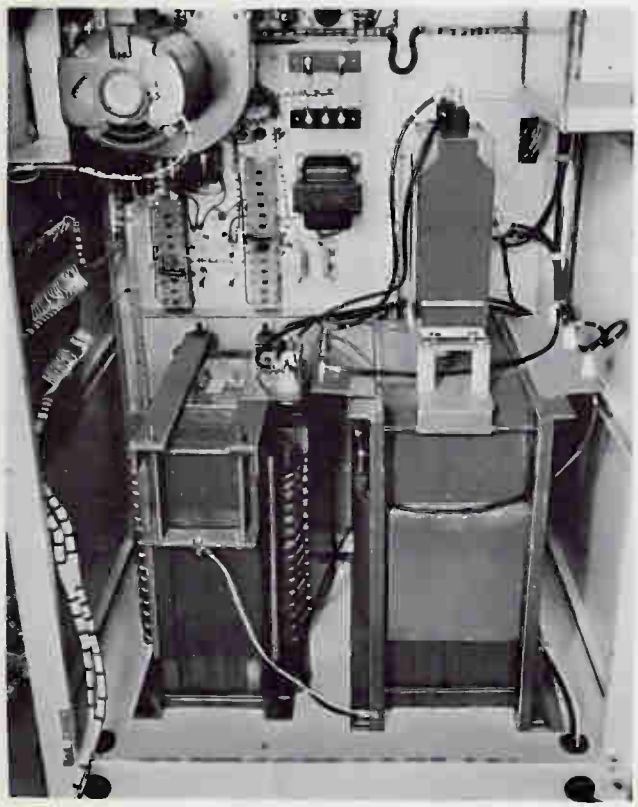


CCA-AM-10,000D — Simplified Black Diagram



AM-10,000D Modulator Cabinet
Rear View
Note: Full Accessibility, and Substantial 30 Hz Response Modulation Components.

TECHNICAL SPECIFICATIONS

Power Output Capability	12KW
Frequency Range	150kHz - 10kHz
Frequency Stability	±5 Hz
Carrier Shift @ 100% Mod.	3% Max.
RF Output Impedance	40 - 250 ohms
AF Input Impedance	150/600 ohms
AF Input Level @ 100% Mod.	+10 dbm Max.
AF Response	
50 - 7500 Hz	±1 db
30 - 10,000 Hz	±1,5 db
AF Distortion	
50 - 100 Hz	2.0%
100 - 7500 Hz	1.5%
Noise (below 100% Mod.)	-55 db
Line Voltage	208/230/380V
Line Frequency	50/60 Hz
Phase	3
Power Consumption (100% Mod.)	28KW Max.
Net Dimensions (W x H x D) inches	68 x 76 x 33
Gross Cubeage Cu. Ft.	210
Gross Weight Lbs.	4000
PA Tube	(1) 3CX10000A3
Modulators	(2) 4CX3000A
Harmonic Attenuation (2nd)	-90 db
3rd	-80 db
Others	-80 db

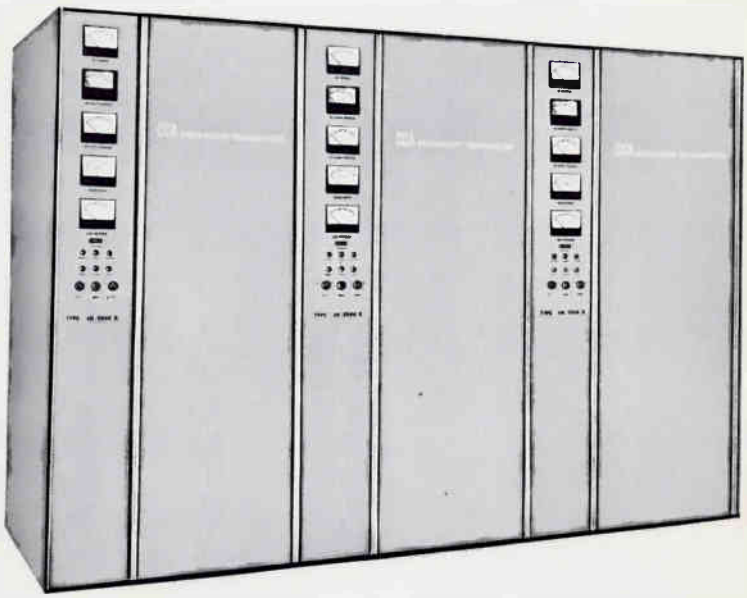
AM-20,000D, 20KW AM BROADCAST TRANSMITTER

FEATURES

- Modern 4CX15000A
- Conventional Standard High Level Modulation
- Lowest Tube Costs
- Silicon Power Supply
- Minimum Floor Space
- Standard Circuitry – Can be operated by average personnel
- Minimum Operating Voltages 7.5KV on Plate
- Minimum Sensitivity to Antenna Impedance Changes
- Full Accessibility to all parts in seconds

USES

The CCA AM-20,000D, 20KW AM Transmitter is a high power, reliable broadcast transmitter which has been designed to be operated by comparatively untrained personnel. Its basic design is such that its operation is not dependent on critical settings or tuning procedures and the transmitter is essentially independent of antenna impedance changes. These basic characteristics of a high level, plate modulated transmitter such as the CCA AM-20,000D is not available in competitive phase type, or lineal systems.



DESCRIPTION

MECHANICAL

The AM-20,000D is housed in three medium sized cabinets. This rather small size is unusual for transmitters of this power level but the AM-20,000D incorporates contemporary tube designs that require a minimum of RF drive and occupy relatively small space. In addition, the transmitter is air-cooled and thus a tremendous reduction in floor space is achieved by eliminating the requirement for water cooling.

Access to all parts can be easily obtained by entrance through the rear interlocked doors, the front doors and the hinged interlocked RF compartment door.

Construction of the transmitter has been such that vertical panel construction is emphasized. Thus, blind spots caused by shelf type assembly is reudced to a minimum. In practically all cases, every part can be seen at a glance by simply opening the appropriate interlocked entrance.

Attractive, rugged, full-sized meters are prominently displayed on the front of the cabinet. These meters indicate the status of every major circuit in the equipment.

Access to all circuits which contain exposed terminals with 300 volts or greater is accomplished through interlocked doors. This fact, together with fast acting bleeder circuitry and automatic shorting of the power supplies to ground protect personnel from unintentionally harming themselves from electrical potentials. In addition to the meters, panel lights exist which describe the status of the control ladder as well as the operation of any specific overload light. For example, in the event of an overload the automatic recycling will restore the equipment instantaneously to operation and if the fault does not persist the equipment will continue in operation. Nevertheless, an indicator light associated with the paritcular circuit which caused the overload will remain lit to advise the operator that a fault had occurred, and to point out the specific circuit in which this fault occurred. The indicator lights for overload are restored by an indpendent restoration button.

All the cooling for the AM-20,000D is accomplished by utilizing high volume high pressure blowers. This blower is located in a central cabinet and provides air for both the modulator and the RF circuitry. All the air that enters this blower system is ducted through filters to prevent any foreign particles from entering the air system. The cooling of the transmitter is three times the recommended value of the tube manufacturers. This assures reserve and long life for the PA and modulator tubes. Dependent on the customer's request, the input air for the system can be obtained from either the rear of the control cabinet or from the top of the cabinet. This is an option which is available to the customer at no additional cost.

ELECTRICAL

Referring to the block diagram of the AM-20,000D it can be seen that it consists of a conventional crystal oscillator with provisions for selecting any one of two crystals. The output of the stage is amplified to a sufficient level to drive a .5KW driver. Although the IPA is capable of developing .5KW, the actual power required to drive the final amplifier to rated power is of the order of 300 watts. The final amplifier utilizes one 4CX15000A tetrode to provide the necessary output power.

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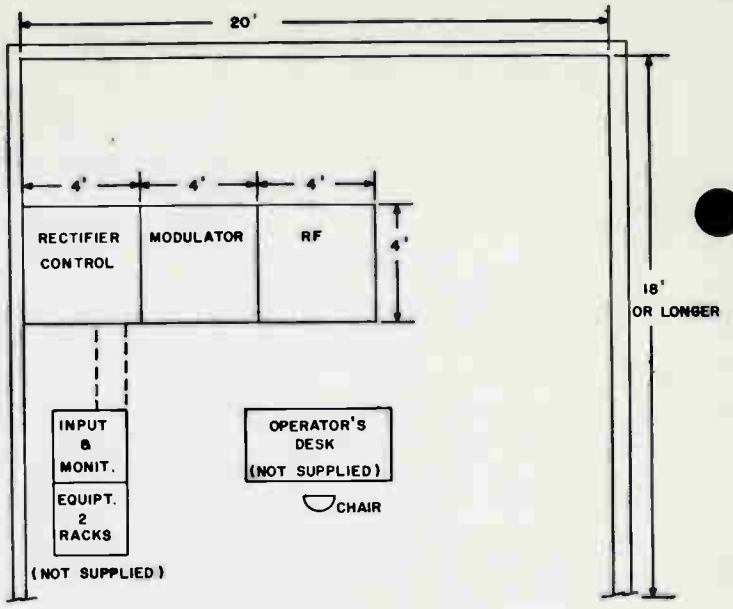
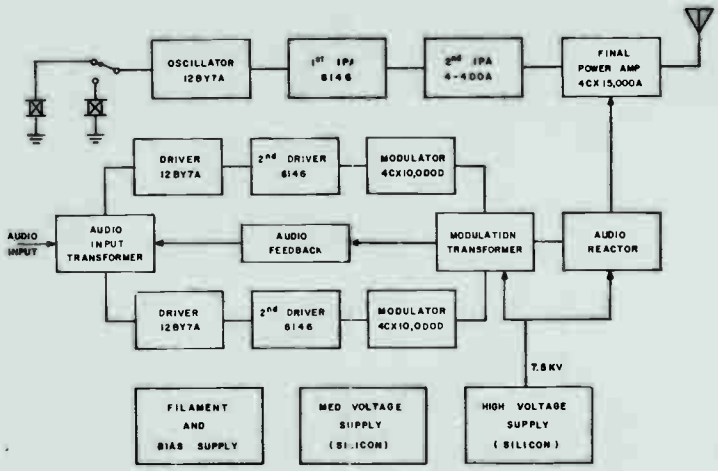
The audio circuitry of the transmitter consists of conventional push-pull circuitry whose output power is developed across a modulation transformer. The secondary of this transformer is terminated in an audio reactor which is in series with the plate supply. This combination of circuitry achieves conventional plate modulation. The 4CX10,000A modulators are the least expensive, but extremely conservative approach towards achieving high level, conventional plate modulation.

The control ladder is so designed that operation of the equipment is achieved by simply operating the front panel switches. Thsi circuitry can also be actuated by utilizing a conventional remote control system. Sampling resistors with wires brought out to accessible terminal boards, permit remote control monitoring of meters without any modification to the basic transmitter.

All power supplies within the equipment utilize conservatively rated silicons which are operated at one-third of their current and voltage ratings. Special precautions have been taken to protect these components from damage due to line surges or transients. A maximum plate voltage of 7,500 volts is required to achieve rated power output. This voltage is extremely low compared to the 20KW transmitters in the field utilizing older type PA tubes and circuitry.



TYPICAL FLOOR PLAN FOR
CCA AM 20,000D BROADCAST TRANSMITTER



AM 20,000D SIMPLIFIED BLOCK DIAGRAM

SPECIFICATIONS

Frequency Range	500 to 1600kHz
Frequency Stability	±5 Hz
AF Input Impedance	150/600 ohms
AF Input Level	+10 dbm ± 2dbm (for 100% modulation)
AF Response:	
50 - 10,000 Hz @ 95% Modulation	±1.5 db
AF Distortion (90% Modulation)	3%, 50-7500 Hz
Noise Unweighted (below 100% Modulation)	55 db
Modulation	High Level
Type of Emission	A3
Type of Output	Unbalanced
Output Impedance (unbalanced)	50 - 300 ohms
Carrier Shift, 100% Modulation	5% or less
RF Voltage (frequency Monitor)	10V, RMS, 75 ohms
RF Voltage (modulation monitor)	10V, RMS, 75 ohms
Power Output Capability	22KW
Power Supply (Specify)	
Line Voltage	230/380/460V, 3 phase
Line Frequency	50/60 Hz

Power Consumption:	
0% Modulation	37KW
Average Program	41KW
100% Modulation	56KW
Power Factor	0.9
Voltage Variation and Regulation	±5%
Spurious Emission (2nd Harmonic & above)	-80db
Operating Amibent Temperature Range	10°F to 100°F
Operating Relative Humidity	100% maximum
Operating Altitude (specify for higher)	8500 ft. max.
Storage Temperature Range	-35° to 60°C

MECHANICAL SPECIFICATIONS

Single Cabinet Size (for cabinets in transmitter)	48" x 48" x 76"
Floor Space Required	48 sq. ft.
Overall Weight (approx.)	8,000 lbs.
Shipping Weight (approx.)	9,000 lbs.

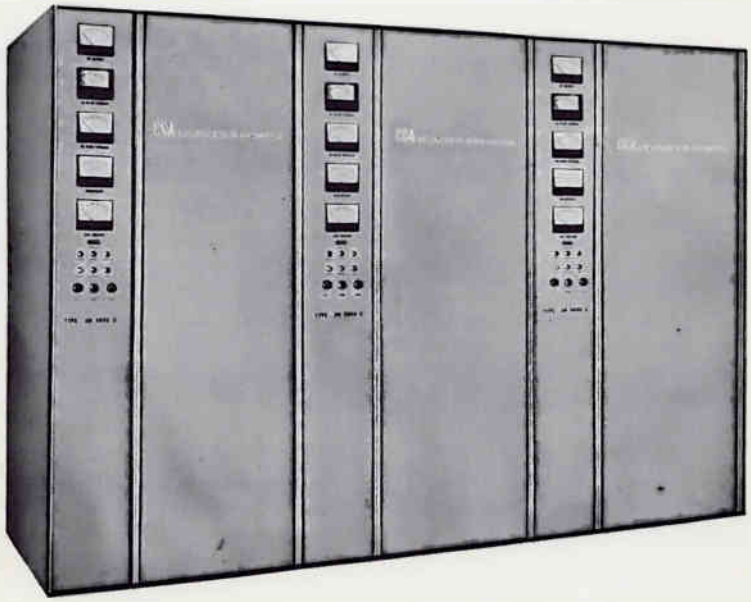
AM-25,000D, 25KW AM BROADCAST TRANSMITTER

FEATURES

- Modern 3CX20000A3 Triode
- Conventional Standard High Level Modulation
- Lowest Tube Costs
- Silicon Power Supply
- Minimum Floor Space
- Standard Circuitry — Can be operated by average personnel
- Minimum Operating Voltages 7.5 KV on Plate
- Minimum Sensitivity to Antenna Impedance Changes
- Full Accessibility to all parts in seconds

USES

The CCA AM-25,000D, 25KW AM Transmitter is a high power, reliable broadcast transmitter which has been designed to be operated by comparatively untrained personnel. Its basic design is such that its operation is not dependent on critical settings or tuning procedures and the transmitter is essentially independent of antenna impedance changes. These basic characteristics of a high level, plate modulated transmitter such as the CCA AM-25,000D is not available in competitive phase type, or lineal systems.



DESCRIPTION

MECHANICAL

The AM-25,000D is housed in three medium sized cabinets. This rather small size is unusual for transmitters of this power level but the AM-25,000D incorporates contemporary tube designs that require a minimum of RF drive and occupy relatively small space. In addition, the transmitter is air-cooled and thus a tremendous reduction in floor space is achieved by eliminating the requirement for water cooling.

Access to all parts can be easily obtained by entrance through the rear interlocked doors, the front doors and the hinged interlocked RF compartment door.

Construction of the transmitter has been such that vertical panel construction is emphasized. Thus, blind spots caused by shelf type assembly is reduced to a minimum. In practically all cases, every part can be seen at a glance by simply opening the appropriate interlocked entrance.

Attractive, rugged, full-sized meters are prominently displayed on the front of the cabinet. These meters indicate the status of every major circuit in the equipment.

Access to all circuits which contain exposed terminals with 300 volts or greater is accomplished through interlocked doors. This fact, together with fast acting bleeder circuitry and automatic shorting of the power supplies to ground protect personnel from unintentionally harming themselves from electrical potentials. In addition to the meters, panel lights exist which describe the status of the control ladder as well as the operation of any specific overload light. For example, in the event of an overload the automatic recycling will restore the equipment instantaneously to operation and if the fault does not persist the equipment will continue in operation. Nevertheless, an indicator light associated with the particular circuit which caused the overload will remain lit to advise the operator that a fault had occurred, and to point out the specific circuit in which this fault occurred. The indicator lights for overload are restored by an independent restoration button.

All the cooling for the AM-25,000D is accomplished by utilizing high volume high pressure blowers. This blower is located in a central cabinet and provides air for both the modulator and the RF circuitry. All the air that enters this blower system is ducted through filters to prevent any foreign particles from entering the air system. The cooling of the transmitter is three times the recommended value of the tube manufacturers. This assures reserve and long life for the PA and modulator tubes. Dependent on the customer's request, the input air for the system can be obtained from either the rear of the control cabinet or from the top of the cabinet. This is an option which is available to the customer at no additional cost.

ELECTRICAL

Referring to the block diagram of the AM-25,000D it can be seen that it consists of a conventional crystal oscillator with provisions for selecting any one of two crystals. The output of the stage is amplified to a sufficient level to drive a driver. Although the IPA is capable of developing 3KW, the actual power required to drive the final amplifier to rated power is of the order of 1KW. The final amplifier utilizes one 3CX20,000A3 triode to provide the necessary output power.

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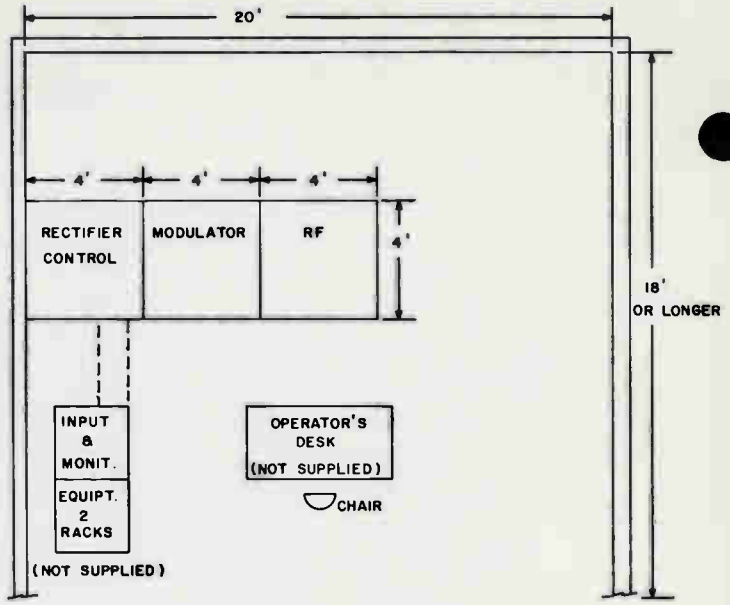
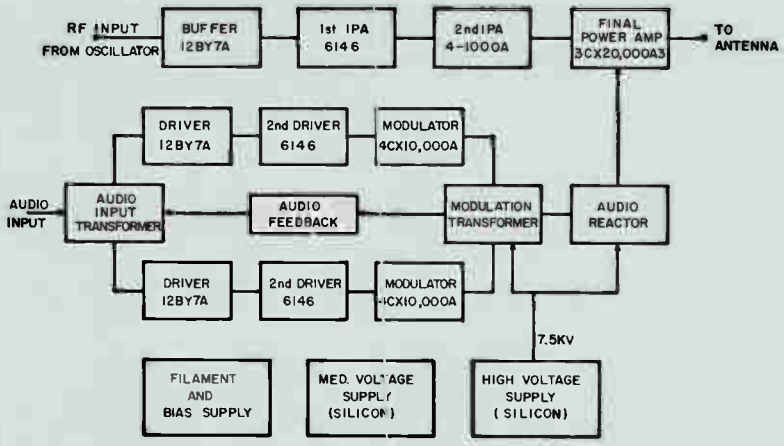
The audio circuitry of the transmitter consists of conventional push-pull circuitry whose output power is developed across a modulation transformer. The secondary of this transformer is terminated in an audio reactor which is in series with the plate supply. This combination of circuitry achieves conventional plate modulation. The 4CX10,000A modulators are the least expensive, but extremely conservative approach towards achieving high level, conventional plate modulation.

The control ladder is so designed that operation of the equipment is achieved by simply operating the front panel switches. This circuitry can also be actuated by utilizing a conventional remote control system. Sampling resistors with wires brought out to accessible terminal boards, permit remote control monitoring of meters without any modification to the basic transmitter.

All power supplies within the equipment utilize conservatively rated silicons which are operated at one-third of their current and voltage ratings. Special precautions have been taken to protect these components from damage due to line surges or transients. A maximum plate voltage of 7,500 volts is required to achieve rated power output. This voltage is extremely low compared to the 25KW transmitters in the field utilizing older type PA tubes and circuitry.



TYPICAL FLOOR PLAN FOR
CCA AM 25,000D BROADCAST TRANSMITTER



AM 25,000D BLOCK DIAGRAM

SPECIFICATIONS

Frequency Range	500 to 1600kHz
Frequency Stability	±5 Hz
AF Input Impedance	150/600 ohms
AF Input Level	+10 dbm ±2dbm (for 100% modulation)
AF Response:	
50 - 10,000 Hz @ 95% Modulation	±1.5 db
AF Distortion (90% Modulation)	3%, 50-7500 Hz
Noise Unweighted (below 100% Modulation)	55 db
Modulation	High Level
Type of Emission	A3
Type of Output	Unbalanced
Output Impedance (unbalanced)	50 - 300 ohms
Carrier Shift, 100% Modulation	5% or less
RF Voltage (frequency Monitor)	10V, RMS, 75 ohms
RF Voltage (modulation monitor)	10V, RMS, 75 ohms
Power Output Capability	30KW
Power Supply (Specify)	
Line Voltage	230/380/460V, 3 phase
Line Frequency	50/60 Hz

Power Consumption:	
0% Modulation	46KW
Average Program	50KW
100% Modulation	70KW
Power Factor	0.9
Voltage Variation and Regulation	±5%
Spurious Emission (2nd Harmonic & above)	-80db
Operating Amibent Temperature Range	10°F to 110°F
Operating Relative Humidity	100% maximum
Operating Altitude (specify for higher)	8500 ft. max.
Storage Temperature Range	-35° to 60°C

MECHANICAL SPECIFICATIONS

Single Cabinet Size (for cabinets in transmitter)	48" x 48" x 76"
Floor Space Required	48 sq. ft.
Overall Weight (approx.)	9,000 lbs.
Shipping Weight (approx.)	10,000 lbs.

AM 250DS 250 WATT AM BROADCAST TRANSMITTER

FEATURES

- Total Accessibility
- 100% Protection of All Circuits
- Low Distortion High Level Modulation
- Double Shielding of All RF Circuits
- Simplified Tuning – Only Two Controls
- Economically Priced
- Designed for Remote Control
- Provisions for Power Cutback
- Pretuned at Customer's Frequency
- Only Three Tube Types
- Automatic Recycling
- Convertable to 500W or 1KW
- Hinged Meter Panel

AM-250DS – Front View

DESCRIPTION

The CCA AM-250DS reflects CCA's considerable experience with both military and broadcast transmitters. The AM-250DS demonstrates the military's requirement for 100% accessibility and protection. All components are visible by opening the rear interlocked door or RF panels. Although a circuit breaker is used for back up protection, all bias, filament, and LV supplies are fused. The average broadcast transmitter with circuit breakers does not provide protection for short circuits in the filament, bias, and LV supplies. Only, CCA offers full protection and accessibility to the commercial broadcaster.

ELECTRICAL DESCRIPTION

RF CIRCUITRY—The RF circuitry consists of a conventional crystal oscillator, a 6146 driver, and two 4-400A tetrodes operated in parallel but Class "C" amplifiers. These tubes conservatively achieve 10,000 hour average life in this service.

POWER SUPPLIES—All power supplies within the AM-250DS utilize field proven silicon rectifiers. A safety factor of 200% exists in both PIV and current.

CONTROL LADDER—The control ladder of the AM-250DS provides protection for cooling, pre-heating of the PA stages, application of protective bias and closing of all door interlocks. An automatic recycling circuit is incorporated which will permit the equipment to automatically be restored to operation in the event of a temporary outage. Protection is obtained by means of fast acting overload relays, circuit breakers, and fuses in circuits not normally controlled by circuit breakers.

POWER CUTBACK—The AM-250DS incorporates provisions for reducing its output power by simply throwing a front panel switch. The equipment as designed can be reduced continuously to as low as 50 watts. Power cutback can be remotely operated.

ADDITIONAL FEATURES—The AM-250DS has no sliding contacts. In addition, only two tuning controls are required for the complete equipment.

ACCESSORIES—The following equipments are available as optional items.

Dummy Load—Tuned to customer's frequency and output impedance. Rated to terminate transmitter at 100% modulation on continuous basis.

Regulator—Maintains all filaments, bias, and low voltages at constant value independent of line voltage variations.

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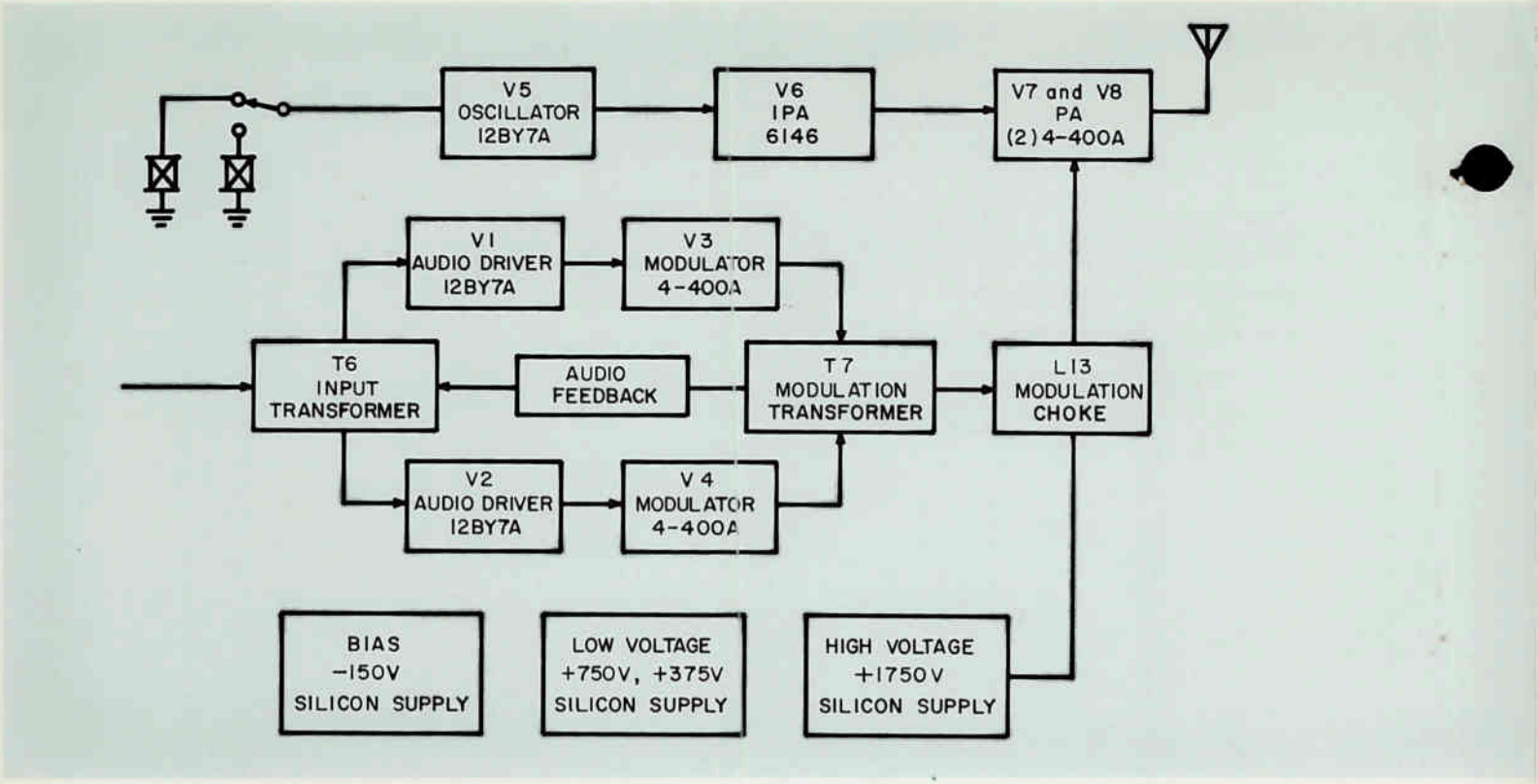
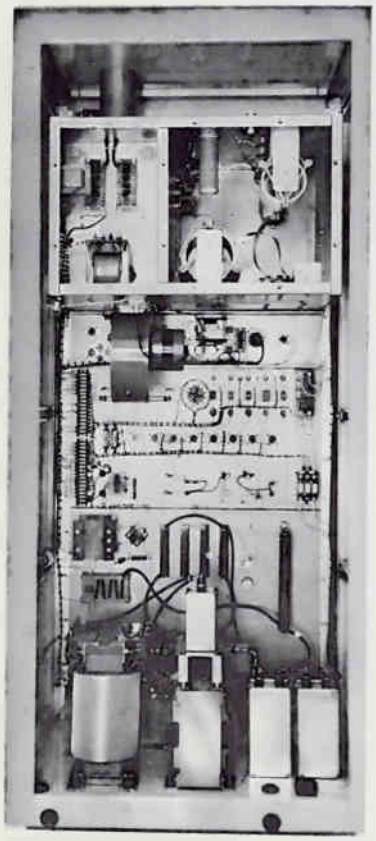


CCA-AM-250DS — Simplified Black Diagram



AM-250DS Rear View
RF Cover and Door Removed
Note: Full Accessibility, 100% RF Shielding, Oversized Blower and Substantial 30 Hz Response Modulation Components

TECHNICAL SPECIFICATIONS

Power Output Capability	350W
Frequency Range	150kHz - 10MHz
Frequency Stability	±5 Hz
Carrier Shift @ 100% Mod.	3% Max.
RF Output Impedance	40 - 250 ohms
AF Input Impedance	150/600 ohms
AF Input Level @ 100% Mod.	±10 dbm Max.
AF Response	
50 - 7500 Hz	±1 db
30 - 10,000 Hz	±1.5 db
AF Distortion	
50 - 100 Hz	2.0%
100 - 7500 Hz	1.5%
Noise (below 100% Mod.)	-55 db
Line Voltage	230V
Line Frequency	50/60 Hz
Phase	1
Power Consumption (100% Mod.)	1KW Max.
Net Dimensions (W x H x D) inches	34 x 76 x 32
Gross Cubeage Cu. Ft.	90
Gross Weight Lbs.	1100
PA Tube	(2) 4-400A
Modulators	(2) 4-400A
Harmonic Attenuation (2nd)	-90 db
3rd	-80 db
Others	-80 db

AM 500D 500 WATT AM BROADCAST TRANSMITTER

FEATURES

- Total Accessibility
- 100% Protection of All Circuits
- Low Distortion High Level Modulation
- Double Shielding of All RF Circuits
- Simplified Tuning – Only Two Controls
- Economically Priced
- Designed for Remote Control
- Provisions for Power Cutback
- Preturned at Customer's Frequency
- Only Three Tube Types
- Automatic Recycling
- Hinged Meter Panel

AM-500D – Front View

DESCRIPTION

The CCA AM-500D reflects CCA's considerable experience with both military and broadcast transmitters. The AM-500D demonstrates the military's requirement for 100% accessibility and protection. All components are visible by opening the rear interlocked door or RF panels. Although a circuit breaker is used for back up protection, all bias, filament, and LV supplies are fused. The average broadcast transmitter with circuit breakers does not provide protection for short circuits in the filament, bias, and LV supplies. Only, CCA offers full protection and accessibility to the commercial broadcaster.

ELECTRICAL DESCRIPTION

RF CIRCUITRY–The RF circuitry consists of a conventional crystal oscillator, a 6146 driver, and two 4-400A tetrodes operated in parallel but Class "C" amplifiers. These tubes conservatively achieve 10,000 hour average life in this service.

POWER SUPPLIES–All power supplies within the AM-500D utilize field proven silicon rectifiers. A safety factor of 200% exists in both PIV and current.

CONTROL LADDER–The control ladder of the AM-500D provides protection for cooling, pre-heating of the PA stages, application of protective bias and closing of all door interlocks. An automatic recycling circuit is incorporated which will permit the equipment to automatically be restored to operation in the event of a temporary outage. Protection is obtained by means of fast acting overload relays, circuit breakers, and fuses in circuits not normally controlled by circuit breakers.

POWER CUTBACK–The AM-500D incorporates provisions for reducing its output power by simply throwing a front panel switch. The equipment as designed can be reduced to 50 watts continuously from 500 watts. Power cutback can be remotely operated.

ADDITIONAL FEATURES–The AM-500D has no sliding contacts. In addition, only two tuning controls are required for the complete equipment.

ACCESSORIES–The following equipments are available as optional items.

Dummy Load–Tuned to customer's frequency and output impedance. Rated to terminate transmitter at 100% modulation on continuous basis.

Regulator–Maintains all filaments, bias, and low voltages at constant value independent of line voltage variations.

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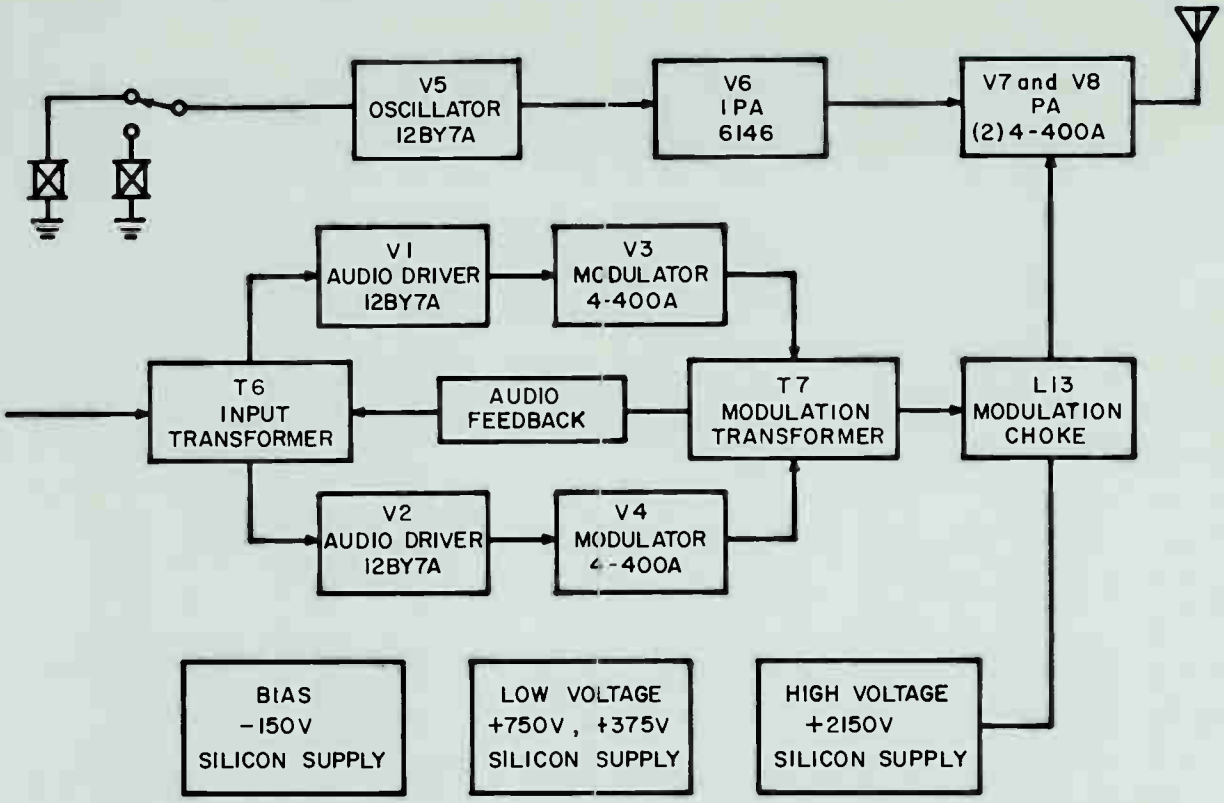
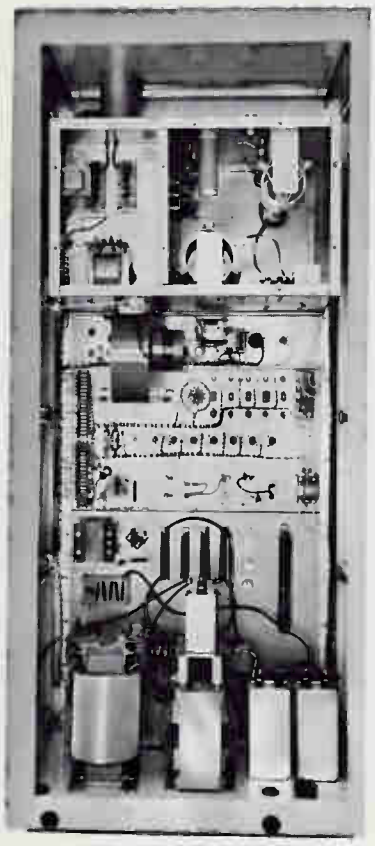


AM 500D BLOCK DIAGRAM



AM-500D — Rear View
RF Cover and Door Removed
Note: Full Accessibility, 100% RF Shielding, Oversized Blower and Substantial 30 Hz Response Modulation Components.

TECHNICAL SPECIFICATIONS

Power Output Capability	550W
Frequency Range	150kHz - 10MHz
Frequency Stability	±5 Hz
Carrier Shift @ 100% Mod.	3% Max.
RF Output Impedance	40 - 250 ohms
AF Input Impedance	150/600 ohms
AF Input Level @ 100% Mod.	+10 dbm Max.
AF Response	
50 - 7500 Hz	±1 db
30 - 10,000 Hz	±1.5 db
AF Distortion	
50 - 100 Hz	2.0%
100 - 7500 Hz	1.5%
Noise (below 100% Mod.)	-55 db
Line Voltage	208/230V
Line Frequency	50/60 Hz
Phase	1
Power Consumption (100% Mod.)	2KW Max.
Net Dimensions (W x H x D) inches	34 x 76 x 32
Gross Cubeage Cu. Ft.	90
Gross Weight Lbs.	1100
PA Tube	(2) 4-400A
Modulators	(2) 4-400A
Harmonic Attenuation (2nd)	-90 db
3rd	-80 db
Others	-80 db

AM-1000D 1000 WATT AM BROADCAST TRANSMITTER

FEATURES

- Total Accessibility
- 100% Protection of All Circuits
- Low Distortion High Level Modulation
- Double Shielding of All RF Circuits
- Simplified Tuning — Only Two Controls
- Economically Priced
- Designed for Remote Control
- Provisions for Power Cutback
- Preturned at Customer's Frequency
- Only Three Tube Types
- Automatic Recycling
- Hinged Meter Panel
- Built in Voltage Regulator

AM-1000D — Front View

DESCRIPTION

The CCA AM-1000D reflects CCA's considerable experience with both military and broadcast transmitters. The AM-1000D demonstrates the military's requirement for 100% accessibility and protection. All components are visible by opening the rear interlocked door or RF panels. Although a circuit breaker is used for back up protection, all bias, filament, and LV supplies are fused. The average broadcast transmitter with circuit breakers does not provide protection for short circuits in the filament, bias, and LV supplies. Only, CCA offers full protection and accessibility to the commercial broadcaster.

ELECTRICAL DESCRIPTION

RF CIRCUITRY—The RF circuitry consists of a conventional crystal oscillator, a 6146 driver, and two 4-400A tetrodes operated in parallel but Class "C" amplifiers. These tubes conservatively achieve 10,000 hour average life in this service.

POWER SUPPLIES—All power supplies within the AM-1000D utilize field proven silicon rectifiers. A safety factor of 200% exists in both PIV and current.

CONTROL LADDER—The control ladder of the AM-1000D provides protection for cooling, pre-heating of the PA stages, application of protective bias and closing of all door interlocks. An automatic recycling circuit is incorporated which will permit the equipment to automatically be restored to operation in the event of a temporary outage. Protection is obtained by means of fast acting overload relays, circuit breakers, and fuses in circuits not normally controlled by circuit breakers.

POWER CUTBACK—The AM-1000D incorporates provisions for reducing its output power by simply throwing a front panel switch. The equipment as designed can be reduced to as low as 50 watts. Power cutback can be remotely operated.

ADDITIONAL FEATURES—The AM-1000D has no sliding contacts. In addition, only two tuning controls are required for the complete equipment.

ACCESSORIES—The following equipments are available as optional items.

Dummy Load—Tuned to customer's frequency and output impedance. Rated to terminate transmitter at 100% modulation on continuous basis.

