CCA ELECTRONICS CORPORATION

BROADCAST PRODUCTS

CCA

CCA ELECTRONICS CORPORATION

716 JERSEY AVENUE, GLOUCESTER CITY, NEW JERSEY 08030

SPECIALISTS IN BEACON, BROADCAST, COMMUNICATION, AND AIRPORT TRANSMITTERS

CCA ELECTRONICS CORPORATION

BROADCAST PRODUCTS

CCA Electronics specializes in the design and manufacture of low, medium and high power Broadcast Transmitters and Accessories.

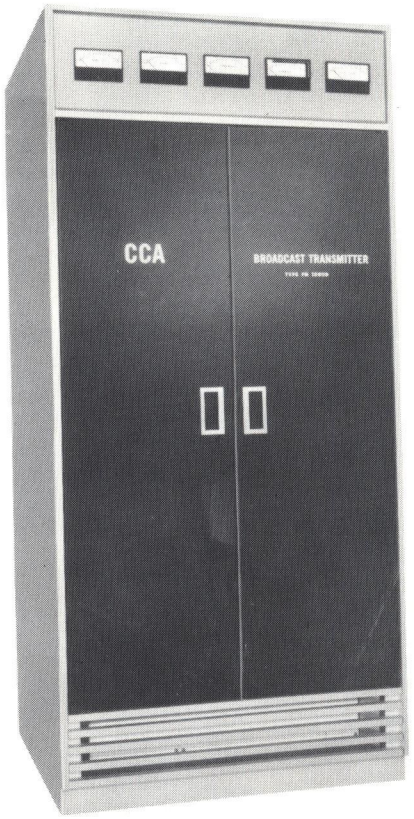
In addition to these CCA manufactured items, we also offer products manufactured by outstanding vendors.

CCA CAN SUPPLY ALL OF YOUR BROADCAST REQUIREMENTS

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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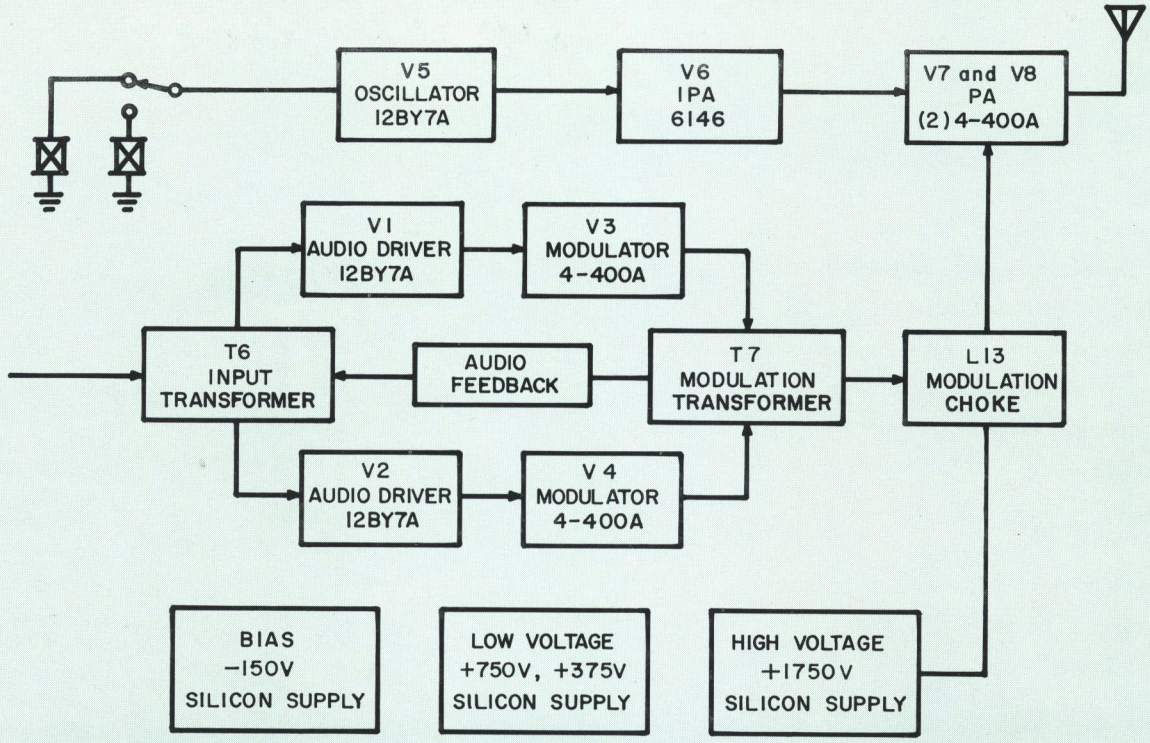
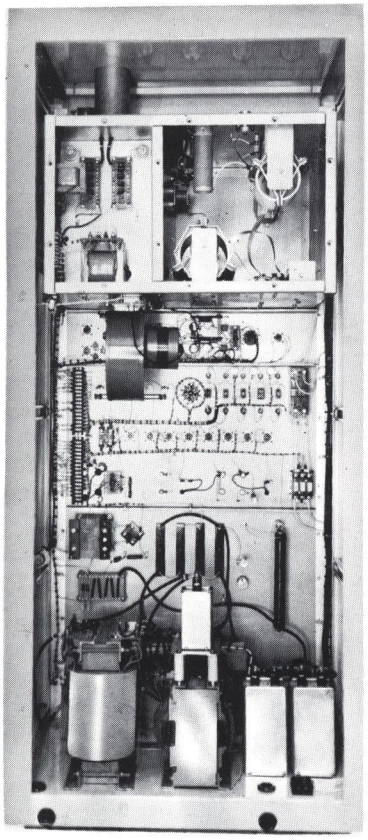


CCA-AM-250DS — Simplified Black Diagram



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

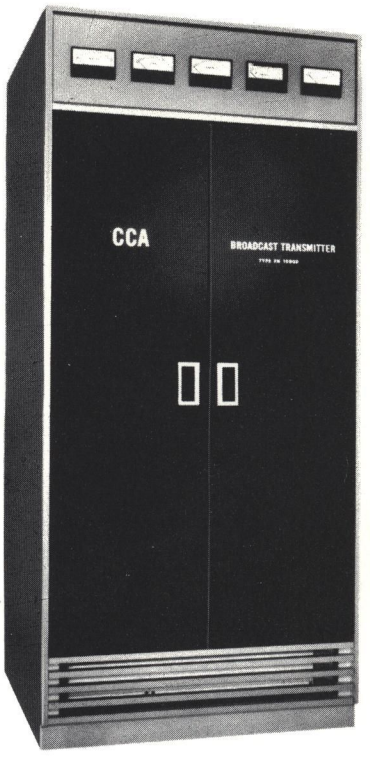
TECHNICAL SPECIFICATIONS

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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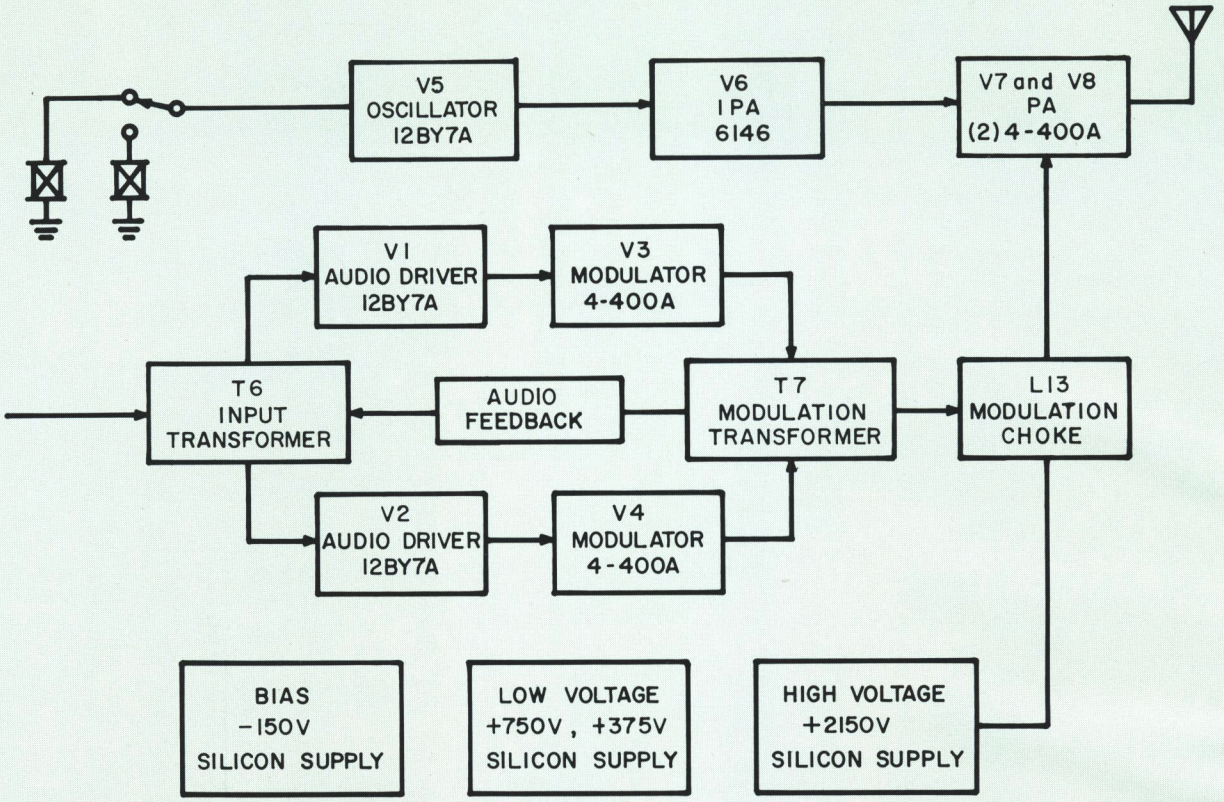
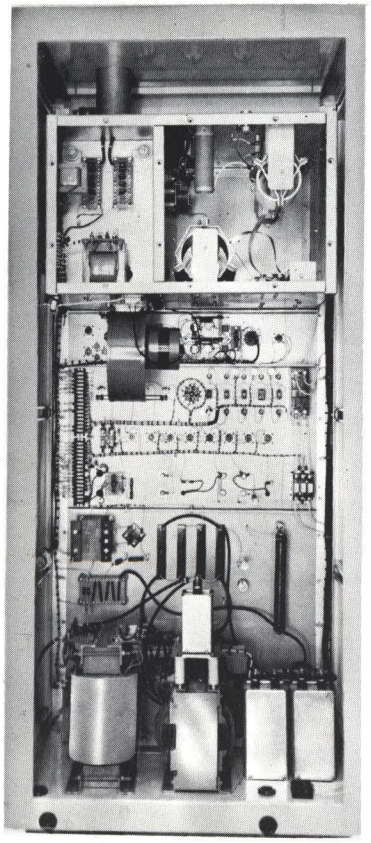


AM 500D BLOCK DIAGRAM



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**

DESCRIPTION

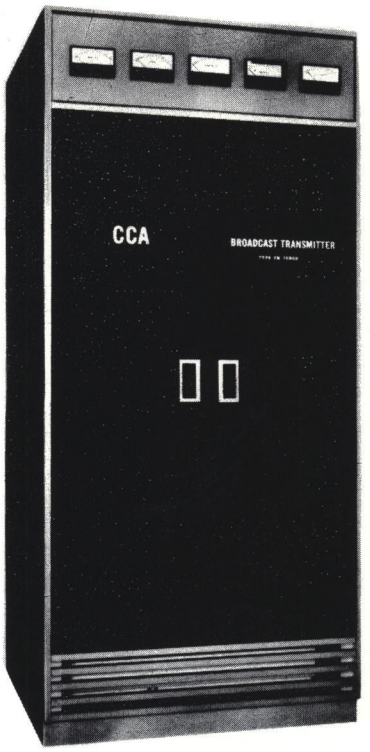
The CCA AM-1000D reflects CCA's considerable experience with both military and broadcast transmitters. The AM-1000D demonstrates the military's requirement for 100% accessibility and protection. All components are visible by opening the rear interlocked door or RF panels. Although a circuit breaker is 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.



AM-1000D — Front View

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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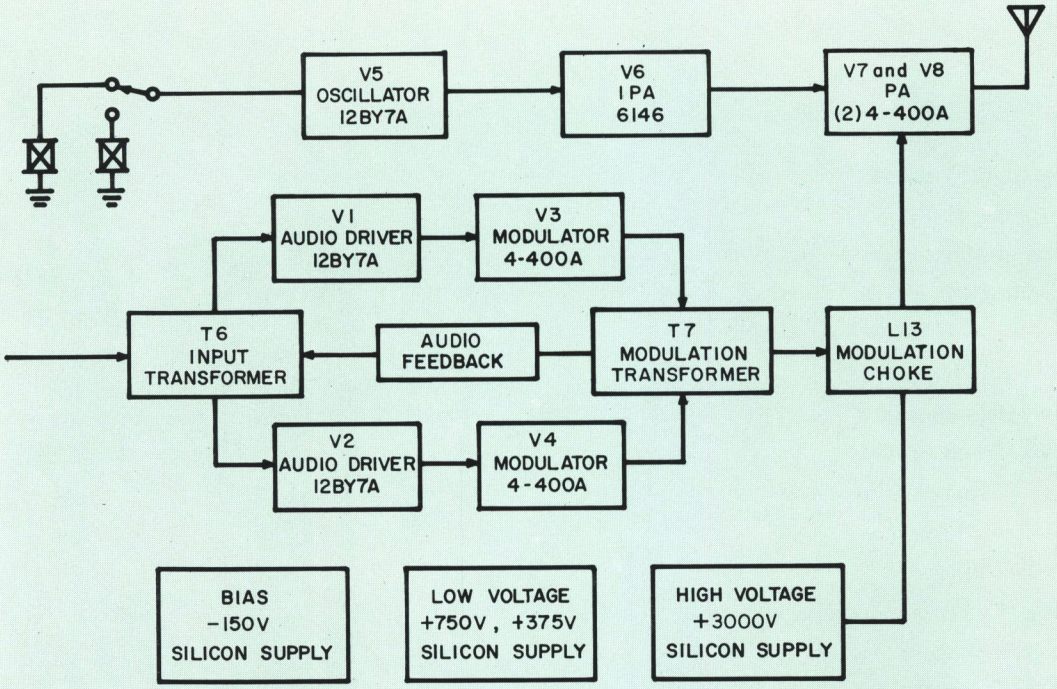
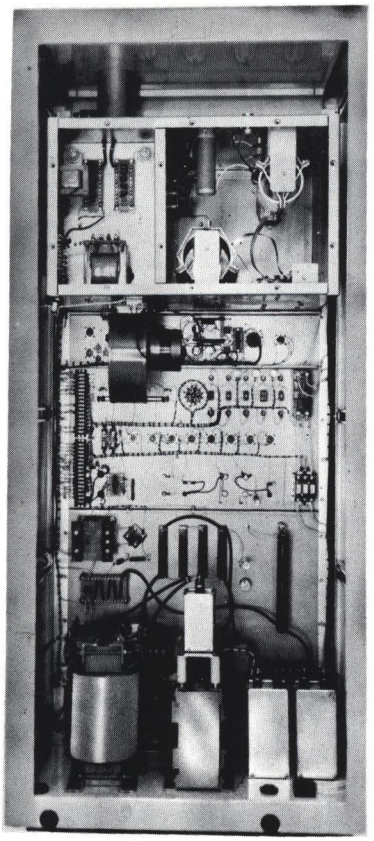