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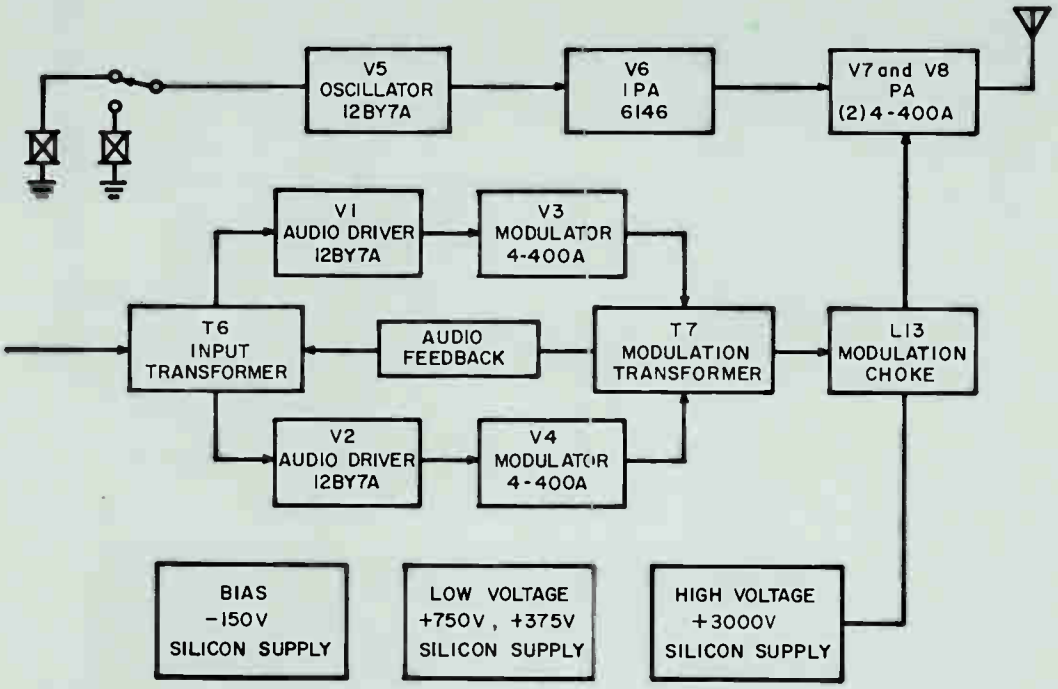
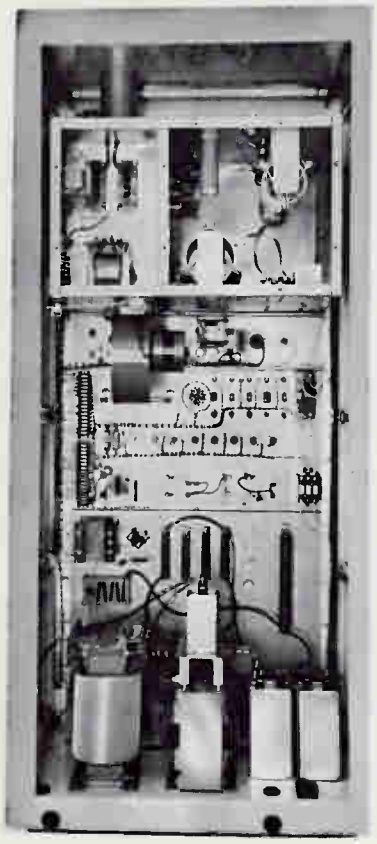


CCA-AM-1000D — simplified Block Diagram



AM-1000D Rear View
RF Cover and Door Removed
Note: Full Accessibility, 100% RF Shielding, Oversized Blower and Substantial 30 Hz Response Modulation Components.

TECHNICAL SPECIFICATIONS

Power Output Capability	1200W
Frequency Range	150kHz - 10MHz
Frequency Stability	±5 Hz
Carrier Shift @ 100% Mod.	3% Max.
RF Output Impedance	40 - 250 ohms
AF Input Impedance	150/600 ohms
AF Input Level @ 100% Mod.	+10 dbm Max.
AF Response	
50 - 7500 Hz	±1 db
30 - 10,000 Hz	±1.5 db
AF Distortion	
50 - 100 Hz	2.0%
100 - 7500 Hz	1.5%
Noise (below 100% Mod.)	- 55 db
Line Voltage	208/230V
Line Frequency	50/60 Hz
Phase	1
Power Consumption (100% Mod.)	4KW Max.
Net Dimensions (W x H x D) inches	34 x 76 x 32
Gross Cubeage Cu. Ft.	90
Gross Weight Lbs.	1200
PA Tube	(2) 4-400A
Modulators	(2) 4-400A
Harmonic Attenuation (2nd)	-90 db
3rd	-80 db
Others	-80 db

15 to 100 KW UHF klystron transmitters

MODELS: TA-15-BT, TA-30-BT, TA-55-BT, TA-100-BT

CCA Electronics Corporation
716 JERSEY AVENUE, GLOUCESTER CITY, NEW JERSEY 08030
PHONE: (609) 456-1716 TELEX: 84-5200

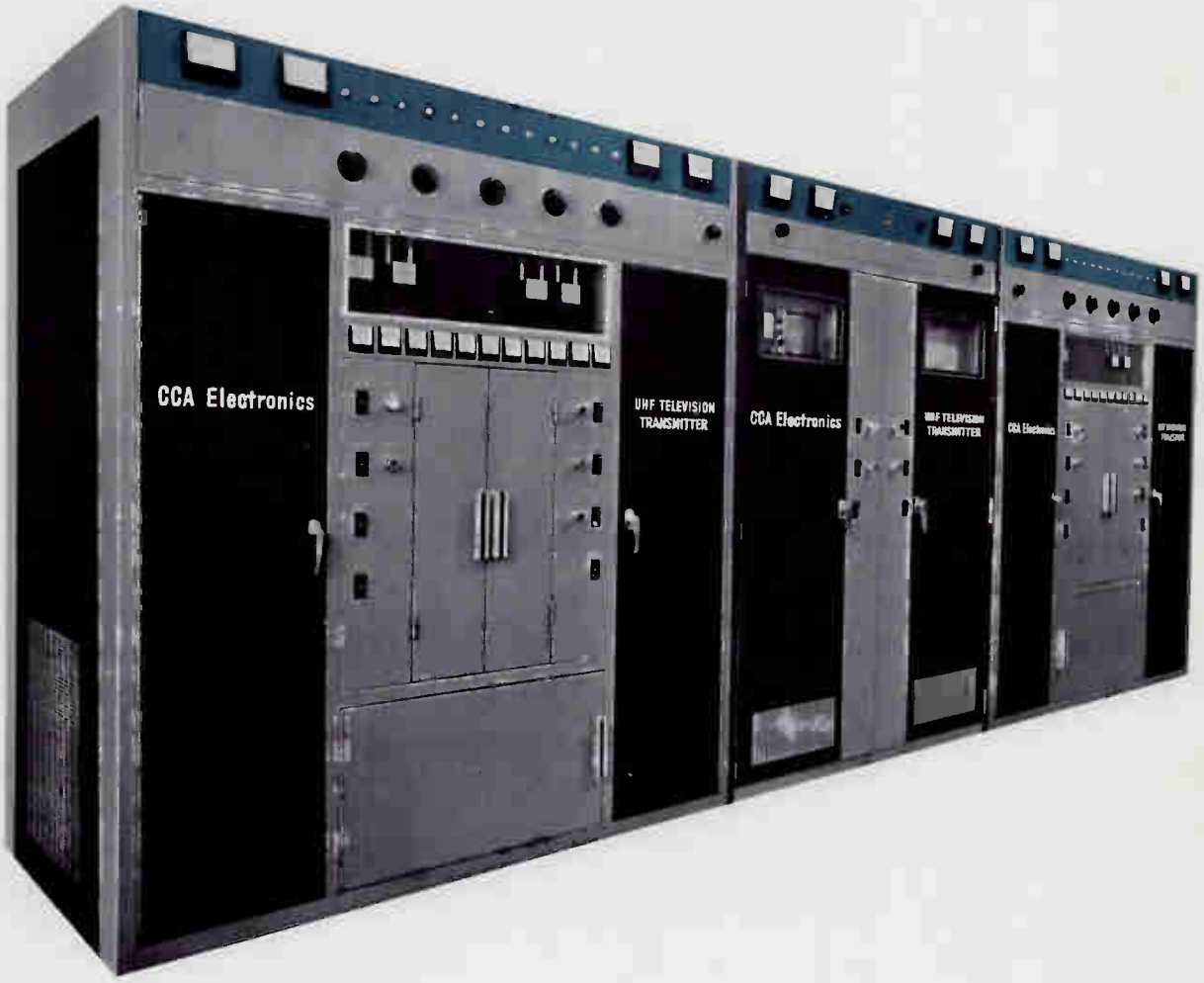
Feature for feature CCA UHF Klystron Transmitters lead the industry in performance and reliability; provide optimum color and monochrome transmission. Water cooled klystrons and transistorized circuitry assure maximum reliability; building-block modules simplify maintenance and allow economical system expansion. All models can be remotely controlled.

Four water-cooled models are offered covering the power range from 15 to 100 kilowatts: Model TA-15-BT rated at 15 kilowatts peak visual power; Model TA-30-BT rated at 30 kilowatts peak visual power; Model TA-55-BT rated at 55 kilowatts peak visual power, and Model TA-100-BT rated at 100 kilowatts visual power.*

With this choice of power levels, it is possible to select an appropriate combination of transmitter power and antenna gain to arrive at the desired ERP. Transmitters can be ordered to meet all domestic and most international station operating specifications.

CCA modular transmitters are designed so that the broadcaster can start with a lower power system and economically expand it later. Modification to power levels up to 100 kilowatts can be done in the field with no interruption in program service.

All CCA klystron transmitters use only three vacuum tubes—two klystrons and the visual modulated amplifier. All other circuits are transistorized. Result: cooler, more compact, power-saving transmission equipment that provides unmatched performance and reliability.



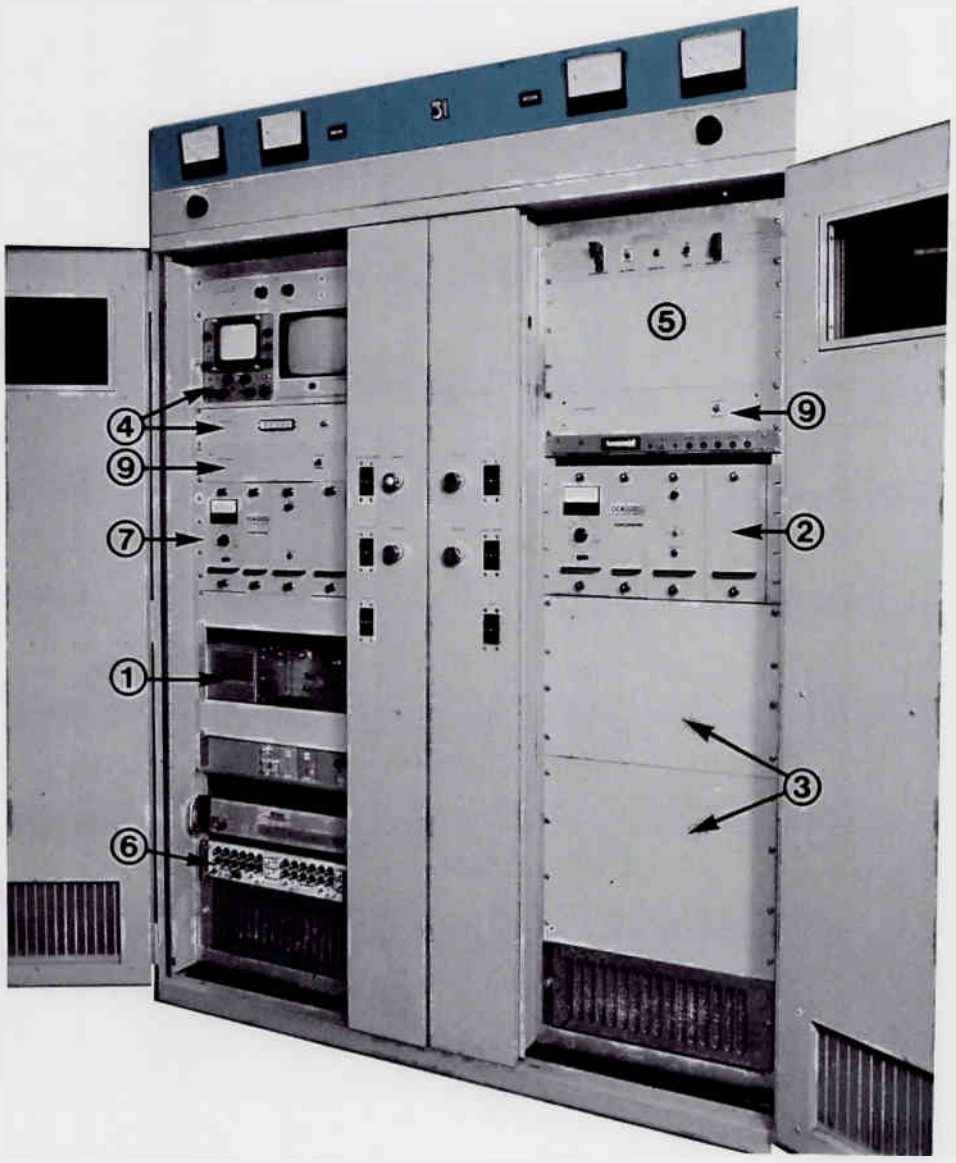
*The general description in this folder applies to all four transmitters. Detailed specifications are given only for 15, 30 and 55 kilowatt models; specifications for the 100 kilowatt model TA-100-BT are given in a separate sheet.

Performance Features

1. Back-to-the-wall mounting saves space, simplifies maintenance.
2. Separate beam power supplies for aural and visual amplifiers.
3. All water control and metering devices mounted on front-facing sub-panel and totally isolated from the system electronics.
4. Individual focus coil power supplies.
5. Quick set up for multiplexing through one amplifier in an emergency.
6. All solid state modulator incorporating advanced processing amplifier features.
7. Unitized power supplies completely enclosed in tank for outside mounting.
8. Complete test and monitoring equipment, including scope, picture monitor, sideband response analyzer, and frequency and modulation monitor is available for mounting in the driver.

The CCA RF Driver contains two independent solid state exciters one for the aural the other for the visual. The output of the aural exciter is 10 watts. Substantially more than the 2 watts required to drive the aural klystron. The Visual exciter drives a YD 1270 triode which can conservatively produce 25 watts. This stage is cathode modulated with a solid state modulator "built-in". This cabinet also contains a four cavity vestigial sideband filter, pre-tuned to the customer's frequency as well as a sophisticated adjustable color phase equalizer and low pass filter. These units guarantee operation within FCC and CCIR color specifications.

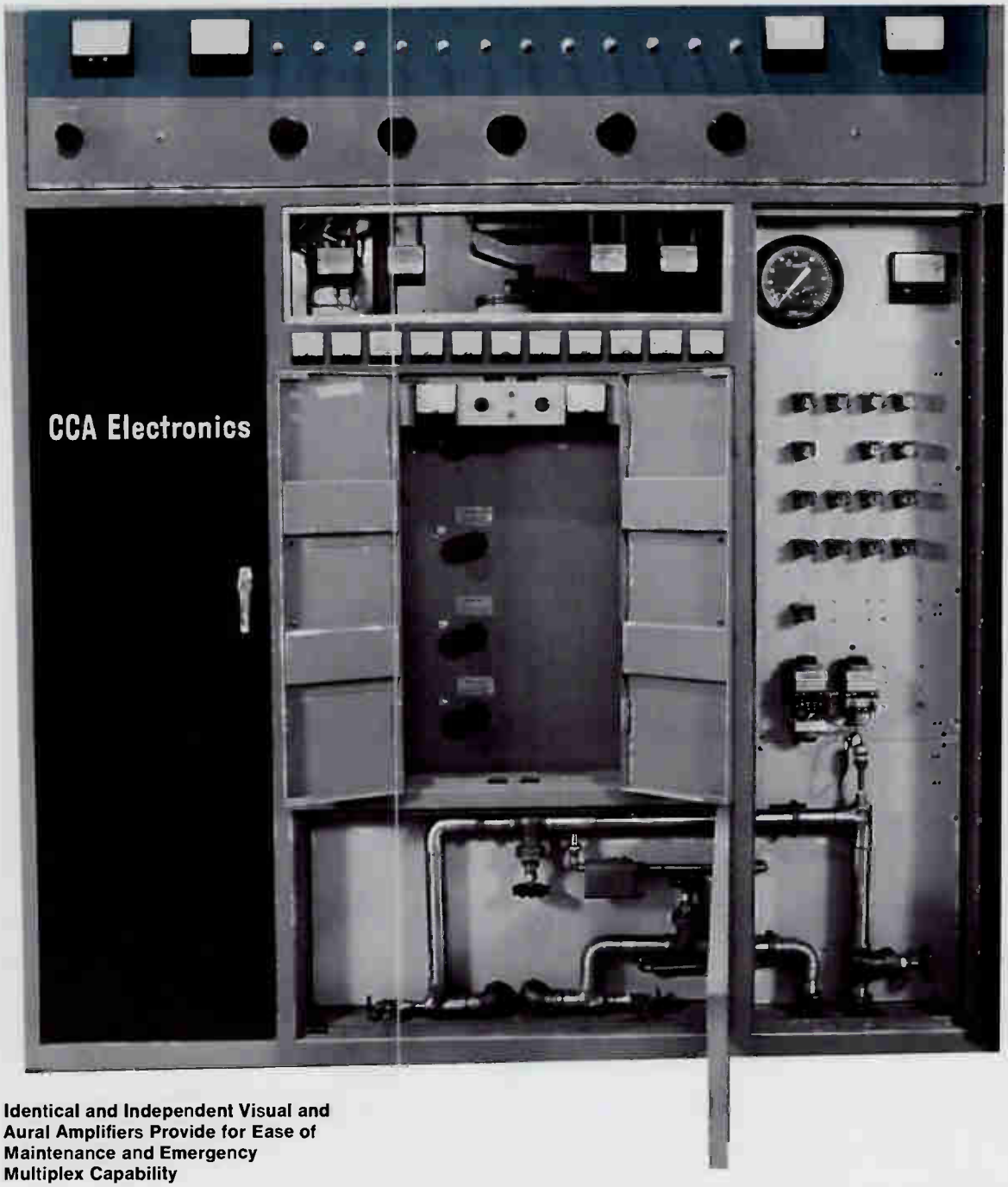
1. Solid state modulator.
2. Aural driver completely transistorized, contains no cavities and employs reliable direct FM.
3. Sideband response analyzer built into driver permits easy testing. (Optional)
4. Waveform and picture monitors with switching panel permits complete monitoring of system from modulator in, to amplifier out. Transistorized chopper and demodulator are also available. (Optional)
5. Modulation monitor is pre-wired into driver cabinetry. (Optional)
6. Color phase equalizers and low pass filter guarantee operation within F.C.C. specifications for color. (Included in transmitter)
7. Visual driver is transistorized, and modulated amplifier uses YD 1270 in rugged cavity with precision tuning mechanism.
8. Both visual and aural crystal oscillators and buffer stages are in temperature controlled ovens.
9. Ferrite isolators, and motorized variable R. F. attenuators, provide for precise control of klystron output.



CCA Transistorized Driver Features
Built In Test and Monitoring Facilities

CCA is the only major equipment supplier that offers in its standard UHF TV transmitter the feature of multiplexing. Thus, in the event that a klystron requires replacement, the operator can arrange to drive the input of the performing klystron with the output of both visual and aural exciters. This will result in approximately 50% power output without any noticeable degradation in quality. Thus, there is no need to invest in an expensive standby klystron with the attendant problems of monthly testing to prevent the formation of gas.

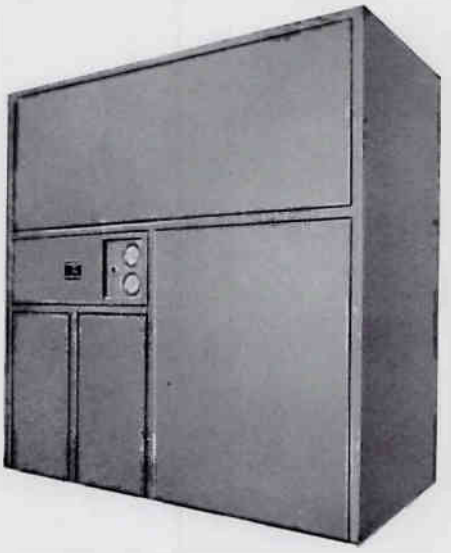
1. Complete metering system requires no meter switches.
2. All water control valves and metering devices are mounted on front-facing sub panel and completely separated from the system electronics.
3. Flow and temperature meters use large, easily read indicators.
4. All four klystron tuning controls and loading adjustments are exposed through central front doors for ease of tuning.
5. Supervisory lights simplify operation and trouble shooting.
6. Control relays are encased plug-in types and are accessible from front.



Identical and Independent Visual and Aural Amplifiers Provide for Ease of Maintenance and Emergency Multiplex Capability

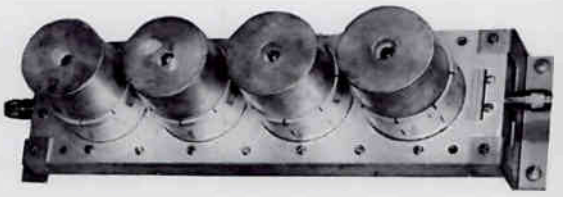
Weatherproof Heat Exchanger

The Heat Exchanger supplied is a combination pump, reservoir, blower and radiator. It contains its own circuit breaker and control circuit which is interconnected with the transmitter. It is constructed such that it may be mounted outdoors. This will substantially reduce ambient noise in the transmitter area. The introduction of glycol in the cooling system permits operation at sub freezing temperatures.



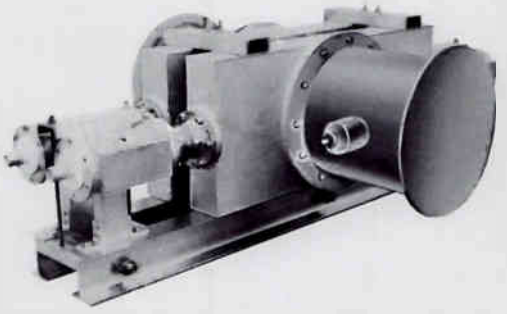
Low Level Sideband Filter

CCA UHF-TV Transmitters achieve vestigial sideband filtering by introducing this sideband filter at the output of the RF exciter. Designed for 100 watts, it is extremely conservative. Pretuned at the factory for either CCIR-PAL or FCC color specifications.



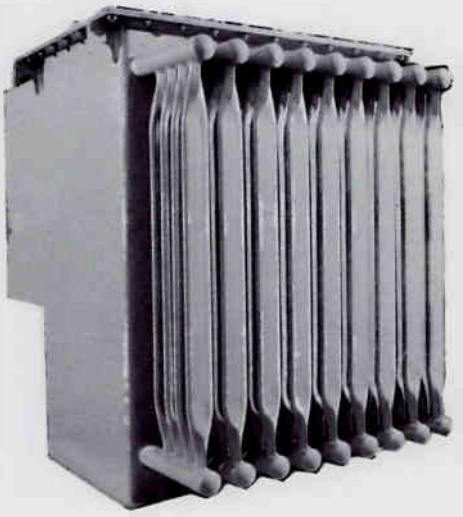
High Power Diplexer

Used to combine aural and visual transmitter outputs into one line. Contains reject load, does not require pressurization.



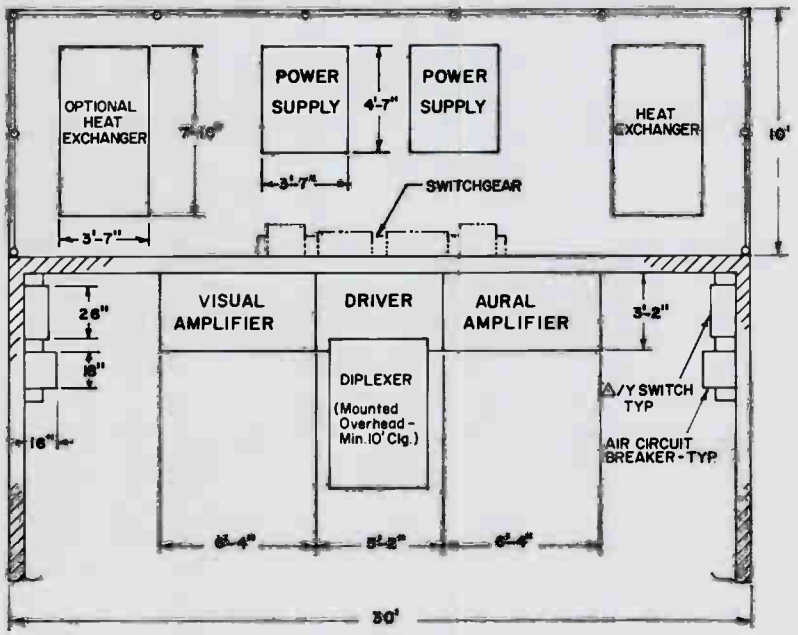
Unitized Klystron Supply

CCA provides two independent high voltage power supplies for the individual power amplifiers of CCA UHF-TV Transmitters. They are weatherproof for outdoor installation and contain a three phase transformer, full wave silicon rectifiers, filter chokes and capacitors.



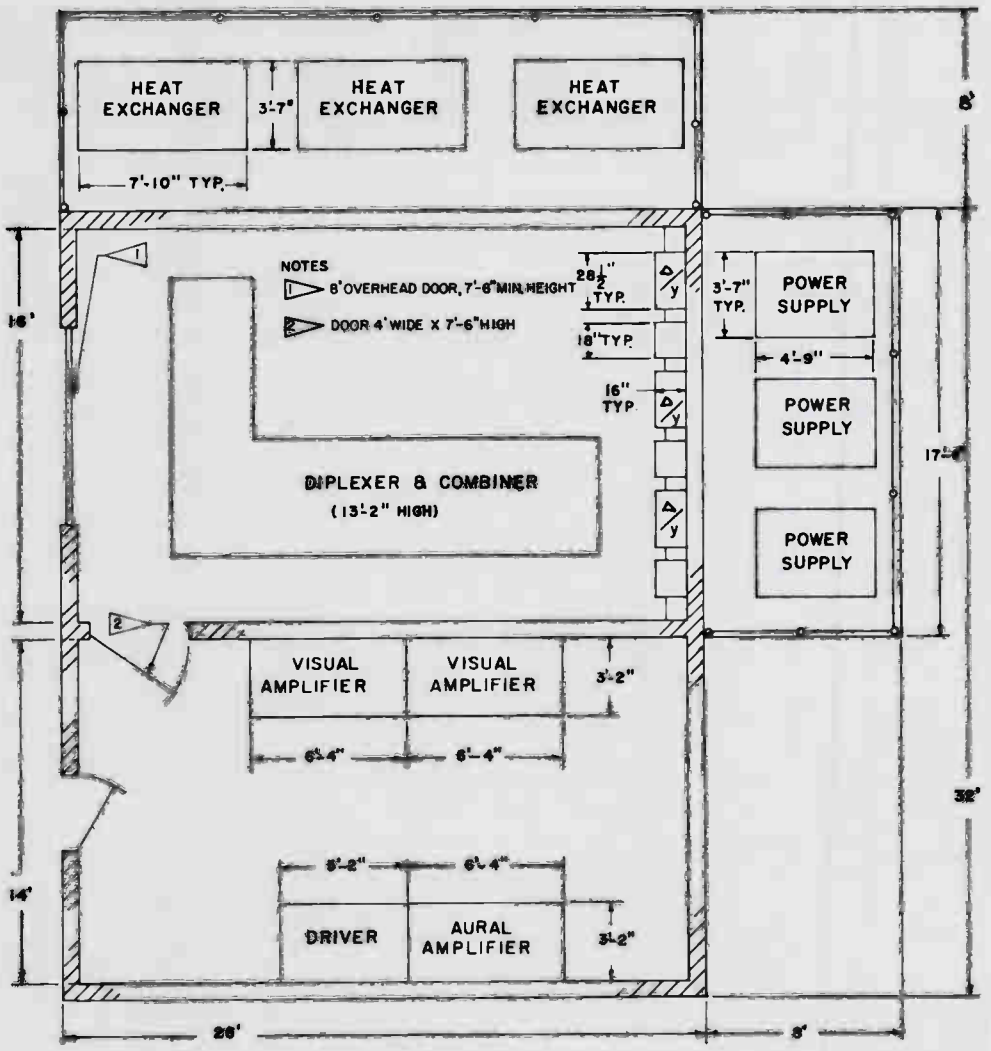
1. Entire transmitter has no rear doors resulting in space savings and ease of maintenance by mounting the transmitter against the wall.
2. Each amplifier is identical and utilizes a separate power supply. Unitized power supplies are compact, require no maintenance and have extreme reliability.
3. R. F. transfer panel is included and connected for quick change to emergency multiplex operation. System is equivalent of having a spare amplifier.
4. Sideband filtering is performed between the driver and klystron. Diplexer is simple and requires no pressurization.

Floor Plan TA-15-BT and TA-30-BT

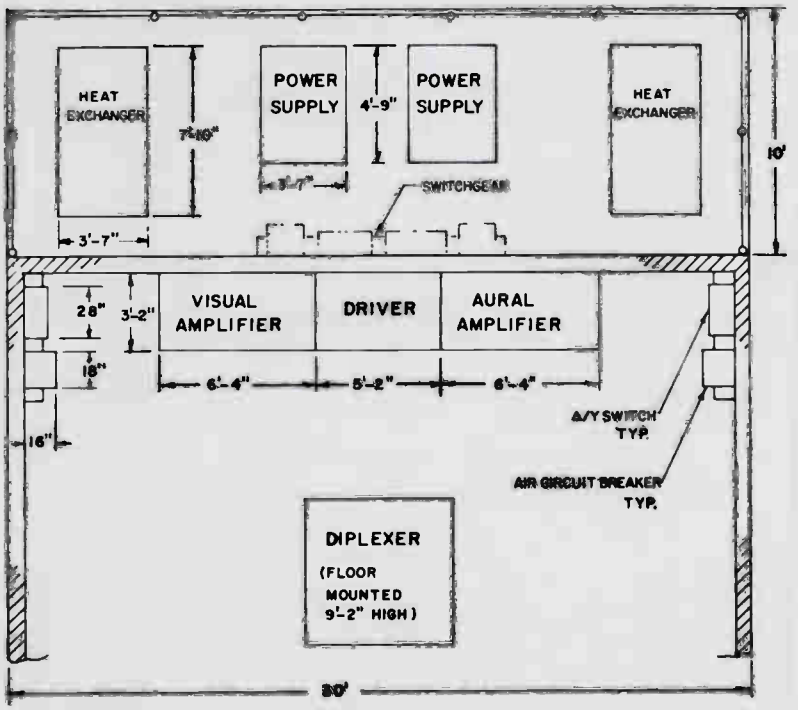


Simplicity of Installation Coupled with Layout for Maximum Efficiency

Floor Plan TA-100-BT



Floor Plan TA-55-BT



Performance Specifications

VISUAL	FCC	CCIR	
		5.5 MHz Carrier Separation	
Output Impedance	50 ohm EIA Std.	50 ohm EIA Std.	
Frequency Range	14 to 83	Band 4 & 5	
Carrier Stability	±250 Hz over 30 days	±150 Hz over 30 days	
RF Output Regulation	3% Black to White	3%	
Visual Amplitude Response:		Visual Amplitude Response:	
Carrier +.2 MHz	0 db reference	Carrier +0.5 MHz ±0.5 db	Carrier —0.75 MHz +0.5/—4 db
Carrier +4. MHz	±.5 db	Carrier +1.5 MHz 0 db	Carrier —1.25 MHz —20 db
Carrier +4.18 MHz	+.5 —1 db	Carrier +4.43 MHz +0.5/—1.0 db	Carrier —3.00 MHz —20 db
Carrier —.5	±.5 db	Carrier +5.0 MHz +0.5/—2.5 db	Carrier —4.43 MHz —30 db
Carrier —.75	Greater than —3.0 db	Carrier —5.5 MHz —20 db	Carrier —5.0 MHz —20 db
Carrier —1.25	20 db or greater	Carrier —0.5 MHz +0.5/—1.5 db	
Carrier —3.58	42 db or greater		
Carrier —5 MHz	Greater than 20 db		
Visual Modulation Capability	10%	10%	
Differential Gain	0.9 db or better	0.9 db or better	
Linearity	.85%	.85%	
AM Noise	Greater than 51 db to peak of sync.	—51 db	
Differential Phase	±3° or better	±3°	
Video	Standard 75 ohm or loop 1 volt P to P	1 volt PP sync Neg.	
Envelope Delay	FCC or better	Greater than —60 db	
Harmonic Radiation	Greater than —60 db.	CCIR specs or better	
AURAL			
		15 dbm ±2 db	
Input Level	10 dbm ±2 db @ 600 ohms	600/150 ohm	
Input Impedance	600/150 ohm Balanced	50 or 75 M sec. ±1 db	
Pre-emphasis	75 M Sec.	1% or better 30 to 15,000 Hzps	
Distortion	Better than FCC	—60 db	
FM Noise	55 db	Greater than —55 db below 100%	
AM Noise	Greater than —50 db below 100%		
		50 ohms EIA Std.	
Output Impedance	50 ohms EIA Std.	±250 Hz	
Frequency Stability	±250 Hz		

Electrical and Mechanical Specifications

	TA-55-BT	TA-30-BT	TA-15-BT
Rated Visual Amplifier Power Output of Diplexer	55 kilowatts peak	30 kilowatts peak	15 kilowatts peak
Rated Aural Amplifier Power Output of Diplexer	33 kilowatts average 11 KW Normal	18 kilowatts average 6 KW Normal	9 kilowatts average 3 KW Normal
Visual Output Power in Emergency Multiplex Operation	30 kilowatts peak	15 kilowatts peak	8 kilowatts average
Aural Output Power in Emergency Multiplex Operation	3 kilowatts average	1.5 kilowatts average	.8 kilowatts average
Power Consumption in Normal Operation	204 KVA	127 KVA	78 KVA
Power Consumption in Emergency Multiplex Operation	182 KVA	108 KVA	67 KVA
Beam Power Supply Voltage	460/480 volt, 3 phase, 50/60 cycle	460/480 volt, 3 phase, 50/60 cycle	460 volts, 3 phase, 50/60 cycle
Transmitter Circuit and Heat Exchanger Input Voltages	208/120 volts, three phase, 50/60 cycle	280/120 volts, three phase, 50/60 cycle	208/120 volts, three phase 50/60 cycle
Transmitter Dimensions	17′ 10″ long, 38″ deep, 83″ high	17′ 10″ long, 38″ deep, 83″ high	17′ 10″ long, 38″ deep, 83″ high
Transmitter Weight	8760 pounds	8760 pounds	8760 pounds
Heat Exchanger Dimensions	82″ long, 42″ deep, 83″ high	82″ long, 42″ deep, 72″ high	82″ long, 42″ deep, 72″ high
Heat Exchanger Weight	2340 pounds per unit	2160 pounds per unit	2160 pounds per unit
Power Supply Dimensions	45″ wide, 41″ deep, 62″ high	40″ wide, 35″ deep, 48″ high	36″ wide, 30″ deep, 42″ high
Power Supply Weight	3950 pounds per unit	2800 pounds per unit	1860 pounds per unit
Ambient Temperature	45° Centigrade Maximum	45° Centigrade Maximum	45° Centigrade Maximum
R. F. Transfer Panel	Seven Position 6⅛″	Seven Position 3⅛″	Seven Position 3⅛″

Specifications Subject to Change Without Notice

Printed in U.S.A.

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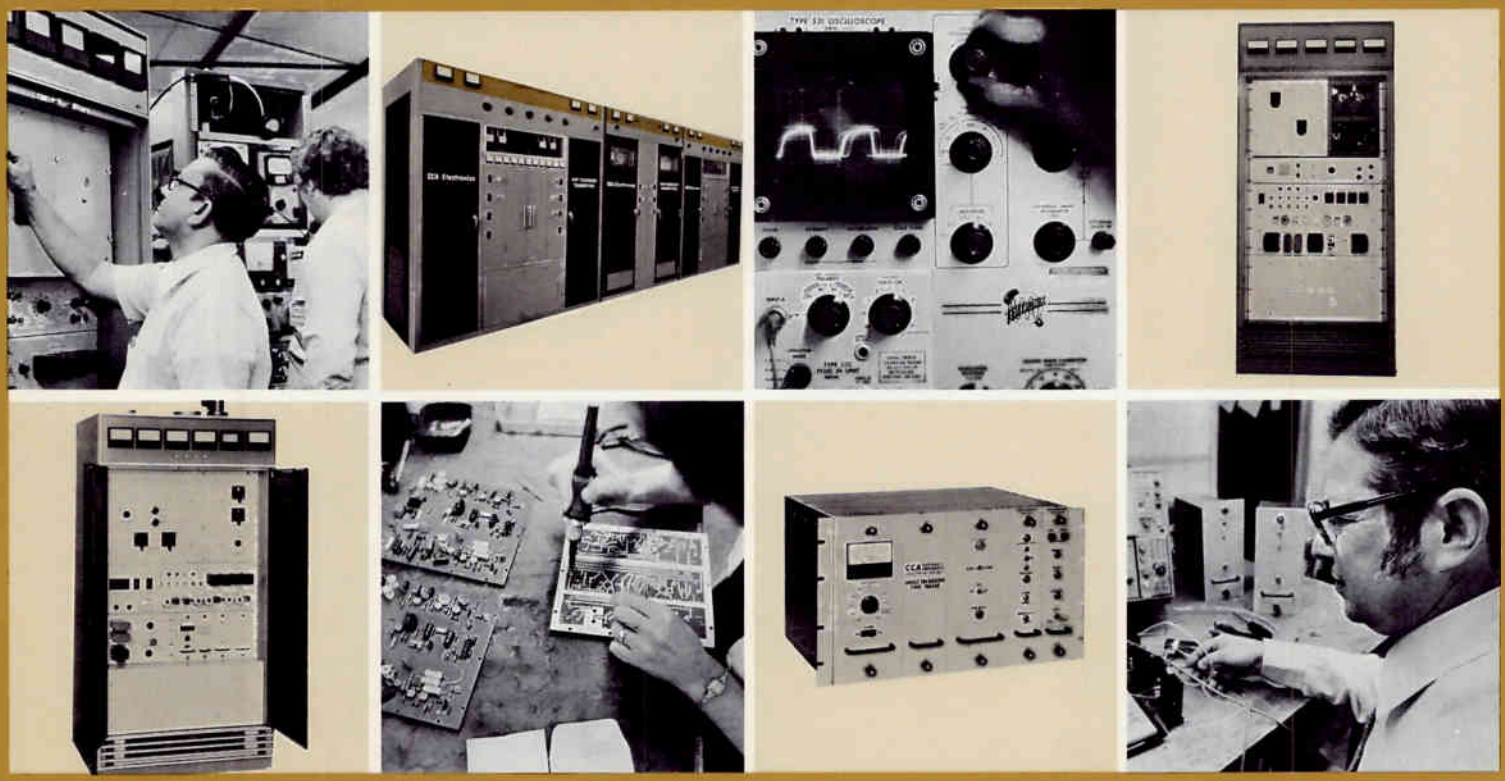


One of the World's Foremost Manufacturers

of

Quality Broadcast and Communications Equipment

Service

Real service starts with complete documentation that the user receives with equipment. We provide valid schematics, and well-written instruction manuals that are easy to read and follow.

We appreciate the fact that many of our users are concerned with the total operation of the broadcasting or communications system and not only with the performance characteristics of our equipment.

For this reason we provide a wide range of expert valuable information and service via our field and plant personnel. Most problems can be solved by telephone, and each member of our staff, including our President and Director of Engineering, is available for plain talk and expert advice.

CCA can give users the total service support they need.

Testing

Our test group consisting of top engineering people know broadcasting and communications equipment as well as they know themselves.

This team knows what it means to calibrate, evaluate, test and repair, and insists on the most rigorous quality control standards.

When you join the family of CCA users you can expect that each sub-assembly has been individually tested and that the results have been recorded—both for you and for us. Accurate overall test data on any piece of equipment is always furnished to the user.

Our product engineering tests are developed to meet the highest standards because our engineering staff insists on performance approaching theoretical limits.

Parts

We know the value of time to a station that is off the air. We have an in-house customer service group whose only function is to supply parts to the user. We want to meet our users needs, and do it quickly.

In the event of a malfunctioning part, we can, and in most cases do, have the part on the next plane.

We also have field engineers to take care of that fraction of 1% of the problems that can't readily be solved over the telephone.

Our field service group is highly competent and experienced. They are ready, willing, and able to assist you when you need it.

Meet CCA Electronics

We are AM, FM, and TV broadcast systems specialists who work exclusively with the national and international broadcast and communications industries.

We design, develop, manufacture, install, and service transmitters, antennas, and systems for all types of broadcast capabilities, and components for all types of systems.

We also provide the *total package* for AM, FM, and TV broadcast and communications stations and systems—from selection and planning, to design, execution, implementation of total follow-up, and equipment maintenance.

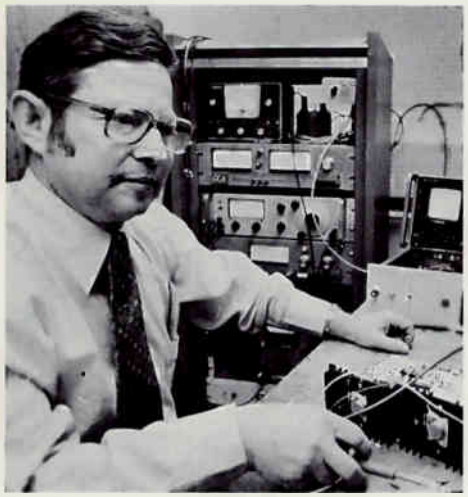
And in every area of our activities . . . in our conceptual approach . . . engineering capabilities and product lines . . . we reflect the most advanced thinking and latest proven technologies available.

Today we have more than 1,500 users who are presently on the air with CCA transmitters, services, and equipment.

CCA Electronics was established in 1963 with the belief that significant improvements could be achieved in the broadcasting and communications fields through the development of technologically improved transmitters and transmitter systems.

The pursuit of this belief ultimately resulted in a diversity of activities and operations that have significantly increased the reliability of our equipment.

Engineering

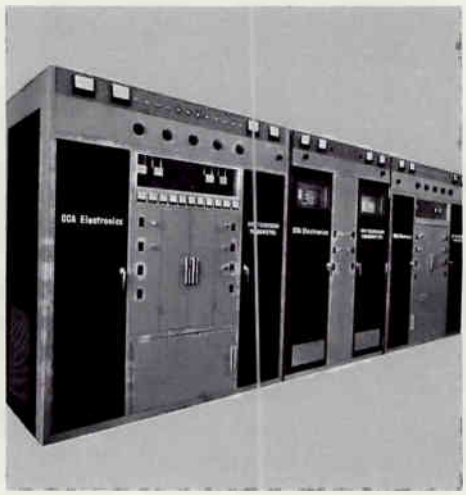


Our engineering capability includes professional engineers, who in addition to extensive broadcast experience, are qualified in such diverse design areas as satellite propagation, radar, and both high and low power communications.

We also have engineers who have been involved in the development and design of communications and broadcasting networks for entire countries.

This breadth of engineering skill is applied to all CCA products, providing users with equipment and systems that will operate reliably, with a minimum of downtime and at a minimum cost.

Product



We have applied imaginative design and superior engineering skills to all products. Each component in our system functions without any unnecessary frills or costly, seldom used features. Human engineering makes operator convenience very high.

Reliable CCA equipment is supported by in-house systems designed to put the station on the air promptly and keep it running.

CCA equipment incorporates high technical standards of design and performance. It ranks well above others when it comes to long term reliability.

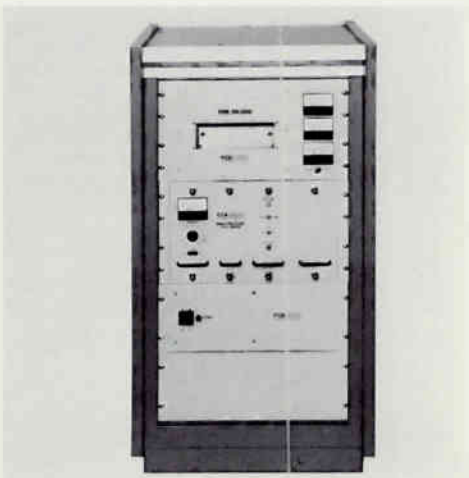
The components in our systems reflect uncompromising care in selection.

Design

CCA designs equipment with the user in mind. We do not employ methods and components until they have been tested and proven to be reliable and efficient. This, of course, reduces costs and failure rates, and results in equipment that is less complex to maintain.

We also incorporate, as much as possible, standard off the shelf components, so that when something needs to be replaced, you can find your part quickly and inexpensively.

At CCA, we plan, create, engineer, and assemble equipment systems that are effective, safe, responsive, and reliable. Our commitment to each user is to insure its operating schedule with consistent and continuous air time.



The World of CCA Electronics

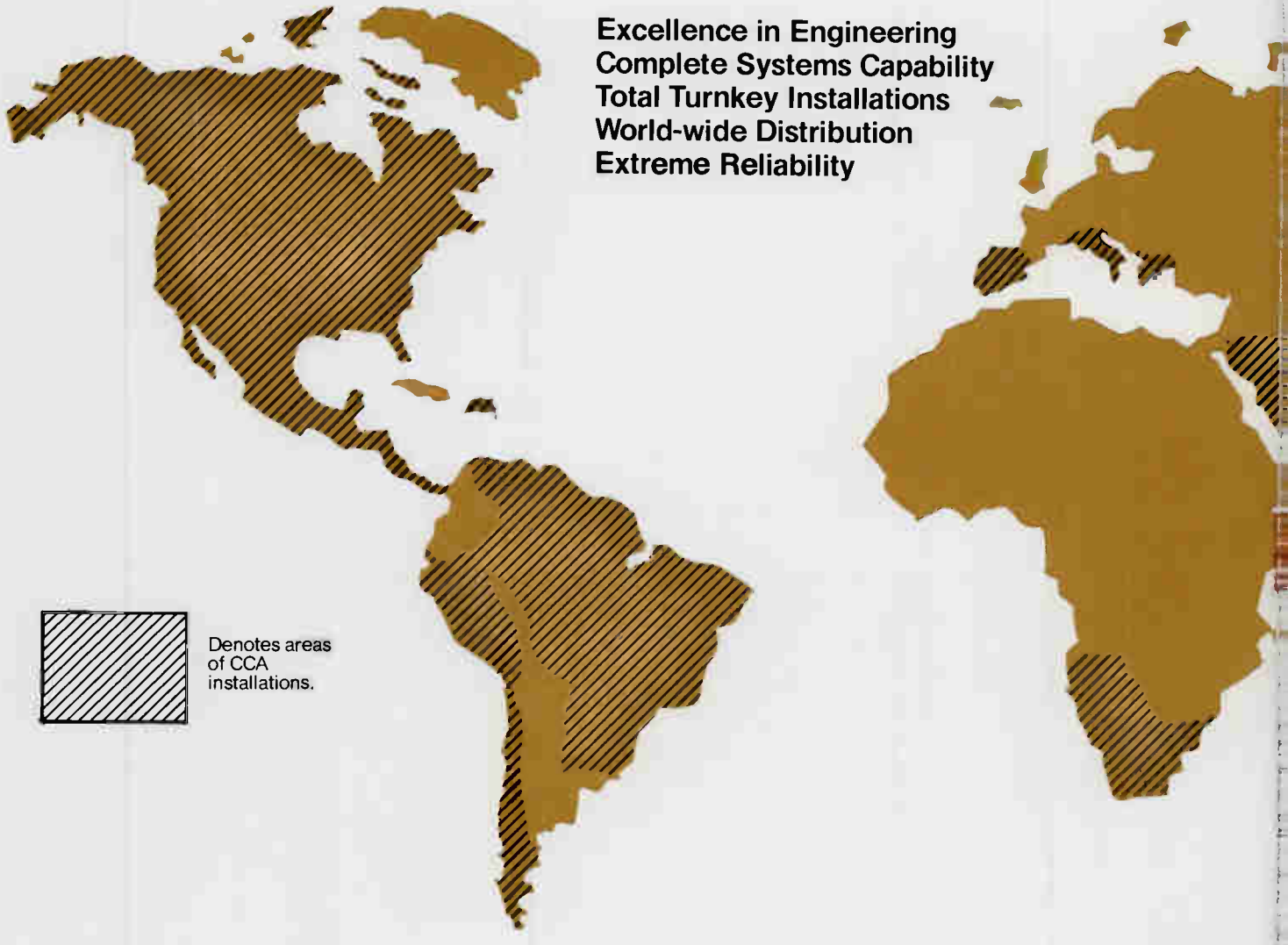
We design systems that are as simple as a college FM station, and systems that are at the other end of the spectrum in complexity, such as a network of parallel television transmitter stations to provide coverage to an entire country.

We have planned, designed, manufactured, and installed a television network in Greece (see pictures to the right). This system takes programming material at one point of origin and transmits it to 5 stations in the network for transmission on several UHF channels.

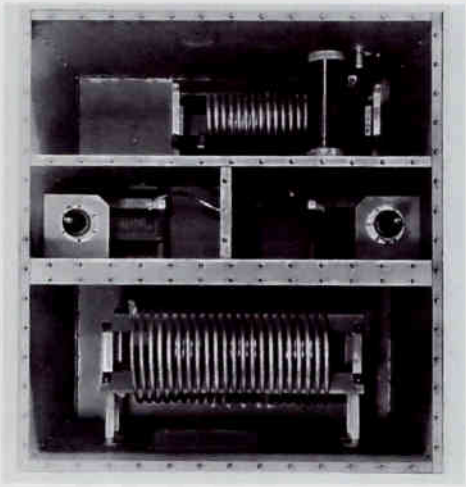
The UHF Transmitter system is composed of redundant drivers, exciters, and klystron amplifiers that are connected by means of an automatic sensing and switching system. This system removes any failed component from service and will place an operating unit in service.

The design provides station reliability

Excellence in Engineering
Complete Systems Capability
Total Turnkey Installations
World-wide Distribution
Extreme Reliability

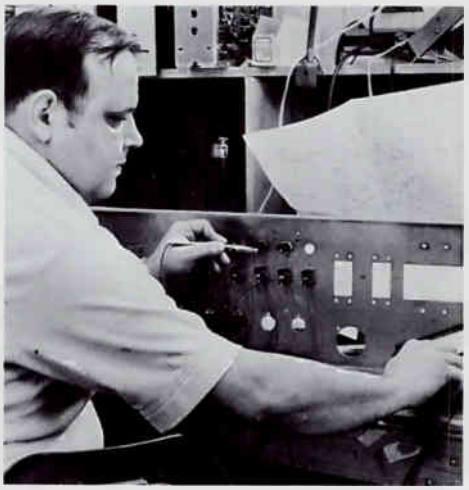


Denotes areas of CCA installations.

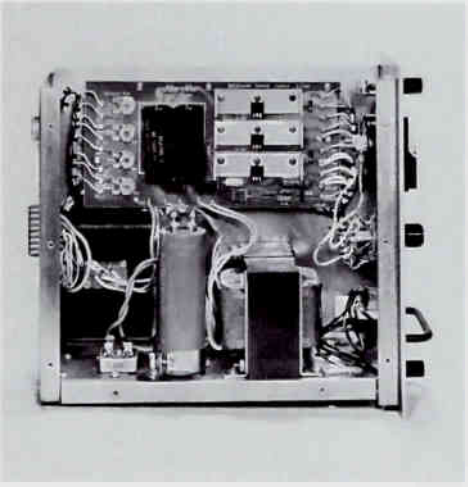


Manufacturing—Typically, we produce 5 manufacturing prototypes for each new piece of equipment that we intend to market. This insures the repeatability of the original design and a perfected manufacturing technique. The aim is to insure high level manufacturing performance so that the 100th unit is just as reliable and well constructed as the first.

Service and Reliability in the Field—The result of our thorough research, conservative design, and proven manufacturing procedure is an extremely efficient and predictable product. This, together with a highly effective customer service department and field organization, produces consistent satisfaction with CCA Electronics products.

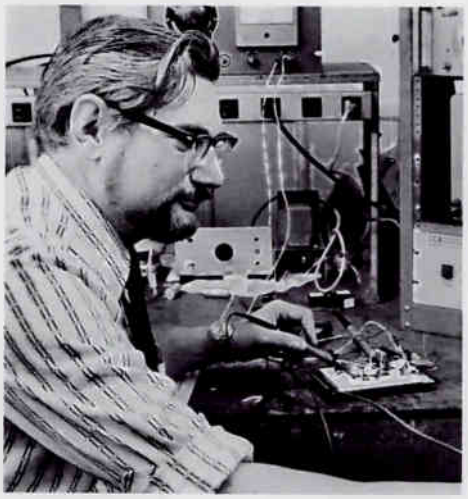


The Company—CCA has been, and will continue to be, a people oriented company. We have a deep concern for our users and our products. We feel that it is this concern that has propelled us into the forefront of the broadcasting and communications field. We also feel that a product cannot be better than the people producing it. And CCA has the people to give you, the user, what you want—a good product that fulfills your needs.



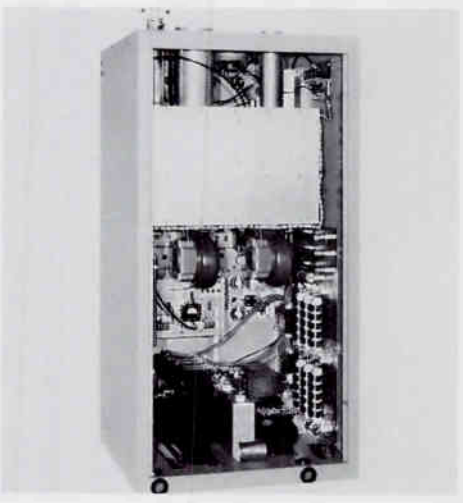
What Makes A Product Good?

Determining the Need—The first step in developing a good product is to determine the needs of the potential user. From its beginning, CCA has been a pioneer in foreseeing and developing new products to meet changing needs. Today, we are making broadcast and communications news with our ability to combine the most modern technology with traditional reliability.



Experienced Engineering Staff—After the need is recognized, the engineering staff must have the expertise to develop solutions. In this area we have a track record that is virtually unmatched in the industry. Also, our engineering flexibility and in-house facilities allow us to adjust and change quickly to user requirements.

Designing the Product—Designing new equipment requires both operating experience and design competence. The CCA engineering staff has repeatedly proven itself by providing solutions to such problems as short tube life and excessive off-air time due to equipment failure. At CCA, every new product begins with two engineering prototypes. In this way we can compare test data and produce higher quality equipment with significantly increased reliability.



Systems

We specialize in offering the most adaptable and effective broadcasting and communications systems in the world today, to be used continuously into tomorrow.

Our staff of skilled top professional engineers know how to build longevity and reliability into a system. Whatever the location of the station —domestic or international, CCA engineers create trend-setting systems which combine operational flexibility with dynamic designs.

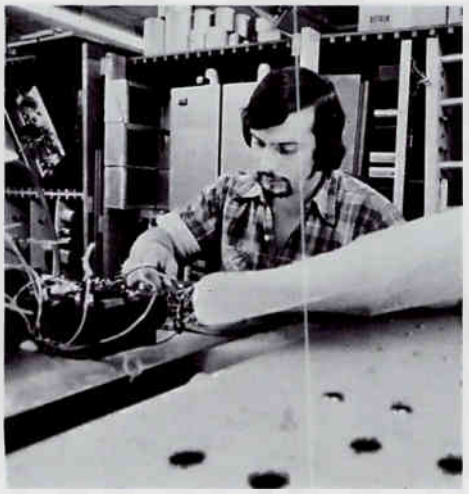
Manufacturing

CCA Electronics is geared and committed to developing and manufacturing the finest broadcasting and communications equipment for any station of any size anywhere in the world.

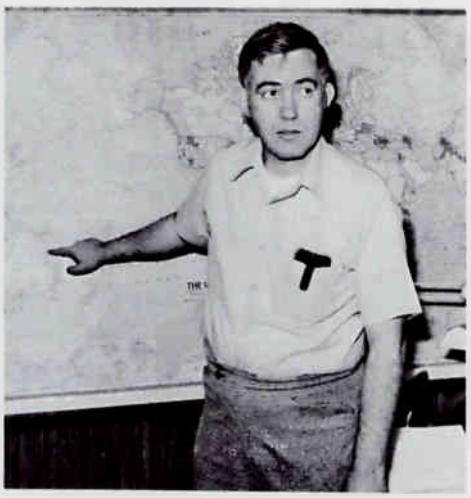
We meet our responsibilities to our users. For us, no challenge—within the body of our expertise and technology—is too small or too large.

We understand how vital it is that no AM, FM, or TV broadcasting station, commercial or educational, is ever shut down because of technical or mechanical failure. We know, too, how necessary it is that the station's daily operation continue at the peak of efficiency while demanding a minimum of maintenance or of replacement parts.

Our users can expect the best from us. And we welcome new customers with the assurance that we will give them the best.



Turnkey Installations



CCA Electronics designs, installs, and commissions entire networks and systems as turnkey projects. Our turnkey installation capability has been responsible for such diverse operations as a hot stand-by FM station with fully automated switching in the capital of Saudi Arabia, the installation and commissioning of a single UHF TV Transmitter station in California, and the design, installation, and commissioning of a five station, country-wide, television network in Greece. Our systems, design, and turnkey installation capabilities also encompass communications and telecommunications networks.

We accept responsibility for any phase of a project from site selection and planning, supervision of building requirements through the complete construction and on-going maintenance of stations and networks.

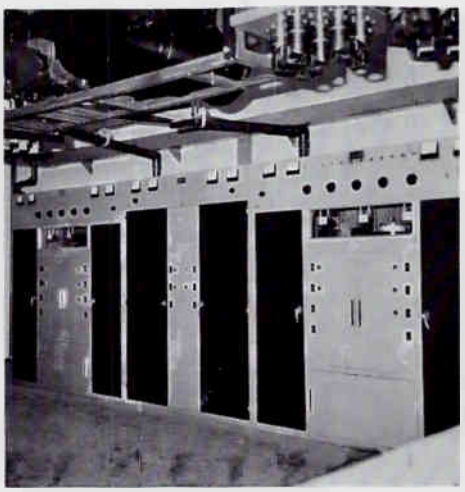
in excess of 99.98%. The likelihood of losing more than three minutes of air time due to transmitter failure is extremely remote.

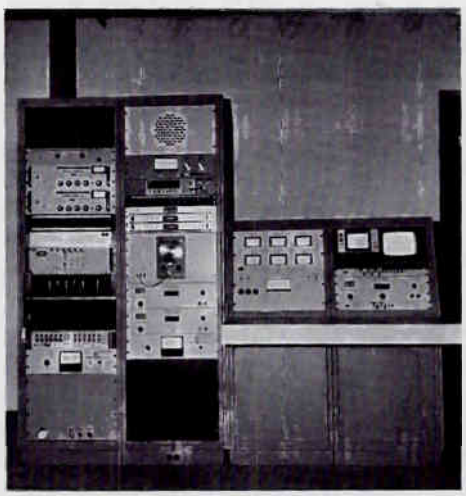
The systems design capability that produced this station is available to satisfy your operating needs.

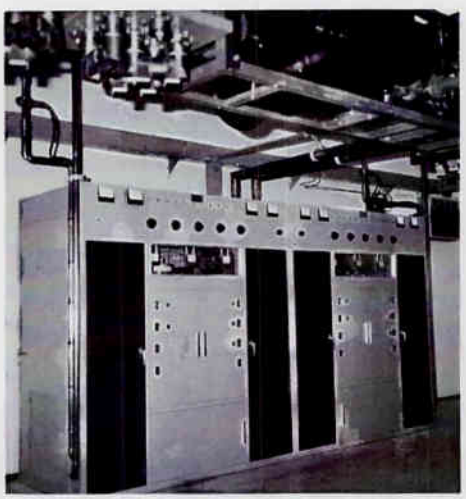
The Greek network and systems were designed, installed and commissioned by CCA Electronics as a turnkey project. This same turnkey installation capability has been responsible for such diverse operations as stations in Saudi Arabia, South America, Africa, and Asia, as well as in the United States.

We can accept the responsibility for any phase of a project, including transmission systems design, specialized antenna design, and limited or full automation of transmitter operations.

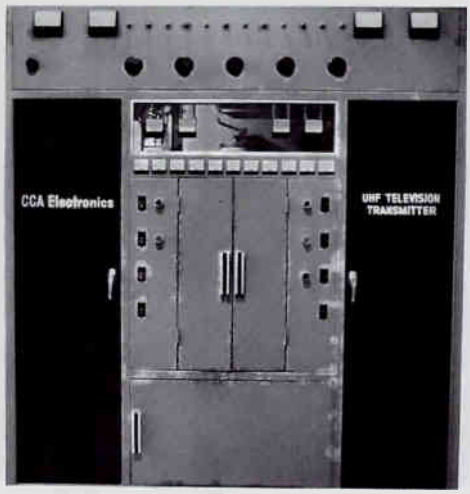
We have manufacturing facilities and field operations offices at a number of locations in the world.



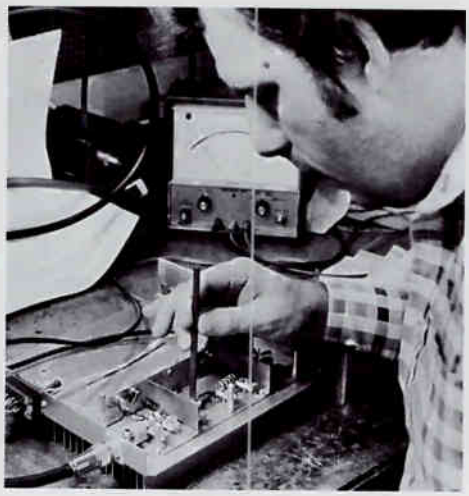




CCA, Your Partner in Performance



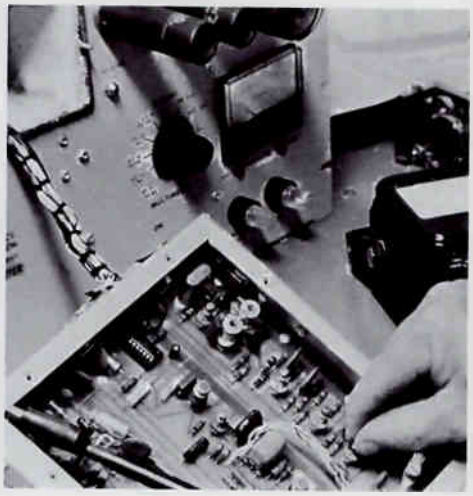
The reliable and efficient operation of CCA broadcasting or communications equipment is the result of a three-way partnership—the User, the Manufacturer, and the Field Sales Force.



We Know the Value of Time—We create this partnership because we understand how vital it is to a station not to lose time by being off the air. This is why we plan, create, engineer, assemble, and maintain with high level service, equipment and systems that are effective, easy to operate, and reliable.

Our commitment to each station is to insure its broadcast schedule with consistent and continuous air time.

And we also have an equal commitment to the management and engineering staff of each station to provide equipment and systems that will endure, even under the most difficult circumstances.



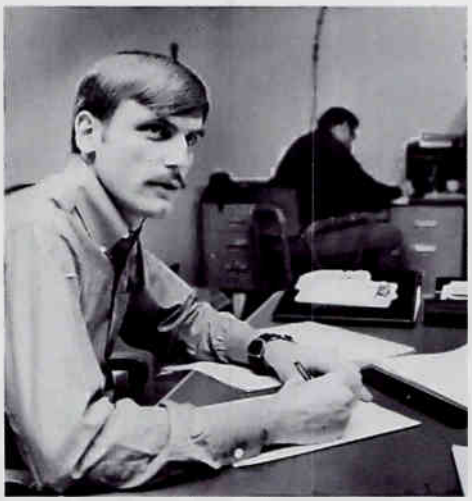
Quality Control Gets Top Priority—The CCA staff, from the top to the bottom, knows that our success as a company is dependent on satisfied customers.

As a result, we are always:

- Improving the technical level of our design, testing, and engineering staffs.
- Training all sales, service, and engineering personnel to better accommodate the customer.
- Developing better quality control techniques.
- Improving customer service methods, to give our users better and faster service.

But, most important, our specialists know they have to provide us with concrete, practical suggestions on how to keep the technology of our parts and systems in advance of our competitors.

And we listen carefully to what they have to say.



Warranties Benefit Our Users—We believe that the best way to deal with warranty questions is to design the warranty from the user's point of view, and not solely to protect ourselves.

Even then, we interpret the warranty in the user's favor whenever possible.

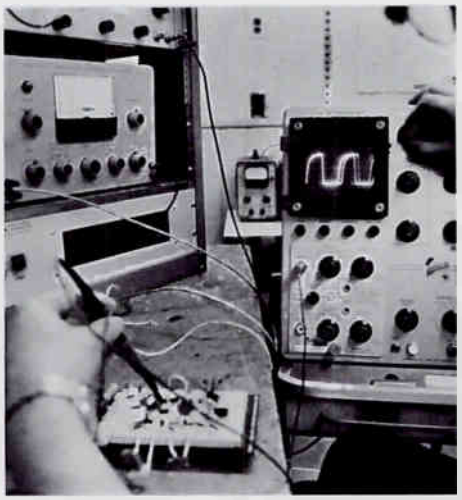
We do this because we believe each station should be fully serviced and operate at a minimum cost for maintenance and parts. And that means we want CCA equipment, services, and warranties to keep our present users, and to bring us new ones.

We Serve Our Customers—We offer a total support service, competent assistance, and concerned personnel.

Service to a customer has many facets—valid, well written materials, accurate parts lists that permit a user to properly identify components, expert advice when needed, personal attention from the field staff, and an outstanding product.

And since we appreciate the fact that most users want and need this kind of total service, we provide a specialized staff and program to supply the need.

In today's ever-changing, always demanding marketplace, there is no room for less than the best. The partnership that we form with the user is based upon this kind of service.



We Offer the Best—CCA's products enjoy a wide acceptance throughout the world, with over 1,500 users. Our name has become synonymous with reliability and low operating cost.

From its beginning, CCA quickly became one of the leading U.S. manufacturers of broadcast and communications equipment. The Company foresaw the growth and development of FM radio as a major broadcast medium in the U.S., pioneered in the development of low cost FM transmitting equipment and captured a major share of this market. In the AM transmitter field as well, CCA became known for exceptionally high reliability.

To the broadcasting and communications industries, high quality and reliability of equipment are perhaps more important than cost because lost time cannot be recovered and lost listeners and viewers mean lost revenues.

CCA has been, and will continue to be, a leader in the industry.

To Summarize

We are an organization of dynamic production people, technicians, engineers, and scientists who are dedicated to the broadcast and communications industries.

We have the production capability.

We have the field engineering force.

We have the new products.

We have the highest level of quality control.

We are building that at which we are expert.

We have the best suppliers.

We are constantly improving existing products.

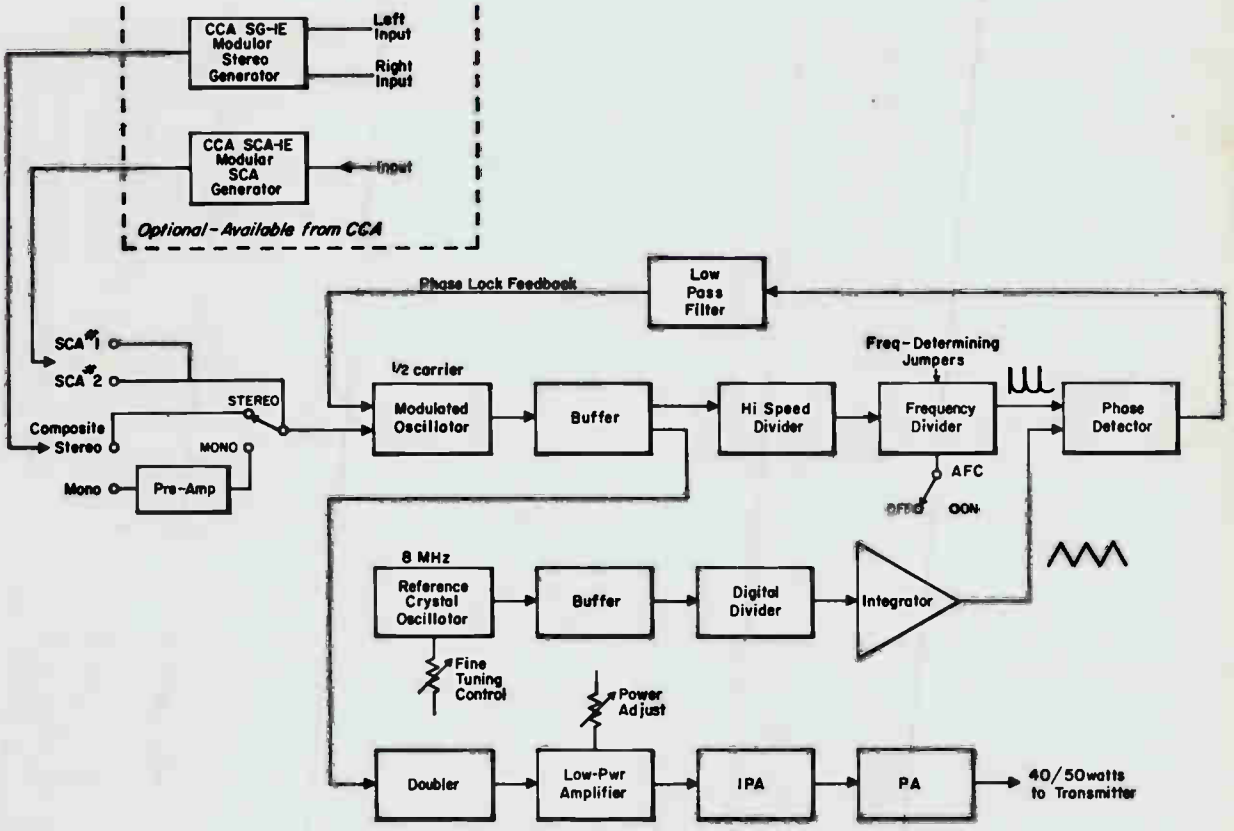
We are continuously creating new products to meet the most rigorous tests.

We are backing up our products with warranties and customer service departments.

We have the follow-through to insure prompt deliveries.

And we know we must keep our users serviced, supplied, and satisfied.

CCA Electronics Corporation
716 JERSEY AVENUE, GLOUCESTER CITY, NEW JERSEY 08030
PHONE: (609) 456-1716 TELEX: 84-5200



CCA FM-40E Block Diagram

Technical Specifications

Power Outputs	40 or 10 watts
Frequency Range (Specify)	87 MHz to 108 MHz
Type of Emission	F3 — F9
Output Connector Type	Type "N"
Modulation Capability	±150 KHz
Carrier Frequency Stability	±500 Hz
Monophonic Audio Input Impedance (Balanced)	600 ohms
Monophonic Audio Input Level [100% Modulation (±75 KHz) @ 400 Hz]	+10 ±2 dbm
Stereo (Composite) Input Impedence	1200 ohms unbalanced
Stereo Input Level (100% Modulated)	4.0 volts peak-peak
Audio Frequency Response 30-15000 Hz (FCC 75μ sec Pre-emphasis) (CCIR 50μ sec Pre-emphasis)	±1.5 dbm
Audio Frequency Distortion 30 — 15,000 Hz	0.5% Maximum
Composite Frequency Response (Wide-band Stereo) 30 — 75,000 Hz (Flat)	±1.0 dB
FM Noise Level (Below 100% Mod.)	—60 dB
AM Noise Level (Referred to Carrier)	—50 dB
SCA Subcarrier Input Level (30% Mod. of Carrier)	1 Volt peak-peak
SCA Subcarrier Input Impedance	1500 ohms unbalanced
Main Channel to Sub-channel Crosstalk	—50 dB
Sub-channel to Main Channel Crosstalk	—60 dB
Environmental Conditions	—10 to +50°C Temperature 10,000 feet Altitude
Power Line Requirements	
Line Voltage	117/220V.A.C. (Specify)
Phase	Single
Frequency	50/60 Hz
Power Consumption	143 Watts
Mechanical Data	
Width x Height x Depth	19" x 10½" x 15"
Weight	42½ pounds
Shipping Cubage	2.47

10 Watt — 40 Watt
Solid State FM Exciters

FM-10E
FM-40E

CCA Electronics Corporation
716 JERSEY AVENUE, GLOUCESTER CITY, NEW JERSEY 08030
PHONE: (609) 456-1716 TELEX: 84-5200

Features

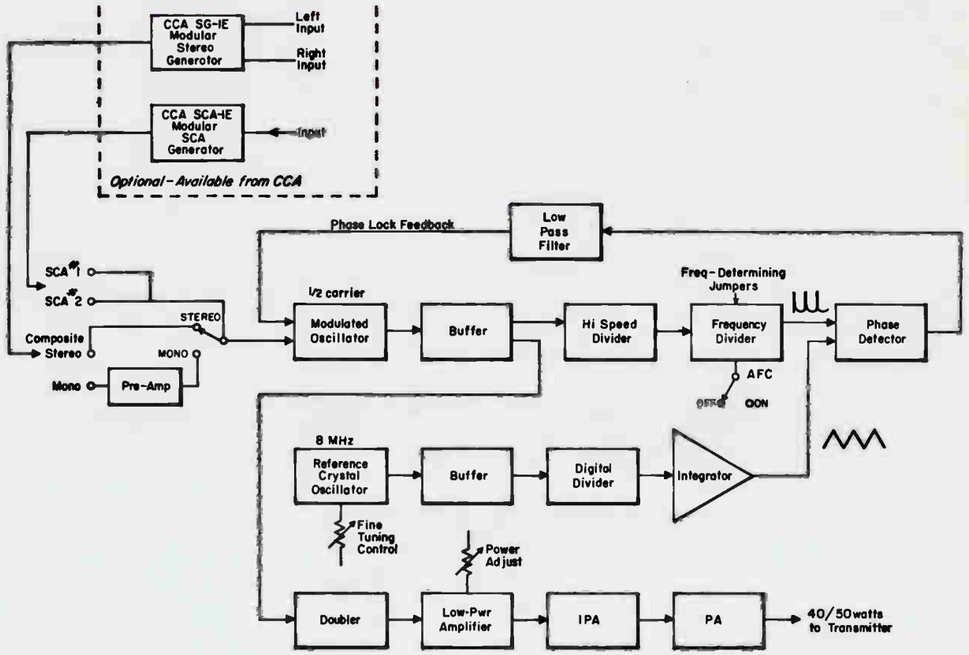
- Two output powers available: 10 Watts, 40 Watts
- 100% Solid State
- Frequency Synthesized—Same Crystal Used for Entire VHF Band
- 40 Watts Rated Maximum Output
- Maximum Temperature Stability—No Ovens Required
- Full Regulation For All Supply Voltages—Exciter Independent of Line Voltage Variations
- All Supply Voltages are Short Circuit Proof
- Both Exciters FCC Type Accepted
- "Plug-in" Modules for Ease of Access
- Plug-in Stereo and SCA Modules—No "Hard-wiring"
- Designed For Maintenance Free Operation
- Meets or Exceeds all FCC and CCIR Specifications for Monaural and Stereo Operation
- Metering of R. F. Power Stages

General Description

The "E" Line Exciters are the result of years of painstaking design and exhaustive component research to produce an exciter capable of meeting the most demanding requirements of the broadcast industry. Transistors were not used to replace tubes until their reliability and superiority were clearly demonstrated.

The "E" Line Exciters characteristically require no regular maintenance, and once installed, require no circuit readjustments during normal operation.

The "E" Line Exciters contain three plug-in modules providing ease of access and speed and simplicity in replacement. The exciter frames have two drawer spaces that allow the addition of optional stereo and SCA plug-in modules.



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Output Connector Type	Type "N"
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Carrier Frequency Stability	±500 Hz
Monophonic Audio Input Impedance (Balanced)	600 ohms
Monophonic Audio Input Level [100% Modulation (±75 KHz) @ 400 Hz]	+10 ±2 dbm
Stereo (Composite) Input Impedence	1200 ohms unbalanced
Stereo Input Level (100% Modulated)	4.0 volts peak-peak
Audio Frequency Response 30-15000 Hz (FCC 75μ sec Pre-emphasis) (CCIR 50μ sec Pre-emphasis)	±1.5 dbm
Audio Frequency Distortion 30 — 15,000 Hz	0.5% Maximum
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Printed in U.S.A.

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The "E" Line Exciters contain three plug-in modules providing ease of access and speed and simplicity in replacement. The exciter frames have two drawer spaces that allow the addition of optional stereo and SCA plug-in modules.

Super Regulated Solid State Power Supply

The modular power supply combines a conservative rating with a high degree of electronic regulation of all supply voltages to assure continuing, stable operation in the presence of the wide variations in line voltage often found at transmitter locations. This high degree of regulation permits the achievement of an extremely stable operation.

Protection of the exciter's transistors and circuitry is of paramount importance. This is accomplished by using integrated circuits that turn off the supply voltage when an overvoltage or excess current condition occurs. Any or all output voltages may be short circuited with no damage to the power supply. This module incorporates metering of both oscillators, the phase lock loop, all supply voltages and all R. F. power stages. Regulated and protected voltages for the operation of the plug-in stereo and SCA modules are also provided by this supply.

Frequency Modulated Oscillator

The FMO accepts stereo generator, SCA generator, and monaural source signals and converts these to a fully modulated 200 milliwatt R. F. signal at carrier frequency. This is accomplished by accepting audio, and sub-carrier frequencies and directly frequency modulating a free running FET oscillator with ultra linear varicaps.

The "Mono-Stereo" input switching feature provides the means of introducing an internal pre-emphasis to eliminate the need for time-consuming rewiring in the unlikely event monaural operation becomes necessary.

The CCA "E" Line Exciters use a directly modulated oscillator with the center frequency determined by a crystal controlled frequency synthesizer. The use of frequency synthesis significantly reduces noise figures by eliminating the use of long chains of multipliers with their inherent noise characteristic. Frequency stability is assured by using a modern phase lock loop with an extremely large frequency capture ratio.

Power output of the exciters may be adjusted from the front panel by means of the Power Adjust control located on the front of the FMO module.

Outstanding Frequency Stability

The heart of the phase lock system is a highly accurate, temperature stable, quartz crystal (2.5 ppm —10°C to +60°C). Because this system recognizes phase error, rather than frequency error, and reacts through high-speed, minimum-delay circuits, the entire system has the stability of the crystal, which is characteristically within 50 Hz in the FM broadcast band.

Since all carrier frequencies are synthesized from a single 8 MHz crystal there are no difficulties or delays in procurement during critical "trouble" periods due to "crystal availability".

Power Amplifier

10 or 40 Watts Solid State

The Power Amplifier when driven by 200 milliwatts of fully modulated, carrier frequency R. F. from the FMO module, provides either 10 or 40 watts of equally low noise, low distortion power to drive the transmitter.

Normally, high power transmitters utilize nominally 10 watt exciters. This new, 40 watt exciter eliminates the requirement for low power vacuum tube transmitter stages which in turn increases reliability, and reduces the complexity of the transmitter.

The design of this module provides high reliability with an extremely low heat factor. A cooling fan is provided to further increase reliability but is in no way essential to amplifier operation.

CCA Stereo Generator SG-1E

- 100% Solid State
- Outstanding Stereo Separation — Typically Better Than 40 db
- Extremely Low Crosstalk — Typically Better Than 40 dB
- Modular Construction Provides Ease of Access and Replacement
- Simplicity of Operation — Virtually No Maintenance or Adjustment after Installation
- Fully Compatible with SCA
- Compatible with CCA FM Exciters FM-40E — FM-10E Plugs Directly into Exciter Frame, No "Hard-wiring" Required

CCA Sub Carrier Generator SCA-1E

- 100% Solid State
- Extremely Low Distortion — Less than 0.5%
- Excellent Signal to Noise Ratio — Greater Than 60 dB
- Extremely Low Crosstalk — Sub to Main Carrier Better Than 60 dB
- Modular Construction Provides Ease of Access and Replacement
- Compatible with CCA FM Exciters FM-40E — FM-10E—Plugs Directly into Exciter Frame, No "Hard-wiring" required

Controls

Input Sensitivity
A rotary stepped switch provides 5 positive settings of required microphone sensitivity. End stop position selects line input enabling the individual channels to also accept high level inputs from tape recorders or amplifiers etc. To avoid any possibility of hum or interference entering long microphone lines, low level inputs are balanced while line inputs follow current equipment practice and are unbalanced.

Equalizers
BASS + MIDDLE + TREBLE. Earlier mixers have suffered severe problems in the design of variable equalizers. In particular mid frequency E.Q. The development team made a design breakthrough with a circuit so advanced that protection was gained under Patent. Gone are the undesirable affects of hum and instability. The E.Q. controls provide the operator with facilities for special effects or the ability to apply tonal correction to equalize program or source deficiencies.

Echo Send
Situated POST main channel fader providing a mono output capable of driving all known echo or tape delay devices.

Foldback
Situated PRE main channel fader. The overall foldback output is also controllable with sufficient level to drive an amplifier or headphones direct.

Pan Pot
Enables any channel to be panned to any point of the stereo image between outputs 1 and 2 or 3 and 4.

Assignment Switch
Determines the routing of the output from each individual channel. In conjunction with the pan pot the mixer may be programmed, 10 into 1 output, 10 into 2 outputs (stereo mixdown), 10 into 3 outputs, 10 into 4 outputs.

Channel Fader
Long track, rugged and of metal construction guaranteeing consistency with smooth performance.

Limiters(4)
Again the development team were ahead of current technology in designing a variable limiter with visual indication to the degree of limiting. Indication is by Light Emitting Diode (L.E.D.) adjacent to the respective V.U. meter. The L.E.D. was chosen for its absolute reliability. The limiters may be switched in or out while the degree of limiting is variable from soft to tight enabling the engineer to produce the same effects found on current record releases.

Monitor Controls(5)
Four volume controls allow full control over the level of groups 1, 2, 3, or 4 fed to the stereo monitor output. The overall stereo volume level is so variable and is powerful enough to drive headphones of any impedance. A headphone socket is located on the extreme right of the desk, insertion of a stereo jack plug into this socket automatically mutes the rear mounted stereo monitor output.

Echo Return(4)
Full echo return facilities are provided allowing control over the level of echo mixed with the group outputs.

Input & Output Sockets
One problem inherent in earlier mixer designs was the inability of mating jack plugs with the respective sockets hidden out of sight on the rear panel. All sockets are conveniently located on the rearward sloping top panel. Socket identification is therefore immediate and positive. The sockets are of the finest quality available featuring heavy gold plated contacts for absolute reliability under all operating conditions.

Technical Specification

Microphone input:	200—600 ohms balanced (actual impedance 1 K ohm) Minimum level for 0dBm mixer output —80dBm Maximum level before clipping +4dBm
Line input:	47 K ohm unbalanced Minimum level —18dBm Maximum level +14dBm
Noise:	—126 dB RMS referred to 200 ohm input at 60dB gain —70 dBm RMS at output system noise —20Hz —20 KHz
Overload margin:	Channel 35dB Overall 22dB
Harmonic distortion:	Less than 0.05% at rated output Less than 0.1% up to within 1dB of clip level
Equalizers:	HF 12dB lift and cut at 10KHz Mid 12dB lift and cut at 2KHz LF 12dB lift and cut at 80Hz
Frequency response:	Within 1dB 20Hz to 20KHz
Outputs:	Line outputs nominally 0dBm (=0VU) 600ohm Echo send nominally 0dBm (=0VU) 600ohm Foldback nominally +4dBm 2.2 K ohm Monitoring 500mW 8ohm for headphones nominally 0dBm 600 ohm for main monitors
Power supply:	210—240 volts, 50/60Hz or 110—117 volts, 40 watts
Weight:	Approx. 25 lbs.
Size:	29½"x24"x10"

10 Channel 4 Group Stereo Mixer

STM 10-4

CCA Electronics Corporation
716 JERSEY AVENUE, GLOUCESTER CITY, NEW JERSEY 08030
PHONE: (609) 456-1716 TELEX: 84-5200

Description

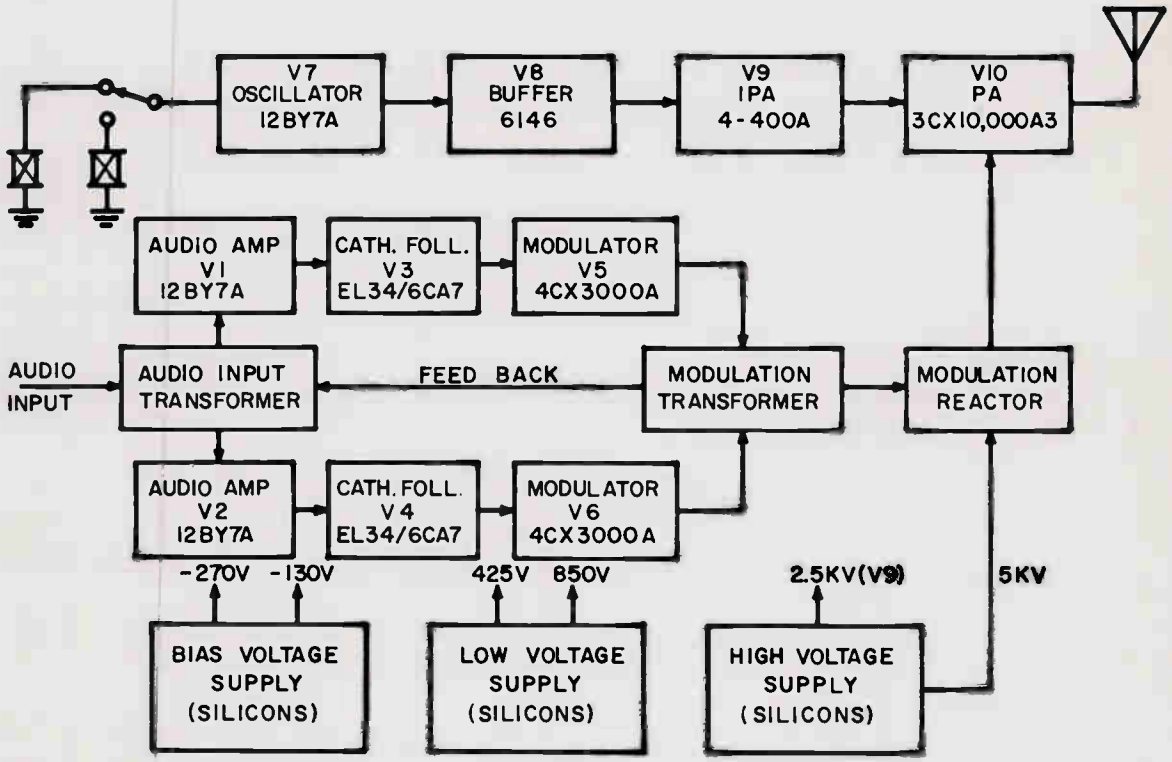
The STM 10-4 is of modular construction containing 15 plug-in fibre glass printed circuit boards. 10 input, 4 output and 1 power supply. Connection between printed circuit cards and main mixer frame is via gold plated pins. The mixer is secured to the cabinet by 4 quick lock catches easily released with a coin or screwdriver. The replacement time of any channel, group or power supply card is therefore less than 20 seconds.