CCA-AM-1000D — simplified Block Diagram



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

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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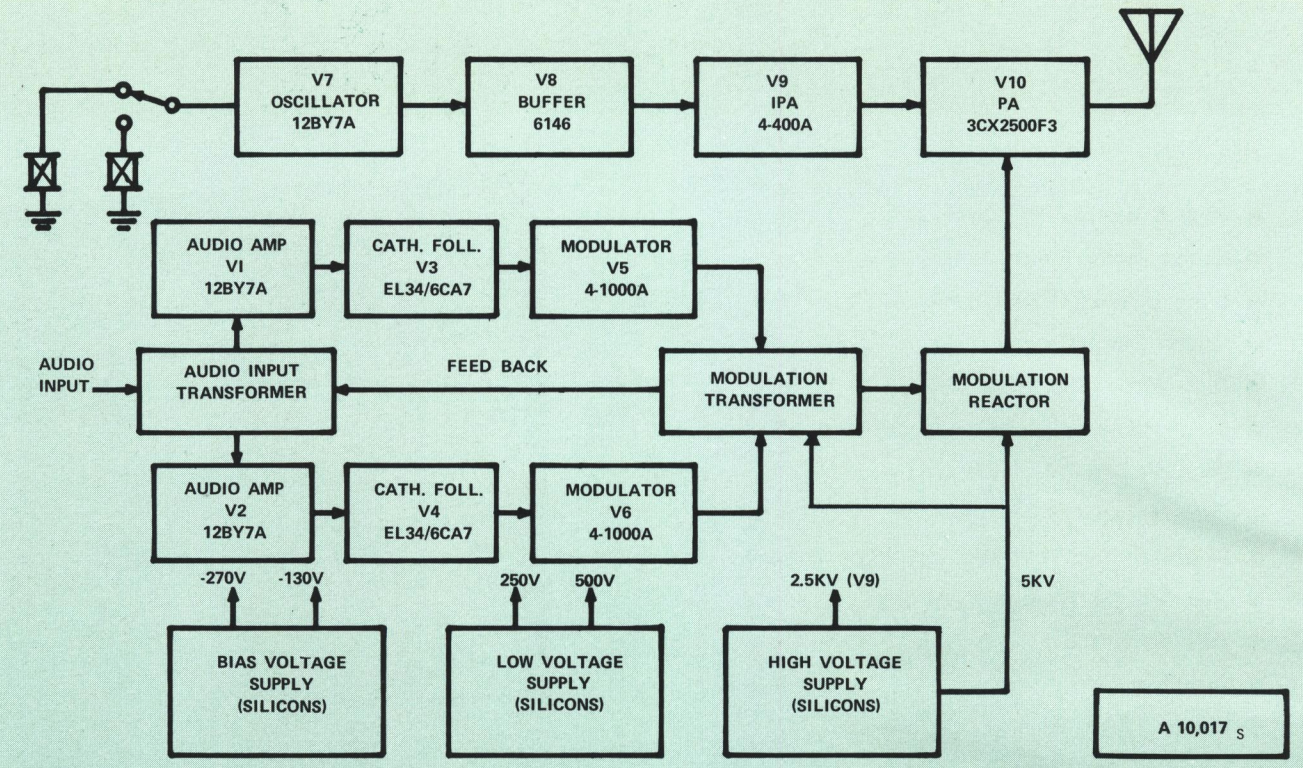
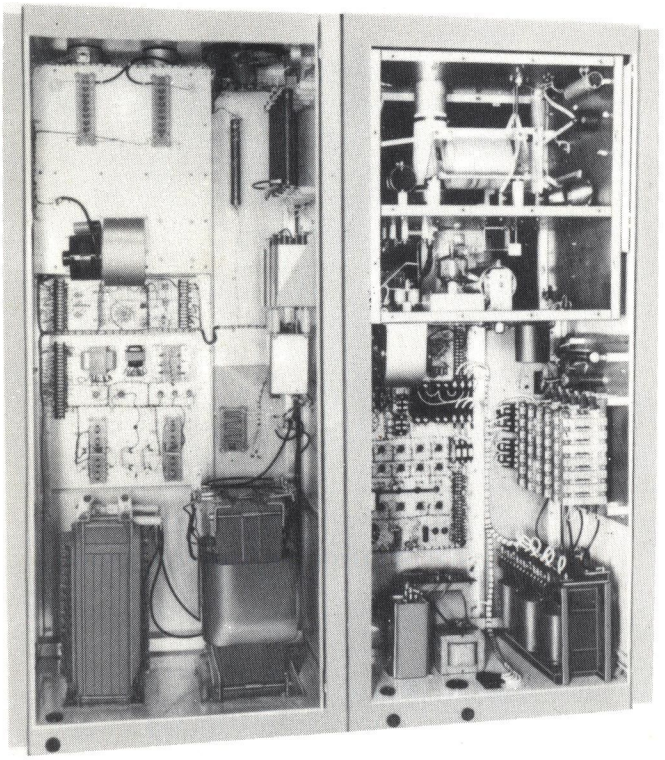


AM 5000 D BLOCK DIAGRAM



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

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.

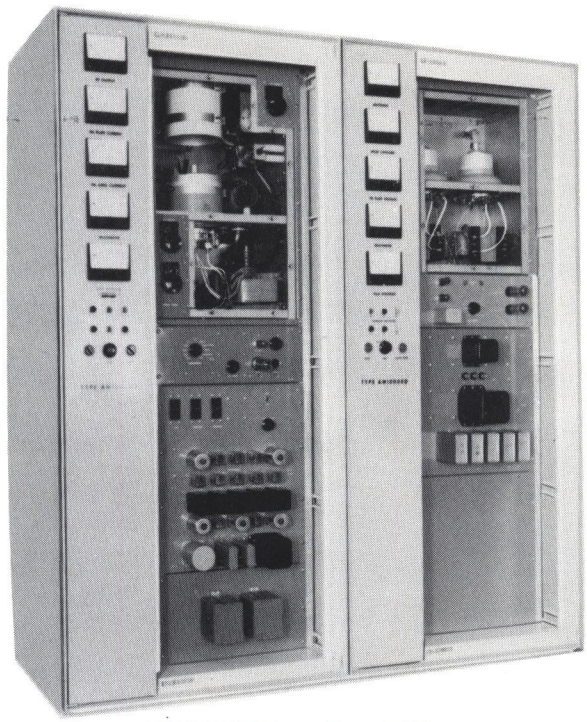
Although the transmitter includes high quality, conservative components, the utilization of modern techniques measurably reduces the volume requirements of the equipment and thus, the complete transmitter can be housed in two cabinets each only 34" wide, 33" deep and 76" high.

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.



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

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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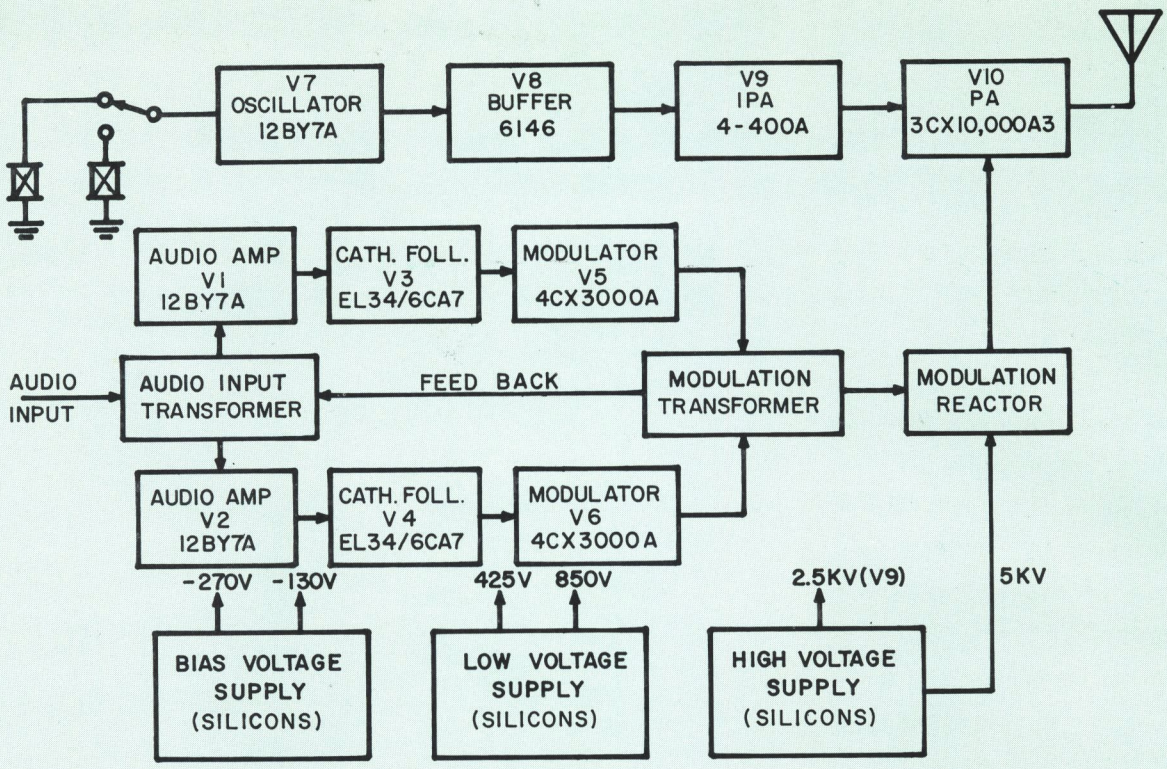
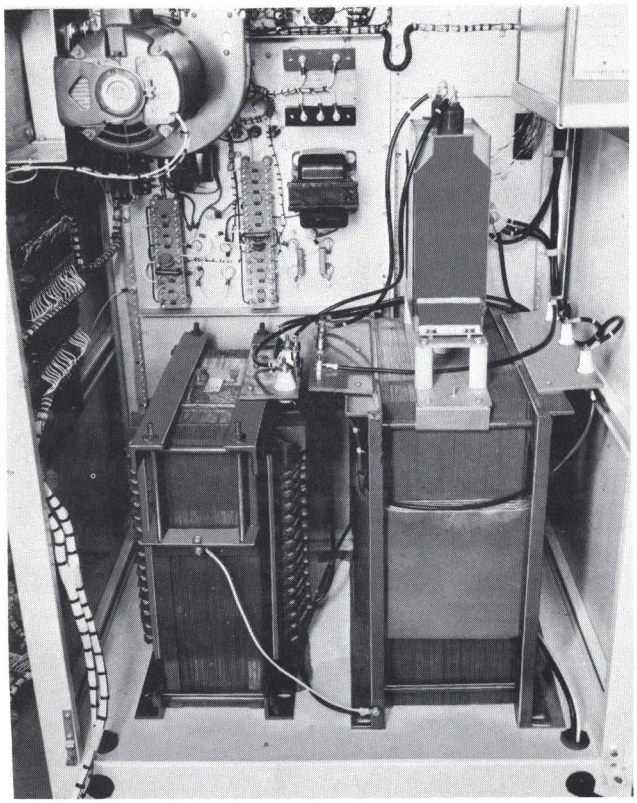


CCA-AM-10,000D — Simplified Black Diagram



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

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

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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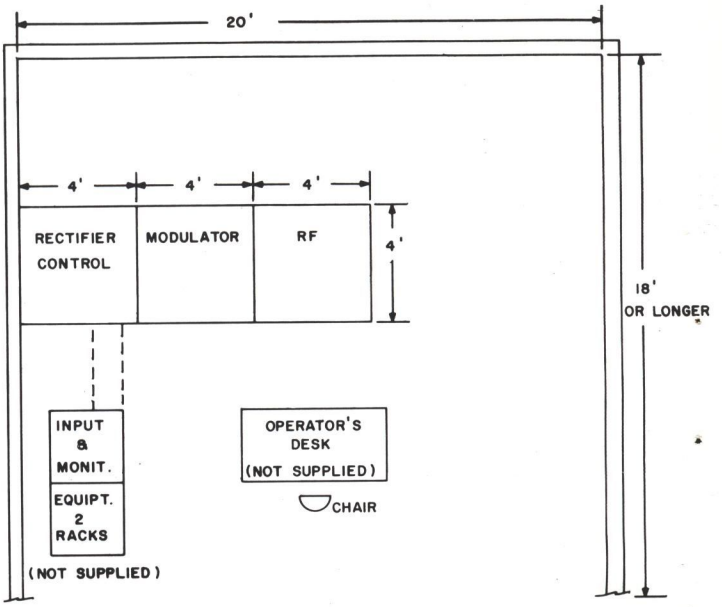
716 JERSEY AVE., GLOUCESTER CITY, NEW JERSEY 08030

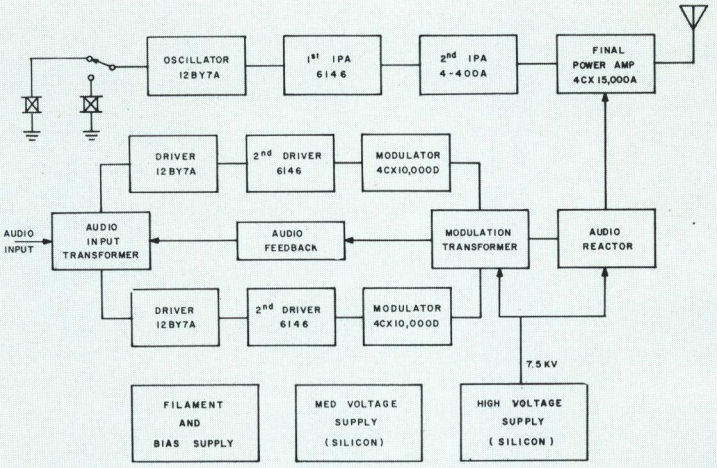
The audio circuitry of the transmitter consists of conventional push-pull circuitry whose output power is developed across a modulation transformer. The secondary of this transformer is terminated in an audio reactor which is in series with the plate supply. This combination of circuitry achieves conventional 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.

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

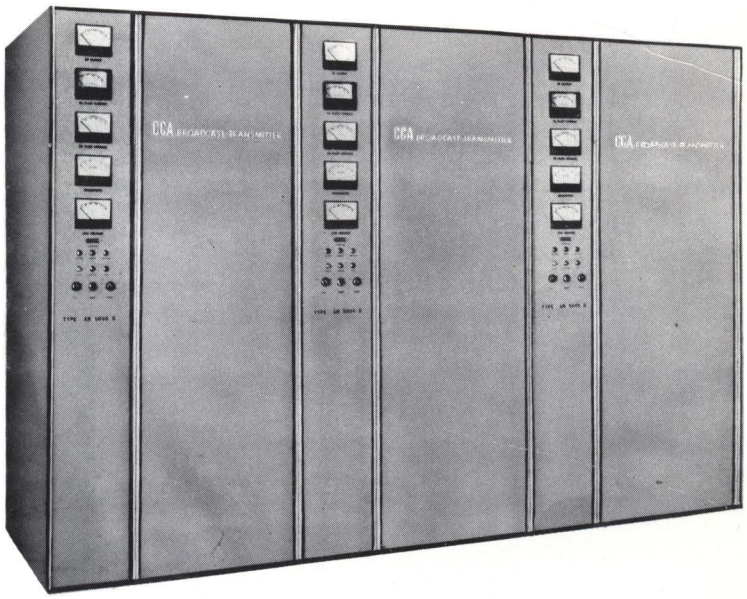
AM-25,000D, 25KW AM BROADCAST TRANSMITTER

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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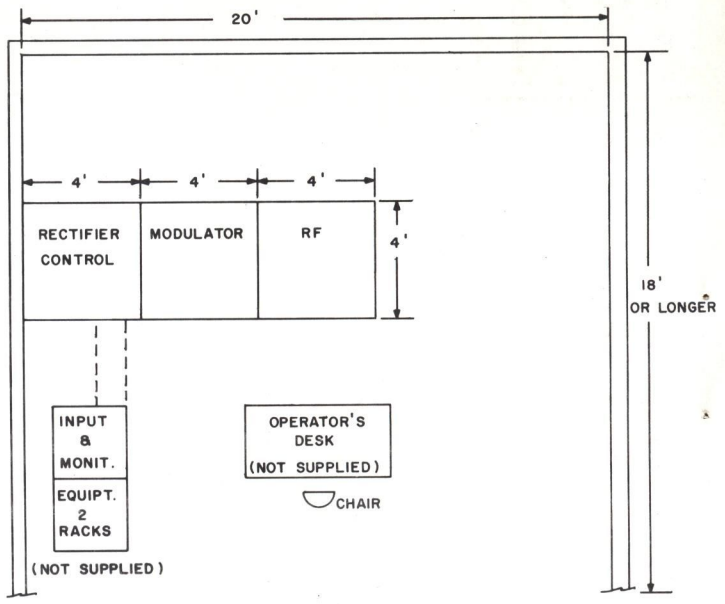
716 JERSEY AVE., GLOUCESTER CITY, NEW JERSEY 08030

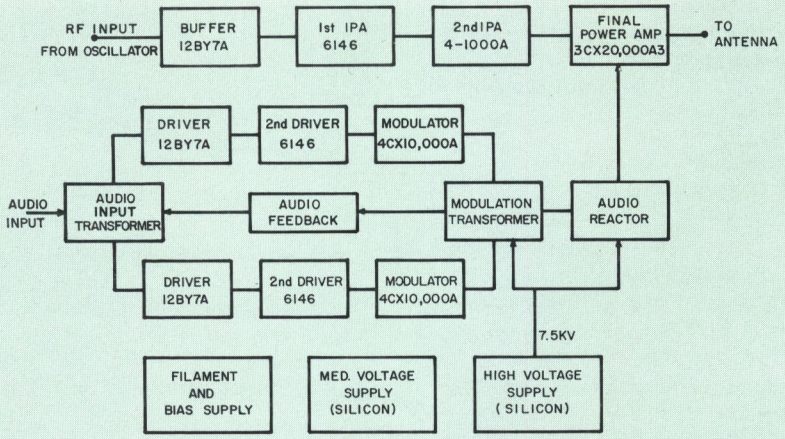
The audio circuitry of the transmitter consists of conventional push-pull circuitry whose output power is developed across a modulation transformer. The secondary of this transformer is terminated in an audio reactor which is in series with the plate supply. This combination of circuitry achieves conventional 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.