A prolonged look at the internal construction confirms our claim that the 10-4 is second to none and will satisfy the most exacting requirements of the recording studios. The engineering approaches military standards while the choice of components provides the user with a built in guarantee of utter reliability and total satisfaction.

Technical Specifications

Power Output Capability	12KW
Frequency Range	500kHz - 2MHz
Frequency Stability	±5 Hz
Carrier Shift @ 100% Mod.	3% Max.
RF Output Impedance	40 - 250 ohms
Modulation Capability	125%
AF Input-Impedance	150/600 ohms
AF Input Level @ 100% Mod.	+10 dbm Max.
AF Response	
50 - 7500 Hz	±1 db
30 - 10,000 Hz	±1.5 db
AF Distortion	
50 - 10kHz	3% Max.

Noise (below 100% Mod.)	—55 db
Line Voltage	208/230/380V
Line Frequency	50/60 Hz
Phase	3
Power Consumption (100% Mod.)	28KW Max.
Net Dimensions (W x H x D) inches	68 x 76 x 33
Gross Cubeage Cu. Ft.	136.95 cu. ft.
Gross Weight Lbs.	4000
PA Tube	(1) 3CX10000A3
Modulators	(2) 4CX3000A
Harmonic Attenuation (2nd)	—90 db
3rd	—80 db
Others	—80 db



CCA-AM-10,000D — Simplified Block Diagram

10,000 Watt AM Broadcast Transmitter

AM-10,000D

CCA Electronics Corporation
716 JERSEY AVENUE, GLOUCESTER CITY, NEW JERSEY 08030
PHONE: (609) 456-1716 TELEX: 84-5200

Features

- High Efficiency PA Circuitry
- Designed for 125% Modulation
- Long Life, Modern Ceramic, 3CX10, 000A3 PA
- Silicon Power Supply
- Only Six Tube Types
- Conventional High Level Modulation
- Simplified Standard Circuitry
- Conservatively Rated 4CX3000A Modulators
- Provisions for 1KW Cut-back
- Designed for Remote Control
- Minimum Floor Space — Only Two Cabinets
- Automatic Recycling

Description

The CCA AM-10,000D is a conservatively rated 10,000 watt AM broadcast transmitter. It incorporates all time proven, straight forward circuitry with modern field tested tubes.

The transmitter includes high quality, conservative components. The complete transmitter is housed in two cabinets each only 34" wide, 33" deep and 76" high.

Access to all components of the equipment is readily had by entering the transmitter through either the front or rear interlocked doors, or the hinged, interlocked meter and control panels.

Electrical Description

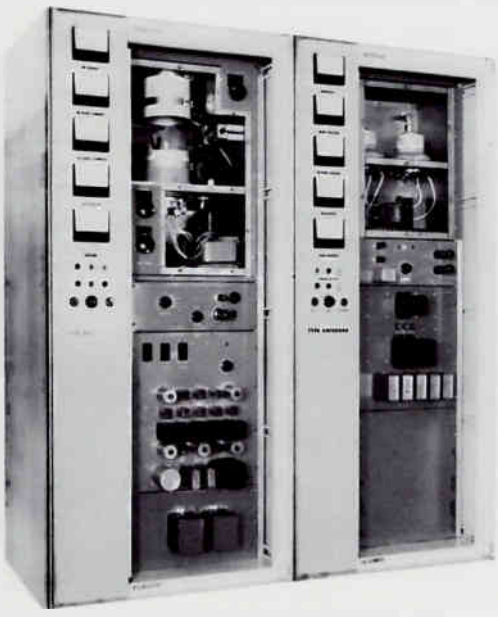
Control Ladder—The AM-10,000D contains a conventional control ladder which requires only the application of a front switch for its operation. It incorporates time delays, individual contactors, fast acting overload relays, and an automatic recycling system. The control ladder is interrupted at convenient points to permit remote control operation. "After cooling" is included as a standard feature.

Power Supplies—All power supplies of the AM-10,000D utilize conservatively rated long life dependable silicons. The utilization of these components eliminates the age old problem of vacuum tube arc back and generation of cabinet heat due to filament power. An additional feature of silicon supplies is that the equipment can be operated at extremes in temperature without rectifier pre-heating. A PIV of 200% in voltage and 100% in current is used.

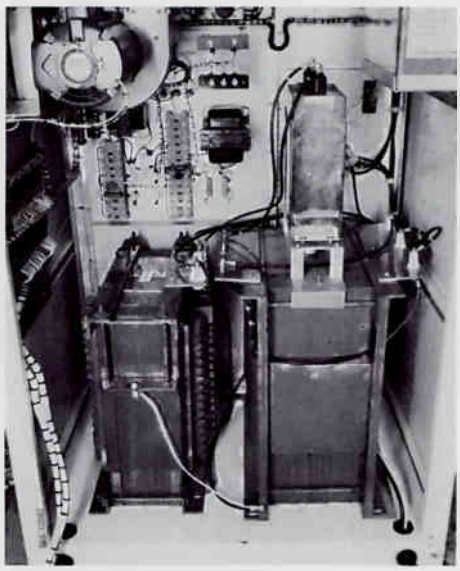
RF Circuitry—The AM-10,000D utilizes a highly stable vacuum crystal oscillator. The 4-400A, IPA, provides more than adequate driving power for the power amplifier. Although 500 watts is available at this stage, only slightly more than 200 watts is used.

The final amplifier in the AM-10,000D is a 3CX10,000A3 triode. This tube is operated as a plate modulated power amplifier, and can very easily achieve a carrier output power of 13,000 watts. Thus, the 11,000 watts is a very conservative rating.

Modulator Circuitry—The modulator of the AM-10,000D contains popular tubes in circuitry with sufficient reserve to assure adequate audio power to modulate the final stage to well over 125%. Negative feedback circuitry is used to assure excellent frequency response and low distortion. The 4CX3000A tetrodes which act as modulators can produce 12KW of audio power as compared to the 7.0KW required.



AM-10,000D — Front View
Front Door and Cover Removed



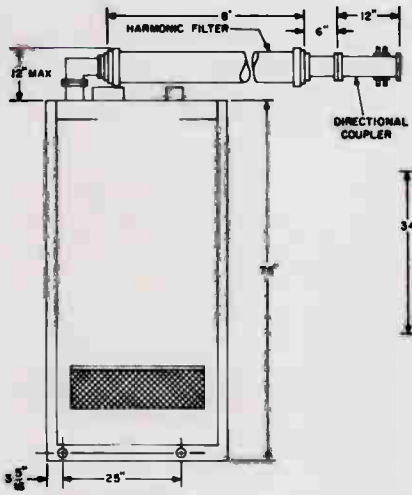
AM-10,000D Modulator Cabinet
Rear View
Note: Full Accessibility, and Substantial 30 Hz Response Modulation Components.

Technical Specifications

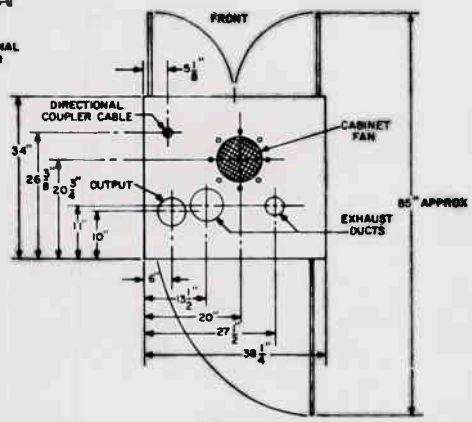
Power Output Capability 3KW
Frequency Range .....87.5 to 150MHz
Type of Emission (Frequency Modulation)
Monaural Transmission F3
Stereo (With optional SG-1E) ...F9
Subsidiary (with optional SCA-1E)F9
RF Output Impedance .....50 ohms
Fitting .....3⅛" EIA
Modulation Capability .....±150KHz
Carrier Frequency Stability .....±500Hz
Pre-emphasis (specify) for FCC ...75μ
for CCIR ..50μ
Spurious and Harmonics (below carrier level) .....—80 db
Audio Frequency Characteristics
Monaural Operations
Input Impedance (balanced) ...600 ohms
Input Level @ 400Hz (specify)..+10 dbm ± 2 dbm
Response with respect to pre-emphasis standard .....±1.5dB
Distortion @ 100% Modulation .1.0% max.
Noise .....FM —60db
Noise .....AM —50db
Stereo Operation
Input Impedance (unbalanced) ..12,000 ohms
Input Composite Level — (75 KHz dev.) .....4V pp
Composite Frequency Response. ±0.5 db from 30Hz to 100KHz

Stereo Performance with CCA Plug In Stereo Generator (SG-1E)
Cross Talk Main Channel to Stereo Sub better than —40 db
Cross Talk Stereo Sub Channel to Main Channel better than —40 db
38 Kc Carrier Suppression better than —40 db
Separation between Left and Right Channels better than —40 db
Subsidiary Operation
Input Impedance .....1500 ohms
SCA Frequencies .....26 to 110Kc
Input Level (for 10% injection)..1.0 volt pk to pk
SCA Performance with CCA Plug in SCA Gen. .....(SCA-1E)
Cross Talk—SCA to Baseband—60 db
—Stereo to SCA ..—50db
Power Line Requirements
Line Voltage .....190 to 240V
Other Voltages Available
Line Phase (others available) ...3 phase
Line Frequency .....50 or 60 cycles
Power Consumption .....4 KW
Line Regulation .....±5%
Mechanical Characteristics
Number of Cabinets .....One
Cabinet Dimensions .....34 x 38 x 76
Weight — Net .....1300 lbs
Shipping Weight — Gross .....1550 lbs
Shipping Cubeage — Ft.³ .....75.37 cu. ft.

Cabinet Outline



Rear View



Top View

NOTES:

1. Position of harmonic filter and directional coupler are not critical and can be placed in any convenient location in the output line.
2. Input power line voltage can enter transmitter thru rear edge or cabinet base.

2.5KW
FM Broadcast Transmitter

Model FM-2500E

CCA Electronics Corporation
716 JERSEY AVENUE, GLOUCESTER CITY, NEW JERSEY 08030
PHONE: (609) 456-1716 TELEX: 84-5200

Features

- 40 Watt Solid State, Plug In, Synthesized Exciter
- High Mu Zero Bias Power Amplifier — 3CX3,000A7
- Self Contained in One Cabinet
- Conservatively Rated for 3.0KW Continuous Power Output
- Designed for FCC and CCIR Requirements
- Accepts "Plug In" Stereo & SCA Generators
- Total Accessibility — Local and Remote Control

Mechanical Description

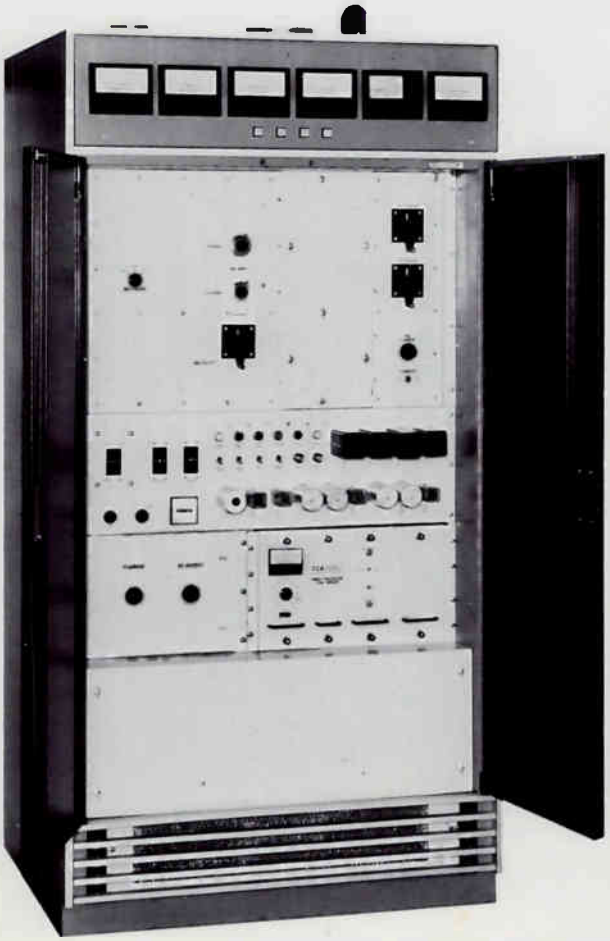
The CCA FM-2500E, 2.5KW FM Broadcast Transmitter incorporates a solid state, modular 40 watt exciter, an extremely conservative IPA (8874) which is capable of producing 400W but is only required to supply 200W and an extremely reliable, long life rugged zero bias triode (3CX3,000A7) which has 3KW of plate dissipation, 7KW of power output capability and operates at only 2.5KW output and 800 watts of dissipation.

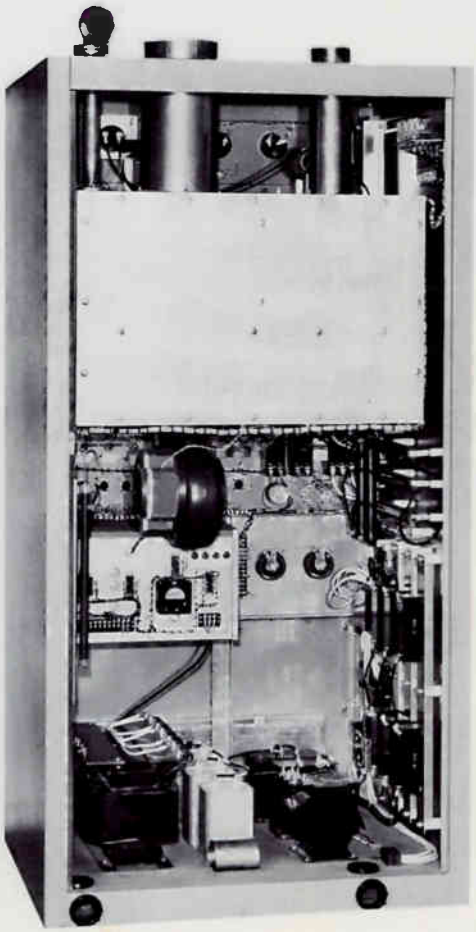
The FM-2500E is self contained in one medium sized cabinet (38"W x 76"H x 34"D). The only external parts are the harmonic filter and directional coupler. Input air enters the equipment through the rear filtered fixed panel and through the front filtered removable panel. The exhaust of the system is available from two ducts located on the top of the equipment.

Electrical Description

The transmitter is capable of meeting or exceeding all FCC and CCIR FM broadcast specifications for monaural transmission as well as stereo transmission (with optional "plug in" CCA Model SG-1E, Stereo Generator) and simultaneous SCA operation with the optional CCA plug in SCA-1E, Sub Carrier Generator.

The conventional, relatively simple control system assures reliability and can be operated from either a local or remote location. Rugged, reliable, plug in relays are used to control the solid state power supplies of the transmitter, as well as to operate the indicating lights, the automatic three cycle overload recycling and after cooling systems.





Technical Specifications

Power Output Capability 30KW
Frequency Range ..... 87.5 to 150MHz
Type of Emission (Frequency Modulation)
Monaural Transmission F3
Stereo (With optional SG-1E) ... F9
Subsidiary (with optional SCA-1E) F9
RF Output Impedance ..... 50 ohms
Fitting ..... 3⅛" EIA
Modulation Capability ..... ±150KHz
Carrier Frequency Stability ..... ±500Hz
Pre-emphasis (specify) for FCC ... 75μ sec
for CCIR .. 50μ sec
Spurious and Harmonics (below carrier level ..... —80db
Audio Frequency Characteristics

Monaural Operations
Input Impedance (balanced) ... 600 ohms
Input Level @ 400Hz (specify) . +10 dbm ± 2 dbm
Response with respect to pre-emphasis standard ..... ±1.5dB
Distortion @ 100% Modulation . 1.0% max.
Noise ..... FM —60db
Noise ..... AM —50db

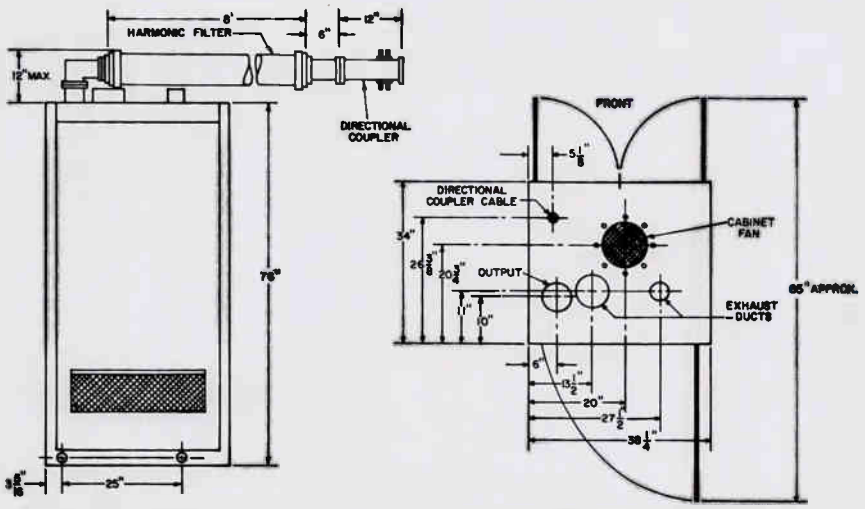
Stereo Operation
Input Impedance (unbalanced).. 12,000 ohms
Input Composite Level—(75 KHz dev.) ..... 4V pp
Composite Frequency Response. ±0.5 db from 30Hz to 100KHz

Stereo Performance with CCA Plug In Stereo Generator (SG-1E)
Cross Talk Main Channel to Stereo Sub better than —40 db
Cross Talk Stereo Sub Channel to Main Channel better than —40 db
38 Kc Carrier Suppression better than —40 db
Separation between Left and Right Channels better than —40 db

Subsidiary Operation
Input Impedance ..... 1500 ohms
SCA Frequencies ..... 26 to 110Kc
Input Level (for 10% injection). 1.0 volt pk to pk
SCA Performance with CCA Plug in SCA Gen. ..... (SCA-1E)
Cross Talk—SCA to Baseband —60db
—Stereo to SCA... —50db

Power Line Requirements
Line Voltage ..... 190 to 240V
Other Voltages Available
Line Phase (others available) .. 3 phase
Line Frequency ..... 50 or 60 cycles
Power Consumption ..... 39.5 KW
Line Regulation ..... ±5%
Mechanical Characteristics
Number of Cabinets ..... One
Cabinet Dimensions ..... 38 x 34 x 76
Weight — Net ..... 1700 lbs
Shipping Weight — Gross ..... 1950 lbs
Shipping Cubeage — Ft.³ ..... 74.37 cu. ft.

Cabinet Outline



Rear View **Top View**

NOTES:

1. Position of harmonic filter and directional coupler are not critical and can be placed in any convenient location in the output line.
2. Input power line voltage can enter transmitter thru rear edge or cabinet base.

25KW
FM Broadcast Transmitter

Model FM

CCA Electronics Corporation
716 JERSEY AVENUE, GLOUCESTER CITY, NEW JERSEY 08030
PHONE: (609) 456-1716 TELEX: 84-5200

Features

- 40 Watt Solid State, Plug In, Synthesized Exciter
- High Mu Zero Bias Power Amplifier — **3CX20,000A7**
- Self Contained in One Cabinet
- Conservatively Rated for 30KW Continuous Power Output
- Designed for FCC and CCIR Requirements
- Accepts "Plug In" Stereo & SCA Generators
- Total Accessibility — Local and Remote Control

Electrical Description

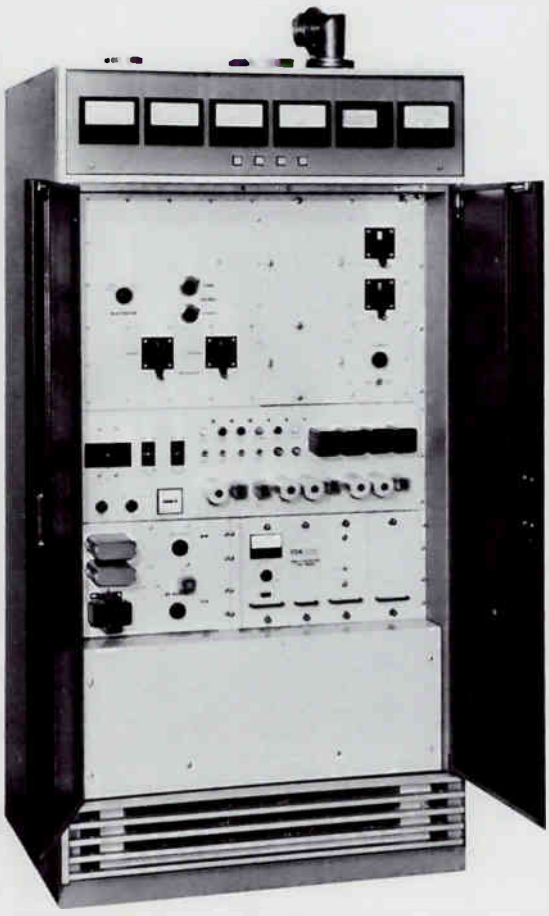
The CCA FM-25,000E, 25KW FM Broadcast Transmitter incorporates a solid state, modular 40 watt exciter, an extremely conservative IPA (5CX1500A) which is capable of producing 2KW; and an extremely reliable, long life rugged zero bias triode (3CX20,000A7) which has 20KW of plate dissipation, 35KW of power output capability and operates at only 25KW output and 9000 watts of dissipation.

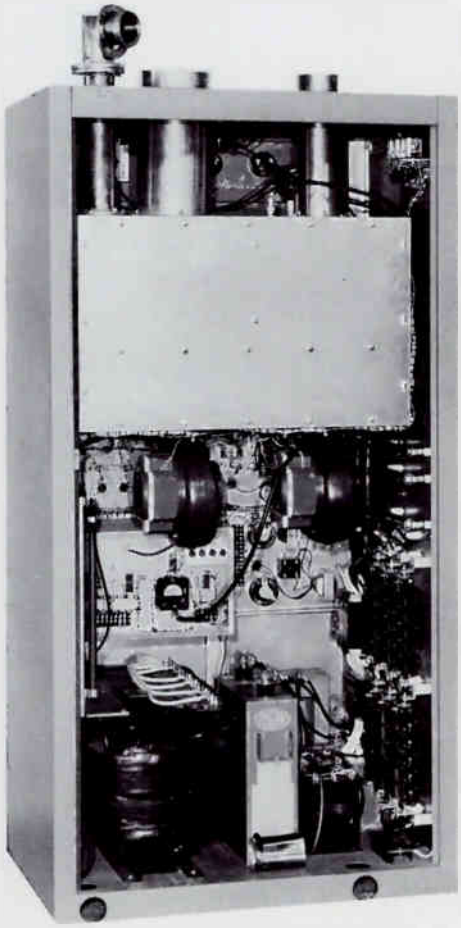
The conventional, relatively simple control system assures reliability and can be operated from either a local or remote location. Rugged, reliable, plug in relays are used to control the solid state power supplies of the transmitter, as well as to operate the indicating lights, the automatic three cycle overload recycling and after cooling systems.

The transmitter is capable of meeting or exceeding all FCC and CCIR FM broadcast specifications for monaural transmission as well as stereo transmission (with optional "plug in" CCA Model SG-1E, Stereo Generator) and simultaneous SCA operation with the optional CCA plug in SCA-1E, Sub Carrier Generator.

Mechanical Description

The FM-25,000E is self contained in one medium sized cabinet (38″W x 76″H x 34″D). The only external parts are the harmonic filter and directional coupler. Input air enters the equipment through the rear filtered fixed panel and through the front filtered removable panel. The exhaust of the system is available from two ducts located on the top of the equipment.

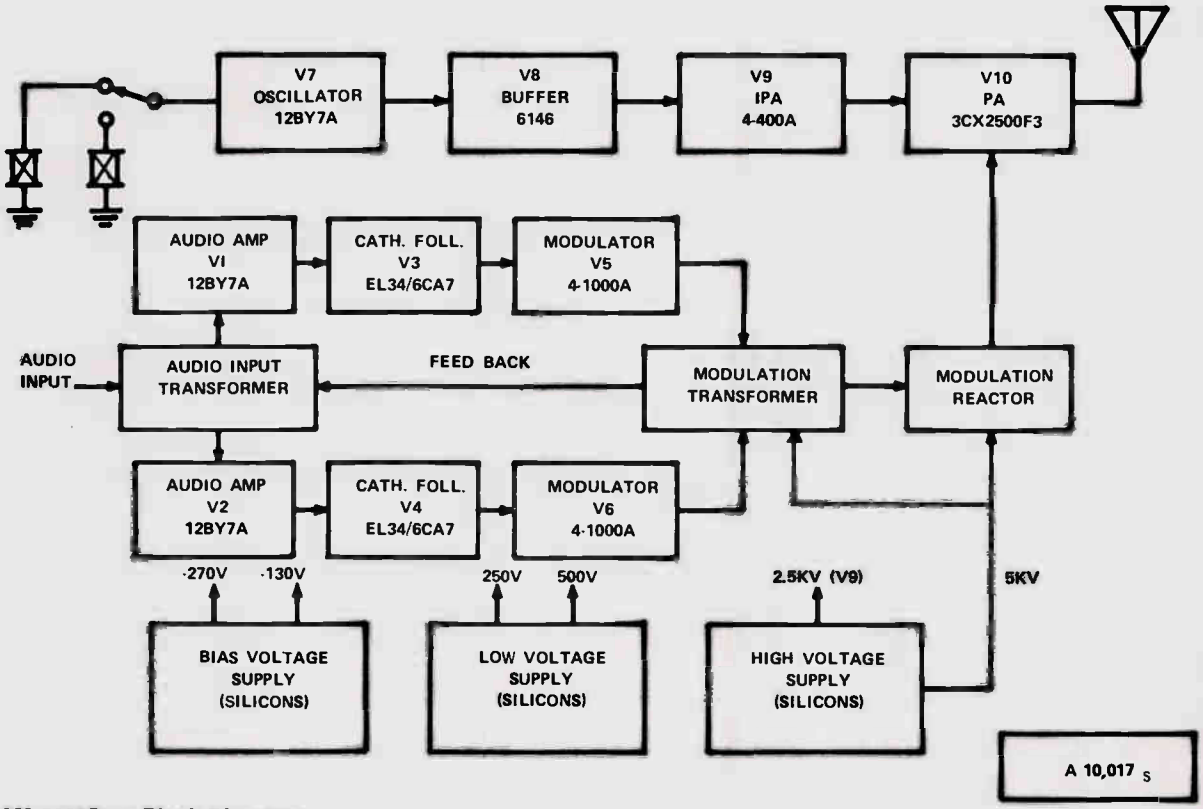




Technical Specifications

Power Output Capability	5500W
Frequency Range	500kHz - 2MHz
Frequency Stability	±5 Hz
Carrier Shift @ 100% Mod.	3% Max.
RF Output Impedance	40 - 250 ohms
Modulation Capability	125%
AF Input Impedance	150/600 ohms
AF Input Level @ 100% Mod.	+10 dbm ± 2 dbm
AF Response	
50 - 7500 Hz	±1 db
30 - 10,000 Hz	±1.5 db
AF Distortion	
50 - 10kHz	2.5% Max.

Noise (below 100% Mod.)	—55 db
Line Voltage	208/230V
Line Frequency	50/60 Hz
Phase	3
Power Consumption (100% Mod.)	14KW Max.
Net Dimensions (W x H x D) inches	68 x 76 x 33
Gross Cubeage Cu. Ft.	136.95 Cu. Ft.
Gross Weight Lbs.	3500
PA Tube	(1) 3CX2500F3
Modulators	(2) 4-1000A
Harmonic Attenuation (2nd)	—90 db
3rd	—80 db
Others	—80 db



AM-5000D — Block Diagram

5000 Watt
AM Broadcast Transmitter

AM-5000D

CCA Electronics Corporation
716 JERSEY AVENUE, GLOUCESTER CITY, NEW JERSEY 08030
PHONE: (609) 456-1716 TELEX: 84-5200

Features

- High Efficiency PA Circuitry
- Economically Priced
- Long Life 3CX2500F3 PA
- Silicon Power Supply
- Only Five Tube Types
- Conventional High Level Modulation
- Simplified Standard Circuitry
- Conservatively Rated
- Provisions for 1KW and 500 Watt Cutback
- Designed for Remote Control
- Full Accessibility — Only Two Cabinets
- Automatic Recycling
- Hinged Meter Panels
- Designed for 125% Modulation

Mechanical Description

The CCA AM-5000D is a conservatively rated 500 watt AM broadcast transmitter. It incorporates all time proven, straight forward circuitry with modern field tested tubes.

Although the transmitter includes high quality, conservative components, the utilization of modern techniques measurably reduces the volume requirements of the equipment and thus the complete transmitter can be housed in two cabinets each of which is only 34″ wide, 33″ deep and 76″ high.

Access to all components of the equipment is readily obtained by entering the transmitter through either the front or rear interlocked doors, the interlocked RF and Modulator enclosures, and the interlocked hinged meter panels.

Electrical Description

Control Ladder—The AM-5000D contains a conventional control ladder which requires only the application of front panel switches for its operation. It incorporates time delays, individual contactors, fast acting overload relays, and an automatic recycling system. The control ladder is interrupted at convenient points to permit remote control operation. "After cooling" automatically cools the transmitter after the filaments are turned off.

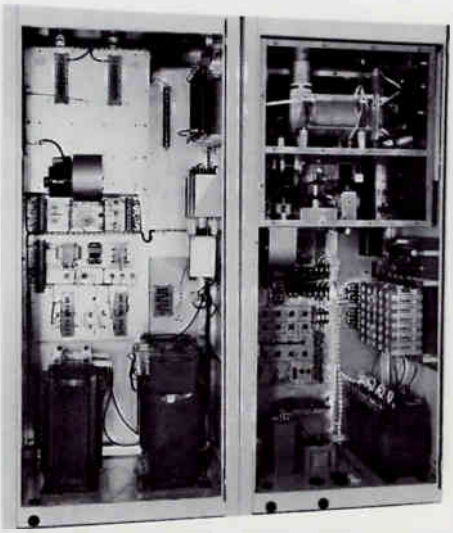
Power Supplies—All power supplies of the AM-5000D utilize conservatively rated long life dependable silicons. The utilization of these components eliminates the age old problem of vacuum tube arc back and generation of cabinet heat due to filament power. An additional feature of silicon supplies is that the equipment can be operated at extremes in temperature without rectifier pre-heating.

RF Circuitry—The AM-5000D utilizes a highly stable vacuum crystal oscillator. The 4-400A, IPA, provides more than adequate driving power for the power amplifier. Although 500 watts is available from this stage, only slightly more than 100 watts is used.

The final amplifier in the AM-5000D is a 3CX2500F3 triode. This tube is operated as a plate modulated power amplifier, and can very easily achieve a carrier output power of 5500 watts.

Modulator Circuitry—The modulator of the AM-5000D contains popular, inexpensive 4-1000A tetrodes with sufficient reserve to assure adequate audio power to modulate the final stage to well over 125%. Negative feedback circuitry is used to assure excellent frequency response and low distortion. The 4-1000A modulators operate in Class AB2 and are driven by cathode followers.

AM-5000D — Front View

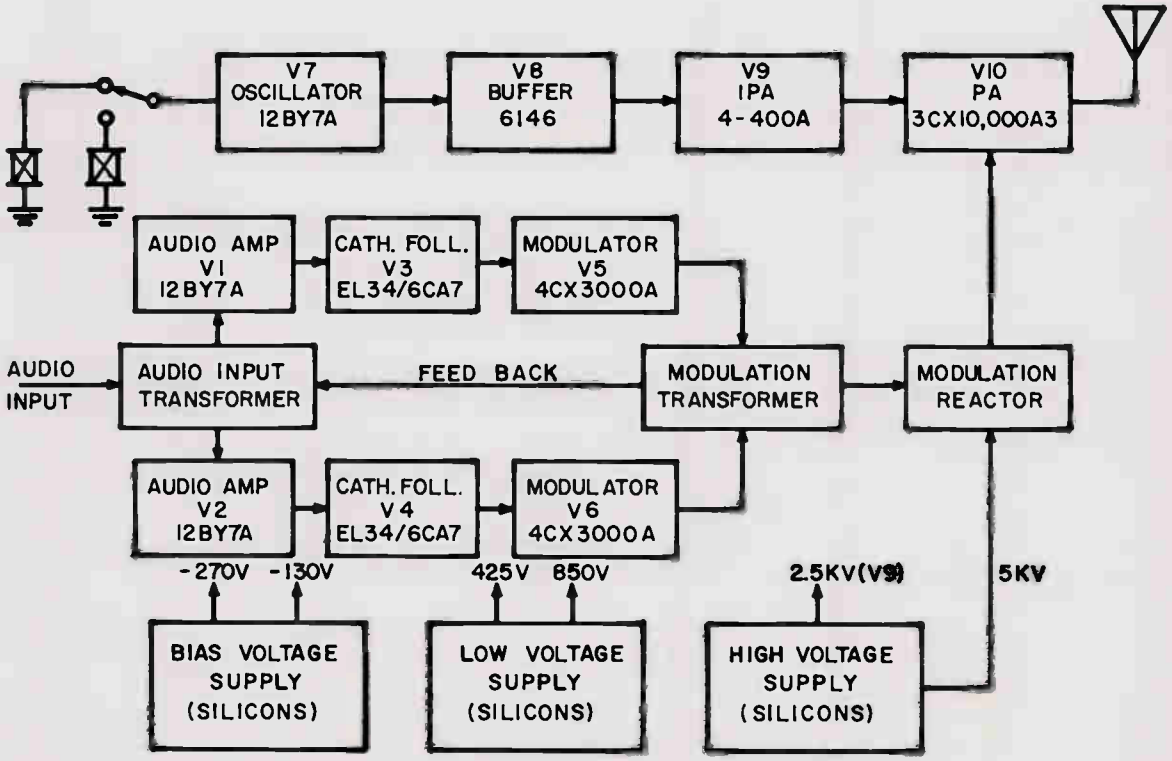


AM-5000D Rear View RF Cover and Door Removed
Note: Full Accessibility, 100% RF Shielding, and Substantial 30 Hz Response Modulation Components.

Technical Specifications

Power Output Capability	12KW
Frequency Range	500kHz - 2MHz
Frequency Stability	±5 Hz
Carrier Shift @ 100% Mod.	3% Max.
RF Output Impedance	40 - 250 ohms
Modulation Capability	125%
AF Input-Impedance	150/600 ohms
AF Input Level @ 100% Mod.	+10 dbm Max.
AF Response	
50 - 7500 Hz	±1 db
30 - 10,000 Hz	±1.5 db
AF Distortion	
50 - 10kHz	3% Max.

Noise (below 100% Mod.)	—55 db
Line Voltage	208/230/380V
Line Frequency	50/60 Hz
Phase	3
Power Consumption (100% Mod.)	28KW Max.
Net Dimensions (W x H x D) inches	68 x 76 x 33
Gross Cubeage Cu. Ft.	136.95 cu. ft.
Gross Weight Lbs.	4000
PA Tube	(1) 3CX10000A3
Modulators	(2) 4CX3000A
Harmonic Attenuation (2nd)	—90 db
3rd	—80 db
Others	—80 db



CCA-AM-10,000D — Simplified Block Diagram

10,000 Watt AM Broadcast Transmitter

AM-10,000D

CCA Electronics Corporation
716 JERSEY AVENUE, GLOUCESTER CITY, NEW JERSEY 08030
PHONE: (609) 456-1716 TELEX: 84-5200

Features

- High Efficiency PA Circuitry
- Designed for 125% Modulation
- Long Life, Modern Ceramic, 3CX10, 000A3 PA
- Silicon Power Supply
- Only Six Tube Types
- Conventional High Level Modulation
- Simplified Standard Circuitry
- Conservatively Rated 4CX3000A Modulators
- Provisions for 1KW Cut-back
- Designed for Remote Control
- Minimum Floor Space — Only Two Cabinets
- Automatic Recycling

Description

The CCA AM-10,000D is a conservatively rated 10,000 watt AM broadcast transmitter. It incorporates all time proven, straight forward circuitry with modern field tested tubes.

The transmitter includes high quality, conservative components. The complete transmitter is housed in two cabinets each only 34" wide, 33" deep and 76" high.

Access to all components of the equipment is readily had by entering the transmitter through either the front or rear interlocked doors, or the hinged, interlocked meter and control panels.

Electrical Description

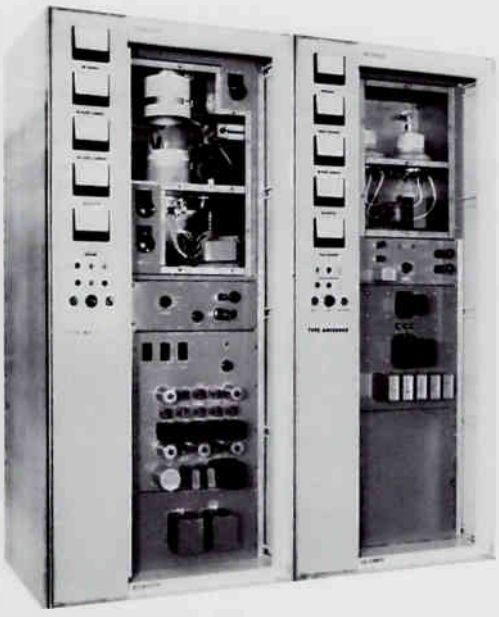
Control Ladder—The AM-10,000D contains a conventional control ladder which requires only the application of a front switch for its operation. It incorporates time delays, individual contactors, fast acting overload relays, and an automatic recycling system. The control ladder is interrupted at convenient points to permit remote control operation. "After cooling" is included as a standard feature.

Power Supplies—All power supplies of the AM-10,000D utilize conservatively rated long life dependable silicons. The utilization of these components eliminates the age old problem of vacuum tube arc back and generation of cabinet heat due to fllament power. An additional feature of silicon supplies is that the equipment can be operated at extremes in temperature without rectifier pre-heating. A PIV of 200% in voltage and 100% in current is used.

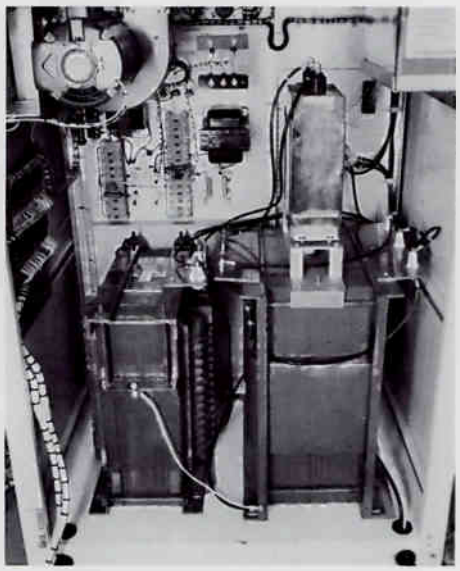
RF Circuitry—The AM-10,000D utilizes a highly stable vacuum crystal oscillator. The 4-400A, IPA, provides more than adequate driving power for the power amplifier. Although 500 watts is available at this stage, only slightly more than 200 watts is used.

The final amplifier in the AM-10,000D is a 3CX10,000A3 triode. This tube is operated as a plate modulated power amplifier, and can very easily achieve a carrier output power of 13,000 watts. Thus, the 11,000 watts is a very conservative rating.

Modulator Circuitry—The modulator of the AM-10,000D contains popular tubes in circuitry with sufficient reserve to assure adequate audio power to modulate the final stage to well over 125%. Negative feedback circuitry is used to assure excellent frequency response and low distortion. The 4CX3000A tetrodes which act as modulators can produce 12KW of audio power as compared to the 7.0KW required.



AM-10,000D — Front View
Front Door and Cover Removed



AM-10,000D Modulator Cabinet
Rear View
Note: Full Accessibility, and Substantial 30 Hz Response Modulation Components.

Technical Specifications

Power Output Capability ..... 9 KW
Frequency Range ..... 87.5 to 150MHz
Type of Emission (Frequency Modulation)
- Monaural Transmission F8
- Stereo (with optional SG-1E) ... F9
- Subsidiary (with optional SCA-1E) F9

RF Output Impedance ..... 50 ohms
- Fitting ..... 3⅛" EIA

Modulation Capability ..... ±150KHz
Carrier Frequency Stability ..... ±500Hz
Pre-emphasis (specify) for FCC ... 75μ
Pre-emphasis (specify) for CCIR .. 50μ
Spurious and Harmonics (below carrier level) ..... —80db
Audio Frequency Characteristics

Monaural Operations
- Input Impedance (balanced) .. 600 ohms
- Input Level @ 400Hz (specify) .. +10 dbm ±2 dbm
- Response with respect to pre-emphasis standard ..... ±1.5dB
- Distortion @ 100% Modulation .. 1.0% max.
- Noise ..... FM—60dB
  ..... AM—50dB

Stereo Operation
- Input Impedance (unbalanced) . 12,000 ohms
- Input Composite Level— (75 KHz dev.) ..... 4V pp
- Composite Frequency Response. ±0.5 db from 30 Hz to 100KHz

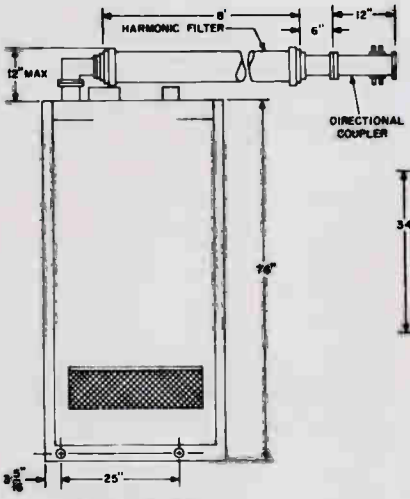
Stereo Performance with CCA Plug In Stereo Generator (SG-1E)
- Cross Talk Main Channel to Stereo Sub better than —40 db
- Cross Talk Stereo Sub Channel to Main Channel better than —40 db
- 38 Kc Carrier Suppression better than —40 db
- Separation between Left and Right Channels better than —40 db

Subsidiary Operation
- Input Impedance ..... 1500 ohms
- SCA Frequencies ..... 26 to 110Kc
- Input Level (for 10% injection) .. 1.0 volt pk to pk
- SCA Performance with CCA Plug in SCA Gen. ..... (SCA-1E)
- Cross Talk—SCA to Baseband .. —60db
- Cross Talk—Stereo to SCA .... —50db

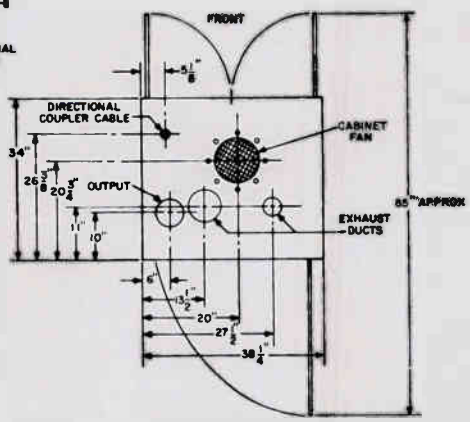
Power Line Requirements
- Line Voltage ..... 190 to 240V
  Other Voltages Available
- Line Phase (others available) .. 3 phase
- Line Frequency ..... 50 or 60 cycles
- Power Consumption ..... 13 KW
- Line Regulation ..... ±5%

Mechanical Characteristics
- Number of Cabinets ..... One
- Cabinet Dimensions ..... 38 x 34 x 76
- Weight—Net ..... 1600 lbs.
- Shipping Weight—Gross ..... 1850 lbs.
- Shipping Cubeage—Ft.³ ..... 75.37 cu. ft.

Cabinet Outline



Rear View



Top View

NOTES:

1. Position of harmonic filter and directional coupler are not critical and can be placed in any convenient location in the output line.
2. Input power line voltage can enter transmitter thru rear edge or cabinet base.

8KW
FM Broadcast Transmitter

Model FM-8,000E

CCA Electronics Corporation
716 JERSEY AVENUE, GLOUCESTER CITY, NEW JERSEY 08030
PHONE: (609) 456-1716 TELEX: 84-5200

Features

- 40 Watt Solid State, Plug In, Synthesized Exciter
- High Mu Zero Bias Power Amplifier—3CX10,000A7
- Self Contained in One Cabinet
- Conservatively Rated for 9KW Continuous Power Output
- Designed for FCC and CCIR Requirements
- Accepts "Plug In" Stereo & SCA Generators
- Total Accessibility—Local and Remote Control

Mechanical Description

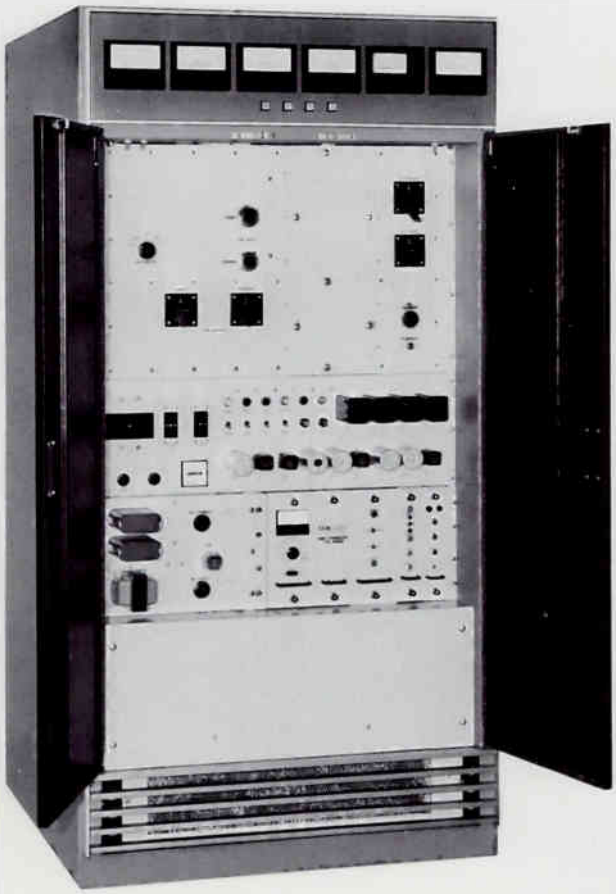
The CCA FM-8,000E, 8KW FM Broadcast Transmitter incorporates a solid state, modular 40 watt exciter, an extremely conservative IPA (5CX1500A) which is capable of producing 2KW but is only required to supply 400W and an extremely reliable, long life rugged zero bias triode (3CX10,000A7) which has 10KW of plate dissipation, 20KW of power output capability and operates at only 8KW output and 2500 watts of dissipation.

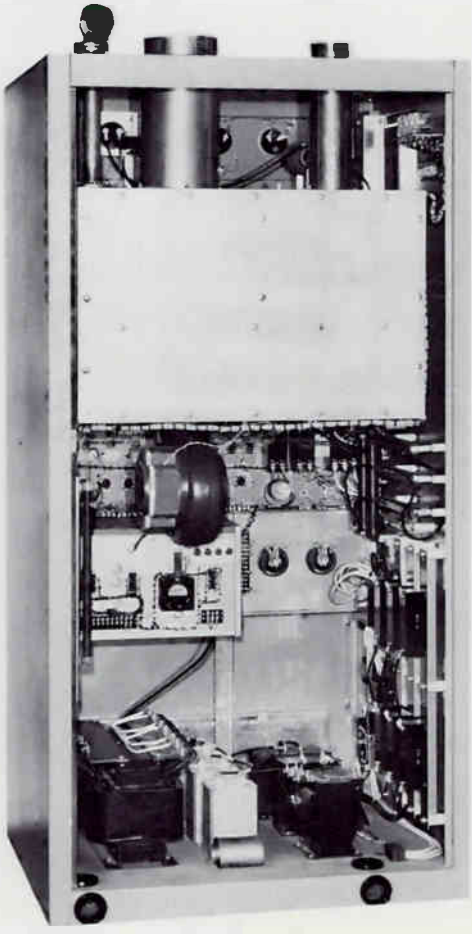
The FM-8,000E is self contained in one medium sized cabinet (38″W x 76″H x 34″D). The only external parts are the harmonic filter and directional coupler. Input air enters the equipment through the rear filtered fixed panel and through the front filtered removable panel. The exhaust of the system is available from two ducts located on the top of the equipment.

Electrical Description

The transmitter is capable of meeting or exceeding all FCC and CCIR FM broadcast specifications for monaural transmission as well as stereo transmission (with option "plug in" CCA Model SG-1E, Stereo Generator) and simultaneous SCA operation with the optional CCA plug in SCA-1E, Sub Carrier Generator.

The conventional, relatively simple control system assures reliability and can be operated from either a local or remote location. Rugged, reliable, plug in relays are used to control the solid state power supplies of the transmitter, as well as to operate the indicating lights, the automatic three cycle overload recycling and after cooling systems.





Technical Specifications

Power Output Capability 13KW
Frequency Range ..... 87.5 to 150MHz
Type of Emission (Frequency Modulation)
  Monaural Transmission F3
  Stereo (With optional SG-1E) ... F9
  Subsidiary (with optional SCA-1E) F9
RF Output Impedance ..... 50 ohms
  Fitting ..... 3⅛" EIA
Modulation Capability ..... ±150KHz
Carrier Frequency Stability ..... ±500Hz
Pre-emphasis (specify) for FCC ... 75μ
Pre-emphasis (specify) for CCIR .. 50μ
Spurious and Harmonics (below carrier level) ..... —80db

Audio Frequency Characteristics
Monaural Operations
  Input Impedance (balanced) ... 600 ohms
  Input Level @ 400Hz (specify) .. +10 dbm ± 2 dbm
  Response with respect to pre-emphasis standard ..... ±1.5 db
  Distortion @ 100% Modulation .. 1.0% max.
  Noise ..... FM —60 db
  ..... AM —50 db

Stereo Operation
  Input Impedance (unbalanced) .. 12,000 ohms
  Input Composite Level— (75 KHz dev.) ..... 4V pp
  Composite Frequency Response. ±0.5 db from 30Hz to 100KHz

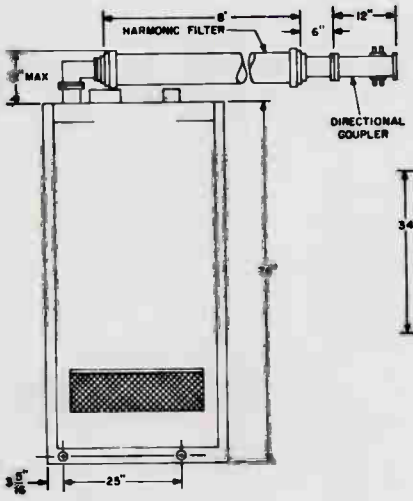
Stereo Performance with CCA Plug In Stereo Generator (SG-1E)
  Cross Talk Main Channel to Stereo Sub better than —40 db
  Cross Talk Stereo Sub Channel to Main Channel better than —40 db
  38 Kc Carrier Suppression better than —40 db
  Separation between Left and Right Channels better than —40 db

Subsidiary Operation
  Input Impedance ..... 1500 ohms
  SCA Frequencies ..... 26 to 110Kc
  Input Level (for 10% injection) .. 1.0 volt pk to pk
SCA Performance with CCA Plug in SCA Gen. (SCA-1E)
  Cross Talk — SCA to Baseband. —60db
  Cross Talk — Stereo to SCA ... —50db

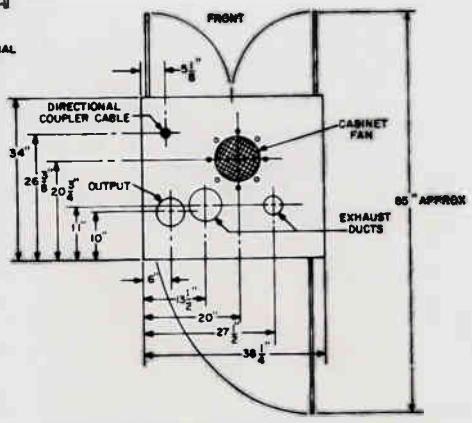
Power Line Requirements
  Line Voltage ..... 190 to 240V
    Other Voltages Available
  Line Phase (others available) ... 3 phase
  Line Frequency ..... 50 or 60 cycles
  Power Consumption ..... 18 KW
  Line Regulation ..... ±5%

Mechanical Characteristics
  Number of Cabinets ..... One
  Cabinet Dimensions ..... 38 x 34 x 76
  Weight—Net ..... 1600 lbs.
  Shipping Weight—Gross ..... 1850 lbs.
  Shipping Cubeage—Ft.³ ..... 75.37 cu. ft.

Cabinet Outline



Rear View



Top View

NOTES:

1. Position of harmonic filter and directional coupler are not critical and can be placed in any convenient location in the output line.
2. Input power line voltage can enter transmitter thru rear edge or cabinet base.

12KW
FM Broadcast Transmitter

Model FM-12,000E

CCA Electronics Corporation
716 JERSEY AVENUE, GLOUCESTER CITY, NEW JERSEY 08030
PHONE: (609) 456-1716 TELEX: 84-5200

Features

- 40 Watt Solid State, Plug In, Synthesized Exciter
- High Mu Zero Bias Power Amplifier—3CX10,000A7
- Self Contained in One Cabinet
- Conservatively Rated for 13KW Continuous Power Output
- Designed for FCC and CCIR Requirements
- Accepts "Plug In" Stereo & SCA Generators
- Total Accessibility—Local and Remote Control

Mechanical Description

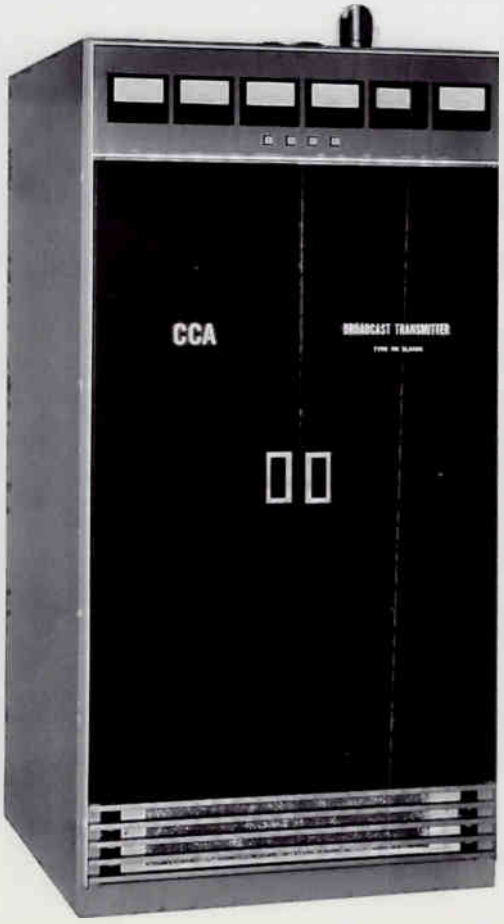
The CCA FM-12,000E, 12KW FM Broadcast Transmitter incorporates a solid state, modular 40 watt exciter, an extremely conservative IPA (5CX1500A) which is capable of producing 2KW but is only required to supply 600W and an extremely reliable, long life rugged zero bias triode (3CX10,000A7) which has 10KW of plate dissipation, 20KW of power output capability and operates at only 12KW output and 4000 watts of dissipation.

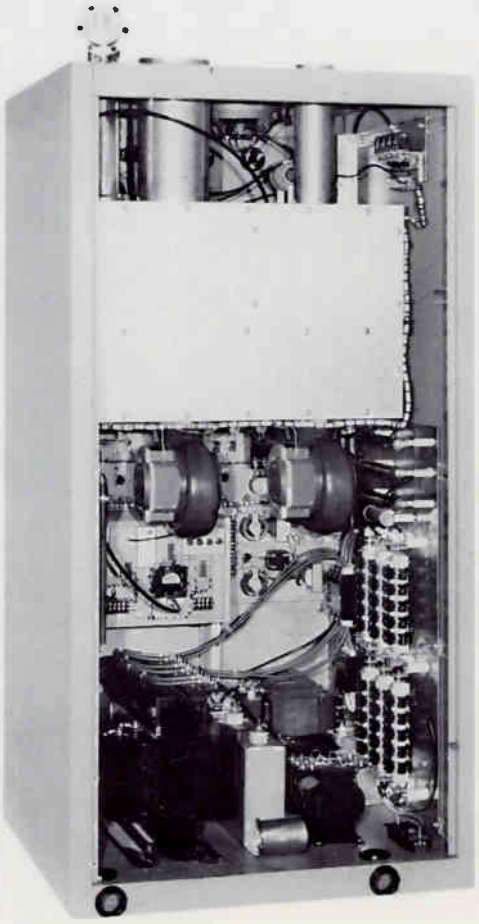
The FM-12,000E is self contained in one medium sized cabinet (38″W x 76″H x 34″D). The only external parts are the harmonic filter and directional coupler. Input air enters the equipment through the rear filtered fixed panel and through the front filtered removable panel. The exhaust of the system is available from two ducts located on the top of the equipment.

Electrical Description

The transmitter is capable of meeting or exceeding all FCC and CCIR FM broadcast specifications for monaural transmission as well as stereo transmission (with optional "plug in" CCA Model SG-1E, Stereo Generator) and simultaneous SCA operation with the optional CCA plug in SCA-1E, Sub Carrier Generator.

The conventional, relatively simple control system assures reliability and can be operated from either a local or remote location. Rugged, reliable, plug in relays are used to control the solid state power supplies of the transmitter, as well as to operate the indicating lights, the automatic three cycle overload recycling and after cooling systems.





Technical Specifications

Power Output Capability 22KW
Frequency Range ..... 87.5 to 150MHz
Type of Emission (Frequency Modulation)
- Monaural Transmission F3
- Stereo (With optional SG-1E) ... F9
- Subsidiary (with optional SCA-1E) F9

RF Output Impedance ..... 50 ohms
- Fitting ..... 3⅛" EIA

Modulation Capability ..... ±150KHz
Carrier Frequency Stability ..... ±500Hz
Pre-emphasis (specify) for FCC ... 75μ sec
for CCIR .. 50μ sec
Spurious and Harmonics (below carrier level ..... −80db
Audio Frequency Characteristics

Monaural Operations
- Input Impedance (balanced) ... 600 ohms
- Input Level @ 400Hz (specify) . +10 dbm ± 2 dbm
- Response with respect to pre-emphasis standard ..... ±1.5dB
- Distortion @ 100% Modulation . 1.0% max.
- Noise ..... FM −60db
- Noise ..... AM −50db

Stereo Operation
- Input Impedance (unbalanced) .. 12,000 ohms
- Input Composite Level—(75 KHz dev.) ..... 4V pp
- Composite Frequency Response. ±0.5 db from 30Hz to 100KHz

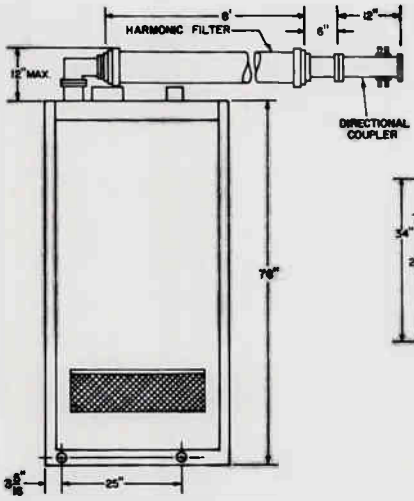
Stereo Performance with CCA Plug In Stereo Generator (SG-1E)
- Cross Talk Main Channel to Stereo Sub better than −40 db
- Cross Talk Stereo Sub Channel to Main Channel better than −40 db
- 38 Kc Carrier Suppression better than −40 db
- Separation between Left and Right Channels better than −40 db

Subsidiary Operation
- Input Impedance ..... 1500 ohms
- SCA Frequencies ..... 26 to 110Kc
- Input Level (for 10% injection). 1.0 volt pk to pk
- SCA Performance with CCA
  - Plug in SCA Gen. ..... (SCA-1E)
  - Cross Talk—SCA to Baseband −60db
  - —Stereo to SCA... −50db

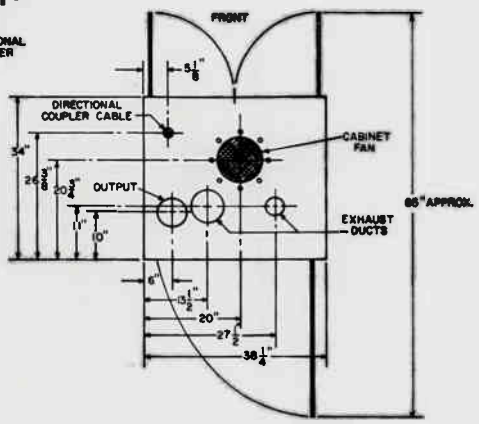
Power Line Requirements
- Line Voltage ..... 190 to 240V
  - Other Voltages Available
- Line Phase (others available) .. 3 phase
- Line Frequency ..... 50 or 60 cycles
- Power Consumption ..... 30 KW
- Line Regulation ..... ±5%

Mechanical Characteristics
- Number of Cabinets ..... One
- Cabinet Dimensions ..... 38 x 34 x 76
- Weight — Net ..... 1700 lbs
- Shipping Weight — Gross ..... 1950 lbs
- Shipping Cubeage — Ft.³ ..... 74.37 cu. ft.

Cabinet Outline



Rear View



Top View

NOTES:

1. Position of harmonic filter and directional coupler are not critical and can be placed in any convenient location in the output line.
2. Input power line voltage can enter transmitter thru rear edge or cabinet base.

20KW
FM Broadcast Transmitter

Model FM-20,000E

CCA Electronics Corporation
716 JERSEY AVENUE, GLOUCESTER CITY, NEW JERSEY 08030
PHONE: (609) 456-1716 TELEX: 84-5200

Features

- 40 Watt Solid State, Plug In, Synthesized Exciter
- High Mu Zero Bias Power Amplifier — **3CX15, 000A7**
- Self Contained in One Cabinet
- Conservatively Rated for **22KW Continuous Power** Output
- Designed for FCC and CCIR Requirements
- Accepts "Plug In" Stereo & SCA Generators
- Total Accessibility — Local and Remote Control

Electrical Description

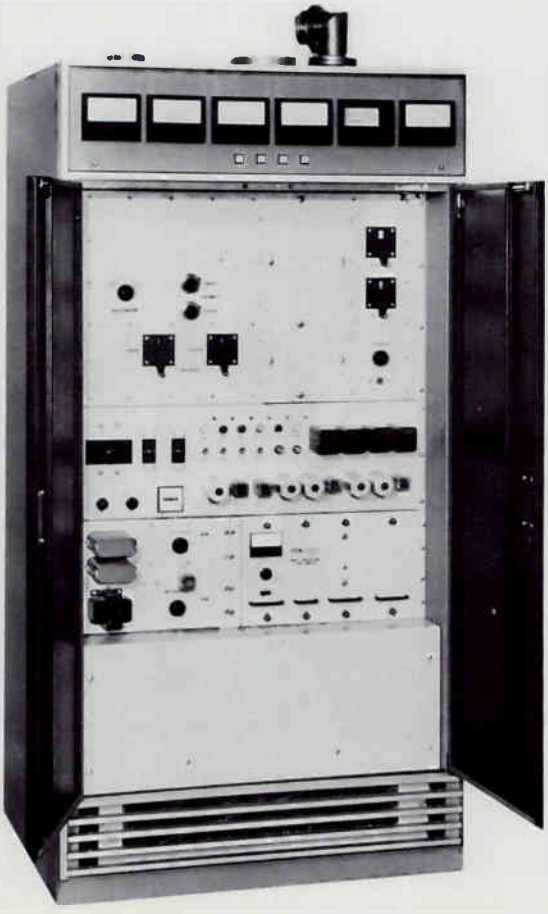
The CCA FM-20,000E, 20KW FM Broadcast Transmitter incorporates a solid state, modular 40 watt exciter, an extremely conservative IPA (5CX1500A) which is capable of producing 2KW but is only required to supply 1KW; and an extremely reliable, long life rugged zero bias triode (3CX15,000A7) which has 15KW of plate dissipation, 30KW of power output capability and operates at only 20KW output and 6000 watts of dissipation.

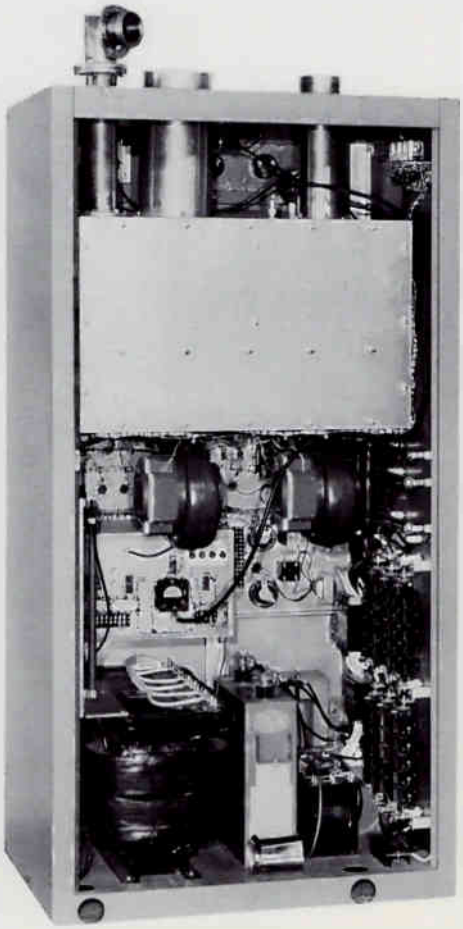
The conventional, relatively simple control system assures reliability and can be operated from either a local or remote location. Rugged, reliable, plug in relays are used to control the solid state power supplies of the transmitter, as well as to operate the indicating lights, the automatic three cycle overload recycling and after cooling systems.

The transmitter is capable of meeting or exceeding all FCC and CCIR FM broadcast specifications for monaural transmission as well as stereo transmission (with optional "plug in" CCA Model SG-1E, Stereo Generator) and simultaneous SCA operation with the optional CCA plug in SCA-1E, Sub Carrier Generator.

Mechanical Description

The FM-20,000E is self contained in one medium sized cabinet (38″W x 76″H x 34″D). The only external parts are the harmonic filter and directional coupler. Input air enters the equipment through the rear filtered fixed panel and through the front filtered removable panel. The exhaust of the system is available from two ducts located on the top of the equipment.

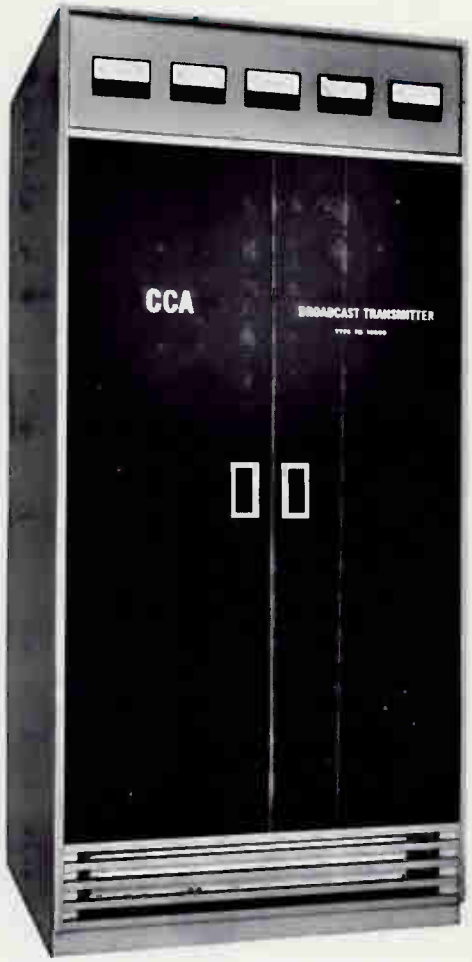




FM - 3,000D/DS, 3KW FM BROADCAST TRANSMITTER

FEATURES

- High Mu Zero Bias Triode in PA
- True Grounded Grid Circuitry
- No Requirement for Neutralization
- Modern Ceramic PA & IPA Tubes
- Conservatively Rated — Tube Capability is 5KW Output
- Available with Monaural or Stereo Exciters
- Designed for Subsidiary Service
- Solid State Silicon Rectifiers
- Automatic Overload Recycling
- Minimum Floor Space — One Cabinet
- Full Accessibility



FM-3000D/DS — Front View

MECHANICAL DESCRIPTION

The FM-3000D/DS is self-contained in a medium sized cabinet. Full access to all parts is assured by entering the rear door or the interlock RF covers. No other FM Transmitter offers as much accessibility as the CCA FM-3000D/DS Transmitter. Forced air cooling with 200% reserve is utilized for maintaining the components well below 50% of the maximum ratings of the tube manufacturer. All operating controls are at convenient hip level. All tuning controls are with calibrated knobs. There is no requirement to enter the equipment for tuning or adjustments. Front panel lights indicate the status of all circuits. A directional coupler and harmonic filter are mounted external to the equipment but are supplied with the original price.

ELECTRICAL DESCRIPTION

EXCITER

The FM-3000D/DS is available with two models of exciters. The less expensive but substantial unit is essentially a conventional phase modulated exciter which can be utilized for low distortion, high fidelity and monaural operation with simultaneous subsidiary service. A somewhat more expensive exciter is available in the stereo version of this transmitter. Customers may purchase the monaural exciter and will be given substantial credit for the exchange of same in the event that they should desire the direct FM unit for stereo operation.

IPA

An 8122 tetrode is used as an intermediate power amplifier. This stage requires less than 2 watts of drive to achieve 250w output—much greater than the 150 watts required from this stage. No requirement for neutralization exists.

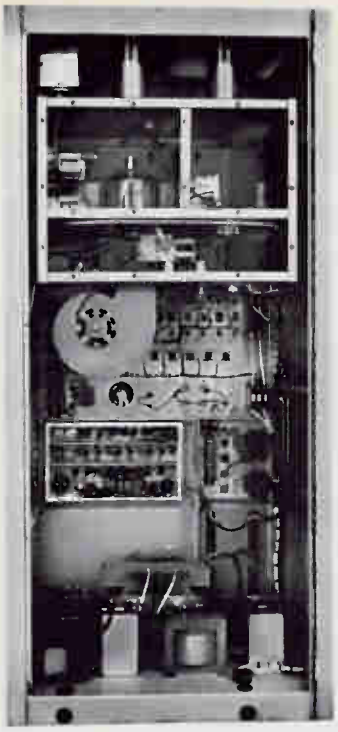
PA

The modern ceramic 3CX3000A7 serves as the final power amplifier. This high MU triode has a power gain of 20 and is operated with its grid connected directly to dc ground. This true grounded grid configuration achieves perfect isolation between input and output circuits and eliminates any possibility of instability and requirement for neutralization. The PA tube operates with a dissipation of only 30% of its maximum rating. Thus, substantial tube life and minimum tube expense can be assured. The output circuit of this stage is a modified pi network with independent calibrated controls for tuning and loading.

POWER SUPPLIES—All power supplies utilize field proven solid state rectifiers, with PIV safety factors of 200% and current reserve of 2000%.

CONTROL CIRCUIT—The FM-3000D/DS is designed to be operated unattended and by remote control. All major supplies are protected by circuit breakers and fast acting overload relays. A three cycle automatic recycling system with an "electronic brain" as well as total protection are additional features of this superior control system.

CCA ELECTRONICS CORPORATION
716 JERSEY AVE., GLOUCESTER CITY, NEW JERSEY 08030



Rear View — Note Full Accessibility, Complete RF Shielding, Silicon Rectifiers, and Rugged, Substantial Power Supply Components.

ACCESSORY EQUIPMENT

SC-1D SUBSIDIARY GENERATOR

CCA offers as an accessory item an inexpensive but reliable multiplex generator. This unit can be used with any modern FM transmitter to produce an auxiliary audio channel which can simultaneously be operated with the main audio channel. With only a modest reduction of modulation of the main carrier, two CCA type SC-1D generators may be used to produce a high quality system with simultaneous main and two auxiliary channel capacity. When ordering, specify frequency of subcarriers.

SG-1D STEREO GENERATOR

Designed to be used in conjunction with a direct FM exciter to produce high fidelity, super performing stereo operation. An individual catalog sheet is available which describes the generator in detail.

CBS FM VOLUMAX

An essential unit in every broadcast facility is a device to prevent overmodulation of the carrier. The CBS Volumax efficiently and inexpensively performs this task by preventing audio peaks from modulating the transmitter. Details available in a separate catalog sheet.

AGC-1D AUDIO AGC AMPLIFIER

The CCA AGC-1D is designed to maintain the average level of broadcast programming to a relatively constant high value. This device eliminates the requirement for constant operation of console controls when switching from one program source to another.

RC-1D REMOTE CONTROL

The CCA-RC-1D is available to those broadcasters who desire to operate their transmitter from a remote point. It provides ten control functions and ten metering positions—more than adequate for the most complicated station facility.

"THIRD GENERATION" FM BROADCAST TRANSMITTER

CCA is the only major equipment supplier who can provide today FM high power transmitters which contain high mu-zero bias triodes—"Third Generation FM Design".

Originally, when the "First Generation" of broadcast transmitters were produced in 1948, they utilized low mu, grounded grid triodes. These designs, in general, were very stable due to the grounded grid configuration. However, the use of the low mu triodes required excessive drive to achieve rated power output. Thus, a 1KW driver was required to produce 3KW; a 3KW driver for 10KW output, etc.

The "Second Generation" designs that were introduced in 1958 utilize high gain tetrodes in their final stages. They required a minimum of RF drive but the necessity for neutralizing these tetrodes and their attendant instabilities have represented a constant source of technical problems for the modern FM operator.

CCA "Third Generation" FM designs solve the problems present in its predecessors. True, grounded grid circuitry with the grid connected directly to DC ground assures perfect stability. The use of "high mu" triodes with power gains of 20 require modest RF drives. The elimination of by pass capacitors, bias and screen supplies results in the most simple, reliable, trouble free 3KW FM Transmitter commercially available.

TECHNICAL SPECIFICATIONS

Power Output Capability	3.5KW
Frequency Range	50 - 150 MHz
Frequency Stability	.001%
RF Output Impedance	50 ohms
(fitting)	1⅝"
AF Input Impedance	150/600 ohms
AF Input Level @ 100% Mod	+10 dbm Max.
AF Response (with 75 us pre-emphasis) 50 - 15,000 Hz (Mono)	±1 db
AF Distortion (Maximum) (Mono)	1%
Noise (below 100% Mod.)	-65 db
Line Voltage	230/380V
Line Frequency	50/60 Hz
Phase	3
Power Consumption (Approx.)	5KW
Net Dimensions (W x H x D) inches	34 x 76 x 33
Gross Cubeage Cu. Ft.	110
Gross Weight Lbs.	1500
PA Tube	3CX3000A7
Harmonic Level (below carrier)	-80 db

2.5KW
FM Broadcast Transmitter

Model FM-2500E

CCA Electronics Corporation
716 JERSEY AVENUE, GLOUCESTER CITY, NEW JERSEY 08030
PHONE: (609) 456-1716 TELEX: 84-5200

Features

- 40 Watt Solid State, Plug In, Synthesized Exciter
- High Mu Zero Bias Power Amplifier — 3CX3,000A7
- Self Contained in One Cabinet
- Conservatively Rated for 3.0KW Continuous Power Output
- Designed for FCC and CCIR Requirements
- Accepts "Plug In" Stereo & SCA Generators
- Total Accessibility — Local and Remote Control

Mechanical Description

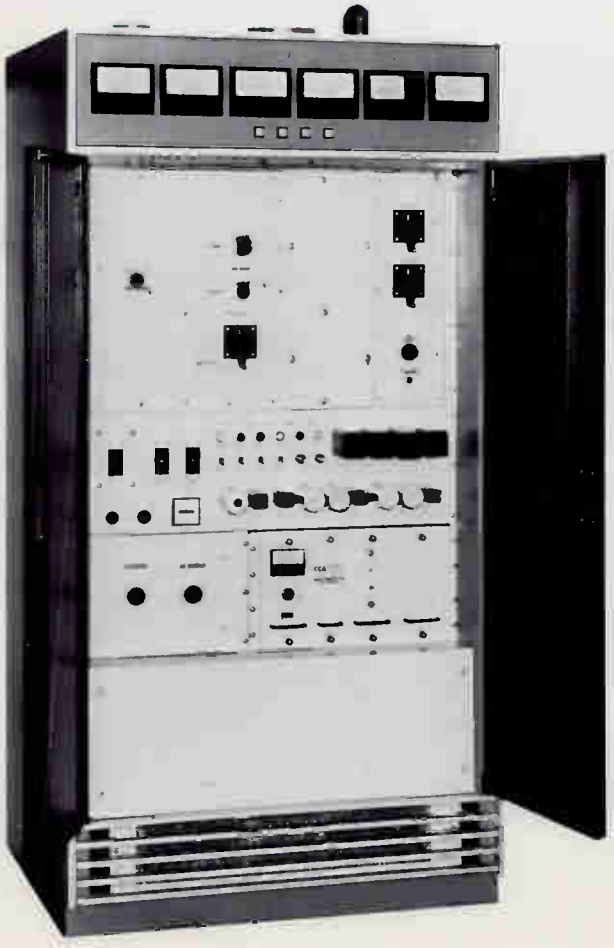
The CCA FM-2500E, 2.5KW FM Broadcast Transmitter incorporates a solid state, modular 40 watt exciter, an extremely conservative IPA (8874) which is capable of producing 400W but is only required to supply 200W and an extremely reliable, long life rugged zero bias triode (3CX3,000A7) which has 3KW of plate dissipation, 7KW of power output capability and operates at only 2.5KW output and 800 watts of dissipation.

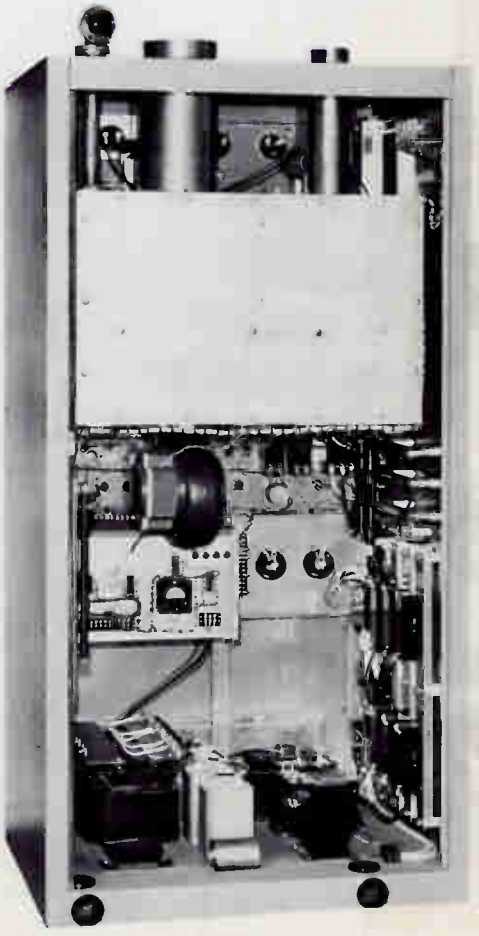
The FM-2500E is self contained in one medium sized cabinet (38"W x 76"H x 34"D). The only external parts are the harmonic filter and directional coupler. Input air enters the equipment through the rear filtered fixed panel and through the front filtered removable panel. The exhaust of the system is available from two ducts located on the top of the equipment.

Electrical Description

The transmitter is capable of meeting or exceeding all FCC and CCIR FM broadcast specifications for monaural transmission as well as stereo transmission (with optional "plug in" CCA Model SG-1E, Stereo Generator) and simultaneous SCA operation with the optional CCA plug in SCA-1E, Sub Carrier Generator.

The conventional, relatively simple control system assures reliability and can be operated from either a local or remote location. Rugged, reliable, plug in relays are used to control the solid state power supplies of the transmitter, as well as to operate the indicating lights, the automatic three cycle overload recycling and after cooling systems.





Technical Specifications

Power Output Capability 3KW
Frequency Range ..... 87.5 to 150MHz
Type of Emission (Frequency Modulation)
- Monaural Transmission F3
- Stereo (With optional SG-1E) ... F9
- Subsidiary (with optional SCA-1E) F9

RF Output Impedance ..... 50 ohms
- Fitting ..... 3⅛" EIA

Modulation Capability ..... ±150KHz
Carrier Frequency Stability ..... ±500Hz
Pre-emphasis (specify) for FCC ... 75μ
- for CCIR .. 50μ

Spurious and Harmonics (below carrier level) ..... —80 db
Audio Frequency Characteristics
Monaural Operations
- Input Impedance (balanced) ... 600 ohms
- Input Level @ 400Hz (specify).. +10 dbm ± 2 dbm
- Response with respect to pre-emphasis standard ..... ±1.5dB
- Distortion @ 100% Modulation . 1.0% max.

Noise ..... FM —60db
Noise ..... AM —50db
Stereo Operation
- Input Impedance (unbalanced) .. 12,000 ohms
- Input Composite Level — (75 KHz dev.) ..... 4V pp
- Composite Frequency Response. ±0.5 db from 30Hz to 100KHz

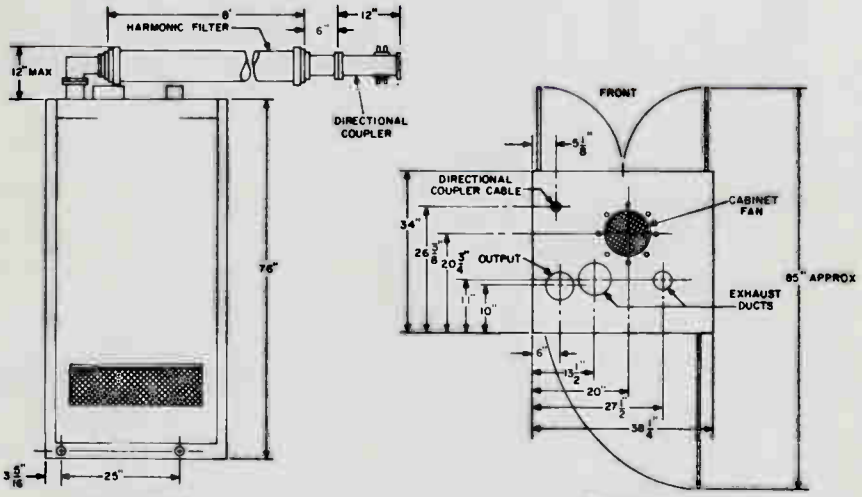
Stereo Performance with CCA Plug In Stereo Generator (SG-1E)
- Cross Talk Main Channel to Stereo Sub better than —40 db
- Cross Talk Stereo Sub Channel to Main Channel better than —40 db
- 38 Kc Carrier Suppression better than —40 db
- Separation between Left and Right Channels better than —40 db

Subsidiary Operation
- Input Impedance ..... 1500 ohms
- SCA Frequencies ..... 26 to 110Kc
- Input Level (for 10% injection).. 1.0 volt pk to pk
- SCA Performance with CCA Plug in SCA Gen. ..... (SCA-1E)
- Cross Talk—SCA to Baseband —60 db
- —Stereo to SCA .. —50db

Power Line Requirements
- Line Voltage ..... 190 to 240V
- Other Voltages Available
- Line Phase (others available) ... 3 phase
- Line Frequency ..... 50 or 60 cycles
- Power Consumption ..... 4 KW
- Line Regulation ..... ±5%

Mechanical Characteristics
- Number of Cabinets ..... One
- Cabinet Dimensions ..... 34 x 38 x 76
- Weight — Net ..... 1300 lbs
- Shipping Weight — Gross ..... 1550 lbs
- Shipping Cubeage — Ft.³ ..... 75.37 cu. ft.

Cabinet Outline



Rear View **Top View**

NOTES:

1. Position of harmonic filter and directional coupler are not critical and can be placed in any convenient location in the output line.
2. Input power line voltage can enter transmitter thru rear edge or cabinet base.

Printed in U.S.A.