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

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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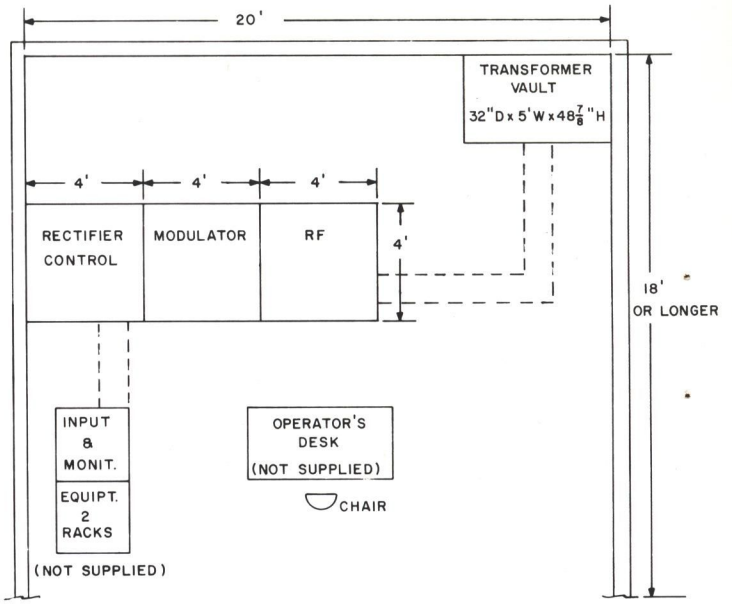
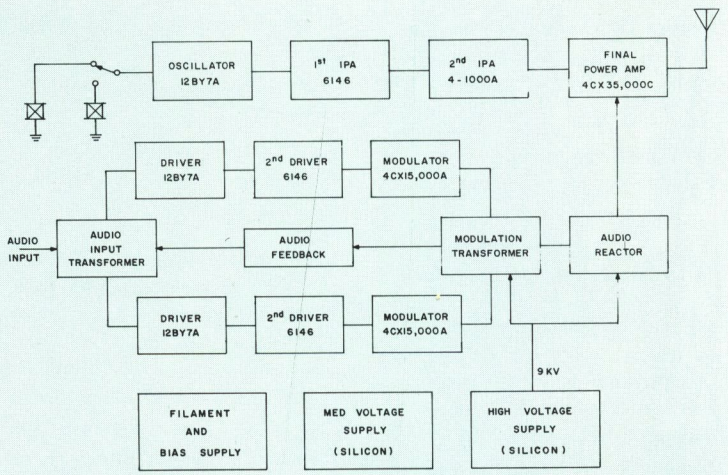
The audio circuitry of the transmitter consists of conventional push-pull circuitry whose output power is developed across a modulation transformer. The secondary of this transformer is terminated in an audio reactor which is in series with the plate supply. This combination of circuitry achieves conventional 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.

*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.**

CCA

CCA ELECTRONICS CORPORATION

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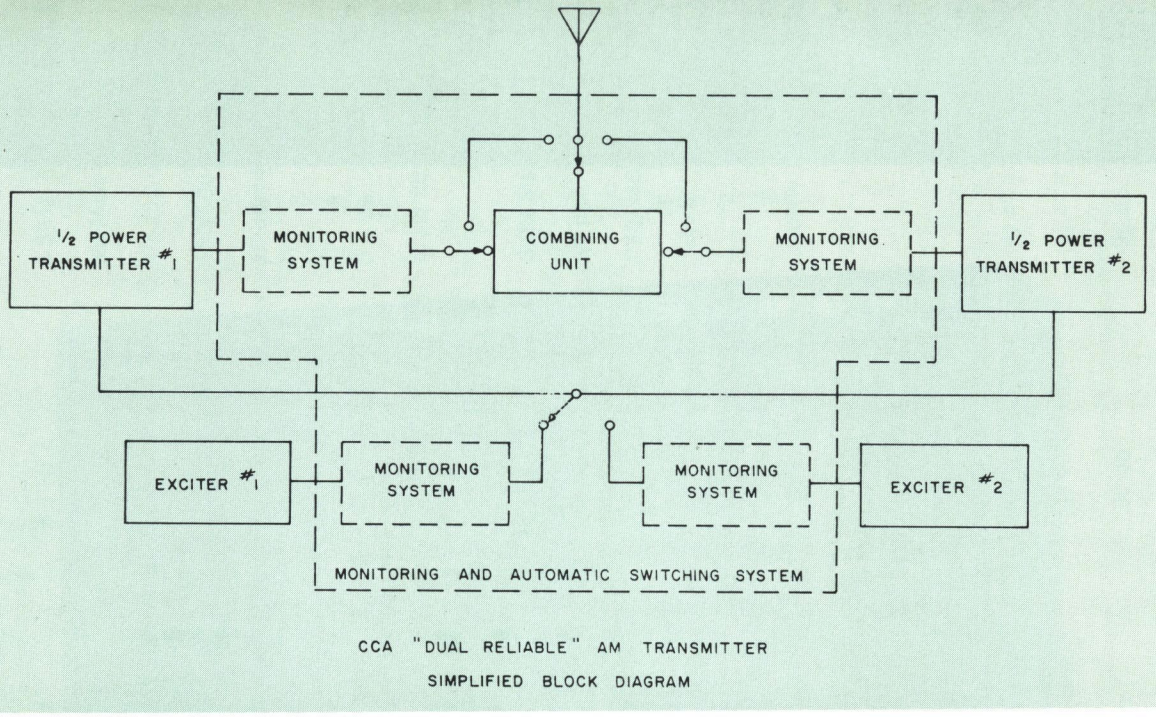


Simplified Block Diagram "Dual Reliable" AM Transmitter

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

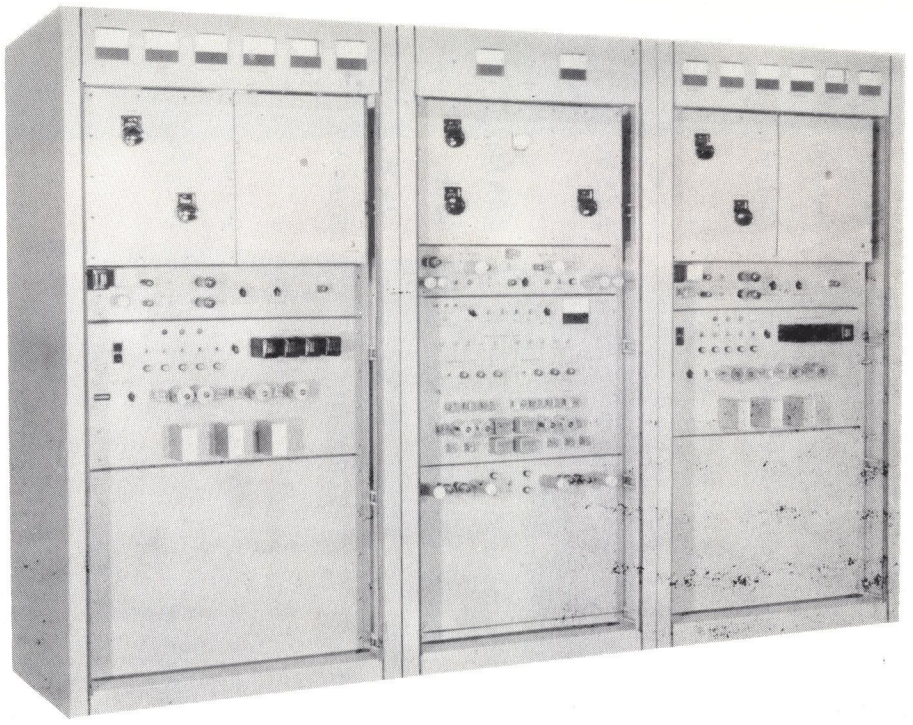
All tubes used in CCA dual reliable transmitter systems operate at 50% of their output capability. Thus, the CCA anticipated 10,000 hour minimum tube life is quite consistent with the extremely conservative use of all tubes.

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.

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) 4-1000A	(2) 3CX2500F3	(2) 3CX10,000A3	(4) 3CX20000A3
Modulator	(4) 4-400A	(4) 4-400A	(4) 4-1000A	(4) 4-1000A	(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

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.

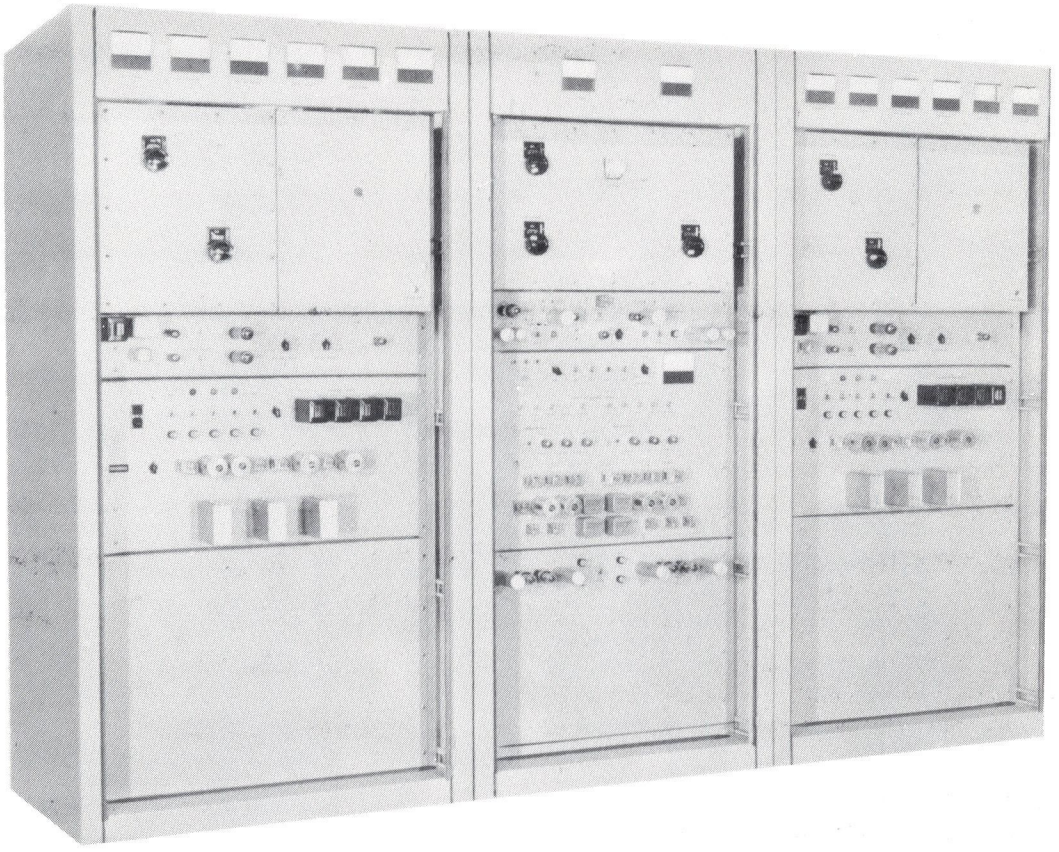
SYSTEM CONSTANTLY MONITORS:

- 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.

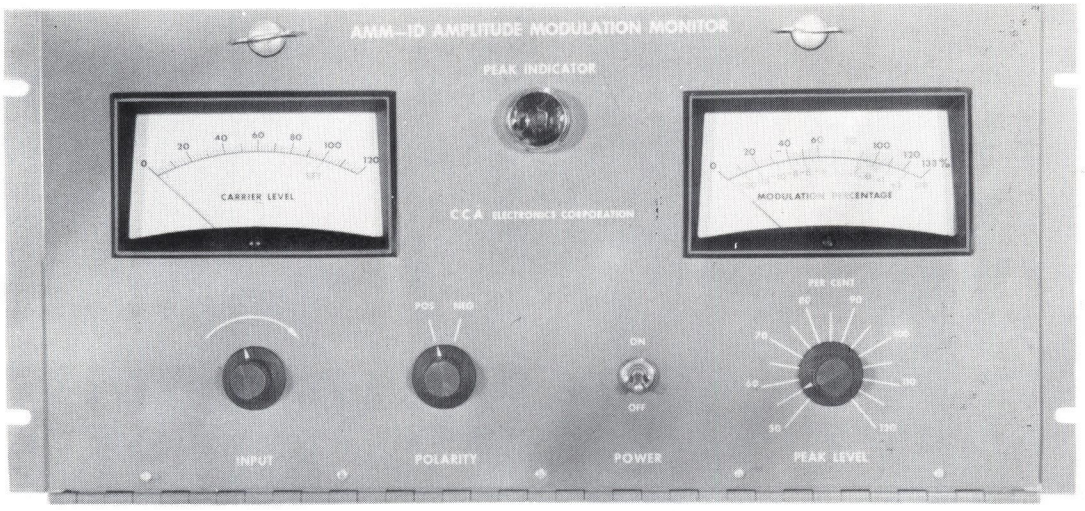
SYSTEM CONSTANTLY MONITORS:

- 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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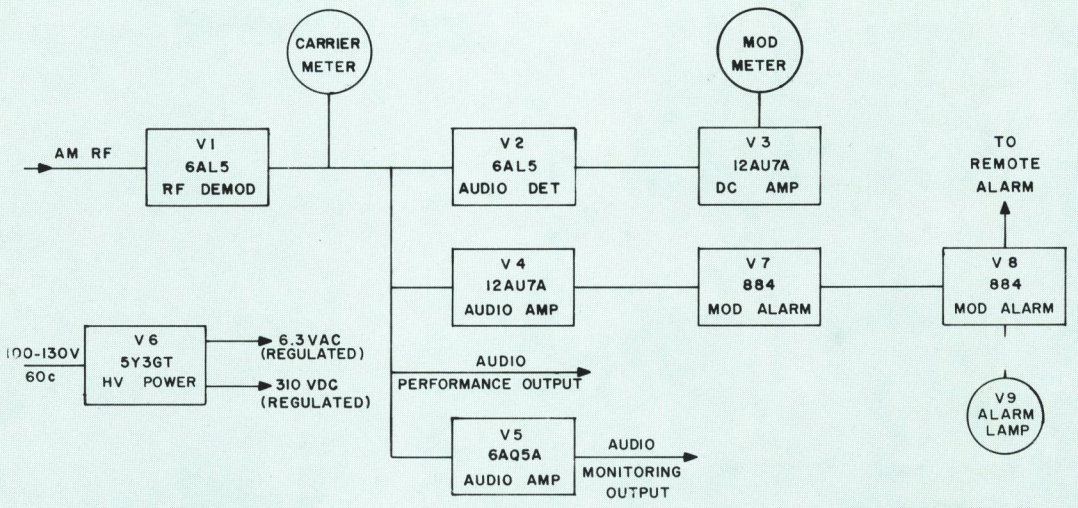

SPECIFICATIONS

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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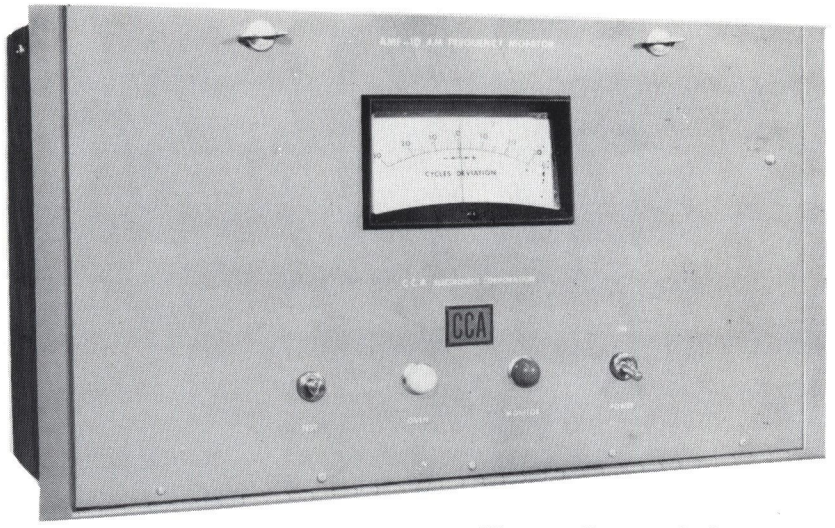
AMF-1D, AM BROADCAST FREQUENCY MONITOR



FEATURES

- **FCC Type Approved No. 3-126**
- **Modern Vacuum Crystal in Super Stable Oven**
- **Direct Reading Frequency Deviation Meter**
- **Monitors CW or AM Carrier**
- **Fully Regulated Power Supplies**
- **Continuous Indication of Carrier Frequency**
- **Guaranteed Accuracy — 2 Hz**
- **Hinged Front Panel — 100% Accessibility**
- **No Printed Circuits — Reliable Conventional Wiring**
- **Insensitive to carrier modulation changes**
- **Facilities for Remote Meter**
- **Monitors TV Color Sub-Carrier**
- **Reliable, Quality, point to point Wiring**

USES

The CCA, AMF-1D, is designed to be used by broadcasters to monitor the carrier frequency to their AM transmitters. This mandatory requirement of the FCC can be achieved by utilizing only instruments that have been tested at the FCC Laboratories. The CCA AMF-1D has passed the rigorous specifications of the FCC and has been assigned the type approval number 3-126.

DESCRIPTION

MECHANICAL

The AMF-1D is self contained in a medium sized chassis that occupies only 10½" of standard 19" rack panel space. Access to all wiring can be had by simply opening the front panel hinged cover. An attractive, large size meter is calibrated so that full scale is ±30 Hz. This permits an operator to quite easily and accurately determine the carrier frequency of his transmitter within one Hz. There are audible means to detect a larger frequency deviation. Conventional, field proven point to point wire techniques are utilized.

All operating controls are conveniently located on the hinged front panel that tilts down for maintenance. Tubes and adjustment controls are accessible on the rear of the chassis. All input and output connections are located on the rear of the chassis. ANY REPAIR OR CALIBRATION CAN BE MADE WITHOUT REMOVING THE UNIT FROM THE RACK.

ELECTRICAL

A crystal oscillator generates a reference signal whose frequency can be adjusted to be precisely 1000 Hz below the assigned transmitter frequency. It is followed by a buffer amplifier that couples the signal to the mixer stage. The transmitter carrier to be monitored is amplified by the R. F. Amplifier, and then fed to the mixer stage, whose plate circuit is tuned to the difference frequency which is approximately 1000 Hz.

This difference frequency is further amplified, limited and amplified again, such that at the secondary of T1 it is a constant amplitude sine wave. It is then fed to a diode discriminator balanced for 1000 Hz. The D. C. output of discriminator is proportional to the deviation from 1000 Hz and it is indicated by the front panel meter.

The AMF-1D is designed for standard rack mounting. The meter indicates the frequency deviation in Hz per second.

A front panel light indicates when the oven heater is ON. This lamp acts as a sensitive fuse for the oven heater. The heater is always connected to the line, even if the monitor switch in the front panel is turned OFF. This monitor switch controls the power supply of the monitor. The front panel light "Monitor" indicates when this switch is ON.

Due to the fact that the oven remains energized all the time, the monitor warm-up time is reduced to two minutes after the front panel switch is turned ON. Due

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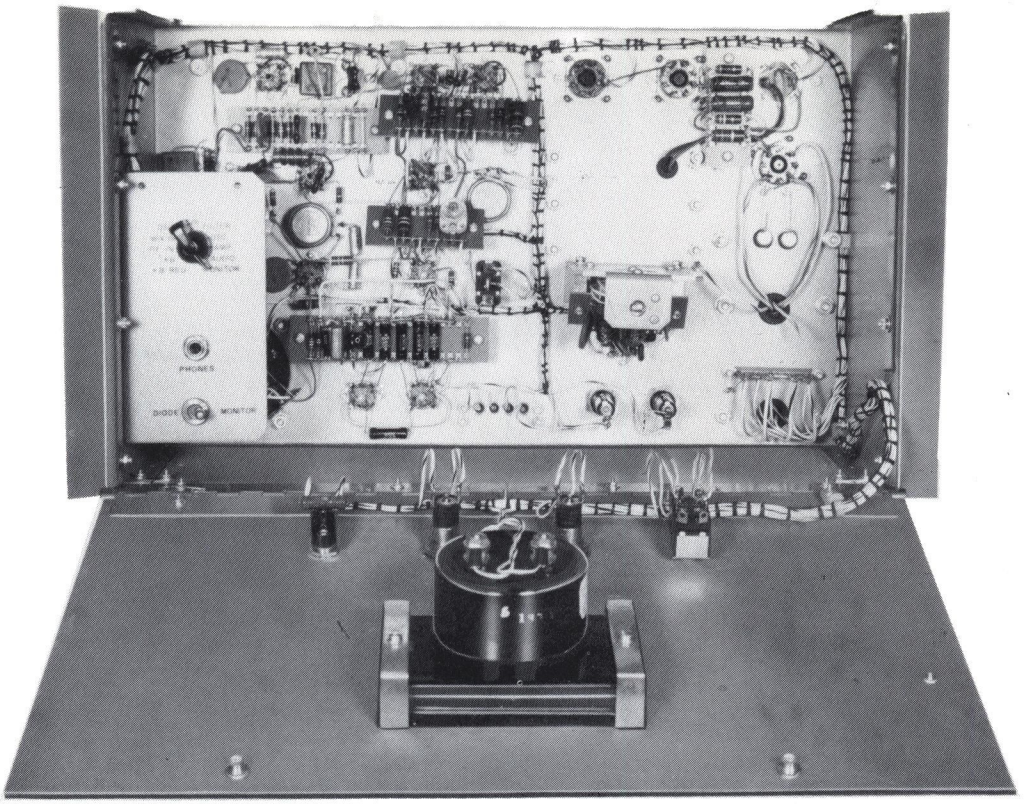


Hinged Meter Panel Permits Full access to all Components from front of equipment. Note the Reliable Point to Point Wiring.

to the unique design of the oven it requires only fifteen minutes to bring the monitor within specifications. This could allow turning off the oven every day, if so desired.

All power supplies of the monitor are driven by a "regulated transformer". Thus the equipment accuracy is independent of line voltage variations.

A modern vaccum type crystal which in itself has a stability far better than FCC specifications is mounted in a precision temperature controlled oven. This combination results in exceptional stability over a wide ambient temperature range.

ACCESSORIES

REMOTE METER PANEL

Supplied in 5¼" standard 19" relay rack panel. Contains matching front panel meter which operates in series with monitor meter.

WHIP ANTENNA KIT

A special optional kit is available which will permit the AMF-1D to operate from as little as 5 millivolts of RF radiated signal. This is a desirable feature when operating the AMF-1D at a point remote from the transmitter.

TECHNICAL SUMMARY

POWER REQUIRED

100 to 130V AC, 60 Hz, 90 watts
Fuse 2 Amp. Type 3AG

CRYSTAL OVEN

100 to 130V AC, 60 Hz, 7 watts.
Fuse 1 Amp. Type 3AG

FREQUENCY RANGE

200 kHz to 5MHz

RF INPUT

Input Impedance 75 ohms (or 50 ohms)
RF Input Voltage 0.01 Volts to 20 Volts

FREQUENCY DEVIATION RANGE

±30 Hz

AUDIBLE RANGE OF OFF-SCALE INDICATION

±3000 Hz, -600 Hz

FREQUENCY INDICATION STABILITY (at 1600kHz)

Change due to ambient temperature variation from 10°C to 55°C ±2Hz.
Change due to line voltage from 100 to 130V ±0.1 Hz.
Change of tubes, after resetting oscillator trimmer and Diode Zero ±1 Hz.
Change due to all factors combined ±3 Hz.

MECHANICAL SPECIFICATIONS

Mounting ---------- Standard 19 inch rack
Dimensions ---------- Width - 19"
Height - 10½"
Depth - 12"
Weight ---------- 35 pounds (unpacked)

TUBE COMPLEMENT

3	6AL5	1	12BY7
1	6AQ5	2	OC3
4	6AU6	1	5Y3

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

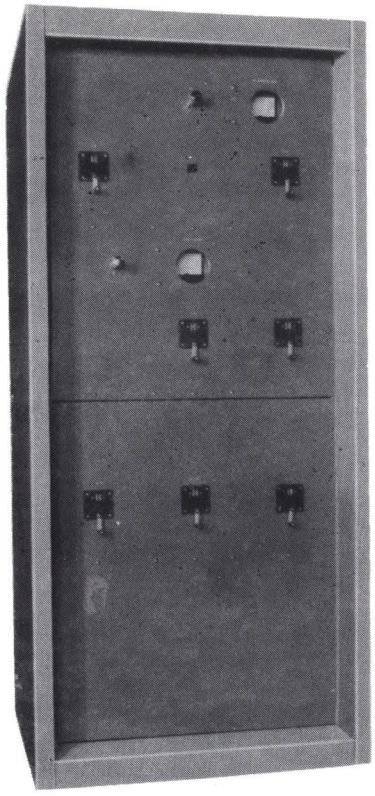
AM BROADCAST ANTENNA PHASING EQUIPMENT

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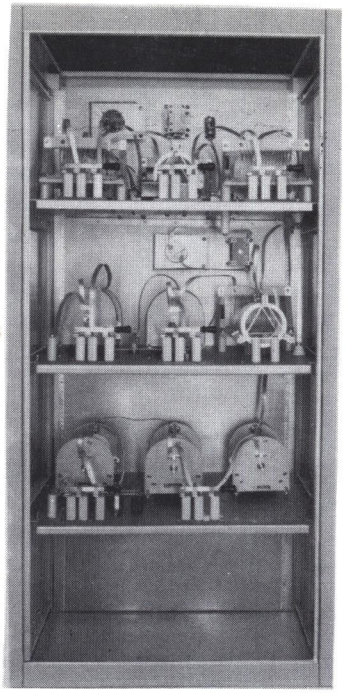
Generally, there exists one independent phase and one amplitude front panel control for each tower in the antenna system.

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.

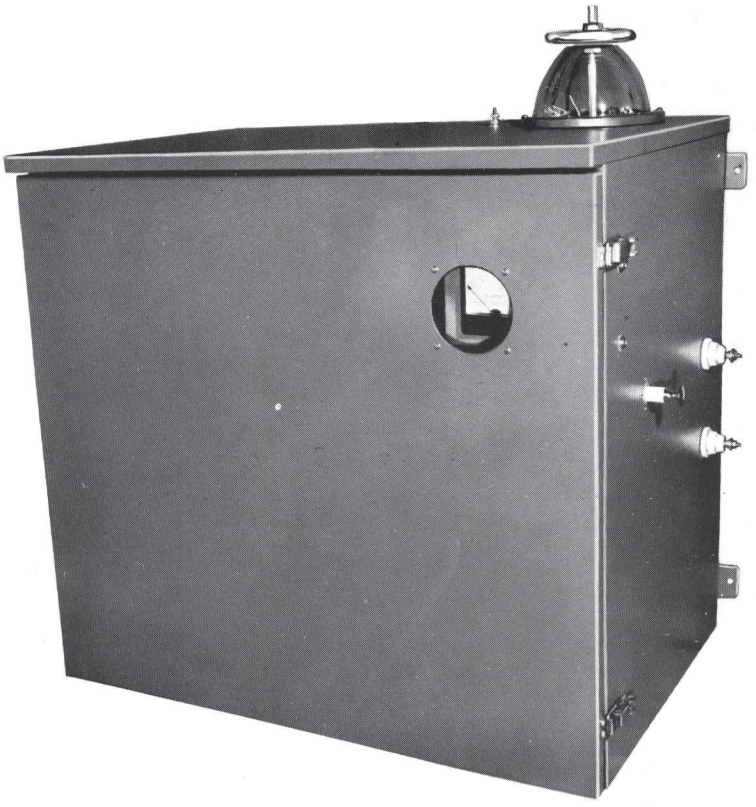
MEDIUM WAVE ANTENNA LINE TERMINATING UNIT

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

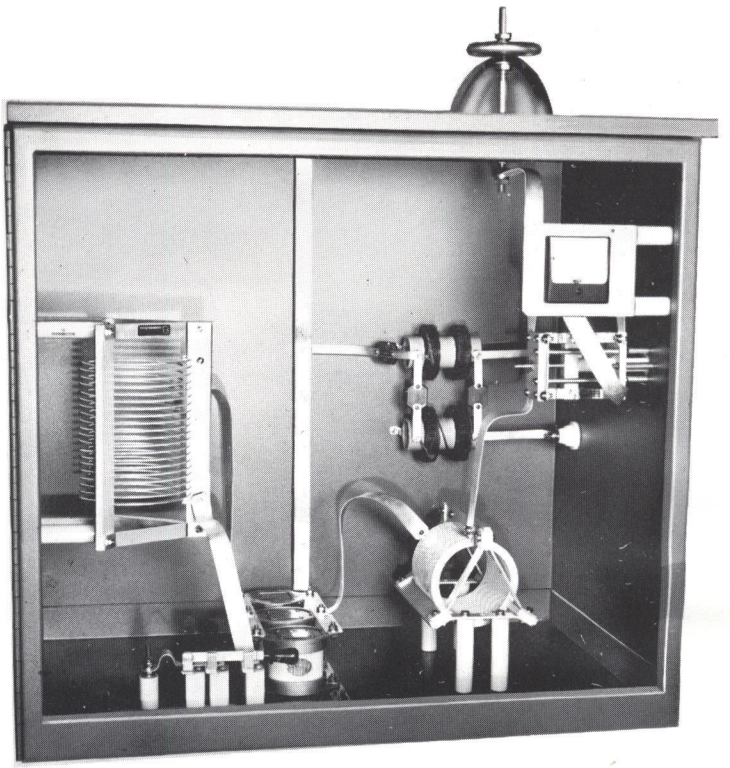
Available in either vacuum tube or solid state version. Supplied with pick up loop to monitor antenna current. Output of diode is D. C. voltage of sufficient level to drive external remote meter.