15 to 100 KW UHF klystron transmitters

MODELS: TA-15-BT, TA-30-BT, TA-55-BT, TA-100-BT

CCA Electronics Corporation
716 JERSEY AVENUE, GLOUCESTER CITY, NEW JERSEY 08030
PHONE: (609) 456-1716 TELEX: 84-5200

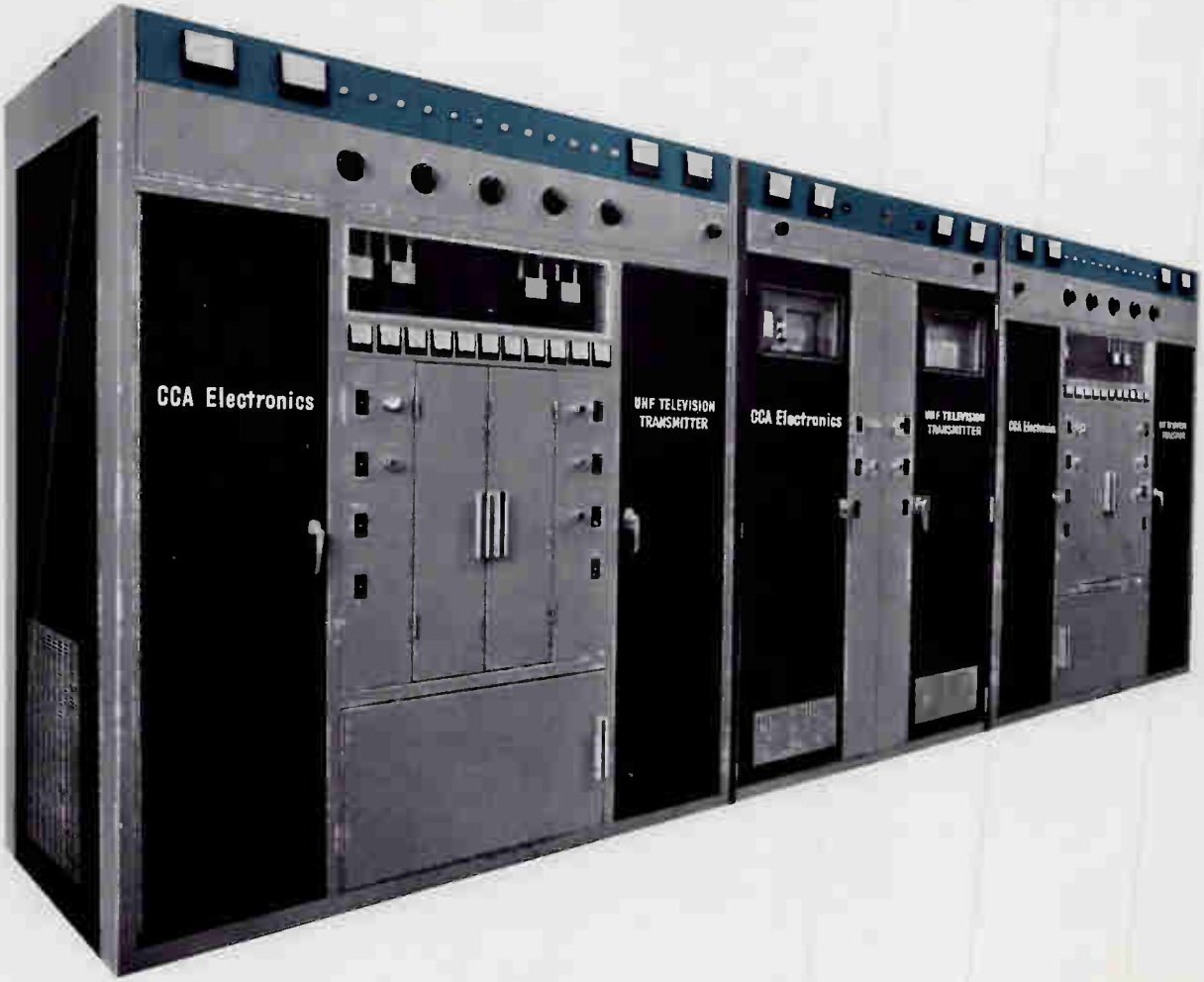
Feature for feature CCA UHF Klystron Transmitters lead the industry in performance and reliability; provide optimum color and monochrome transmission. Water cooled klystrons and transistorized circuitry assure maximum reliability; building-block modules simplify maintenance and allow economical system expansion. All models can be remotely controlled.

Four water-cooled models are offered covering the power range from 15 to 100 kilowatts: Model TA-15-BT rated at 15 kilowatts peak visual power; Model TA-30-BT rated at 30 kilowatts peak visual power; Model TA-55-BT rated at 55 kilowatts peak visual power, and Model TA-100-BT rated at 100 kilowatts visual power.*

With this choice of power levels, it is possible to select an appropriate combination of transmitter power and antenna gain to arrive at the desired ERP. Transmitters can be ordered to meet all domestic and most international station operating specifications.

CCA modular transmitters are designed so that the broadcaster can start with a lower power system and economically expand it later. Modification to power levels up to 100 kilowatts can be done in the field with no interruption in program service.

All CCA klystron transmitters use only three vacuum tubes—two klystrons and the visual modulated amplifier. All other circuits are transistorized. Result: cooler, more compact, power-saving transmission equipment that provides unmatched performance and reliability.



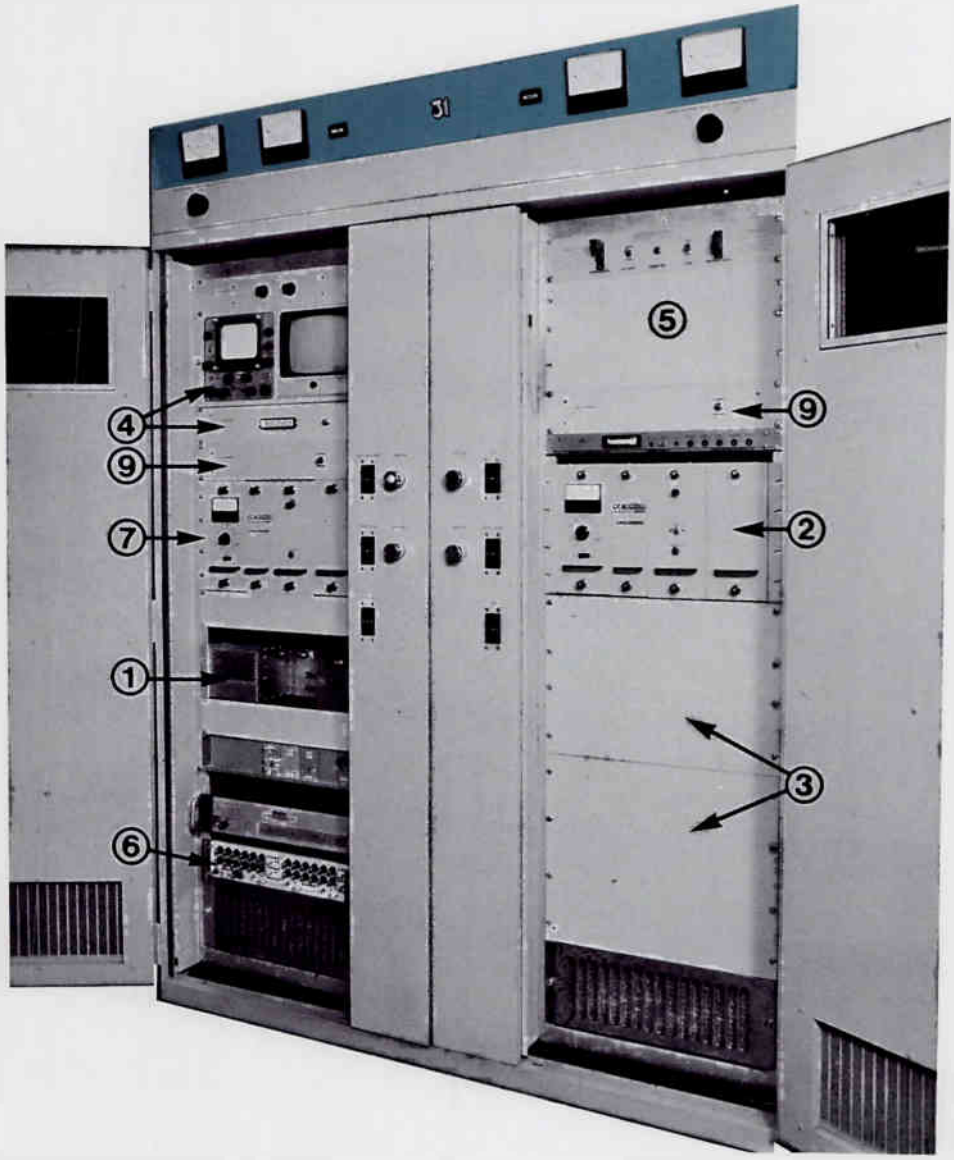
*The general description in this folder applies to all four transmitters. Detailed specifications are given only for 15, 30 and 55 kilowatt models; specifications for the 100 kilowatt model TA-100-BT are given in a separate sheet.

Performance Features

1. Back-to-the-wall mounting saves space, simplifies maintenance.
2. Separate beam power supplies for aural and visual amplifiers.
3. All water control and metering devices mounted on front-facing sub-panel and totally isolated from the system electronics.
4. Individual focus coil power supplies.
5. Quick set up for multiplexing through one amplifier in an emergency.
6. All solid state modulator incorporating advanced processing amplifier features.
7. Unitized power supplies completely enclosed in tank for outside mounting.
8. Complete test and monitoring equipment, including scope, picture monitor, sideband response analyzer, and frequency and modulation monitor is available for mounting in the driver.

The CCA RF Driver contains two independent solid state exciters one for the aural the other for the visual. The output of the aural exciter is 10 watts. Substantially more than the 2 watts required to drive the aural klystron. The Visual exciter drives a YD 1270 triode which can conservatively produce 25 watts. This stage is cathode modulated with a solid state modulator "built-in". This cabinet also contains a four cavity vestigial sideband filter, pre-tuned to the customer's frequency as well as a sophisticated adjustable color phase equalizer and low pass filter. These units guarantee operation within FCC and CCIR color specifications.

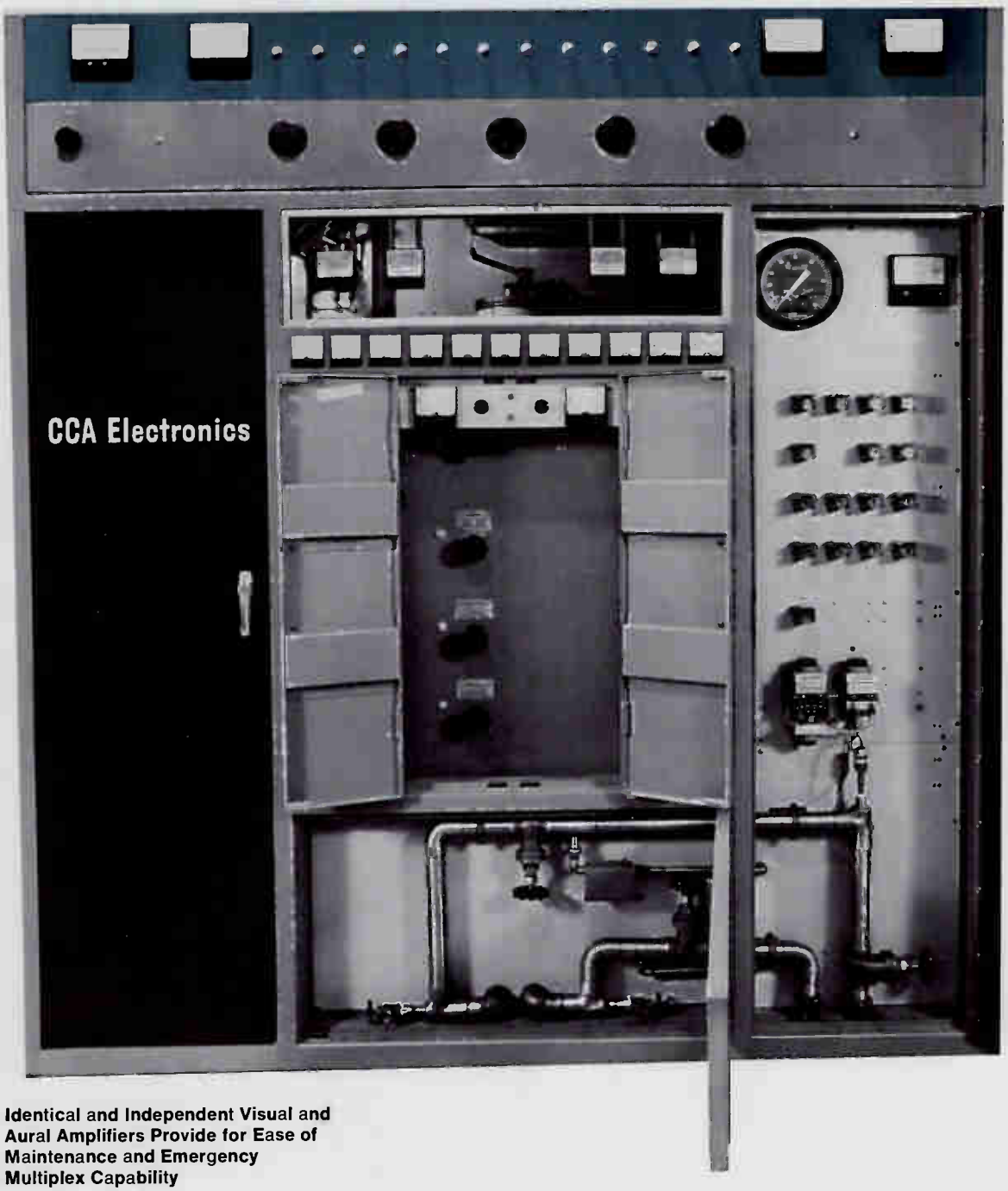
1. Solid state modulator.
2. Aural driver completely transistorized, contains no cavities and employs reliable direct FM.
3. Sideband response analyzer built into driver permits easy testing. (Optional)
4. Waveform and picture monitors with switching panel permits complete monitoring of system from modulator in, to amplifier out. Transistorized chopper and demodulator are also available. (Optional)
5. Modulation monitor is pre-wired into driver cabinetry. (Optional)
6. Color phase equalizers and low pass filter guarantee operation within F.C.C. specifications for color. (Included in transmitter)
7. Visual driver is transistorized, and modulated amplifier uses YD 1270 in rugged cavity with precision tuning mechanism.
8. Both visual and aural crystal oscillators and buffer stages are in temperature controlled ovens.
9. Ferrite isolators, and motorized variable R. F. attenuators, provide for precise control of klystron output.



CCA Transistorized Driver Features
Built In Test and Monitoring Facilities

CCA is the only major equipment supplier that offers in its standard UHF TV transmitter the feature of multiplexing. Thus, in the event that a klystron requires replacement, the operator can arrange to drive the input of the performing klystron with the output of both visual and aural exciters. This will result in approximately 50% power output without any noticeable degradation in quality. Thus, there is no need to invest in an expensive standby klystron with the attendant problems of monthly testing to prevent the formation of gas.

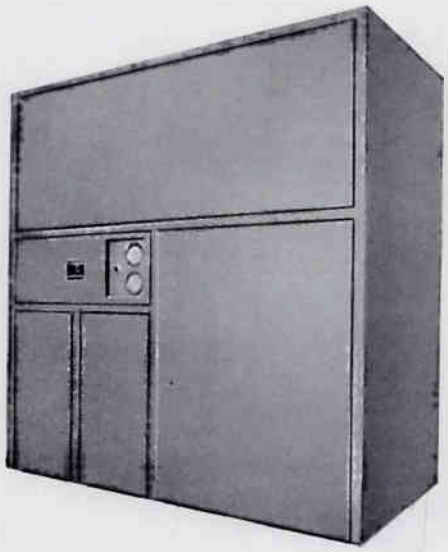
1. Complete metering system requires no meter switches.
2. All water control valves and metering devices are mounted on front-facing sub panel and completely separated from the system electronics.
3. Flow and temperature meters use large, easily read indicators.
4. All four klystron tuning controls and loading adjustments are exposed through central front doors for ease of tuning.
5. Supervisory lights simplify operation and trouble shooting.
6. Control relays are encased plug-in types and are accessible from front.



Identical and Independent Visual and Aural Amplifiers Provide for Ease of Maintenance and Emergency Multiplex Capability

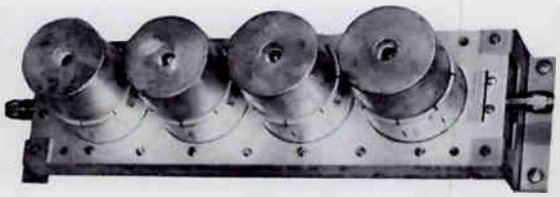
Weatherproof Heat Exchanger

The Heat Exchanger supplied is a combination pump, reservoir, blower and radiator. It contains its own circuit breaker and control circuit which is interconnected with the transmitter. It is constructed such that it may be mounted outdoors. This will substantially reduce ambient noise in the transmitter area. The introduction of glycol in the cooling system permits operation at sub freezing temperatures.



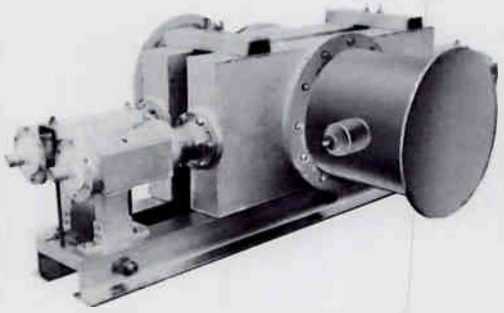
Low Level Sideband Filter

CCA UHF-TV Transmitters achieve vestigial sideband filtering by introducing this sideband filter at the output of the RF exciter. Designed for 100 watts, it is extremely conservative. Pretuned at the factory for either CCIR-PAL or FCC color specifications.



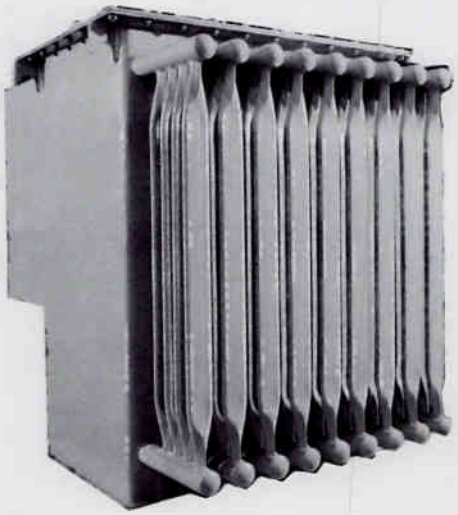
High Power Diplexer

Used to combine aural and visual transmitter outputs into one line. Contains reject load, does not require pressurization.



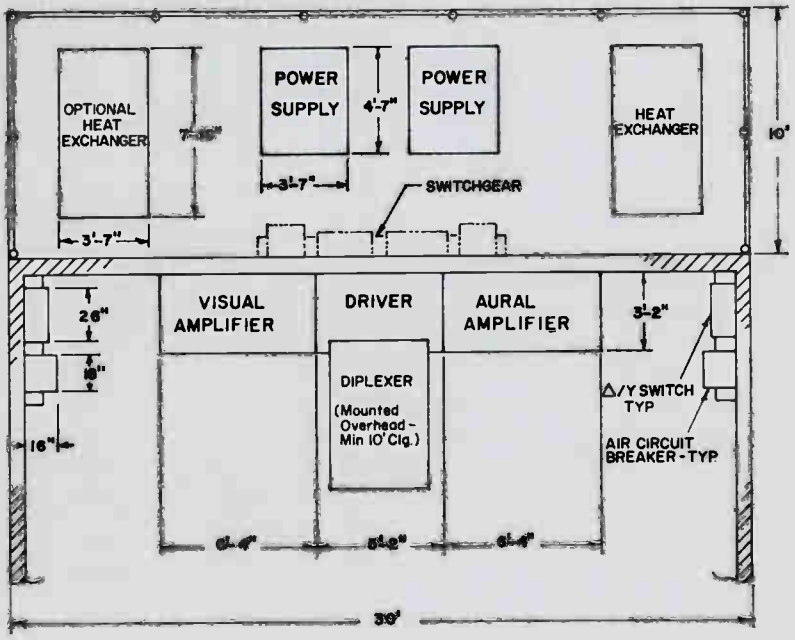
Unitized Klystron Supply

CCA provides two independent high voltage power supplies for the individual power amplifiers of CCA UHF-TV Transmitters. They are weatherproof for outdoor installation and contain a three phase transformer, full wave silicon rectifiers, filter chokes and capacitors.



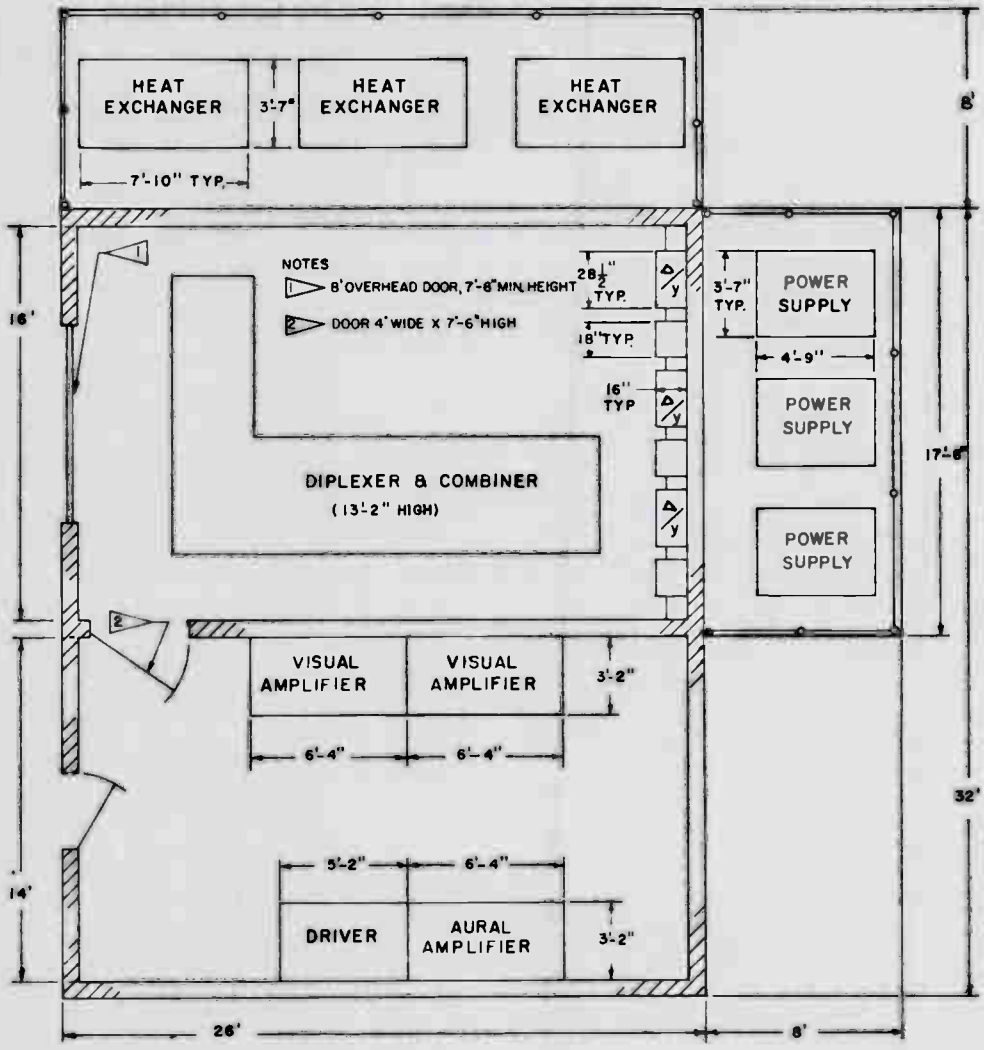
1. Entire transmitter has no rear doors resulting in space savings and ease of maintenance by mounting the transmitter against the wall.
2. Each amplifier is identical and utilizes a separate power supply. Unitized power supplies are compact, require no maintenance and have extreme reliability.
3. R. F. transfer panel is included and connected for quick change to emergency multiplex operation. System is equivalent of having a spare amplifier.
4. Sideband filtering is performed between the driver and klystron. Diplexer is simple and requires no pressurization.

Floor Plan TA-15-BT and TA-30-BT

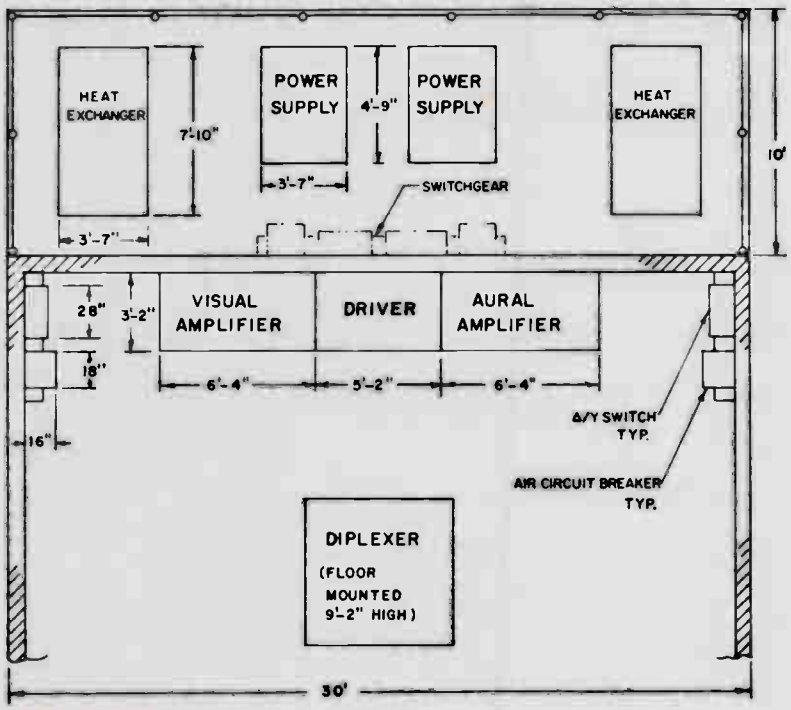


Simplicity of Installation Coupled with Layout for Maximum Efficiency

Floor Plan TA-100-BT



Floor Plan TA-55-BT



Performance Specifications

VISUAL	FCC	CCIR	
		5.5 MHz Carrier Separation	
Output Impedance	50 ohm EIA Std.	50 ohm EIA Std.	
Frequency Range	14 to 83	Band 4 & 5	
Carrier Stability	±250 Hz over 30 days	±150 Hz over 30 days	
RF Output Regulation	3% Black to White	3%	
Visual Amplitude Response:		Visual Amplitude Response:	
Carrier +.2 MHz	0 db reference	Carrier +0.5 MHz ±0.5 db	Carrier —0.75 MHz +0.5/—4 db
Carrier +4. MHz	±.5 db	Carrier +1.5 MHz 0 db	Carrier —1.25 MHz —20 db
Carrier +4.18 MHz	+.5 —1 db	Carrier +4.43 MHz +0.5/—1.0 db	Carrier —3.00 MHz —20 db
Carrier —.5	±.5 db	Carrier +5.0 MHz +0.5/—2.5 db	Carrier —4.43 MHz —30 db
Carrier —.75	Greater than —3.0 db	Carrier —5.5 MHz —20 db	Carrier —5.0 MHz —20 db
Carrier —1.25	20 db or greater	Carrier —0.5 MHz +0.5/—1.5 db	
Carrier —3.58	42 db or greater		
Carrier —5 MHz	Greater than 20 db		
Visual Modulation Capability	10%	10%	
Differential Gain	0.9 db or better	0.9 db or better	
Linearity	.85%	.85%	
AM Noise	Greater than 51 db to peak of sync.	—51 db	
Differential Phase	±3° or better	±3°	
Video	Standard 75 ohm or loop 1 volt P to P	1 volt PP sync Neg.	
Envelope Delay	FCC or better	Greater than —60 db	
Harmonic Radiation	Greater than —60 db.	CCIR specs or better	
AURAL			
		15 dbm ±2 db	
Input Level	10 dbm ±2 db @ 600 ohms	600/150 ohm	
Input Impedance	600/150 ohm Balanced	50 or 75 M sec. ±1 db	
Pre-emphasis	75 M Sec.	1% or better 30 to 15,000 Hzps	
Distortion	Better than FCC	—60 db	
FM Noise	55 db	Greater than —55 db below 100%	
AM Noise	Greater than —50 db below 100%		
Output Impedance	50 ohms EIA Std.	50 ohms EIA Std.	
Frequency Stability	±250 Hz	±250 Hz	

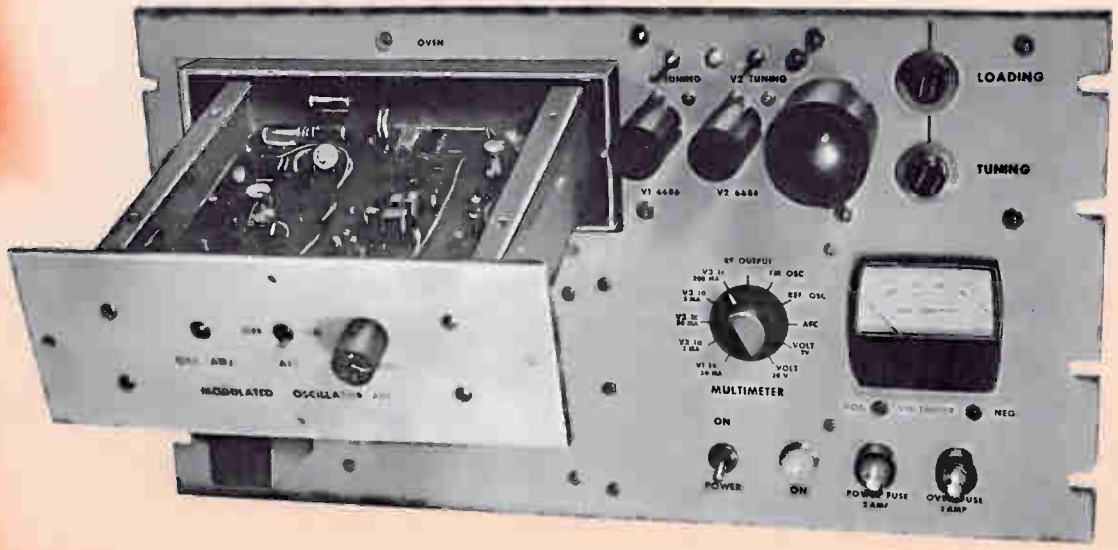
Electrical and Mechanical Specifications

	TA-55-BT	TA-30-BT	TA-15-BT
Rated Visual Amplifier Power Output of Diplexer	55 kilowatts peak	30 kilowatts peak	15 kilowatts peak
Rated Aural Amplifier Power Output of Diplexer	33 kilowatts average 11 KW Normal	18 kilowatts average 6 KW Normal	9 kilowatts average 3 KW Normal
Visual Output Power in Emergency Multiplex Operation	30 kilowatts peak	15 kilowatts peak	8 kilowatts average
Aural Output Power in Emergency Multiplex Operation	3 kilowatts average	1.5 kilowatts average	.8 kilowatts average
Power Consumption in Normal Operation	204 KVA	127 KVA	78 KVA
Power Consumption in Emergency Multiplex Operation	182 KVA	108 KVA	67 KVA
Beam Power Supply Voltage	460/480 volt, 3 phase, 50/60 cycle	460/480 volt, 3 phase, 50/60 cycle	460 volts, 3 phase, 50/60 cycle
Transmitter Circuit and Heat Exchanger Input Voltages	208/120 volts, three phase, 50/60 cycle	280/120 volts, three phase, 50/60 cycle	208/120 volts, three phase 50/60 cycle
Transmitter Dimensions	17' 10" long, 38" deep, 83" high	17' 10" long, 38" deep, 83" high	17' 10" long, 38" deep, 83" high
Transmitter Weight	8760 pounds	8760 pounds	8760 pounds
Heat Exchanger Dimensions	82" long, 42" deep, 83" high	82" long, 42" deep, 72" high	82" long, 42" deep, 72" high
Heat Exchanger Weight	2340 pounds per unit	2160 pounds per unit	2160 pounds per unit
Power Supply Dimensions	45" wide, 41" deep, 62" high	40" wide, 35" deep, 48" high	36" wide, 30" deep, 42" high
Power Supply Weight	3950 pounds per unit	2800 pounds per unit	1860 pounds per unit
Ambient Temperature	45° Centigrade Maximum	45° Centigrade Maximum	45° Centigrade Maximum
R. F. Transfer Panel	Seven Position 6⅛"	Seven Position 3⅛"	Seven Position 3⅛"

Specifications Subject to Change Without Notice

Printed in U.S.A.

CCA FM-10DS
DIRECT FM STEREO EXCITER



FEATURES

- True Direct FM Modulation
- Modern Field Proven Solid State Circuitry
- Temperature Stable Analog Control System
- Isolated SCA Modulator Circuitry
- Typical Distortions less than .2%
- Conventional, Reliable 3 Tube Power Amplifier Total Cost less than $10.00
- Removable Transistorized Module for Ease of Access
- Super Regulated Solid State Supply
- Metering of all RF Power Stages
- *Perfect Frequency Stability* — Does not require exciter to remain ON to maintain frequency stability.
- Frequency Correction System has capture ratio of 500 Kc and *always* acts to correct frequency. *Does not* require Off Frequency Disable System.
- *Designed and Manufactured by CCA* — No requirement for outside support for troubleshooting.

DESCRIPTION

THREE YEARS IN DEVELOPMENT

The CCA FM-10DS, 10 Watt Direct FM Stereo Exciter is the result of three years of exhaustive development by the Engineering Staff of CCA. During this period we have made use not only of all the theoretical personnel available to us and the industry, but we have also contracted with outstanding Broadcast Engineers, in particular, Mr. Edward Beluhe of station KCFM, St. Louis, Mo. to reflect the practical applications so necessary to the "new heart" of our FM Broadcast line.

REALISTIC — RELIABLE TRANSISTOR CIRCUITRY

The FM-10DS combines the optimum in field proven techniques for both transistor and conventional tube circuitry. We have not simply replaced tubes with solid state circuitry on a "hit and miss" basis but we have only used transistors where their reliability and superiority over tube technique have been clearly demonstrated. Thus, the FM-10DS has a completely transistorized FM module whose output power is 20 milliwatts at ¼ the operating frequency. This super stable "perfect" exciter output is amplified and multiplied by 3 conventional inexpensive tubes to produce an outstanding 10 Watt FM Broadcast Exciter.

SUPER STABLE INSULATED GATE FIELD EFFECT TRANSISTOR OSCILLATOR

The CCA FM-10DS uses a special FET transistor oscillator whose characteristics are equivalent to that of a conventional vacuum tube pentode. Its output impedance is extremely high and assures isolation from the subsequent stages. This stage contains the only adjustable element of the transistorized module. This is a variable inductance which is mechanically secured to the printed module circuit board in such a manner that its contribution to AM noise is negligible.

It should be noted that this oscillator is at ¼ the carrier frequency. This represents the optimum compromise between workable components and circuit complexity.

DISTORTION FREE VARICAP MODULATOR

The CCA FM-10DS uses solid state varicaps to achieve a direct FM Modulation of the free ruhning oscillator. These solid state devices are capacitors which change in capacity value with an application of voltage. Within limited ranges this change in capacity is perfectly square law. The unique CCA circuitry requires only a maximum of 0.2 volts to be applied to the varicaps to achieve 100 Kc deviation of the carrier. This insignificant voltage produces direct FM modulation of the carrier with less than .1% distortion of the carrier. It should be noted that this distortion is so insignificant that there is no requirement for audio compensation — a technique incorporated in competitive designs to overcome modulator weakness.

ISOLATED SCA INPUT

In order to eliminate any injurious effects of crosstalk between SCA and Stereo channels, CCA is one of the few major suppliers which use separate modulating components in their SCA channel. Thus, in the CCA FM-10DS independent varicaps are used for achieving SCA modulation and perfect isolation exists between main and SCA channels.

UNTUNED BUFFER AMPLIFIERS

The output of the free running oscillator is amplified by a pair of transistors arranged as a stage gain pair. This combination, rather than a cascade approach achieves a very high input impedance, good isolation and substantial gain. The output of this stage is approximately 20 milliwatts of modulated carrier at ¼ the carrier frequency.

NON CRITICAL SOLID STATE ANALOG CORRECTION CIRCUITRY

The CCA-FM-10DS uses an analog method of providing a corrective voltage to maintain frequency stability of the RF carrier. Basically this consists of producing a difference frequency between a crystal controlled oscillator and the output carrier. This difference frequency is converted to a D.C. voltage which in turn is used to stabilize the free running oscillator. This system differs from the competitive "phase-lock" method in that it does not have a limited capture ratio. By that, it is understood, that in the competitive "phase-lock" system a drift of the main oscillator of any magnitude will instead of being corrected, be magnified by the "phase-lock" system. On the other hand, the CCA "controlled analog" system has a capture ratio in excess of 500 Kc and *always* performs a corrective action on the free running oscillator.

SOLID STATE CRYSTAL OSCILLATOR, MIXER AND LIMITERS

The output of a third overtone transistor crystal oscillator is mixed with a sample of the RF carrier in a hermetically sealed solid state mixer to produce a difference frequency of 250 Kc. This signal is filtered to eliminate any VHF components and is amplified by two solid state limiters to achieve a constant amplitude intermediate frequency of approximately 250 Kc.

MODERN INTEGRATED CIRCUITRY

Field proven sophisticated integrated circuits are used as a binary counter and a one shot, mono stable, multivibrator. The output of the solid state limiters are used to drive the IC binary counter. Its output is at ½ the IF frequency and is used to drive the mono stable one shot mulitivibrator formed by an integrated circuit. The output of this IC is a pulse of constant width and amplitude. This pulse is in turn converted to DC by a transistor integrator. It should be noted that the DC voltage is related to the IF frequency which is related in turn to the status of the free running oscillator.

DC OPERATIONAL AMPLIFIER

The DC voltage from the integrator is amplified 500 fold by a solid state DC operational amplifier. This voltage is fed through appropriate filters to serve as an appropriate error correcting voltage to the modulating varicap. Thus, when the carrier is on the assigned frequency, the DC operational amplifier will produce essentially zero correction voltage. If the modulated oscillator should drift, a compensating correction voltage would be generated.

RELIABLE, RUGGED, RF MULTIPLIERS AND AMPLIFIERS

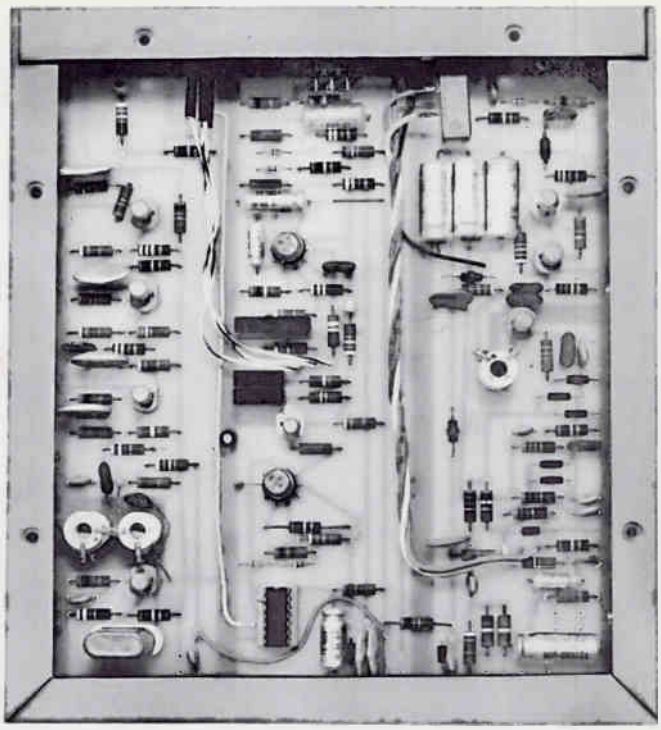
The output of the Solid State Exciter is a modulated RF carrier whose frequency is ¼ the desired frequency. This signal is amplified and multiplied by *three* inexpensive but reliable vacuum tubes whose total expense is less than ten dollars. Our inclusion at this point of conventional vacuum tubes rather than power transistors is simply consistent with the CCA philosophy of only using field proven techniques. There is no question but that power transistors are imminently available but CCA conservative engineering is patiently investigating solid state power amplifiers to find those practical units that can be mistuned without destruction; can be adjusted in a conventional manner by the average broadcast engineer and can operate under the ambient temperature and power line variations present in so many remote control transmitter sites. Until those power transistors are available CCA will continue to utilize three, trouble free, conventional, inexpensive tubes in the RF power amplifier of our 10 Watt Exciter.

SUPER REGULATED POWER SUPPLY

In order to achieve the extremely low noise figures and distortion levels required for acceptable performance a super regulated power supply is used to provide voltage to the transistor module. This system assures constant voltage independent of line voltage variations.

ALL PURPOSE — NON ESSENTIAL OVEN:

CCA engineering has spent exhaustive months in designing circuitry and investigating components for the solid state circuitry which would be essentially insensitive to temperature variations. The result is that CCA has developed a module which maintains frequency stability within FCC specifications over an ambient temperature of 0 to 45°C. However, in order to maintain much tighter limitations, the entire module is placed in an oversized oven which produces the most stable direct FM Exciter of any commercially available transmitter. This oven precludes the necessity of keeping the exciter on all the time as so many competitive units suffer. In addition, as described above, if the oven should malfunction, the exciter will still remain within FCC specifications.



Top View
SOLID STATE MODULE

MONAURAL-STEREO SWITCHING

Another demonstration of the practical aspects of the CCA FM-10DS design is the "mono-stereo" switch feature. Normally, pre-emphasis circuitry exists in a stereo generator. However, if the stereo generator should fail, the operator of competitive exciters would have to physically remove wires and connect the audio cable to the pre-emphasis input. In the CCA FM-10DS an input transformer and pre-emphasis circuit exist for monaural operation. The audio input to the system is connected to a switch which selects either the complex audio from the stereo generator or the mono audio to modulate the exciter.