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*

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:

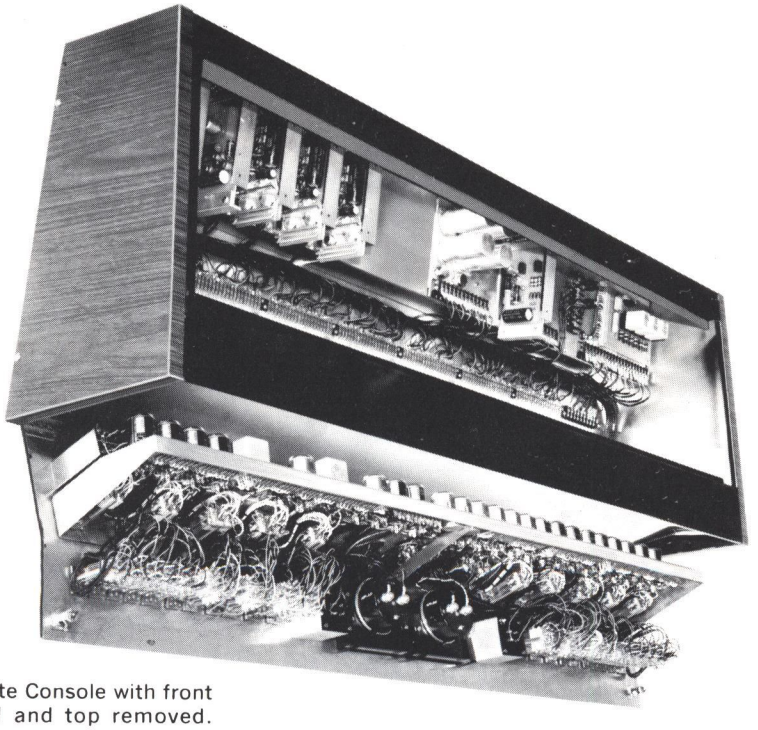
The CCA "Ultimate" has facilities for talking back to the remote lines as well as to the other studios. Again, this is a feature not present in a number of competitive units.

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.

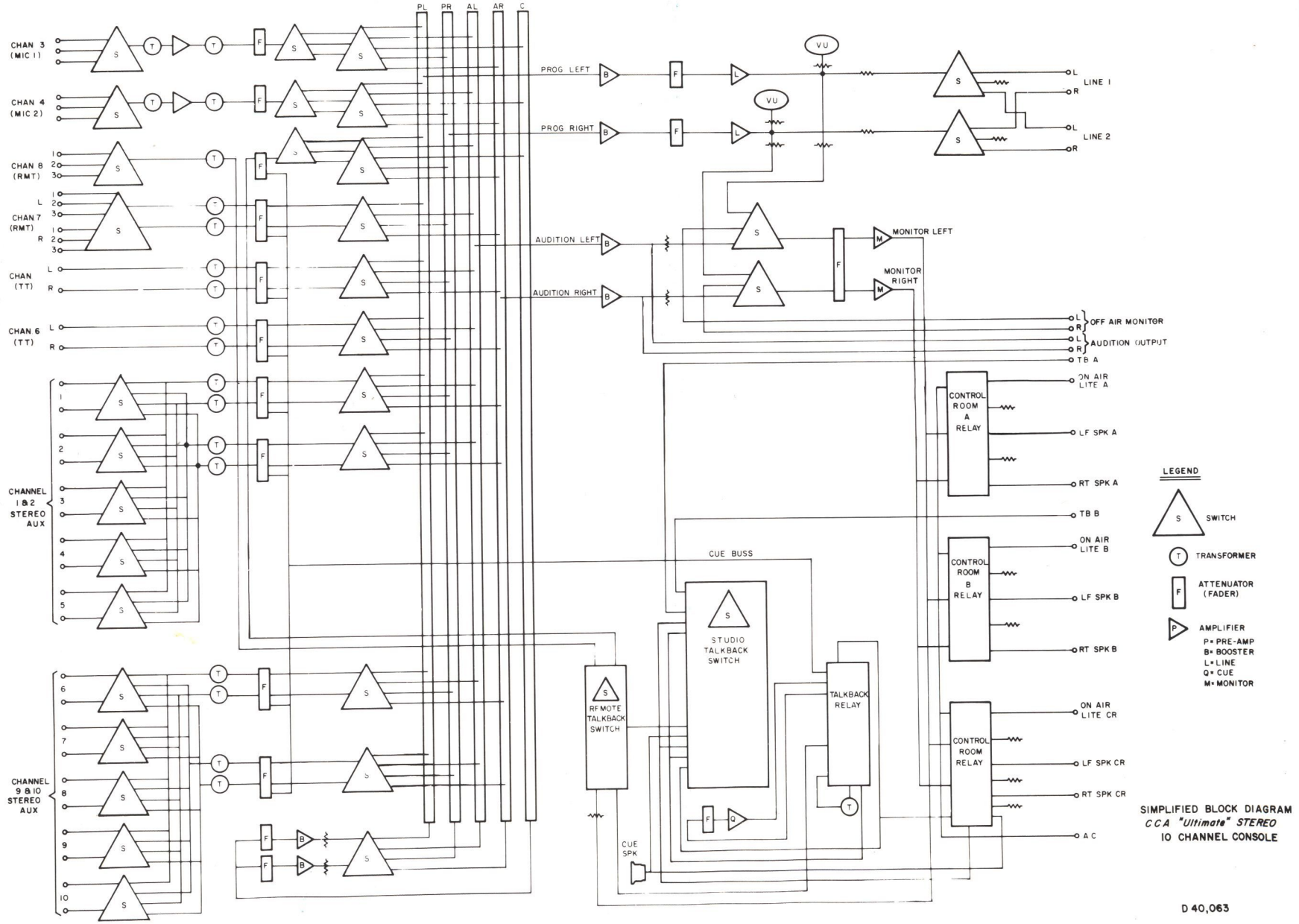
SIZE: 48½" wide, 12" high, 18" deep.

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*

BLOCK DIAGRAM



SIMPLIFIED BLOCK DIAGRAM
C.C.A. "Ultimate" STEREO
10 CHANNEL CONSOLE

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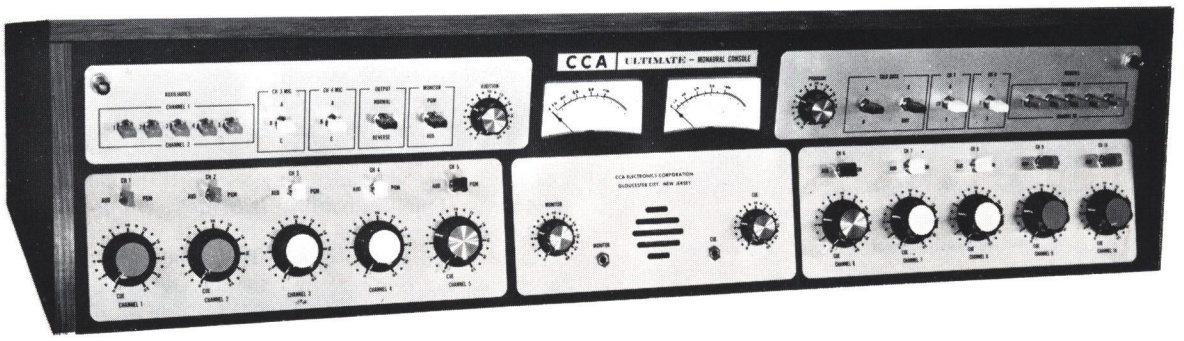
CCA "MONO ULTIMATE"
DUAL CHANNEL MONAURAL CONSOLE



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: –
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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

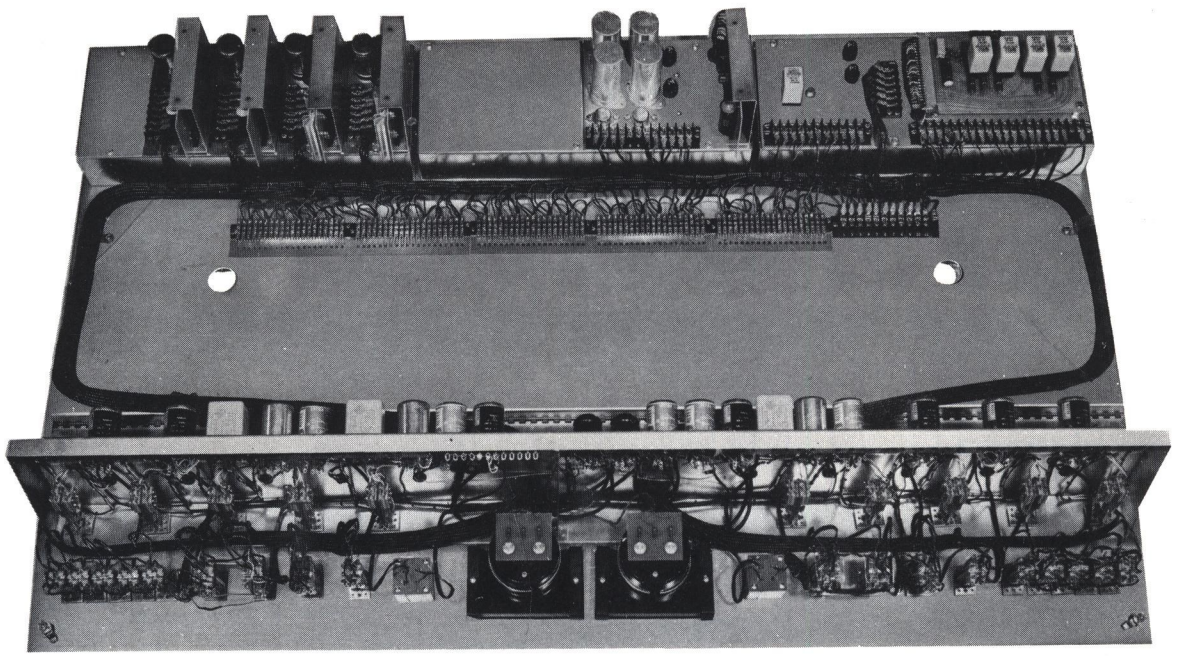
The CCA "Mono-Ultimate" has facilities for talking back to the remote lines as well as to the other studios. Again, this is a feature not present in a number of competitive units.

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.

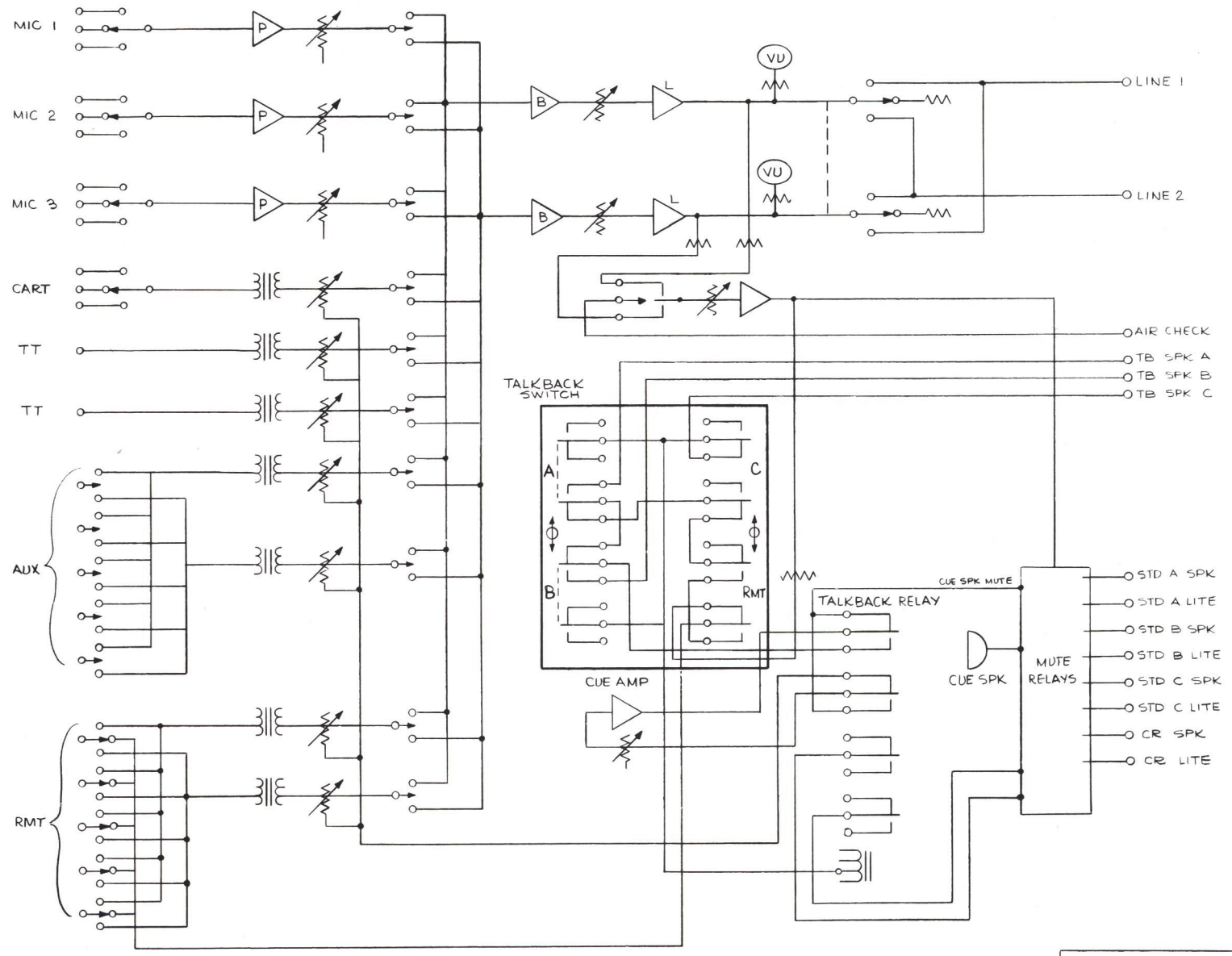
SIZE: 48½" wide, 12" high, 18" deep.

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*

BLOCK DIAGRAM

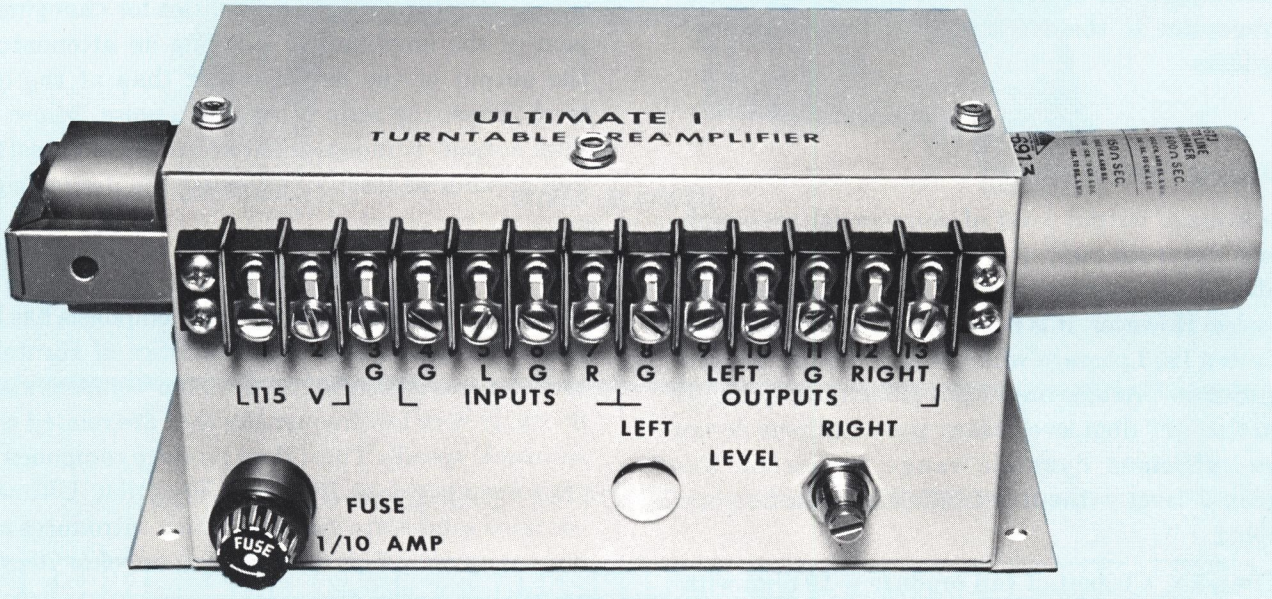


10 FADER DUAL CHANNEL
MONO ULTIMATE CONSOLE

MARCH 13, 1969

C 30,056

QRK ULTIMATE I—TURNTABLE MONO EQUALIZED PRE-AMPLIFIER



FEATURES

- Fixed equalization per RIAA and NAB specifications.
- Maximum "head room" (+10 dbm output).
- Typical distortion — 0.1% @ any output level to +10 dbm.
- Gain @ 1 Kc — with 12 mv input — 1 volt output.
- Modern Solid State integrated circuitry.
- Built-in power supply.
- 100% magnetic shielding.
- Full range output level control without degradation of response, noise or distortion.
- Magnetically shielded output transformer provides 150/600 ohms balanced output.
- Maximum dynamic range — eliminates clipping and distortion @ high level passage.
- Contains built-in rumble filter.
- Designed for use with all popular variable reluctance and magnetic cartridges.
- Noise level — below rated output — better than —75 db.
- Can be driven with stereo cartridge with full response.
- Scratch filtering can be achieved by simply adding resistor across input terminals.

QRK ELECTRONIC PRODUCTS, INC.
1568 NORTH SIERRA VISTA, FRESNO, CALIF. 93703 · Phone: 209 251-4213
A Subsidiary of CCA Electronics Corp. Gloucester City, New Jersey 08030

USES

The QRK Ultimate I, monaural equalized pre-amplifier is designed to be used with turntable monaural and stereo cartridges to provide the broadcaster and recording laboratory with a reliable pre-amplifier for disc reproduction. In addition to having excellent noise, distortion and equalization properties, the Ultimate I has exceptional dynamic range. This substantial "head room" eliminates the common problem of distortion and clipping at loud passages due to the overloading of commercial pre-amplifiers.

DESCRIPTION

MAXIMUM "HEAD ROOM"

The average output level of commercial pre-amplifiers is approximately —20 dbm. This is quite adequate for the average mixing buss in conventional consoles. However, it is not unusual for a record disc to have a loud passage which would require the pre-amplifier to produce an output substantially higher than the —20 dbm level. Many pre-amplifiers do not have sufficient dynamic range to accept this increased level without introducing distortion and clipping.

The QRK Ultimate I can produce +10 dbm without any evidence of distortion or clipping. Thus, it contains a substantial reserve or "Head Room" for the common loud record passages which will permit amplification without degradation of the signal.

RESPONSE WITHIN +0.5 db OF NAB CURVE

The Ultimate I contains a fixed equalization to compensate for the NAB equalization in the original recording. Thus, the result is that the output of the pre-amplifier when fed by an NAB disc is essentially flat from 30 cycles to 15,000 cycles.

BUILT-IN POWER SUPPLY

One major source of noise and hum pick-up in many commercial pre-amplifiers is the interconnection wires and circuitry between the pre-amplifier and its power supply. The QRK Ultimate I has a power supply as an integral part of its physical package. This eliminates many problems and contributes substantially to the very low noise (—75 db) of the pre-amplifier.

MAGNETICALLY SHIELDED OUTPUT TRANSFORMER

The Ultimate I contains as a standard component, a substantial magnetically shielded transformer which achieves a balanced 150/600 dbm output. This transformer can substantially reproduce +10 dbm at 30 cycles without saturating. The use of a transformer isolates the ground circuitry between the pre-amplifier and its termination and thus eliminates "ground loops".

NOISE INDEPENDENT OF OUTPUT LEVEL

The QRK Ultimate I has facilities for changing the gain of the amplifier by utilizing an attenuator at the output of the device rather than at the input level. Thus, the ratio of signal to noise, below +10 dbm output, is independent of output level settings and remains at least 75 db below the desired signal.

BUILT-IN RUMBLE FILTER

With the advent of stereo, greater emphasis has been placed on the rumble characteristics of turntables, tone arm and cartridges. Rumble components are normally very low frequencies that are related to the turntable speeds. Thus, they produce components at approximately 5 to 15 cycles. The QRK Ultimate I contains solid state circuitry which introduces a low frequency roll-off of 6 db per octave below 70 cycles.

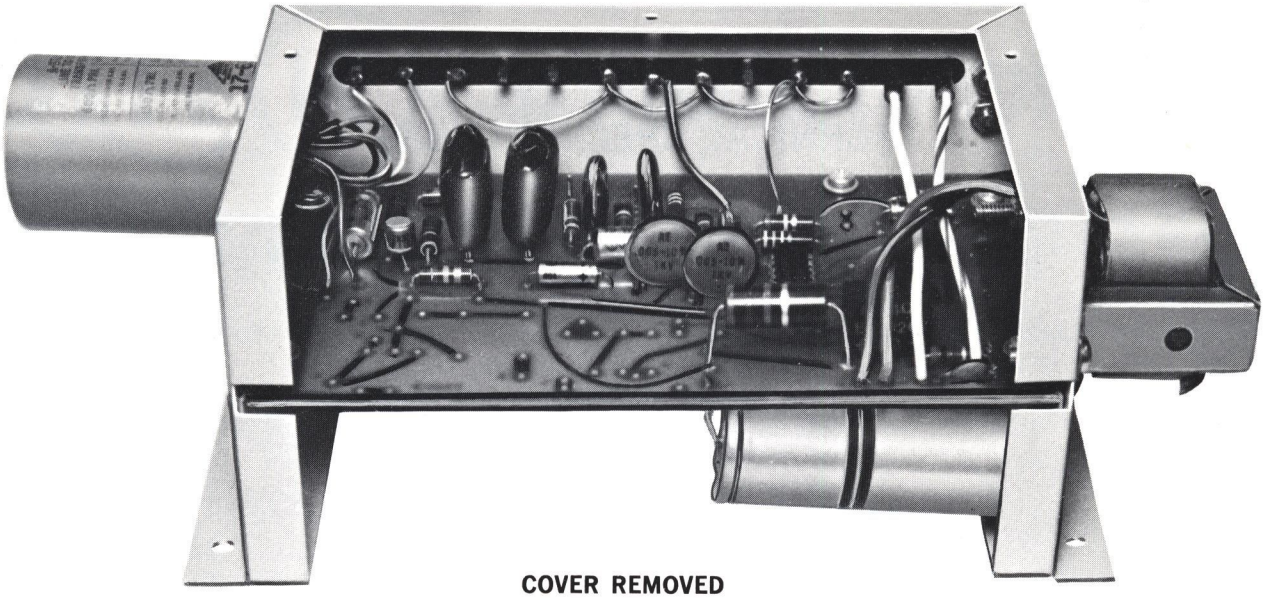
CAN BE USED WITH ALL POPULAR MONO AND STEREO CARTRIDGES

The QRK Ultimate I has an input impedance of approximately 150 K. By terminating its input terminals with an appropriate terminating resistor, the pre-amplifier may be driven by any popular cartridge.

For example, stereo cartridges have had their outputs paralleled and have been terminated with one half of their individual normal impedance wired across the Ultimate I. Perfect reproduction has occurred with this combination.

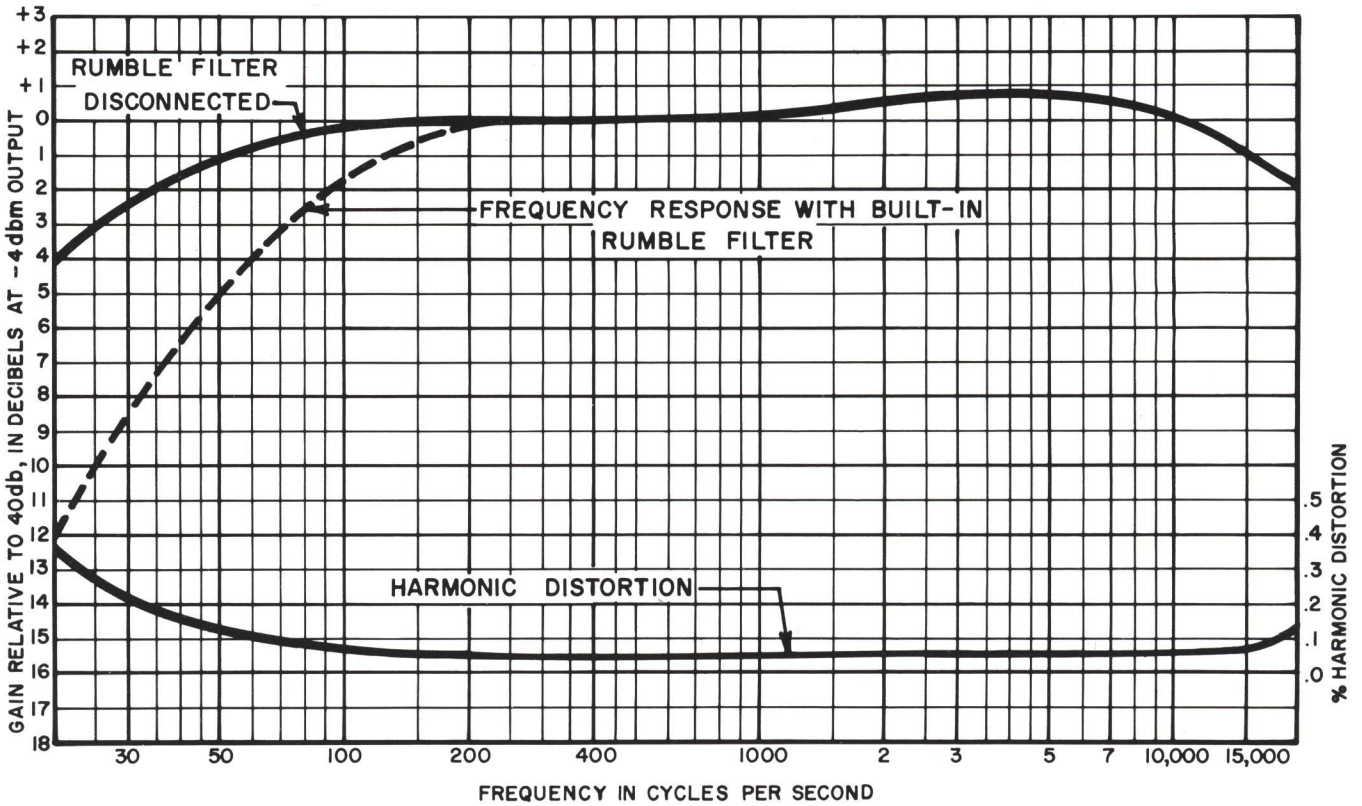
SCRATCH FILTERING

The QRK Ultimate I normally has its input terminals terminated with an impedance of approximately 47 K. This results in a reasonably flat response with respect to a normalized RIAA curve. However, by simply adding a low valve resistor across the input terminals, a high frequency roll-off, or "scratch filtering" will occur. Rather than making this easily available to untrained personnel, QRK provides the data and permits the operator to make his own decision relative to insertion in the circuit.



COVER REMOVED
Note full accessibility to all parts and modern, Solid State and fabrication techniques.

NORMALIZED FREQUENCY RESPONSE & HARMONIC DISTORTION



The response curve described above is normalized to the NAB curve for standard disc reproducing characteristics.

TECHNICAL SPECIFICATIONS

Output Level with standard NAB reference input (12 mv)	0 dbm
Guaranteed Maximum Output Level without signal clipping	+10 dbm output
Maximum Input Level	50 mv
Gain @ 1 Kc	0.8 volt output with 12 mv input
Noise, with 12 mv input	−75 db
Output Impedance	150/600 ohms (balanced)
Distortion at all levels to +10 dbm output	0.2% max. (.1% typical)
Frequency Responses with respect to NAB curve	±1 db -50 Hz
with rumble filter connected	−3.0 db @ 50 hz
	12 db per octave below 70 hz
Maximum Operating Temperature	+60° C
Power - 105/125 volts, 50/60 cycles	4 watts

Size - 9" L x 3" H x 3" W

Weight - 2 # net, 2½ # gross

Mounting position - Can be mounted in any position.

QRK PRODUCTS

- Professional Turntables
- Turntable Cabinets
- Precision Tone Arms
- Equalized Pre-Amplifiers
- Mono and Stereo Cartridges

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

QRK ELECTRONIC PRODUCTS, INC.
1568 NORTH SIERRA VISTA, FRESNO, CALIF. 93703 · Phone: 209 251-4213
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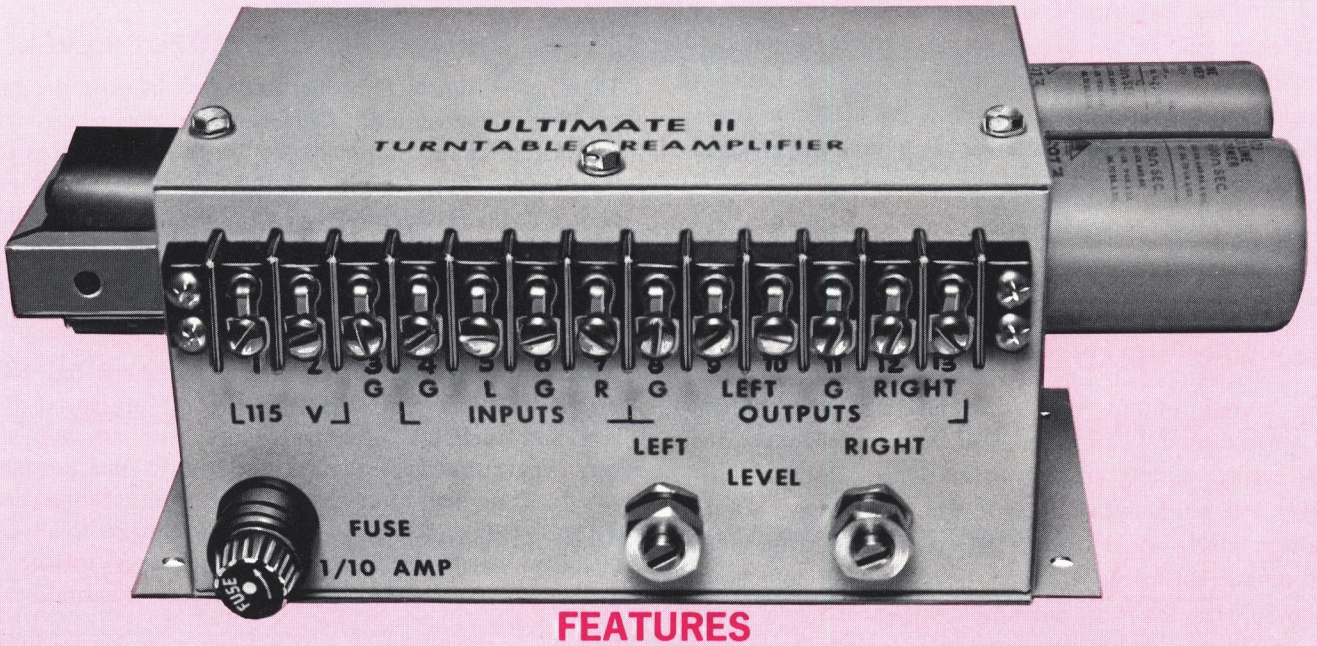
QRK ULTIMATE II-TURNTABLE STEREO EQUALIZED PRE-AMPLIFIER



FEATURES

- Fixed equalization per RIAA and NAB specifications.
- Maximum "head room" (+10 dbm output.)
- Typical distortion — 0.1% @ any output level to +10 dbm.
- Gain @ 1 Kc — with 12 mv input — 1 volt output.
- Modern Solid State integrated circuitry.
- Built-in power supply.
- 100% magnetic shielding.
- Full range output level control without degradation of response, noise, or distortion.
- Magnetically shielded output transformer provides 150/600 ohms balanced output.
- Maximum dynamic range - eliminates clipping and distortion @ high level passage.
- Contains built-in rumble filter.
- Designed for use with all popular variable reluctance and magnetic cartridges.
- Noise level — below rated output — better than −75 db.
- Two independent channels.
- Can be driven by two mono turntables.
- Separation between channels — better than 60 db.
- Scratch filtering can be achieved by simply adding resistor across input terminals.