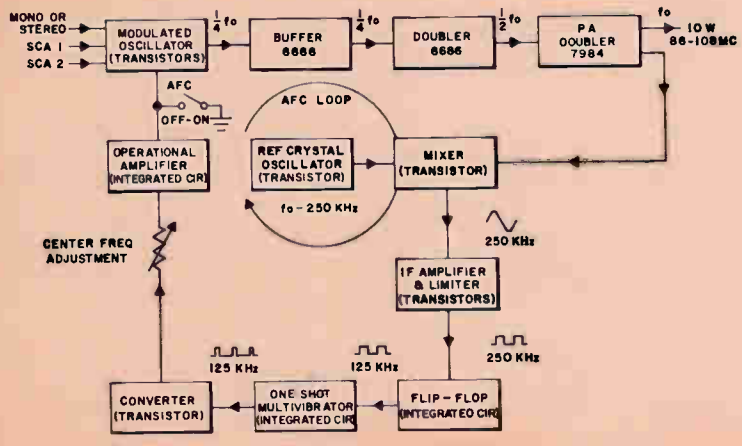
DESIGNED AND CONSTRUCTED BY *CCA* – SERVICEABLE BY *CCA*

Surprisingly, a number of competitors utilize exciters in their Broadcast Transmitters *that are not of their own design*. This approach can serve as an expedient but may introduce substantial problems when coordination between the customer and the source is required. Thus, CCA *insists* that CCA Transmitters in their entirety are *designed* and manufactured "in house"

TECHNICAL SPECIFICATIONS

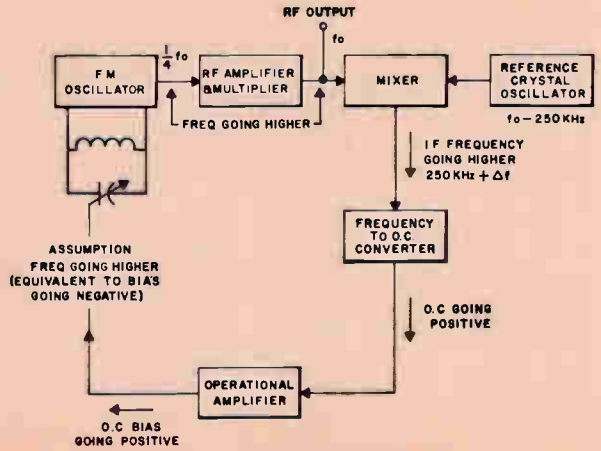
Power Output ..... 10 Watts Minimum
Frequency Range (Specify) ..... 50 to 150 mc
Type of Emission ..... F3—F9
Output Impedance ..... 50 Ohms
Output Connector ..... BNC
Modulation Capability ..... ±150 Kc
Carrier Frequency Stability ..... ±1000 cycles
Audio Input Impedance ..... 600 ohms
Audio Input Level
(100% Mod. @ 400 cycles) ..... +10 ±2 dbm
Audio Frequency Response (Monaural)
30—15,000 cycles
(Pre-emphasis 75 us) ..... ±1 db (±0.5 db typical)
Audio Frequency Response (Wide-band stereo)
30—75,000 cycles
(Pre-emphasis 75 us) ..... ±0.5 db (±0.25 db typical)

Audio Frequency Distortion
30—15,000 cycles ..... 0.5% Max. (0.2% typical)
FM Noise Level
(Below 100% Mod.) ..... −65 db (−70 db typical)
AM Noise Level
(Referred to Carrier) ..... 55 db (−65 db typical)
SCA Subcarrier Input Level
(30% Mod. of Carrier) ..... 2 volts Max.
SCA Subcarrier Input Impedance ..... 15 K
Main Channel to Sub-Channel Crosstalk ..... 55 db
Sub to Main-Channel Crosstalk ..... −65 db
Power Line Requirements
Line Voltage ..... 115 volts
Phase ..... Single
Frequency ..... 50/60 c
Power Consumption ..... 70 Watts (Approx.)



BLOCK DIAGRAM OF FM-10DS

A 18289

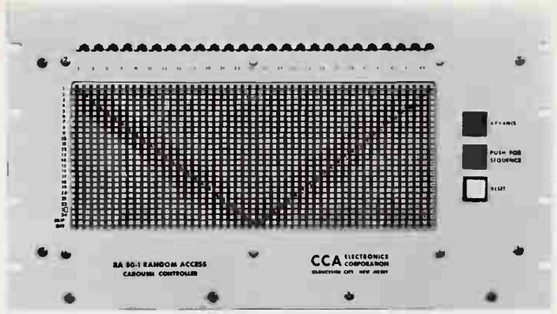


FM 10-DS
BLOCK DIAGRAM OF AFC LOOP

A 18290

CCA ELECTRONICS CORPORATION
716 JERSEY AVE., GLOUCESTER CITY, NEW JERSEY 08030

MODEL RA-50-1 RANDOM ACCESS CAROUSEL CONTROLLER



DESCRIPTION

The CCA RA-50-1 is designed to permit rapid, reliable control on a Random basis of the 24 cartridges stored in the popular "carousel" multiple cartridge playback machine. This 10½" panel permits the broadcaster to rapidly arrange the sequence in which the various cartridges within the carousel will play without the necessity of removing the cartridges from their positions within the carousel.

Referring to the photograph of the panel, it can be seen that it contains 50 levers, each of which refer to individual events. Placing these levers in any one of 24 positions determines the cartridge which will operate when that event is sequentially selected. Each lever also has a "skip" position which, in the CCA automated system, will bypass to the next cartridge source. A front panel light indicates the "next" event to be played in the carousel. To the right of the panel exists three switches which achieve rapid, greater flexibility of the panel. This includes advancing the events rapidly, converts to a consecutive system and resetting the programming to event number 1.

FEATURES

- Access to any one of 24 Cartridges in Seconds.
- Programming of 24 Cartridges in 50 Sequential Events
- Event Sequence Can Be Changed with Minimum of Effort
- Indicator Light Status of Next Event
- Facilities for Automatically Bypassing Machine or Individual Cartridge
- Rugged Switching Controls Fully Accessible and Prominently Labeled
- Auxiliary Switches to Advance Sequence, Convert from Consecutive to Preset Random Sequence and Reset to Beginning of Program

OPTIONAL EQUIPMENT

CCA offers a complete line of accessory equipments which are available on an optional basis. These equipments, together with the products in this catalog sheet, provide the broadcaster with all of the versatility to achieve any normal programming. Detailed data associated with these equipments available upon request.

TIMING EQUIPMENT

Model CC-1: Mechanical Cam (1) hour clock with two priority switches and one-minute increment for each priority. Rack mounted.

Model ECC-1: Electronic Clock

TIME-ANNOUNCING EQUIPMENT

Son-O-Mag, Model 581: Rack mounting - requires 24" depth.

Pre-recorded Time Tapes

Model TAA-1D: Time Announcer adapter panel. Can be used with two existing cartridge playback machines with 150 cycle detectors to achieve a time-announcing machine.

NETWORK-JOINING EQUIPMENT

NJ-1D: Controlling panel for operating recording equipment from network cue control tones.

MULTIPLE CARTRIDGE EQUIPMENT

Carousels

Model 250RS: Mono Playback only wired for random select.

Model 252RS: Stereo Playback only wired for random select.

Random Select, Model RA-50-1: For controlling one carousel for 50 sequences.

QRK Model 801R: Triple Automation cartridge playback (mono rack mounted.)

ACCESSORIES

Model SF-1: Switch and Fuse Panel

Model VU-1: VU Meter Panel - rack mounting with one VU Meter.

Model VU-2: With (2) VU Meters.

Deluxe CCA Rack - 70" Panel Space

Custom Automation Cabinet 70" Panel Space, Translucent Door

Three-Bay Custom Automation Cabinet (70" Panel Space per bay.)

Four-Bay Custom Automation Cabinet (70" Panel Space per bay.)

TAPE REPRODUCING EQUIPMENT

CCA Automation equipment operates with any professional reel-to-reel and cartridge tape equipment. We do, however, recommend QRK cartridge and Revox reel-to-reel tape equipment. CCA stocks both of these product lines in substantial depth and can provide prompt delivery and warranty support from our nationwide distribution centers.

CCA ELECTRONICS CORPORATION
716 JERSEY AVE., GLOUCESTER CITY, NEW JERSEY 08030

CCA "MINI-AUTOMATION"

FEATURES

- Reasonable Capacity @ An Extremely Attractive Price
- Solid State Audio, Control and Switching
- Modular Panels for Ease of Expansion
- Can be Adapted to any Conventional Format
- Can be Used with any Professional Audio Reel Tape or Cartridge Source
- Available in Modules or a Prewired System

CCA Electronics offers the broadcaster a number of outstanding modules which can be obtained for a modest initial investment and which can be interconnected in a matter of minutes to achieve an automated program source. This "mini-automation" equipment, when arranged in its simplest combination, is ideally suited for "part-time" automation and, with the addition of "expansion panels," to full-time, more sophisticated formats. This catalog sheet is intended to describe some basic "mini-automation" modules as well as to permit suggested applications.

CCA ELECTRONICS CORPORATION
716 JERSEY AVE., GLOUCESTER CITY, NEW JERSEY 08030

MODEL AMS-1 — 4-SOURCE "MINI-AUTOMATION" AUDIO SELECTOR

FEATURES

- Understandable - Front Panel Control System
- Solid State Audio Amplification, Switching and Control
- Facilities to Control 4 Audio Channels in Sequence Covering 4 Events, with facilities to reset at selected times.
- Built-In 25 Cycle Tone Generator
- Contains (2) two "Plug-in" 25 Cycle Cue Detectors with Overlap Delay Adjustment
- Incorporates Silence Sensor for Automatic Transfer to Next Programmed Event
- Can Be Operated by Remote Control
- Can Be Used in Conjunction with Local Origination
- Occupies only 10½" of Standard Rack Space
- Can Be Used with any Professional Reel or Cartridge Tape Audio Equipment
- Built-In Two Priority Clock with Full Front Panel Accessibility

DESCRIPTION

The CCA Model AMS-1 is the "heart" of the CCA "Mini-Automation" System. It represents the first control package offered by a major equipment supplier which incorporates sophisticated electronics, simplicity of operation and at an attractive selling price. A brief explanation of its features follows:

Sequential Arrangement of Four Sources: Referring to the photograph of the panel, it can be seen that there exist four lever switches, each with a four-position capacity. The event at which each program source occurs can quickly be arranged by setting the four switches to the desired positions. Normally, the cue detectors associated with the tape machines advance the system from one prearranged program source to another.

However, upon request, the built-in priority clock can be used to interrupt the sequence. Located above each of the switches is a "status" light which when registered indicates that this event, sequentially is next.

Built-In Dual Priority Clock: An inexpensive but reliable one-hour clock is provided with the AMS-1. It has facilities for presetting two switches in one-minute increments. Each of these switches are normally supplied prewired to the first two audio sources which can thus be used on a "real time" priority basis rather than on a sequential basis. For example, Source No. 1 could be a combination of Station ID, Time Announce and prerecorded News which would occur every half hour. The second source could be one or several multiple cartridge machines which could be set up to play every 10 minutes. Please note, that the system will not normally interrupt its programming and switch to another source in the middle of a message. The cue detector will normally restore the program line back to the AMS-1 and if a priority has been called - this source will then supersede the sequential event.

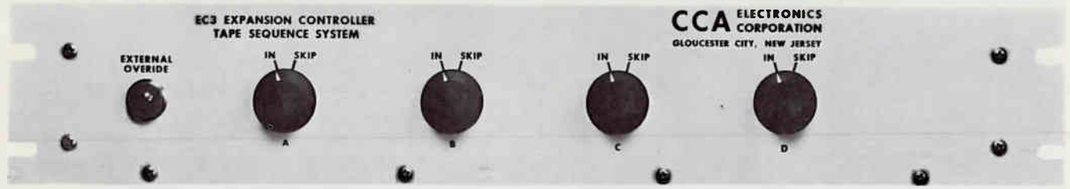
Built-In Cue Detectors: The Model AMS-1 contains (2) two plug-in 25 cycle cue detectors. These units are designed to detect the presence of a 25 cycle tone at a level as low as -30 dbm and will not overload or cause miscues at levels as high as +10 dbm. In a normal automation system, the 25 cycle "end of message tone" is generally recorded on the left channel and at a level of approximately -5 dbm. The 40 db dynamic range of the CCA Q-Tectors will permit them to function over a wide range of errors in the production and playback of 25 cycle cue information. Each detector has controls for achieving an adjustable overlap.

Built-In 25 Cycle Generator: The AMS-1 contains a built-in 25 cycle generator with dual 25 cycle filters. It is preset to operate for 2 seconds and can be controlled from either the front panel or a remote position. It is independent from the normal program lines and thus, production work can be done while the system is providing programs.

Built-In Silence Sensor: The AMS-1 contains solid state circuitry which can sense the absence of signal on the program line. This circuitry can be adjusted to operate at any predetermined time from 2 to 20 seconds of silence. Thus, if one of the machines should become inoperative, the silence sensor will detect the problem and sequence the system to the next scheduled event.

Local Origination: The AMS-1 contains a front panel switch which when depressed will serve as a priority. Thus, once this button is operated, the next source of the automation system would be that associated with the "remote." The "mini-automation" system may then be used to serve as a program source and periodically news or some other priority may be inserted in the system. The silence sensor is disabled while using the "remote" source to allow flexibility of program content.

MODEL EC3 — EXPANSION PANELS



DESCRIPTION

CCA has developed a series of panels which can be used in conjunction with the CCA "automation systems" to expand a single channel from one to three more audio sources. All panels occupy 3½" of vertical height in a standard 19" relay rack.

Model EC3-C: The simplest version of the family of expansion panels is the Model EC3-C. It is designed to expand single play tape cartridge machines such as the QRK301, or multiple cartridge machines such as the Carousel or the QRK801.

The additional three sources and the original source of the audio channel can be controlled from the front panel of the EC3-C. Each sub source has a switch associated with it. This switch programs the source or "by passes" the sub source. There also exists a provision for an external override, which when set to override the system, will skip all remaining sub-sources to be played and will restore to the basis Automation System at the end of selection being played. This permits priority "override" of the expansion system.

Model EC3-RO: Identical to Model EC3-C but prewired to accept (3) three 25 cycle cue detector cards but no detectors are included.

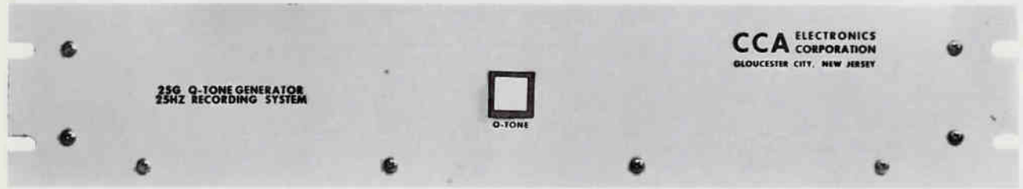
Model EC3-R1: This panel is basically the EC3-RO but with one 25 cycle cue detector. Thus, it can be used to control as one sub-source a reel-to-reel tape machine.

Model EC3-R2: Same as EC3-R1 but with two detectors.

Model EC3-R3: Same as EC3-R1 but with three detectors.

On the rear of each panel which contains a Q-Tector are controls for adjusting the time after the end of the cue tone at which the "reel to reel" tape machine will stop. This adjustable delay permits achieving a very "tight" format as well as any practical "overlay." A switch for each internal cue detector is available on the rear for overriding any preset "overlay."

25 CYCLE CUE EQUIPMENT



DESCRIPTION

CCA offers a complete line of 25 cycle generator and detector panels which have sufficient flexibility to meet the majority of applications. Each of these panels occupy only 3½" of standard 19" rack space. All panels have self-contained power supplies. All panels with cue detectors contain controls for adjustable delays and switches for eliminating overlap. All detectors are independent of each other.

All panels which contain 25 cycle generators contain front panel switches which register when operated. Duration of 25 cycle is adjustable but is normally preset for 2 seconds. All 25 cycle generators contain dual 25 cycle filters to maintain phase coincidence in both channels. Normal attenuation of 25 cycle notch is 40 db with 1½ db effect at 50 cycles.

Model 25G: 25 cycle Generator with 25 cycle filters in both channels. For 19" rack mounting.

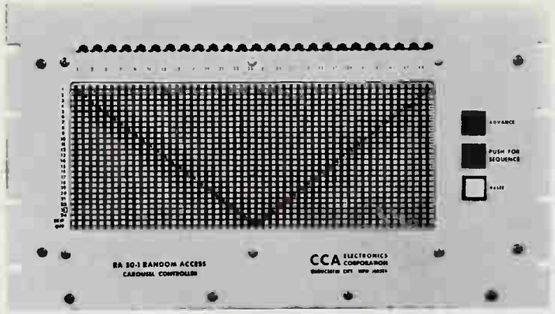
Model RQ-1G: Same as 25G with independent non-connected 25 cycle cue detector with adjustable delay and rear panel switch for eliminating overlap.

Model RQ-1: Rack mounted, 25 cycle cue detector with built-in power supply - no filters, but adjustable overlap.

Model RQ-2: Same as RQ-1 but with two independent 25 cycle cue detectors.

*EXPORT SALES: Telesco International Corporation * 1044 Northern Blvd. * Roslyn, L. I., New York 11576*
*CANADIAN SALES: Caldwell A/V Equip. Co. Ltd. * 1080 Ballamy Road North * Scarborough, Ontario*

MODEL RA-50-1 RANDOM ACCESS CAROUSEL CONTROLLER



FEATURES

- Access to any one of 24 Cartridges in Seconds.
- Programming of 24 Cartridges in 50 Sequential Events
- Event Sequence Can Be Changed with Minimum of Effort
- Indicator Light Status of Next Event
- Facilities for Automatically Bypassing Machine or Individual Cartridge
- Rugged Switching Controls Fully Accessible and Prominently Labeled
- Auxiliary Switches to Advance Sequence, Convert from Consecutive to Preset Random Sequence and Reset to Beginning of Program

DESCRIPTION

The CCA RA-50-1 is designed to permit rapid, reliable control on a Random basis of the 24 cartridges stored in the popular "carousel" multiple cartridge playback machine. This 10½" panel permits the broadcaster to rapidly arrange the sequence in which the various cartridges within the carousel will play without the necessity of removing the cartridges from their positions within the carousel.

Referring to the photograph of the panel, it can be seen that it contains 50 levers, each of which refer to individual events. Placing these levers in any one of 24 positions determines the cartridge which will operate when that event is sequentially selected. Each lever also has a "skip" position which, in the CCA automated system, will bypass to the next cartridge source. A front panel light indicates the "next" event to be played in the carousel. To the right of the panel exists three switches which achieve rapid, greater flexibility of the panel. This includes advancing the events rapidly, converts to a consecutive system and resetting the programming to event number 1.

OPTIONAL EQUIPMENT

CCA offers a complete line of accessory equipments which are available on an optional basis. These equipments, together with the products in this catalog sheet, provide the broadcaster with all of the versatility to achieve any normal programming. Detailed data associated with these equipments available upon request.

TIMING EQUIPMENT

Model CC-1: Mechanical Cam (1) hour clock with two priority switches and one-minute increment for each priority. Rack mounted.

Model ECC-1: Electronic Clock

TIME-ANNOUNCING EQUIPMENT

Son-O-Mag, Model 581: Rack mounting - requires 24" depth.

Pre-recorded Time Tapes

Model TAA-1D: Time Announcer adapter panel. Can be used with two existing cartridge playback machines with 150 cycle detectors to achieve a time-announcing machine.

NETWORK-JOINING EQUIPMENT

NJ-1D: Controlling panel for operating recording equipment from network cue control tones.

MULTIPLE CARTRIDGE EQUIPMENT

Carousels

Model 250RS: Mono Playback only wired for random select.

Model 252RS: Stereo Playback only wired for random select.

Random Select, Model RA-50-1: For controlling one carousel for 50 sequences.

QRK Model 801R: Triple Automation cartridge playback (mono rack mounted.)

ACCESSORIES

Model SF-1: Switch and Fuse Panel

Model VU-1: VU Meter Panel - rack mounting with one VU Meter.

Model VU-2: With (2) VU Meters.

Deluxe CCA Rack - 70" Panel Space

Custom Automation Cabinet 70" Panel Space, Translucent Door

Three-Bay Custom Automation Cabinet (70" Panel Space per bay.)

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TAPE REPRODUCING EQUIPMENT

CCA Automation equipment operates with any professional reel-to-reel and cartridge tape equipment. We do, however, recommend QRK cartridge and Revox reel-to-reel tape equipment. CCA stocks both of these product lines in substantial depth and can provide prompt delivery and warranty support from our nationwide distribution centers.

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CCA ELECTRONICS CORPORATION
716 JERSEY AVE., GLOUCESTER CITY, NEW JERSEY 08030

MODEL AMS-1 — 4-SOURCE "MINI-AUTOMATION" AUDIO SELECTOR

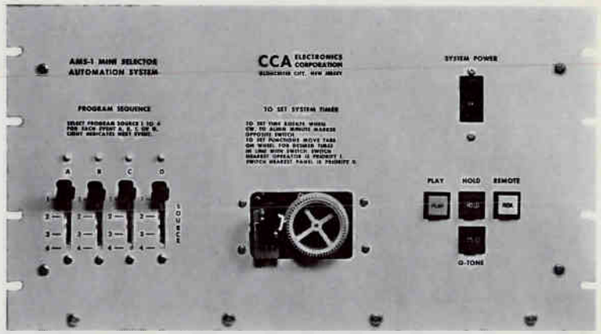
FEATURES

- Understandable - Front Panel Control System
- Solid State Audio Amplification, Switching and Control
- Facilities to Control 4 Audio Channels in Sequence Covering 4 Events, with facilities to reset at selected times.
- Built-In 25 Cycle Tone Generator
- Contains (2) two "Plug-in" 25 Cycle Cue Detectors with Overlap Delay Adjustment
- Incorporates Silence Sensor for Automatic Transfer to Next Programmed Event
- Can Be Operated by Remote Control
- Can Be Used in Conjunction with Local Origination
- Occupies only 10½" of Standard Rack Space
- Can Be Used with any Professional Reel or Cartridge Tape Audio Equipment
- Built-In Two Priority Clock with Full Front Panel Accessibility

DESCRIPTION

The CCA Model AMS-1 is the "heart" of the CCA "Mini-Automation" System. It represents the first control package offered by a major equipment supplier which incorporates sophisticated electronics, simplicity of operation and at an attractive selling price. A brief explanation of its features follows:

Sequential Arrangement of Four Sources: Referring to the photograph of the panel, it can be seen that there exist four lever switches, each with a four-position capacity. The event at which each program source occurs can quickly be arranged by setting the four switches to the desired positions. Normally, the cue detectors associated with the tape machines advance the system from one prearranged program source to another.



However, upon request, the built-in priority clock can be used to interrupt the sequence. Located above each of the switches is a "status" light which when registered indicates that this event, sequentially is next.

Built-In Dual Priority Clock: An inexpensive but reliable one-hour clock is provided with the AMS-1. It has facilities for presetting two switches in one-minute increments. Each of these switches are normally supplied prewired to the first two audio sources which can thus be used on a "real time" priority basis rather than on a sequential basis. For example, Source No. 1 could be a combination of Station ID, Time Announce and prerecorded News which would occur every half hour. The second source could be one or several multiple cartridge machines which could be set up to play every 10 minutes. Please note, that the system will not normally interrupt its programming and switch to another source in the middle of a message. The cue detector will normally restore the program line back to the AMS-1 and if a priority has been called - this source will then supersede the sequential event.

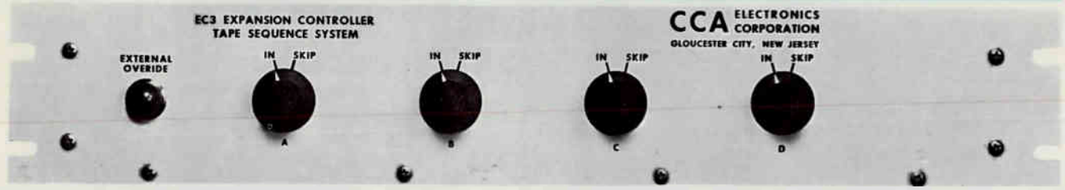
Built-In Cue Detectors: The Model AMS-1 contains (2) two plug-in 25 cycle cue detectors. These units are designed to detect the presence of a 25 cycle tone at a level as low as -30 dbm and will not overload or cause miscues at levels as high as +10 dbm. In a normal automation system, the 25 cycle "end of message tone" is generally recorded on the left channel and at a level of approximately -5 dbm. The 40 db dynamic range of the CCA Q-Tectors will permit them to function over a wide range of errors in the production and playback of 25 cycle cue information. Each detector has controls for achieving an adjustable overlap.

Built-In 25 Cycle Generator: The AMS-1 contains a built-in 25 cycle generator with dual 25 cycle filters. It is preset to operate for 2 seconds and can be controlled from either the front panel or a remote position. It is independent from the normal program lines and thus, production work can be done while the system is providing programs.

Built-In Silence Sensor: The AMS-1 contains solid state circuitry which can sense the absence of signal on the program line. This circuitry can be adjusted to operate at any predetermined time from 2 to 20 seconds of silence. Thus, if one of the machines should become inoperative, the silence sensor will detect the problem and sequence the system to the next scheduled event.

Local Origination: The AMS-1 contains a front panel switch which when depressed will serve as a priority. Thus, once this button is operated, the next source of the automation system would be that associated with the "remote." The "mini-automation" system may then be used to serve as a program source and periodically news or some other priority may be inserted in the system. The silence sensor is disabled while using the "remote" source to allow flexibility of program content.

MODEL EC3 — EXPANSION PANELS



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Model EC3-C: The simplest version of the family of expansion panels is the Model EC3-C. It is designed to expand single play tape cartridge machines such as the QRK301, or multiple cartridge machines such as the Carousel or the QRK801.

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Model EC3-RO: Identical to Model EC3-C but prewired to accept (3) three 25 cycle cue detector cards but no detectors are included.

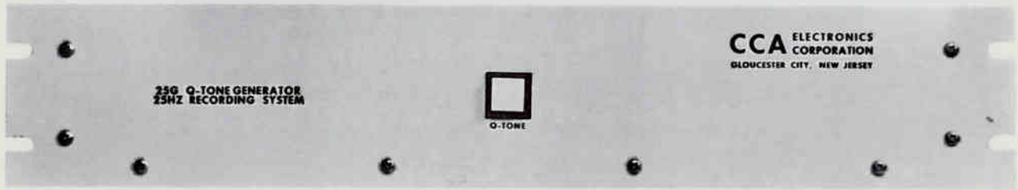
Model EC3-R1: This panel is basically the EC3-RO but with one 25 cycle cue detector. Thus, it can be used to control as one sub-source a reel-to-reel tape machine.

Model EC3-R2: Same as EC3-R1 but with two detectors.

Model EC3-R3: Same as EC3-R1 but with three detectors.

On the rear of each panel which contains a Q-Tector are controls for adjusting the time after the end of the cue tone at which the "reel to reel" tape machine will stop. This adjustable delay permits achieving a very "tight" format as well as any practical "overlay." A switch for each internal cue detector is available on the rear for overriding any preset "overlay."

25 CYCLE CUE EQUIPMENT



DESCRIPTION

CCA offers a complete line of 25 cycle generator and detector panels which have sufficient flexibility to meet the majority of applications. Each of these panels occupy only 3½" of standard 19" rack space. All panels have self-contained power supplies. All panels with cue detectors contain controls for adjustable delays and switches for eliminating overlap. All detectors are independent of each other.

All panels which contain 25 cycle generators contain front panel switches which register when operated. Duration of 25 cycle is adjustable but is normally preset for 2 seconds. All 25 cycle generators contain dual 25 cycle filters to maintain phase coincidence in both channels. Normal attenuation of 25 cycle notch is 40 db with 1½ db effect at 50 cycles.

Model 25G: 25 cycle Generator with 25 cycle filters in both channels. For 19" rack mounting.

Model RQ-1G: Same as 25G with independent non-connected 25 cycle cue detector with adjustable delay and rear panel switch for eliminating overlap.

Model RQ-1: Rack mounted, 25 cycle cue detector with built-in power supply - no filters, but adjustable overlap.

Model RQ-2: Same as RQ-1 but with two independent 25 cycle cue detectors.

*EXPORT SALES: Telesco International Corporation * 1044 Northern Blvd. * Roslyn, L. I., New York 11576*
*CANADIAN SALES: Caldwell A/V Equip. Co. Ltd. * 1080 Ballamy Road North * Scarborough, Ontario*

4KW
FM Broadcast Transmitter

Model FM-4,000E

CCA Electronics Corporation
716 JERSEY AVENUE, GLOUCESTER CITY, NEW JERSEY 08030
PHONE: (609) 456-1716 TELEX: 84-5200

Features

- 40 Watt Solid State, Plug In ,Synthesized Exciter
- High Mu Zero Bias Power Amplifier—3CX3,000A7
- Self Contained in One Cabinet
- Conservatively Rated for 4.5KW Continuous Power Output
- Designed for FCC and CCIR Requirements
- Accepts "Plug In" Stereo & SCA Generators
- Total Accessibility—Local and Remote Control

Mechanical Description

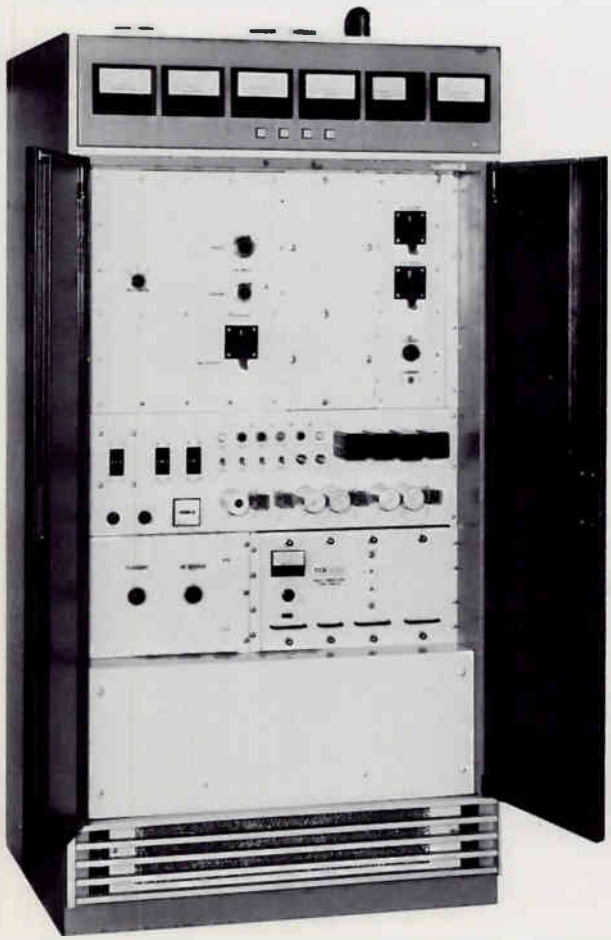
The CCA FM-4,000E, 4KW FM Broadcast Transmitter incorporates a solid state, modular 40 watt exciter, an extremely conservative IPA (8874) which is capable of producing 400W but is only required to supply 250W and an extremely reliable, long life rugged zero bias triode (3CX3,000A7) which has 3KW of plate dissipation, 7KW of power output capability and operates at only 4KW output and 1300 watts of dissipation.

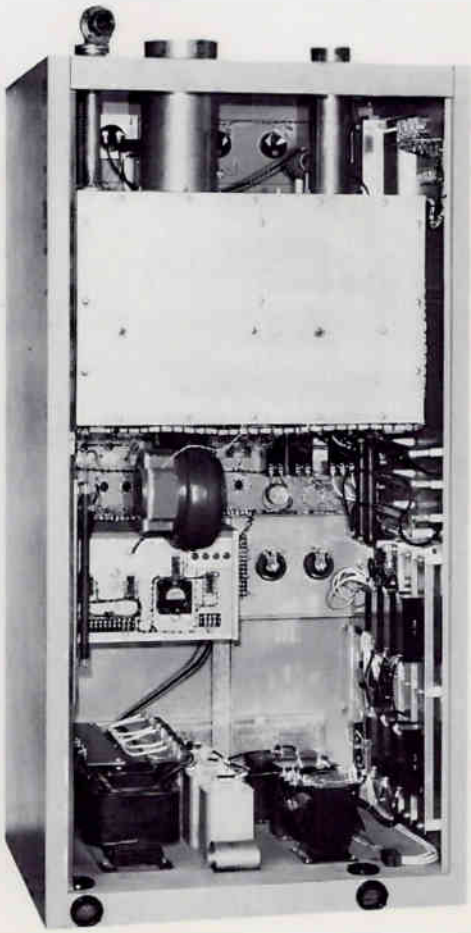
The FM-4,000E is self contained in one medium sized cabinet (38¼" W x 76" H x 34" D). The only external parts are the harmonic filter and directional coupler. Input air enters the equipment through the rear filtered fixed panel and through the front filtered removable panel. The exhaust of the system is available from two ducts located on the top of the equipment.

Electrical Description

The transmitter is capable of meeting or exceeding all FCC and CCIR FM broadcast specifications for monaural transmission as well as stereo transmission (with optional "plug in" CCA Model SG-1E, Stereo Generator) and simultaneous SCA operation with the optional CCA plug in SCA-1E, Sub Carrier Generator.

The conventional, relatively simple control system assures reliability and can be operated from either a local or remote location. Rugged, reliable, plug in relays are used to control the solid state power supplies of the transmitter, as well as to operate the indicating lights, the automatic three cycle overload recycling and after cooling systems.





Technical Specifications

Power Output Capability ..... 4.5 KW
Frequency Range ..... 87.5 to 150MHz
Type of Emission (Frequency Modulation)
  Monaural Transmission F3
  Stereo (with optional SG-1E) ... F9
  Subsidiary (with optional SCA-1E) F9
RF Output Impedance ..... 50 ohms
  Fitting ..... 3⅛" EIA
Modulation Capability ..... ±150KHz
Carrier Frequency Stability ..... ±500Hz
Pre-emphasis (specify) for FCC ... 75μ
Pre-emphasis (specify) for CCIR .. 50μ
Spurious and Harmonics (below carrier level) ..... —80db

Audio Frequency Characteristics
Monaural Operations
  Input Impedance (balanced) ... 600 ohms
  Input Level @ 400Hz (specify) .. +10 dbm ± 2 dbm
  Response with respect to pre-emphasis standard ..... ±1.5db
  Distortion @ 100% Modulation .. 1.0% max.
  Noise ..... FM—60db
  ..... AM—50 db

Stereo Operation
  Input Impedance (unbalanced) . 12,000 ohms
  Input Composite Level— (75 KHz dev.) ..... 4V pp
  Composite Frequency Response. ±0.5 db from 30Hz to 100KHz

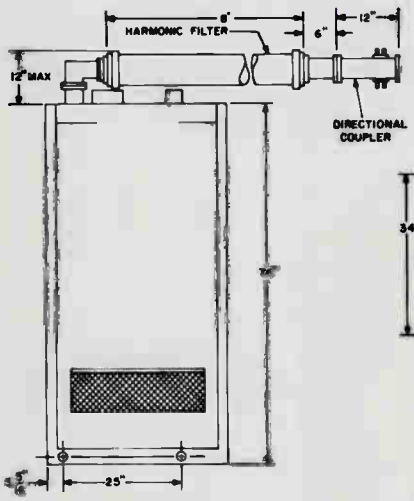
Stereo Performance with CCA Plug In Stereo Generator (SG-1E)
  Cross Talk Main Channel to Stereo Sub better than —40 db
  Cross Talk Stereo Sub Channel to Main Channel better than —40 db
  38 Kc Carrier Suppression better than —40 db
  Separation between Left and Right Channels better than —40 db

Subsidiary Operation
  Input Impedance ..... 1500 ohms
  SCA Frequencies ..... 26 to 110Kc
  Input Level (for 10% injection) .. 1.0 volts pk to pk
  SCA Performance with CCA Plug in SCA Gen ..... (SCA-1E)
  Cross Talk—SCA to Baseband .. —60db
  Cross Talk—Stereo to SCA .... —50db

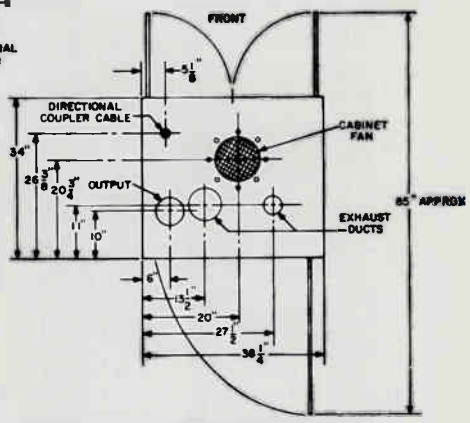
Power Line Requirements
  Line Voltage ..... 190 to 240V
  Other Voltages Available
  Line Phase (others available) .. 3 phase
  Line Frequency ..... 50 or 60 cycles
  Power Consumption ..... 7 KW
  Line Regulation ..... ±5%

Mechanical Characteristics
  Number of Cabinets ..... One
  Cabinet Dimensions ..... 34 x 38 x 76
  Weight—Net ..... 1400 lbs.
  Shipping Weight—Gross ..... 1650 lbs.
  Shipping Cubeage—Ft.³ ..... 75.37 cu. ft.

Cabinet Outline



Rear View



Top View

NOTES:

1. Position of harmonic filter and directional coupler are not critical and can be placed in any convenient location in the output line.
2. Input power line voltage can enter transmitter thru rear edge or cabinet base.

ANTENNA SPECIFICATIONS

FMC-LP- ( ) Shunt Fed with 1 5/8" Feed Line FMC-HP- ( ) Shunt Fed with 3 1/8" Feed Line

Type No. & Bays	Power Gain	Gain In DB	Field Gain	FS @ 1 Mile 1KW, MV/M	* Net Wt. Lbs.	*** Power Rating	** Windload 50/33PSF
FMC-LP-1	.45	-3.24	.67	93	118	5KW	97
FMC-HP-1	.475	-3.21	.69	95	178	10KW	160
FMC-LP-2	.95	-0.2	.98	136	145	8KW	170
FMC-HP-2	1.00	0.0	1.0	138	223	20KW	280
FMC-LP-3	1.5	1.8	1.23	170	172	8KW	250
FMC-HP-3	1.55	1.9	1.25	172	268	30KW	400
FMC-LP-4	2.05	3.1	1.44	199	198	8KW	325
FMC-HP-4	2.15	3.30	1.47	203	313	40KW	525
FMC-LP-5	2.55	4.1	1.6	221	225	8KW	400
FMC-HP-5	2.70	4.3	1.65	227	358	40KW	650
FMC-LP-6	3.15	5.0	1.78	246	251	8KW	480
FMC-HP-6	3.30	5.2	1.82	251	404	40KW	780
FMC-LP-7	3.65	5.6	1.92	265	278	8KW	560
FMC-HP-7	3.85	5.9	1.97	273	449	40KW	910
FMC-LP-8	4.2	6.2	2.05	283	305	8KW	640
FMC-HP-8	4.4	6.4	2.10	290	494	40KW	1030
FMC-LP-10	5.2	7.2	2.28	315	365	15KW	820
FMC-HP-10	5.5	7.4	2.35	325	600	40KW	1320
FMC-LP-12	6.25	8.0	2.5	345	418	15KW	975
FMC-HP-12	6.60	8.2	2.57	355	690	40KW	1560
FMC-LP-14	7.3	8.6	2.7	373	471	15KW	1130
FMC-HP-14	7.7	8.9	2.8	386	781	40KW	1800
FMC-LP-16	8.4	9.2	2.9	400	532	15KW	1290
FMC-HP-16	8.8	9.5	2.97	410	872	40KW	2060

** Windloading includes 100 lbs. for transformer of HP and 53 lbs. for LP.

* Net Weight includes 51 lbs. for transformer of HP and 23 lbs. for LP.
Length of Antenna in feet is 984 divided by frequency in MHz X (number of bays less 1) plus 6½ feet for transformer.

*** Higher power ratings available upon request at optional prices.

Power gains are for 50/50 horizontally and vertically polarized ratios. Other ratios available.

Antenna polarization is circular clockwise, in all directions of azimuth

Prices include complete mounting hardware for leg mounting on uniform guyed towers.

Brackets for face mounting or self-supporting towers are extra. Prices on request.

Antenna input flange on HP series is 3 1/8" EIA Female. The LP series is 1 5/8" EIA Female.

Windload ratings are 50/33 PSF, 110 miles per hour.

Antenna weights include standard mounting hardware. Add 10 lbs./bay for deicers.

Deicers require 230 volts, single phase balanced to ground with 400 watts consumption per bay.

WHEN ORDERING BE SURE TO SPECIFY:

Antenna Type Number

Deicers, if any

Channel, (between 88 - 108 Mhz)

Horizontal and Vertical Power Gains

Description of Tower — Make and Model

Beam Tilt and Null Fill-in, if any

*EXPORT SALES: Telesco International Corporation * 1044 Northern Blvd. * Roslyn, L. I., New York 11576*
*CANADIAN SALES: Caldwell A/V Equip. Co. Ltd. * 1080 Ballamy Road North * Scarborough, Ontario*

CCA ELECTRONICS CORPORATION
716 JERSEY AVE., GLOUCESTER CITY, NEW JERSEY 08030

CCA MODEL FMC-HP/LP CIRCULARLY POLARIZED ANTENNAS

FEATURES

- **True** Circular Polarization (Same Phase Center for Horizontal and Vertical Components.)
- 1½ Turn Helix Form Factor Eliminates all Sharp Points and Minimizes Corona.
- 2" Diameter Copper Construction Permits 20KW Testing of Basic Elements.
- Available with 1 5/8" Feed Systems (LP)
  3 1/8" Feed Systems (HP)
- Stainless Steel Deicers Easily Removable and Designed for Many Years of Trouble-Free Service.
- Supplied with Triple Stub Transformer for Matching to Any Supporting Structure.
- Available in "Super" Power and with Null Fill.
- Available with Null Fill and Beam Tilt.