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1568 NORTH SIERRA VISTA, FRESNO, CALIF. 93703 • Phone: 209 251-4213
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USES

The QRK Ultimate II stereo equalized pre-amplifier is designed to be used with two monaural or one stereo cartridge to provide the broadcaster and recording laboratory with a reliable pre-amplifier for disc reproduction. In addition to having excellent noise, distortion and equalization properties, the Ultimate II has exceptional dynamic range. This substantial "head room" eliminates the common problem of distortion and clipping at loud passages due to the overloading of commercial pre-amplifiers. It also has substantial separation between channels (60 db) to assure minimum cross talk in stereo operation and reliable operation with two mono turntables.

DESCRIPTION

MAXIMUM "HEAD ROOM"

The average output level of commercial pre-amplifiers is approximately −20 dbm. This is quite adequate for the average mixing buss in conventional consoles. However, it is not unusual for a record disc to have a loud passage which would require the pre-amplifier to produce an output substantially higher than the −20 dbm level. Many pre-amplifiers do not have sufficient dynamic range to accept this increased level without introducing distortion and clipping.

The QRK Ultimate II can produce +10 dbm on both channels without any evidence of distortion or clipping. Thus, it contains a substantial reserve or "Head Room" for the common loud record passages which will permit amplification without degradation of the signal.

RESPONSE WITHIN +0.5 db OF NAB CURVE

The Ultimate II contains a fixed equalization to compensate for the NAB equalization in the original recording. Thus, the result is that the output of the pre-amplifier when fed by a NAB disc is essentially flat from 30 cycles to 15,000 cycles.

BUILT-IN POWER SUPPLY

One major source of noise and hum pick-up in many commercial pre-amplifiers is the interconnection wires and circuitry between the pre-amplifier and its power supply. The QRK Ultimate II has a power supply as an integral part of its physical package. This eliminates many problems and contributes substantially to the very low noise (−75 db) of the pre-amplifier on both channels.

MAGNETICALLY SHIELDED OUTPUT TRANSFORMERS

The Ultimate II contains as a standard component, a substantial magnetically shielded transformer which achieves a balanced 150/600 dbm output. This transformer can substantially reproduce +10 dbm at 30 cycles without saturating on both channels. The use of transformers isolates the ground circuitry between the pre-amplifier and its termination and thus eliminates "ground loops."

NOISE INDEPENDENT OF OUTPUT LEVEL

The QRK Ultimate II has facilities for changing the gain of the amplifier on both channels by utilizing independent attenuators at the output of the device rather than at the input level. Thus, the ratio of signal to noise, below +10 dbm output, is independent of output level settings and remains at least 75 db below the desired signal.

BUILT-IN RUMBLE FILTER

With the advent of stereo, greater emphasis has been placed on the rumble characteristics of turntables, tone arm and cartridges. Rumble components are normally very low frequencies that are related to the turntable speeds. Thus, they produce components at approximately 5 to 15 cycles. The QRK Ultimate II contains solid state circuitry which introduces a low frequency roll-off of 6 db per octave below 70 cycles on each channel.

**CAN BE USED WITH ALL POPULAR MONO AND STEREO CARTRIDGES

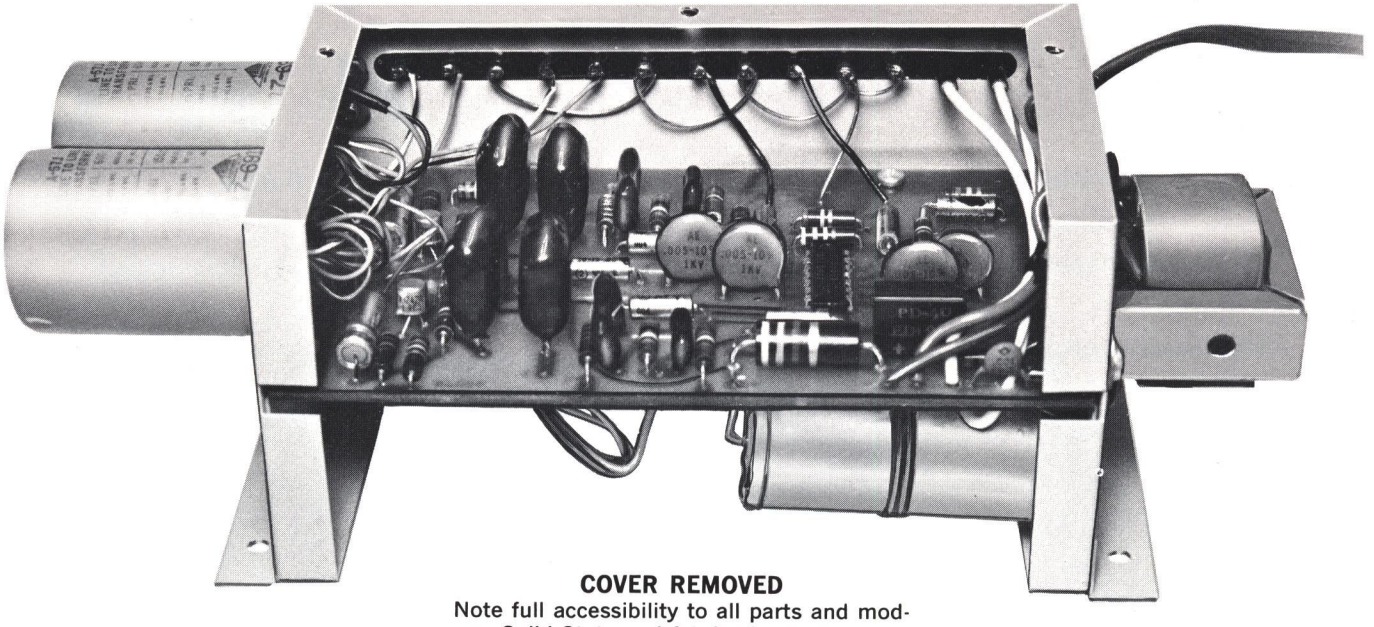
The QRK Ultimate II has an input impedance of approximately 150 K on each channel. By terminating its input terminals with an appropriate terminating resistor, the pre-amplifier may be driven by any popular cartridge.

*SCRATCH FILTERING

The QRK Ultimate II normally has its input terminals terminated with an impedance of approximately 47 K. This results in a reasonably flat response with respect to a normalized RIAA curve. However, by simply adding a low valve resistor across the input terminals, a high frequency roll-off, or "scratch filtering" will occur. Rather than making this easily available to untrained personnel, QRK provides the data and permits the operator to make his own decision relative to insertion in the circuit.

SEPARATION BETWEEN CHANNELS - 60 db

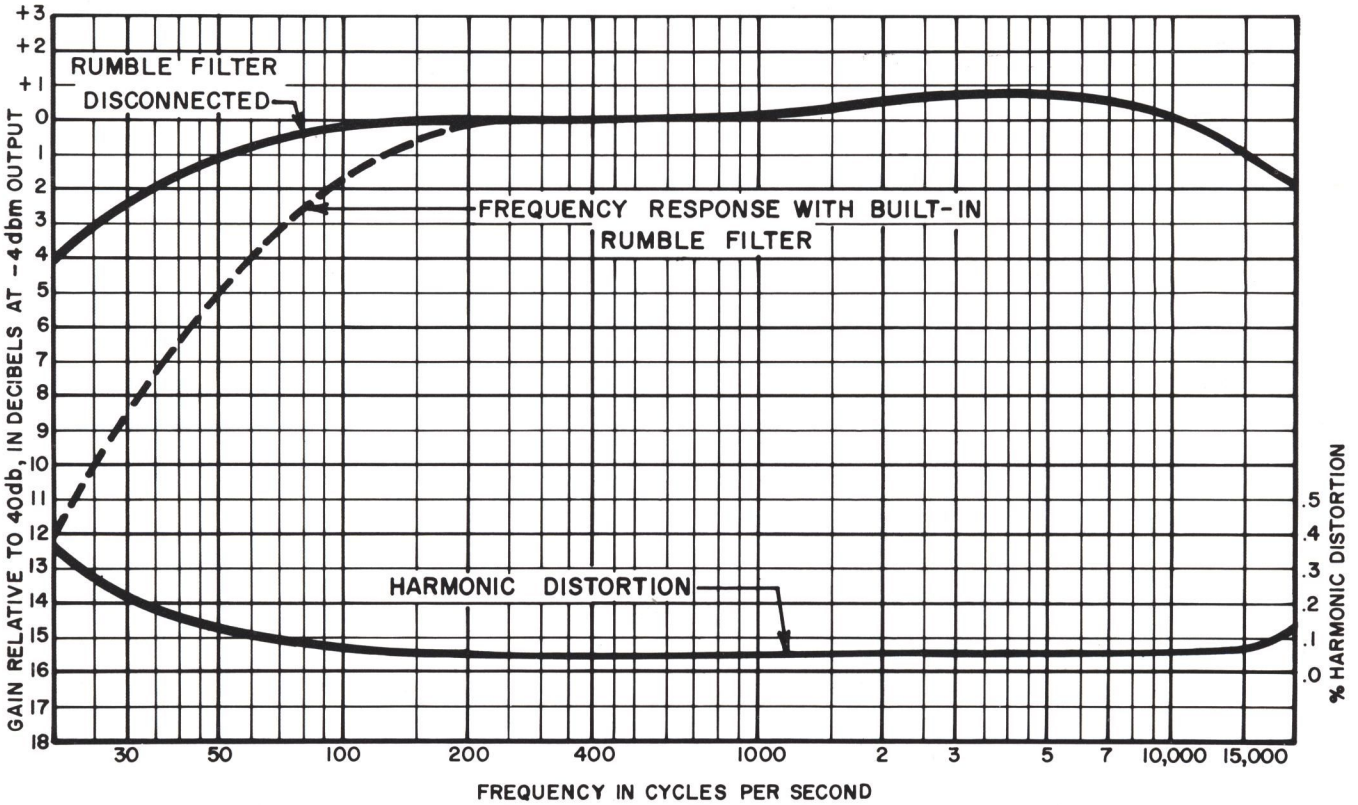
The QRK Ultimate II has two independent channels with a minimum separation of 60 db between each other. Thus, the broadcaster can be assured of practically "absolute isolation" in the stereo mode. In addition, where two turntables are located adjacent to each other, one Ultimate II can serve as a pre-amplifier for two mono turntables.



COVER REMOVED

Note full accessibility to all parts and modern, Solid State and fabrication techniques.

NORMALIZED FREQUENCY RESPONSE & HARMONIC DISTORTION



The response curve described above is normalized to the NAB curve for standard disc reproducing characteristics.

TECHNICAL SPECIFICATIONS

Output Level with standard NAB reference input (12 mv)	0 dbm
Guaranteed Maximum Output Level without signal clipping	+10 dbm output
Maximum Input Level	50 mv
Gain @ 1 Kc	0.8 volt output with 12 mv input
Noise, with 12 mv input	−75 db
Output Impedance	150/600 ohms (balanced)
Distortion at all levels to +10 dbm output	0.2% max. (.1% typical)
Frequency Responses with respect to NAB curve	±1 db -50 HZ to 15 KHz
with rumble filter connected	−3.0 db @ 50hz
	12 db per octave below 70 hz
Separation between channels	60 db
Maximum Operating Temperature	+60° C
Power - 105/125 volts, 50/60 cycles	6 watts

Size - 9" L x 3" H x 3" W

Weight - 2½ #net, 3 #gross

Mounting position - Can be mounted in any position.

QRK PRODUCTS

- Professional Turntables
- Turntable Cabinets
- Precision Tone Arms
- Equalized Pre-Amplifiers
- Mono and Stereo Cartridges

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

QRK ELECTRONIC PRODUCTS, INC.
1568 NORTH SIERRA VISTA, FRESNO, CALIF. 93703 • Phone: 209 251-4213
A Subsidiary of CCA Electronics Corp. Gloucester City, New Jersey 08030

MODEL 12C - INSTANT START
BROADCAST PROFESSIONAL TURNTABLE

FEATURES

- Instant Start
- Anticipated life - 20 years.
- Three moving parts.
- 99.95% speed regulation
- 25 years of service.
- Available in custom colors.
- World's most popular professional turntable. (25,000 users)
- Rim drive assures minimum rumble consistent with maximum torque.
- Precision rugged aluminum base and platter.
- Instant speed change to 33 1/3, 78 and 45 RPM.
- Patented platter configuration permits reliable reproduction of 33 1/3, 78 and 45 RPM records of non-flat or "dished" form.
- Chassis easily mounted in any turntable housing or table.
- Available from stock - stored at nationwide distributors and at two plants - one on each USA coast.
- Supplied with optional equalized preamplifiers, tonearms, and housings.
- Supplied with pre-drilled holes for specified tonearms.

ELECTRONIC PRODUCTS, INC.
Telephone: 209/251-4213
1568 No. SIERRA VISTA
Fresno, California 93703

A Subsidiary of
CCA ELECTRONICS CORP.
716 Jersey Avenue Tel. (609) 456-1716
GLOUCESTER CITY, NEW JERSEY 08030

DESCRIPTION

INSTANT START
The QRK-12C professional turntable is designed specifically for the broadcast and recording industries, where fast start up, consistent with excellent quality is required to achieve continuous programming with a minimum of time between events.

THREE MOVING PARTS
The QRK instant start turntables incorporate **only three moving parts.** A substantial synchronous motor with a precision capstan: a wearproof neoprene idler wheel; and a precision balanced aluminum platter. Operation of the speed control engages the idler wheel with a specific portion of the capstan which in turn transfers this motion to the rim of the platter.

RIM PLATTER DRIVE
QRK developed the fundamental patent for the conventional "instant start" professional turntables. In evaluating the various methods of coupling the energy from the motor to the platter, it was concluded that rim drive represents the optimum compromise between reliability, instant start and minimum rumble.

RUGGED 3-SPEED ADJUSTER
Located in front of the turntable is a finished metallic arm which, when placed in the appropriate slot, will engage the idler wheel with the capstan and produce a turntable speed of 33 RPM, 45 RPM or 78 RPM.

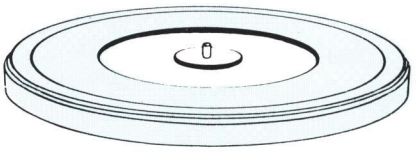
NON-SLIP EXCLUSIVE PLATTER WITH FIXED 33 1/3, 45 AND 78 RPM FACILITIES
QRK is the only major professional turntable which has facilities for playing conventional records without adding custom adaptors to the platter. The center pin serves as a centering device for 78 and 33 RPM records. These record sizes rest on the center large hub and the outer felt portion of the platter. The 45 RPM records use the large hub as a centering device and nestles inside the center recessed area. The substantial traction available from this platter configuration permits the use of semi-warped, non-flat records.

ADEQUATE AREA FOR TONE ARM INSTALLATION
The QRK-12C turntable is displaced somewhat to the left on its base. Thus, there exists a reasonable area to the right of the platter to install the specific tone arm desired by the user. If desired, QRK will pre-drill the mounting holes for the specific tone arms. This can be supplied at a nominal additional charge. If tone arms are ordered with the turntable, pre-drilling is available at no additional charge.

AVAILABLE WITH COLORS OF YOUR CHOICE
The standard QRK-12C turntable is supplied in a handsome beige color. At an optional price, these tables may be provided in the color of the user's choice.

INSTALLATION SIMPLICITY
The QRK-12C requires only 6" of depth and approximately 1½ square feet of surface area. The turntables are supplied with a full-scale hole pattern which can serve as an overlay in fabricating the turntable housing. (QRK offers a complete line of walnut finished cabinets for these turntables.)

OPTIONAL ACCESSORIES AVAILABLE
QRK offers a complete line of equalized preamplifiers, handsome turntable housings, and a number of popular tone arms and cartridges. These are available on an individual basis or prewired in a complete assembly.



Exclusive **PLATTER - DAPTER**

SPECIFICATIONS

Line Voltage
115/230 volts AC - (115 volts standard)
Note: If 230 volts specify - optional cost.

Line Frequency
50/60 cycles (60 cycles standard)
Note: If 50 cycles specify - optional cost.

Speed Regulation
99.95%

Wow, Rumble, Flutter
Meets or exceeds NAB standards.

Start-up time @ 33 RPM for full speed
1/8 sec. max. (1/16th of revolution)

Standard Color
Beige with brown felt.
Turntable available with special colors @ optional cost.