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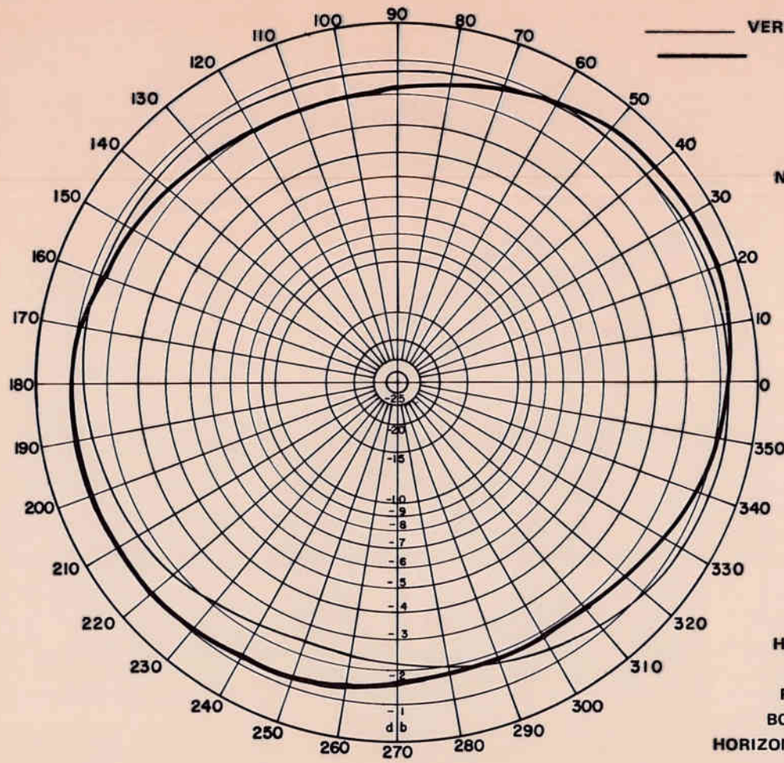
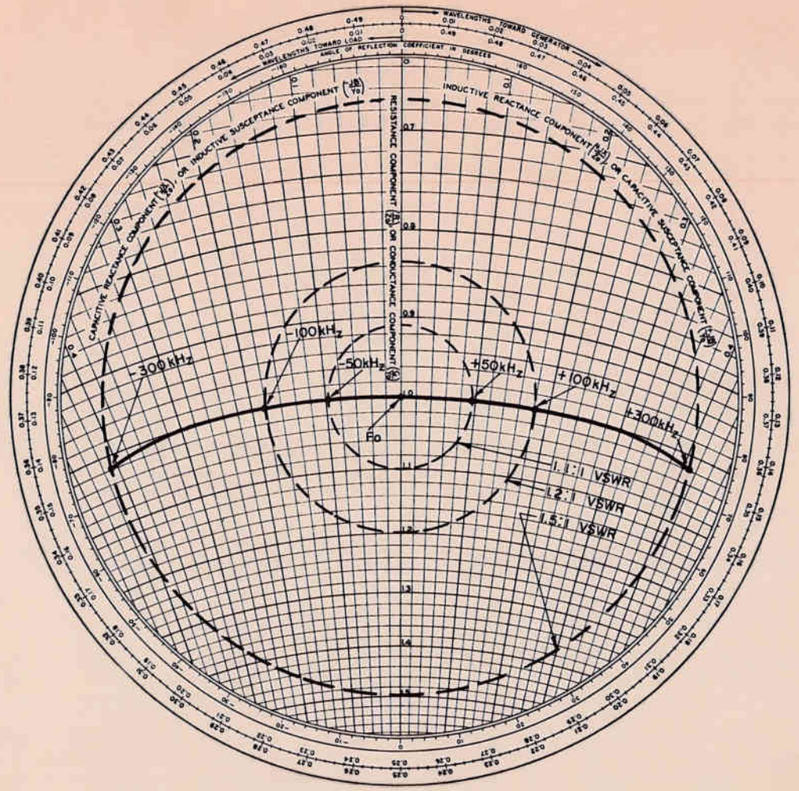


NOTE: VERTICAL COMPONENT CIRCULARITY, ± 0.9db

HORIZONTAL COMPONENT CIRCULARITY, ± 0.75db

MAX. RATIO V/H = 1.1db

FREE SPACE HORIZONTAL PLANE PATTERN OF CCA FMC-ANTENNA FOR BOTH VERTICAL AND HORIZONTAL COMPONENTS



IMPEDANCE PLOT OF 1 BAY OF FMC ANTENNA

2nd GENERATION ANTENNA

CCA Electronics was one of the first of the major equipment suppliers to offer Circularly Polarized Antennas to the FM broadcast industry. The effectiveness of these antennas has been proven in a multitude of installations. From this experience, CCA has developed the FMC series of Circularly Polarized Antennas. This second generation of antennas reflects a somewhat more conservative power rating, less susceptibility to corona, and an approach which assures phase coincidence in the centers of both vertical and horizontal components.

MECHANICAL DESCRIPTION

The CCA series of FMC, Circularly Polarized Antennas utilizes identical radiating elements for both the Lower Power (LP) and High Power (HP) series. The LP series utilizes 1 5/8" feed line while the HP series uses 3 1/8" feed line. Both series of antennas are available in systems that incorporate 1 to 16 elements. Normally, systems with 8 or less elements are fed at the bottom while above 8, the system is fed from the center.

Each of the radiators is constructed of 2" Diameter, thick-walled copper with substantially rounded surface that eliminates for all practical purposes any corona problems.

The element is essentially a 1½ turn helix with a standard 1 5/8" EIA Flange Fitting which fits into the transmission line feed.

Each side of the helix radiator contains facilities for accepting stainless steel deicer rods. This permits comparatively easy replacement of heating elements.

Each antenna contains a matching transformer which is approximately 6 ft. long. It is extremely simple to adjust and has a fool-proof method of adjustment without losing pressure.

Mounting brackets are supplied with the antenna to assure proper mounting to the supporting structure.

ELECTRICAL DESCRIPTION

The CCA series of Circularly Polarized Antennas type FMC are basically 1½ turn helixes separated one wavelength apart.

The radiation centers of both the vertical and horizontal components are identical, thus the CCA FMC antennas are one of the few antennas with phase coincidence so essential for true circular polarization.

The basic element with a minimum of retuning can serve as a radiator at any frequency in the standard FM broadcast band.

Each of the elements in the antenna system will represent an impedance of 50 ohms times the number of elements. For example, an 8-bay antenna would have 400 ohm elements. Thus, since all elements are spaced one wavelength apart, all elements are fed in parallel with equal power and represent a nominal 50 ohms to the feed line.

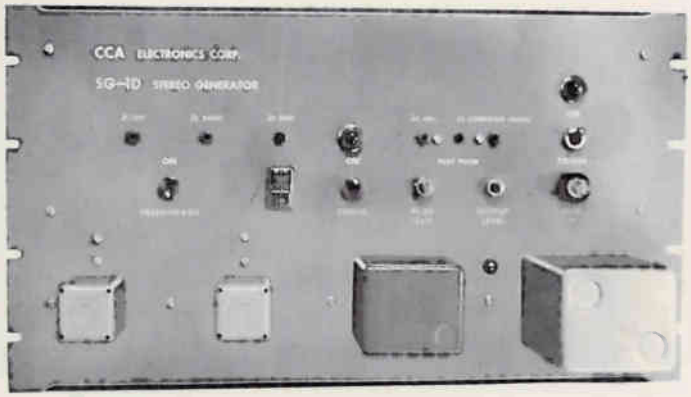
The substantial diameter of the basic elements represents fairly low Q broadband elements and thus, it is possible with associated combiners to have one CCA, FMC type antenna radiate several FM channels.

The free space circularity patterns of the FMC antenna are within ±1 db of perfect circularity. However, when side mounted on a wide tower, the FMC like all antennas which radiate a vertical component produces a pattern in the vertical field with nulls and some directivity. However, in practice the FMC will provide the urban area with considerably better coverage than a horizontal only radiating system.

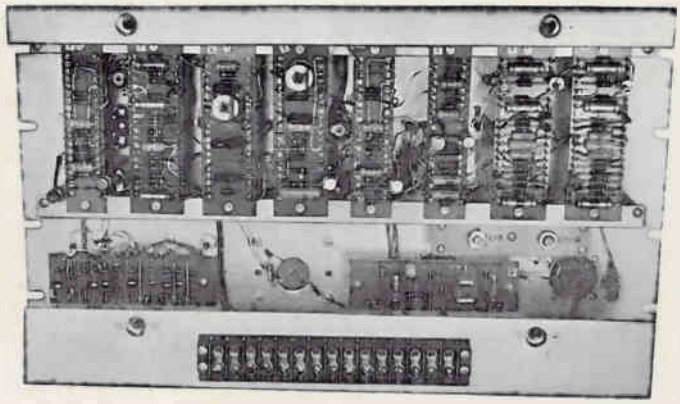
The antenna is supplied with a triple stub tuner which provides adjustable capacitors at discrete positions in the feed line. These adjustments are such that they compensate for impedance changes due to mounting environment and still achieve a matched condition.

The deicers of the FMC series are stainless steel rods which require approximately 400 watts of power consumption per bay. They are capable of achieving ice-free operation at ambient temperatures of 0° C. and 50 MPH winds. They require 230 volts, single phase balanced to ground.

SG - ID - SOLID STATE STEREO GENERATOR



Front View



Rear View

FEATURES

- 100% Solid State
- Phase Linear Time Division Multiplex
- No Requirement for 38kHz Balance Adjustments
- No Matrixing or Balanced Modulator
- No Requirement for Phase Compensation
- Compatible with SCA — Maximum Cross Talk to SCA — 55db
- Stereo Separation — 50 kHz to 10 kHz -40 db
  10 kHz to 15 kHz -35 db

USES

The CCA SG—1D Solid State Stereo Generator is the result of several years of exhaustive research by CCA Engineering. It provides the broadcaster with a super reliable, drift free generator that meets or exceeds all FCC stereo specifications. It requires absolutely no maintenance and once set up, requires no readjustment.

DESCRIPTION

MECHANICAL

The CCA SG-1D is designed for mounting on a standard 19" rack.

It consists of a vertical panel on which most of the components are mounted. By removing the rear cover, practically all components are accessible. The unit can be serviced without rewiring it from the mounting rack.

All input and output connections, as well as the power input, are provided by means of terminals at the rear of the unit. No wiring has to be carried to the front panel.

A minimum number of front panel controls has been achieved by reducing the complexity of the circuitry, thus resulting in a simplified adjustment for proper stereo operation.

All transformers and large components are mounted on the front panel of the unit.

The wiring of the SG-1D is half-way between printed circuit and point to point connection methods.

Most of the components, especially the small ones, are mounted on separate strip boards, which provide direct mounting and allow very easy inspection and component location. On the other hand, this method allows very easy removal of components in contrast with the difficulties found working with printed circuits.

Each circuit board is identified with a number which corresponds to a section in the schematic diagram, such that the numbers in the schematic diagram correspond to the board. This simplifies circuit tracing and component location.

ELECTRICAL

The principle of operation of the CCA, SG-1D Stereo Generator employs the time-division system, which is the counterpath of the decoding method most commonly used in high quality stereo receivers and monitors.

The mono and stereo channels are developed at a common point and do not go through different circuits, which could introduce undesirable delays. Observing the block diagram, the left and right signals are fed through matching transformers into the left and right amplifiers. These are two identical amplifiers with very flat frequency response; but when the pre-emphasis switch is ON the frequency response of the amplifier is modified through a frequency sensitive, negative feedback network, such that the response of the amplifiers follows very closely that of the 75 micro second pre-emphasis required for FM broadcasting.

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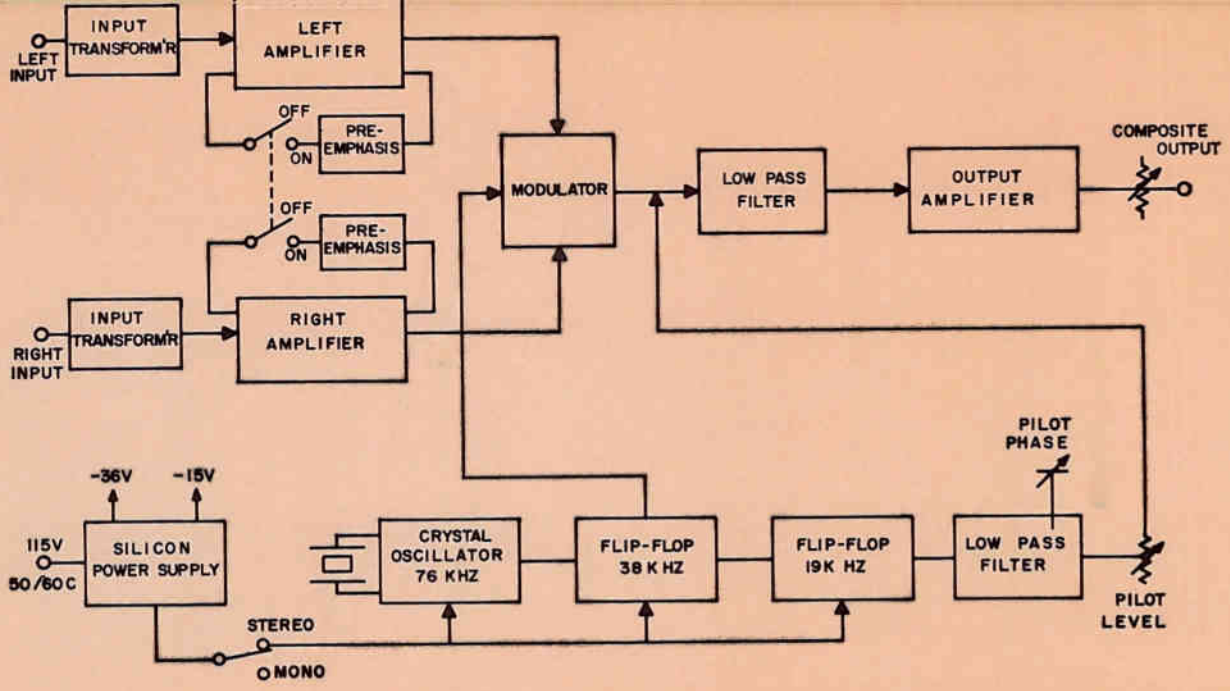


SG-ID STEREO GENERATOR
BLOCK DIAGRAM

A 10,197

The 38 kHz carrier frequency, as well as the 19 kHz pilot, are originated by a crystal oscillator that operates at 76kHz. This oscillator drives a flip-flop that divides the frequency by 2 providing a 38kHz square wave on each one of the outputs. At the same time this flip-flop drives another flip-flop which in turn divides the frequency to 19kHz. This 19kHz square wave is filtered by a low pass filter and only the fundamental 19kHz sine-wave is obtained at the output. This is followed by a pilot level control and a phase control and then added to the output amplifier to form the composite signal.

The use of frequency dividing flip-flop allows for a perfect 38kHz square wave. Quartz crystals for 76kHz oscillators are more stable and less expensive than for 19kHz.

The left and right signals are fed to transistor switches that are turned on and off at the rate of 38kHz. This switching alternatively shorts out to ground the left or right signals. It can be demonstrated mathematically that this is equivalent to a complete composite signal as required for the transmission of FM Stereo Broadcasting.

The use of transistors instead of diodes improves the symmetry of the switching to the point that NO 38kHz CARRIER BALANCE CONTROLS ARE REQUIRED.

The switching process creates a high order harmonic of the 38kHz as well as the side bands of the desired signals; thus, a low pass filter is included in the circuit in order to eliminate frequencies above 53kHz. This low pass filter is very flat in frequency response up to 53kHz, and its phase linearity is almost perfect such that the total time delay at any frequency from 30 Hz to 53kHz is constant.

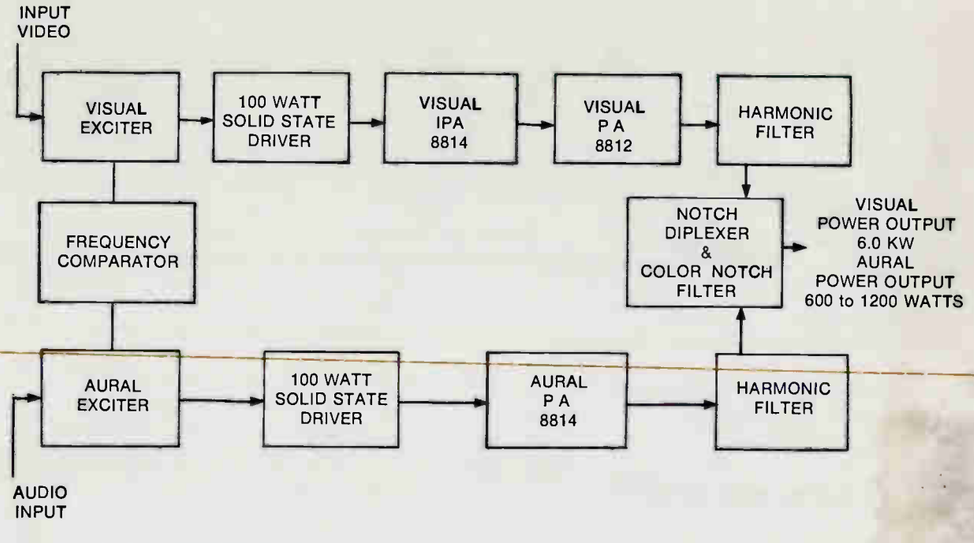
The output of the low pass filter is fed to the output amplifier, where the 19kHz is added in order to obtain a composite stereo signal ready to modulate an FM Broadcast Transmitter in compliance with FCC specifications.

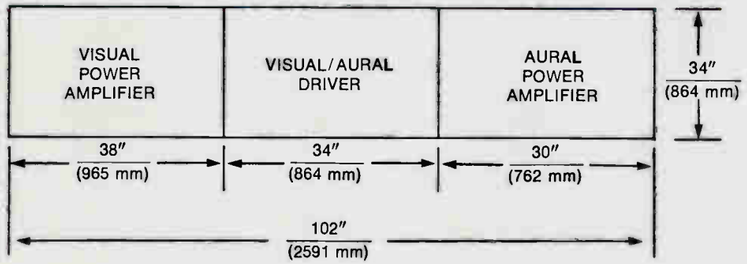
The power supply includes a full wave bridge rectifier which provides two voltages of 36 and 15 volts. These voltages are regulated with zenner diodes such that the output signal level of the generator is independent of power line variations.

TECHNICAL SPECIFICATIONS

Frequency Range — Left and Right Input	30 Hz to 15 kHz
Input Level (Left and Right Channel)	-4 dbm
Input Impedance	600 ohms
Frequency Response (Pre-emphasis off) 50 Hz to 15 kHz	±0.2db
Frequency Response 75 micro sec. (Pre-emphasis)	±0.5db
Output Signal Level (Composite Signal)	1.5 volt peak to peak
Stereo Channel Separation (50 Hz to 10 kHz)	40 db
Stereo Separation (10 kHz to 15 kHz)	35 db
Main Channel Distortion (Max.)	0.5%
Stereo Channel Distortion (Max.)	0.5%
Noise Level (Below full output)	-70 db
Residual 38 kHz carrier (Below 90% Modulation)	46 db
Mono to Stereo Cross-Talk (Below 90% Modulation)	45 db
Stereo to Mono Cross-Talk (Below 90% Modulation)	45 db
Pilot Frequency Stability (0°C to 50° C)	±1 Hz
Pilot Level (Adjustable) (Referred to 100% Modulation)	0 to 12%
Power Supply Requirement	115V 50/60 Hz
Power Consumption	25 Watts
76 kHz Supression (Below 100% Modulation)	60 db
Worst Case Cross Talk from Stereo Transmission to 67 kHz (SCA)	-55 db

Block Diagram





PLAN VIEW

6KW Low Band VHF TV Transmitter

CCA Model TVT-6

CCA Electronics Corporation
716 JERSEY AVENUE, GLOUCESTER CITY, NEW JERSEY 08030
PHONE (609) 456-1716 TELEX 84-5200

Features

- Solid State I. F. Visual Modulated Exciter
- 100 Watt Solid State Visual Driver
- Independent 1.2KW Aural Amplifier
- Independent 6KW Visual Amplifier
- "Built-in" Waveform Correction Controls ("Black", "White", "Sync", "Knee", and "Depth of Modulation" Correction)
- Minimum Floor Space—3 Medium Sized Cabinets
- 2 Independent RF Amp Power Supplies, Internal
- Full Accessibility with Vertical Panel Construction, Hinged Meter Panels, Front and Back Doors, and "Plug-In" Transistorized Printed Circuits
- Field Proven, Long Life, Linear Tetrode in Visual Power Stage No. 8812
- Field Proven, Conservative, Economical, Rugged Tetrode in Aural PA—No. 8814
- Designed for Remote Control
- Meets or Exceeds FCC and CCIR Specifications for Both Monochrome and Color Transmission

Description

The CCA Model TVT-6 is a Medium power television transmitter designed to conservatively produce 6KW peak visual power and 1.2KW aural power. The combination of this transmitter and an appropriate CCA antenna can quite adequately achieve effective coverage over a maximum sized population area.

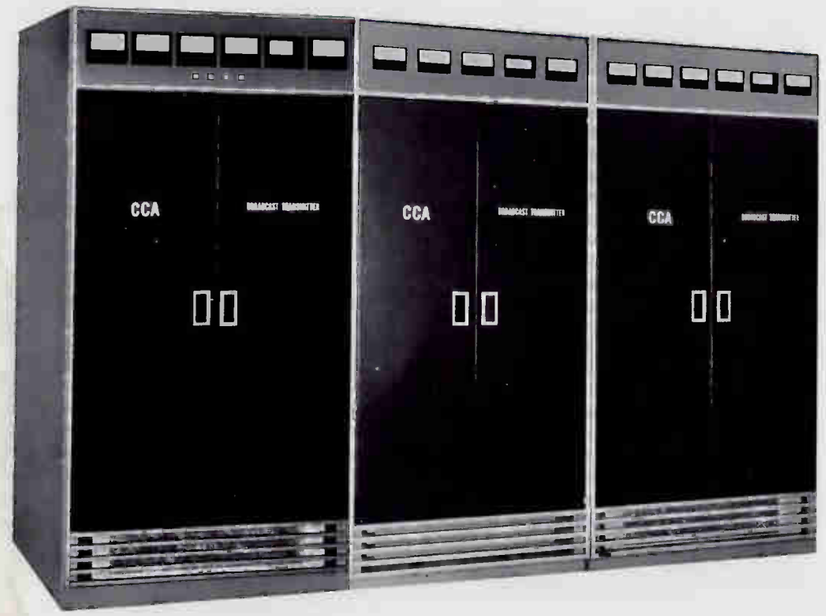
Mechanical Description

The CCA Model TVT-6 is self-contained within three medium sized modern cabinets. The Driver cabinet is only 34″ wide while the visual and aural cabinets are 38″ and 30″ wide respectively. All cabinets are 76″ high x 34″ deep.

Access to all components may be had through either the front or back doors or the hinged meter panels. Transistorized circuitry is used in all aural, video and RF circuits up to and including 100 watt level. All controls are calibrated and meters are available for all critical circuitry.

All components are self-contained within the three cabinets, save for the notch diplexer, harmonic filters, visual diplexer and "color notches" which are mounted externally. All cabinets contain air blower systems which obtain fresh air through rear filtered doors. The exhaust of these cabinets are available at the top of the cabinets.

Input AC, Video, Audio and Remote control wires enter the cabinets from the base. The output transmission line is available from the top of the cabinet. RF monitoring of the output is also present on top of the cabinets.



Electrical Description

The aural amplifier occupies one cabinet and has its own direct FM Exciter. This is the same solid state exciter used in hundreds of CCA FM broadcast transmitters. Modulation is achieved by applying audio to a varicap which is located across a free running oscillator. The output of this stage is sampled and compared to a signal derived from a crystal reference and controlled by a phase lock circuit. This crystal is housed in a temperature stable container which assures an output frequency difference stability of ± 150 Hz. This signal is amplified to carrier frequency by solid state components to 100 watts level. A tetrode (8814) very conservatively produces 1200 watts output power requirement of the aural transmitter.

Visual Transmitter—Exciter: The heart of the CCA VHF TV Transmitter visual transmitter is an I. F. modulated exciter. This solid state exciter consists of a crystal controlled exciter in which all visual passband and linearity corrections are applied before heterodyning to the visual RF frequency. Vestigial side band filtering is accomplished at the I. F. frequency by having the signal pass through a filter with exact CCIR or FCC response characteristics. Individual correction circuits exist for providing white, black and knee correction as well as sync stretch. In addition, individual plug-in cards contain equalization for differential phase, group delay and receiver equalization.

Thus, there is no requirement for any external equalizer or processing amplifier to correct for transmitter deficiencies.

After heterodyning to the carrier frequency, the modulated carrier is amplified by solid state circuitry to achieve 100 mw output.

Visual Driver—A transistor amplifier is used to amplify 100 mw exciter output up to 100 watts.

IPA—The first high power stage in the visual transmitter is an 8814 tetrode. This stage can very conservatively produce 1.5KW output.

PA—The final power amplifier of the transmitter consists of an 8812 tetrodes. This rugged tetrode operating in a grounded grid configuration can very conservatively produce the 6KW peak visual power required at both CCIR and FCC conditions. Both the input and output of this stage contains appropriate tuning and loading controls.

External Components—Each TV transmitter is supplied with integrated diplexer which is mounted externally to the cabinetry. This device combines the aural and visual transmission line. It contains a reject load, an aural notch cavity resonator, and two color subcarrier filters. It assures that the audio carrier does not appear in the picture transmission and that the color subcarrier below the visual carrier is attenuated a minimum of 42 db. In addition to the diplexer, two harmonic filters are provided, one for each PA output. These assure

POWER AMPLIFIER CAVITY

The CCA-TVT-6 contains two high power RF cavities in its visual transmitter. Each of these cavities and their respective tetrodes are designed to produce on a continuous basis, 7.5KW. Thus, the 6.0KW requirement is extremely conservative. All cavities are mounted on "Roll-in" devices which permit access to all parts in a matter of minutes. These cavities and their tubes have been field proven in hundreds of sockets under the most stringent FCC and CCIR color specifications.

Technical Specifications

PERFORMANCE

	FCC SPECS.	CCIR SYSTEM B*
Type of Emission:		
Visual	A5C	A5C
Aural	F3	F3
Frequency Range	Ch 2 to Ch 13	Ch. 2E to 11E
Rated Power Output:		
Visual	6000 watt	6000 watt
Aural	1200 watt	1200 watt
R-F Output Impedance	50/51.5 Ohms	50/51.5 Ohms
Input Impedance:		
Visual	75 Ohms	75 Ohms
Aural	600/150 Ohms	600/150 Ohms
Input Level:		
Visual	1.0V Peak-to-Peak min.	1.0V Peak-to-Peak min. (composite video)
Aural	+10 ±2dBM for ±25KHz dev.	+16 ±2dBm for ±50KHz dev.
Amplitude vs. Frequency Response	Uniform ±1dB from 50 to 15,000Hz	Uniform ±1dB from 50 to 15,000Hz
Upper Sideband Response at Carrier:		
+0.5MHz	+1, −1.5dB	+.5, −.5dB
+1.25MHz	+1, −1.5dB	+.5, −.5dB
+1.5MHz	—0—	—0—
+2.0MHz	+1, −1.5dB	+.5, −1.0dB
+3.0MHz	+1, −1.5dB	+.5, −1.0dB
+3.58MHz	+1, −1.5dB	—
+4.18MHz	+1, −3.0dB	+.5, −1.0dB
+4.75MHz	−20dB max.	—
+5.0MHz	—	+.5, −2.5dB
+5.MHz	—	−20dB max.
Lower Sideband Response at Carrier:		
−0.5MHz	+1, −1.5dB	+.5, −1.5dB
−1.25MHz	−20dB max.	−20dB max.
−3.58MHz	−42dB max.	—
−4.43MHz	—	−30dB
−5.00MHz	—	−20dB
Carrier Frequency Stability:		
Visual	±150Hz/3mo.	±150Hz/3mo.
Aural	±150Hz	±150Hz
Modulation Capability:		
Visual	12.5 ±2.5% (reference white)	12.5 ±2.5% (reference white)
Aural	±50KHz	±100KHz
Audio Frequency Distortion 50-15000Hz	1% max.	1% max.
FM Noise	−60dB (25KHz Dev.)	−60dB (50KHz Dev.)
Am Noise, r.m.s., Visual	−55dB below sync level	−55dB below sync level (hum and thermal)
Aural	−50dB below carrier	−50dB below carrier

*Other systems available on request.

	FCC SPECS.	CCIR SYSTEM B*
Amplitude Variation Over One Picture Frame	Less than 2% of the peak of sync level	Less than 2% of the peak of sync level
Regulation of output	5% max.	5% max.
Diff. Gain	±5% max.	±5% max.
Diff. Phase	±3% max.	±3% max.
"K" Factor 2T Pulse	2%	2%
Low Frequency Tilt @ Field Rate	±2% max.	±2% max.
Envelope Delay vs. Frequency	±.06 μ sec. from 0.2 to 2.1MHz	±40 n sec. from 0 to 4MHz
	±.03 μ sec. at 3.58MHz	±20 n sec. at 4.43MHz
	±.06 μ sec. at 4.18MHz	±80 n sec. at 4.43-4.8MHz
Harmonic Attenuation ratio of any single harmonic peak visual fundamental	At least −60dB	At least −60dB

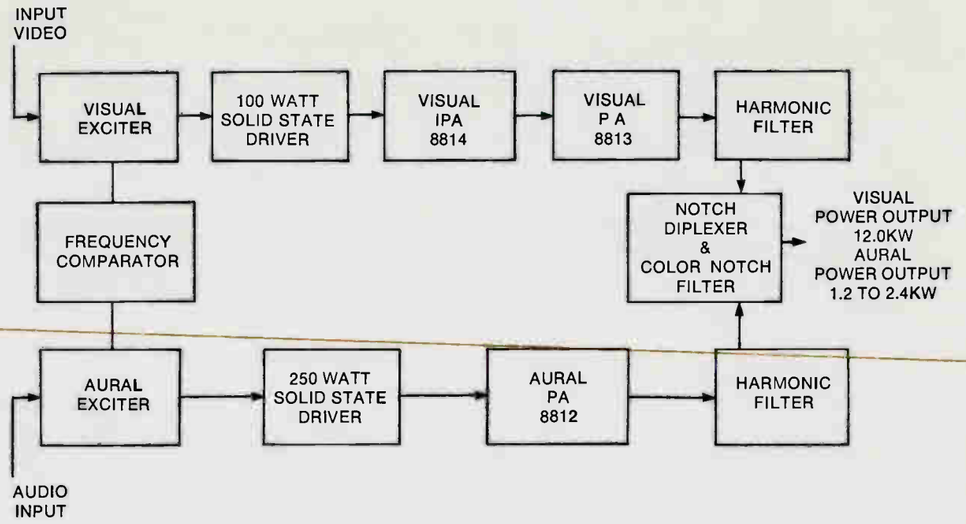
ELECTRICAL

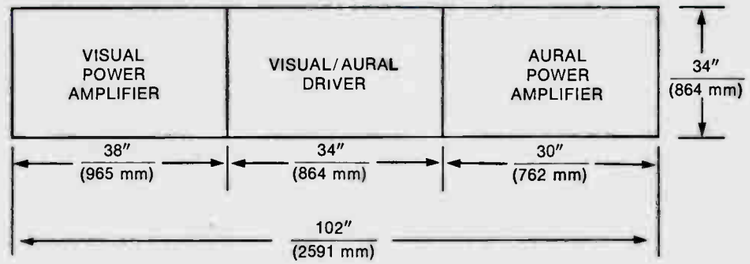
	FCC SPECS.	CCIR SYSTEM B*
Power Line Requirements:		
Transmitter: Line	208/240V, 3-phase, 50/60Hz	380/415V, 3-phase, 50Hz
Slow Line Variations	±5% max.	±5% max.
Rapid Line Variations	±3% max.	±3% max.
Power Consumptions (6KW Visual and 1200W Aural)	22KW black Pix	22KW black Pix
Power Factor (approx.)	90%	90%
Crystal Heaters Line	115V, single phase, 50/60Hz	115V, single phase, 50/60Hz
Power Consumption	28 Watts	28 Watts

MECHANICAL

Weight (approx.)	4000 lbs.	(1814 kg)
Dimensions—Net		
Overall Length (cabinets only)	102 in.	(2591 mm)
Overall Height (front line cabinets only)	76 in.	(1930 mm)
Depth (front line cabinets only)	34 in.	(864 mm)
Maximum Altitude (Std.)	7500 ft.	(2286 mm)
Ambient Temperature	−4° to +140°F	(−20° to +60°C)

Block Diagram





PLAN VIEW

12.5KW Low Band VHF TV Transmitter

CCA Model TVT-12

CCA Electronics Corporation
716 JERSEY AVENUE, GLOUCESTER CITY, NEW JERSEY 08030
PHONE: (609) 456-1716 TELEX: 84-5200

Features

- Solid State I. F. Modulated Exciter
- 100 Watt Solid State Visual Driver
- Independent 2.5KW Aural Amplifier
- 1.5KW Visual Driver
- 12.5KW Visual Amplifier
- "Built-in" Waveform Correction Controls ("Black", "White", "Sync.", "Knee", and "Depth of Modulation" Correction)
- Minimum Floor Space—3 Medium Sized Cabinets
- Independent RF Amp Power Supplies, Internal
- Full Accessibility with Vertical Panel Construction, Hinged Meter Panels, Front and Back Doors, and "Plug-In" Transistorized Printed Circuits
- Field Proven, Long Life, Linear Tubes in all Power Stages
- Designed for Remote Control
- Meets or Exceeds FCC and CCIR Specifications for Both Monochrome and Color Transmission

Description

The CCA Model TVT-12 is a High power television transmitter designed to conservatively produce 12.5KW peak visual power and 2.5KW aural power. The combination of this transmitter and an appropriate CCA antenna can quite adequately achieve effective coverage over a maximum sized population area.

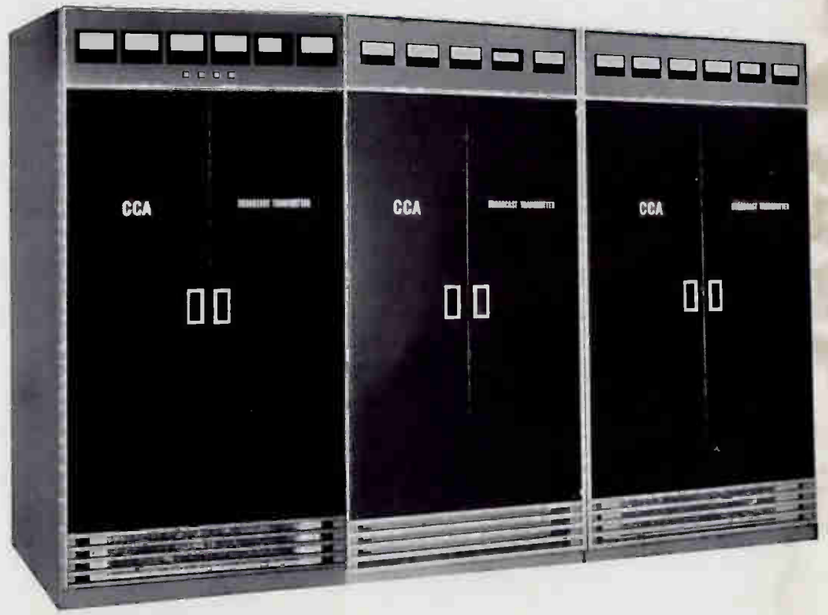
Mechanical Description

The CCA Model TVT-12 is self contained within three medium sized modern cabinets. The Driver cabinet is only 34″ wide while the visual and aural cabinets are 38″ and 30″ wide respectively. All cabinets are 76″ high x 34″ deep.

Access to all components may be had through either the front and back doors and the hinged meter panels. Transistorized plug in circuitry are used in all aural, video and RF circuits up to and including the 200 watt level. All controls are calibrated and meters are available for all critical circuitry.

All components are self contained within the three cabinets save for the notch diplexer, harmonic filters, visual diplexer and "color notches" which are mounted externally. All cabinets contain air blower systems which obtain fresh air through rear filtered doors. The exhaust of these cabinets are available at the top of the cabinets.

Input AC, Video, Audio and Remote control wires enter the cabinets from the base. The output transmission line is available from the top of the cabinet. RF monitoring of the output is also present on top of the cabinets.



Electrical Description

The aural transmitter is contained in the driver cabinet and has its own direct FM Exciter. This is the same solid state exciter used in hundreds of CCA FM broadcast transmitters. Modulation is achieved by applying audio to a varicap which is located across a free running oscillator. The output of this stage is sampled and compared to a signal derived from a crystal reference and controlled by a phase lock circuit. This exciter crystal is housed in a temperature stable container which assures an output frequency difference of ±150 Hz. The output of this modulated RF source is multiplied and amplified to carrier frequency by solid state components to 200 watt level. A one stage amplifier consisting of a 8812 very conservatively produce the 2500 watts output power requirement of the aural transmitter.

Visual Transmitter—Exciter: The heart of the CCA VHF TV Transmitter visual transmitter is an I. F. modulated exciter. This solid state exciter consists of a crystal controlled exciter in which all visual passband and linearity corrections are applied before heterodyning to the visual RF frequency. Vestigial side band filtering is accomplished at the I. F. frequency by having the signal pass through a filter with exact CCIR or FCC response characteristics. Individual correction circuits exist for providing white, black and knee correction as well as sync stretch. In addition, individual plug in cards contain equalization for differential phase, group delay and receiver equalization.

Thus, there is no requirement for any external equalizer or processing amplifier to correct for transmitter deficiencies.

After heterodyning to the carrier frequency, the modulated carrier is amplified by solid state circuitry to achieve 100 mw output.

Visual Driver—A transistor amplifier is used to amplify the exciter output up to 100 watt.

IPA—A grounded grid triode, type 8814 operating in Class AB amplifies the level to 1000 watts. Actually only 720 watts is required to drive the next stage. This stage occupies one cabinet.

PA—The final power amplifier of the transmitter consists of a 8813 tetrode. This rugged tetrode operating in a grounded grid configuration can very conservatively produce the 12.5KW peak visual power required at both CCIR and FCC conditions. This cavity is mounted in a separate cabinet with its self contained blower. Both the input and output of this stage contains appropriate tuning and loading circuitry.

External Components—Each TV transmitter is supplied with integrated diplexer which is mounted external to the cabinetry. This device combines the aural and visual transmitters into one transmission line. It contains a reject load, an aural notch cavity resonator, and color subcarrier filtering. It assures that the audio carrier does not appear in the picture transmission and that the color subcarrier below the visual carrier is attenuated a minimum of 42 db. In addition to the diplexer, two harmonic filters are provided, one for each PA output. These assure harmonic attenuation of at least 60 db.

POWER AMPLIFIER CAVITY

The TVT-12 contains two high power RF cavities in its visual transmitter. Each of these cavities and their respective tubes are designed to produce on a continuous basis. Thus, the 12.5KW requirement is extremely conservative. All cavities are mounted on "Roll-in" devices which permit access to all parts in a matter of minutes. These cavities and their tubes have been field proven in hundreds of sockets under the most stringent FCC and CCIR color specifications.

Technical Specifications

PERFORMANCE

	FCC SPECS.	CCIR SYSTEM B*
Type of Emission:		
Visual	A5C	A5C
Aural	F3	F3
Frequency Range	Ch 2 to Ch 13	Ch 2E to 11E
Rated Power Output:		
Visual	12,500 watts	12,500 watts
Aural	2,500 watts	2,500 watts
R-F Output Impedance	50/51.50 Ohms	50/51.50 Ohms
Input Impedance:		
Visual	75 Ohms	75 Ohms
Aural	600/150 Ohms	600/150 Ohms
Input Level:		
Visual	1.0V Peak-to-Peak min.	1.0V Peak-to-Peak min. (composite video)
Aural	+10 ±2dBm for ±25KHz dev.	+ 16 ±2dBm for ±50KHz dev.
Amplitude vs. Frequency Response	Uniform ±1dB from 50 to 15,000Hz	Uniform ±1dB from 50 to 15,000Hz
Upper Sideband Response at Carrier:		
+0.5MHz	+1, −1.5dB	+.5, −.5dB
+1.25MHz	+1, −1.5dB	+.5, −.5dB
+1.5MHz	−0−	−0−
+2.0MHz	+1, −1.5dB	+.5, −1.0dB
+3.0MHz	+1, −1.5dB	+.5, −1.0dB
+3.58MHz	+1, −1.5dB	—
+4.18MHz	+1, −3.0dB	+.5, −1.0dB
+4.75MHz	−20dB max.	—
+5.0MHz	—	+.5, −2.5dB
+5.0MHz	—	−20dB max.
Lower Sideband Response at Carrier:		
−0.5MHz	+1, −1.5dB	+.5, −1.5dB
−1.25MHz	−20dB max.	−20dB max.
−3.58MHz	−42db max.	—
−4.43MHz	—	−30dB
−5.00MHz	—	−20dB
Carrier Frequency Stability:		
Visual	±150Hz/3mo.	±150Hz/3mo.
Aural	±150Hz	±150Hz
Modulation Capability:		
Visual	12.5 ±2.5% (reference white)	12.5 ±2.5% (reference white)
Aural	±50KHz	±100KHz
Audio Frequency Distortion:		
50-15000Hz	1% max.	1% max.
FM Noise	−60dB (25KHz Dev.)	−60dB (50KHz Dev.)
AM Noise, r.m.s.,		
Visual	−55dB below sync level	−55dB below sync level (hum and themal)
Aural	−50dB below carrier	−50dB below carrier

*Other systems available on request.

	FCC SPECS.	CCIR SYSTEM B*
Amplitude Variation Over One Picture Frame	Less than 2% of the peak of sync level	Less than 2% of the peak of sync level
Regulation of output	5% max.	5% max.
Diff. Gain	±5% max.	±5% max.
Diff. Phase	±3% max.	±3% max.
"K" Factor 2T Pulse	2%	2%
Low Frequency Tilt @ Field Rate	±2% max.	±2% max.
Envelope Delay vs. Frequency	±.06 μ sec. from 0.2 to 2.1MHz	±40 n sec. from 0 to 4MHz
	±.03 μ sec. at 3.58MHz	±20 n sec. 4.43MHz
	±.06 μ sec. at 4.18MHz	±80 n sec. 4.43-4.8MHz
Harmonic Attenuation ratio of any single harmonic to peak visual fundamental	At least −60dB	At least −60dB

ELECTRICAL

	FCC SPECS.	CCIR SPECS.
Power Line Requirements:		
Transmitter:		
Line	208/240V, 3 phase, 50/60Hz	380/415 Volts, 3 phase, 50Hz
Slow Line Variations	±5% max.	±5% max.
Rapid Line Variations	±3% max.	±3% max.
Power Consumptions (12.5KW Visual and 2.5KW Aural)	36.7KW black Pix	36.7KW black Pix
Power Factor (approx.)	90%	90%
Crystal Heaters Line	115V, single phase, 50/60Hz	115V, single phase, 50/60Hz
Power Consumption	28 Watts	28 Watts

MECHANICAL

Weight (approx.)	4500 lbs.	(2041 kg)
Dimensions—Net		
Over Length (cabinets only)	102 in.	(2591 mm)
Over Height (front line cabinets only)	76 in.	(1930 mm)
Depth (front line cabinets only)	34 in.	(864 mm)
Maximum Altitude (SCd)	7500 ft.	(2286 m)
Ambient Temperature	−4° to +140°F	(−20° to +60°C)