Dimensions 12S / 16S
Width - 14 1/2" / 19 5/8"; front to back - 15 3/8" / 19 5/8"; depth below frame - 6" / 6"

Weight
17 net; packed # 23

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

QRK MODEL 101
PROFESSIONAL TONE ARM

FEATURES

* Tracks as low as 1/2 gram without skipping grooves.
* Designed to work with modern, highly-compliant, light-tracking cartridges.
* When used with modern cartridges - will not wear records.
* Ruggedly built of high-strength alloys.
* Elastically damped counterbalance with vernier adjustment for precision zero balance.
* When used with QRK cartridge - no resonances from 30 cycles to 30 Kc.
* Excellent cueing visibility.
* Separate horizontal and vertical pivots with stops.
* Skating force with QRK cartridge negligible (less than 2/10 gram.)
* Easy one-hole mounting with pivots and rest heights adjustable - 1 11/32" to 2 3/8".
* Statically Balanced - no springs. Loading easily adjustable by calibrated counterweight arm.
* Gravity Loading assures tracking on warped records.
* Provisions for Anti-skate adjustment.
* Removable head for fast cartridge installation.
* Provided with audio cord with matching 5-connector plug.
* Extra length and careful design minimizes lateral tracking error - Max. error 1.25 degrees.
* Cartridge head can accommodate all standard and majority of non-standard cartridges.
* No exposed audio leads - maximum shielding.
* Stylus not affected by stiffness or dress of audio cable.
* Independent, simple to operate, balancing and tracking controls.

USES

The QRK-101, professional Tone Arm, is a contemporary design which, when used with modern cartridges, provides the broadcasting and recording industries with a device that can faithfully reproduce modern stereo records without the common problems of poor tracking, skipping and excessive record wear. It also incorporates a number of mechanical features which permit ease of installation, rapid cartridge change and excellent cueing visibility.

QRK ELECTRONIC PRODUCTS, INC.
1568 NORTH SIERRA VISTA, FRESNO, CALIF. 93703 · Phone: 209 251-4213
A Subsidiary of CCA Electronics Corp. Gloucester City, New Jersey 08030

MODEL 101 PROFESSIONAL TONE ARM

DESCRIPTION

Designed for Modern Cartridges: The highly compliant, light tracking cartridges presently being offered represent a minimum of loading (1 to 3 grams) to the tone arm. This weight is not sufficient to assure proper tracking by viscous damped and older type tone arm designs. Increased loading on the older type tone arms to assure tracking reduces the reproduction qualities of the cartridges and introduces substantial wear to records. The QRK-101 can reliably track with the highly compliant, light tracking modern mono and stereo cartridges.

Separate Vertical and Horizontal Pivots: The QRK-101 tone arm is designed to faithfully reproduce modern stereo records. This can only be accomplished with individual vertical and horizontal pivots. In addition, the QRK-101 incorporates stops which prevent damage to audio cables.

Simplicity of Mounting, Adjustment and Cartridge Change: The QRK-101 requires only one conventional sized hole for mounting. In addition, it contains calibrated controls to achieve balance and anti-skate adjustments in a matter of seconds. There is no requirement to spend endless hours "weighting" the tone arm. The "head" of the tone arm can be removed in seconds by simply "unscrewing" a threaded, keyed bushing. Thus, a cartridge can be replaced in a minimum of time.

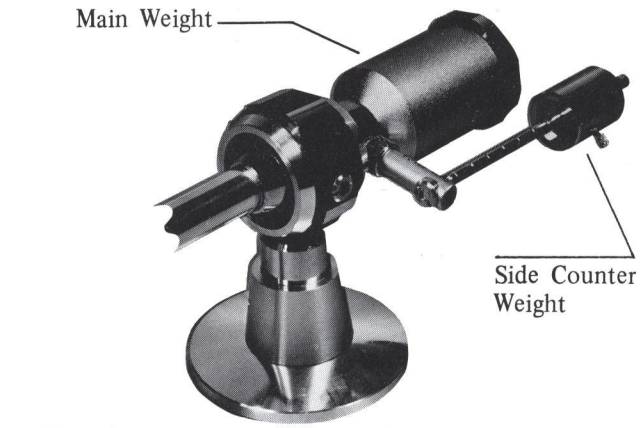
Gravity Loading Assures Excellent, Uniform Tracking: The QRK-101 Tone Arm does not utilize any viscous damping or spring loading. Thus, the loading on the cartridge of the QRK Tone Arm will be constant, independent of the flatness of the record. In a viscous damped arm, the arm will not track on a warped record due to the built-in viscous damping. This results in actual skipping of grooves and low frequency intermodulation distortion products. Spring loaded arms introduce "non-constant" tracking loads on warped records.

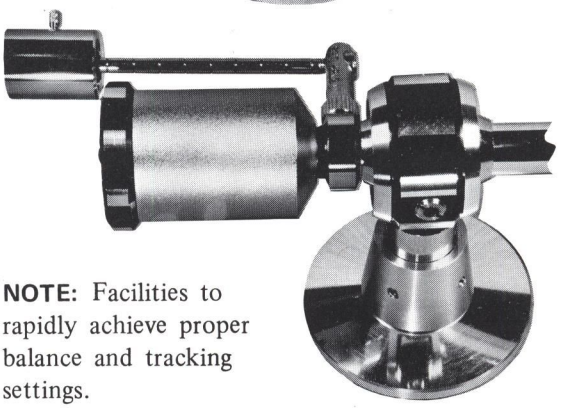
Minimum Tracking Error: The QRK-101 Arm is somewhat longer than conventional arms. This fact, together with a special form factor design, results in a maximum lateral tracking error of less than 1.25 degrees.

Designed to Accommodate Non-Standard Cartridges: The tone arm cartridge housing contains (3) three sets of mountings to accommodate practically all popular and non-standard cartridges.

Low Mass Arm Does Not Contribute to Resonances: Friction-free operation is guaranteed by the use of miniature ball bearings. In addition, special alloys are used with substantial mechanical strength but of such a nature that resonances do not occur. When used with the QRK Cartridge, the first resonance is at 35,000 cycles which is the stylus tip mass resonance.

Excellent Cueing Visibility: Due to the unique form factor of the arm, it is possible to quickly locate the cartridge stylus on the disc when viewing the arm from any view.





NOTE: Facilities to rapidly achieve proper balance and tracking settings.

SPECIFICATIONS

Dimensions: Overall - 13 5/8"
Spindle to Pivot - 9"
Spindle to Back of Arm - 3 3/8"
Overhang - Spindle to Stylus Center 9/16"
Adjustable for off-standard pickups.

Weight: - 12 Ounces

Tracking Error: - 1.25° Max.

Resonance: - Below 10 cycles with average pickup. Virtually damped out.

Tracking Pressure: - Depending on cartridge, can track @ 1/2 Gram. (2 1/4 grams recommended for QRK F3 Cartridge)

Viscous Damping: - None required. (Silicon oil in pivot bearings produces drag and effects trackability and reproduction qualities.)

Balancing: - Achieved by Adjustable Control

Tracking Adjustment: - Achieved by side mounted calibrated counter weight.

Cartridge Head: - Removable - Can mount non-standard cartridge.

Pivot and Rest Heights: - Adjustable (1 11/32" to 2 3/8") - Supplied with color coded, audio cables with plugs at each end.

QRK MODEL F3 STEREO CARTRIDGE

FEATURES

* Specifications unequalled by any other cartridge
* Rugged - Designed to last under the punishment of "back-cueing"
* Trackability second to none when tested at 2 grams tracking force and +18 dbm output
* Frequency Response - ±1 db 20 - 20,000 cycles
  ±3 db 10 - 35,000 cycles
* No Resonance Peaks - 10 to 35,000 cycles
* Constant Mechanical Impedance at all frequencies
* IM distortion factor less than 1% over full frequency range
* Channel Separation unequalled by any other cartridge:
  25 db from 100 to 10,000 cycles
  20 db from 20 to 20,000 cycles
* Channel Balance - Typical ±1 db on both channels.
* Tracking Force – 1.5 - 3.5 grams. Optimum at 2¼ grams in QRK Arm - Assures Minimum loading on stylus and optimum disc and stylus life.
* Precision Mechanical Pivot for stylus designed to absorb heavy broadcast applications
* Low internal impedance permits operation of long audio output cables without effecting frequency response and output.

USES

The QRK F3 Tone Arm Stereo Cartridge was designed to provide the broadcast and recording industires with a rugged, reliable stereo cartridge which could faithfully reproduce stereo records with a minimum of tone arm loading and which can withstand the rugged work load of broadcast "back-cueing" and normal mis-handling.

DESCRIPTION

Trackability - Second to None: QRK has thoroughly evaluated the Model F3 cartridge under the most severe program material (15 db above normal recording levels at all audio frequencies.) The cartridge, when mounted in the QRK Tone Arm and loading for a nominal 2¼ grams has consistently tracked without skipping.

Separation - Channel separation is important in mono reproduction as well as stereo. In mono, if the channels are not closely balanced and the L and R channels are paralleled, peaks and dips will occur in the response. The QRK F3 cartridge has a channel separation of better than 25 db from 100 to 10,000 cycles and 20 db minimum at 20,000 cycles. This is unequalled by any other cartridges we have measured. Competitive cartridges normally have separations of less than 6 db at the higher audio frequencies.

QRK ELECTRONIC PRODUCTS, INC.
1568 NORTH SIERRA VISTA, FRESNO, CALIF. 93703 · Phone: 209 251-4213
A Subsidiary of CCA Electronics Corp. Gloucester City, New Jersey 08030

MODEL F3 STEREO CARTRIDGE

DESCRIPTION (Continued)

Channel Balance - The QRK F3 cartridge is guaranteed to produce the same output voltage on each channel within 2 db over the full frequency range. (Typical results ±1 db.) This is an extremely important feature for both mono and stereo operations. It contributes to the excellent response when paralleling the channels for mono performance and maintains substantial directionality for stereo.

No Resonant Peaks - One of the major problems in a cartridge design is to eliminate mechanical and electrical resonance which amplifies selectively specific frequencies in the audio spectrum. The QRK F3 cartridge has its first resonance, its tip mass resonance, at 35,000 cycles, thus there is no spurious amplification over the complete audio frequency range.

Rugged - The QRK F3 cartridge utilizes an elastomeric thrust bearing which is designed to overcome the "nemesis" of all broadcast cartridges - "back-cueing." The fabricated metal pivots instead of the usual "O" ring maintain the original stylus alignment under the stress of mis-handling and "rough duty" service.

Minimum Tracking Force - Assures minimum disc and stylus wear - The QRK F3 can reliably track under a tracking force range of 1.5 to 3.5 grams. The recommended 2¼ grams when used in the QRK Tone Arm, have consistently tracked without losing contact with the groove wall at the loudest recorded passages. (Highest stylus velocities.)

TECHNICAL SPECIFICATIONS

Output - 4 Millivolts @ 3.54 CMV - 45°(Left or Right)

Frequency Response – 10 - 35,000 Hz (cps) ±3 db;
20 - 20,000 Hz (cps) ±1 db

Channel Separation - Dynamic Full Range - 25 DB
(CBS STR III L & R Channel Square Wave)

Recommended Load - 10,000 ohms or more (47K Normal)

Inductance - 55 Millihenries

DC Resistance - 700 Ohms

Tip Mass Resonance - 35,000 Hz (cps)

Mounting - Standard ½" (12.7mm) centers

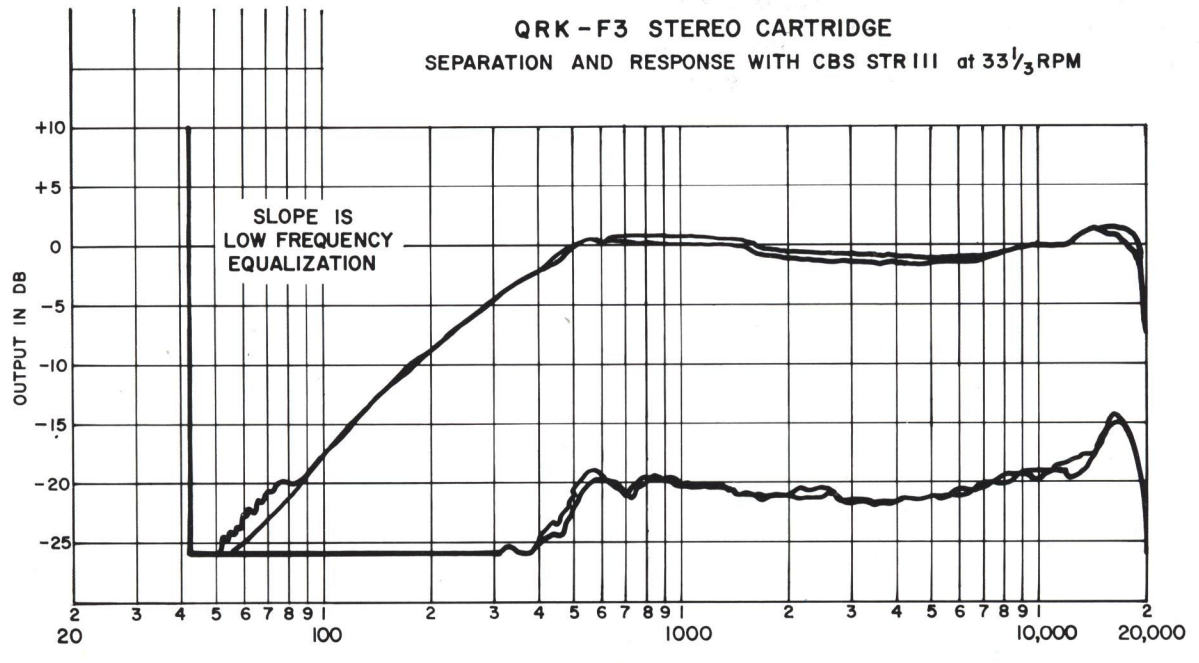
Pickup Weight - 5.5 grams

Stylus - Diamond - .6 spherical

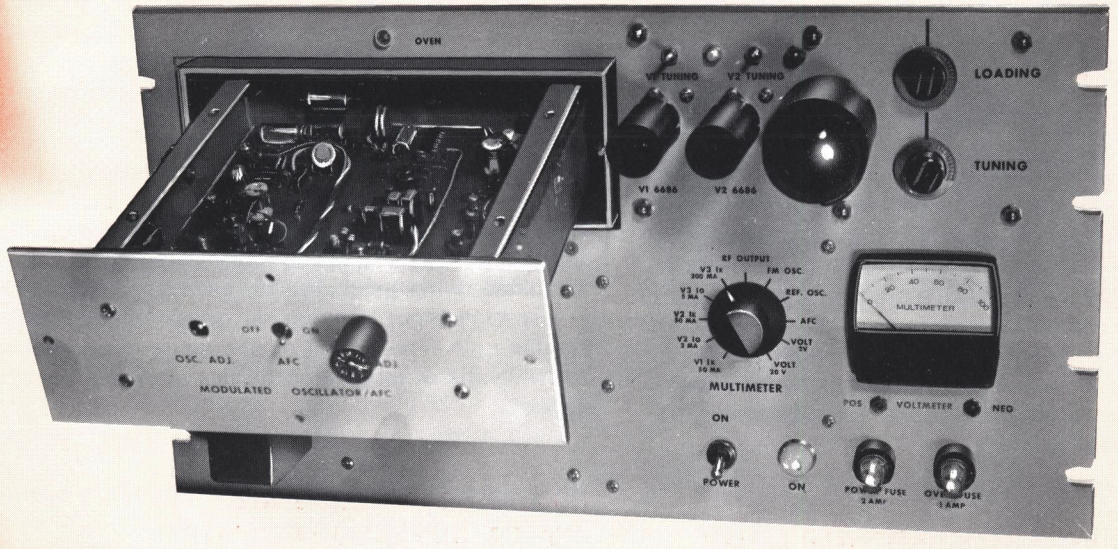
Tracking Force – 2 - 2¼ grams

Channel Balance - ±2 db (±1 db typical)

Terminals - 4 in standard Configuration



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 running 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

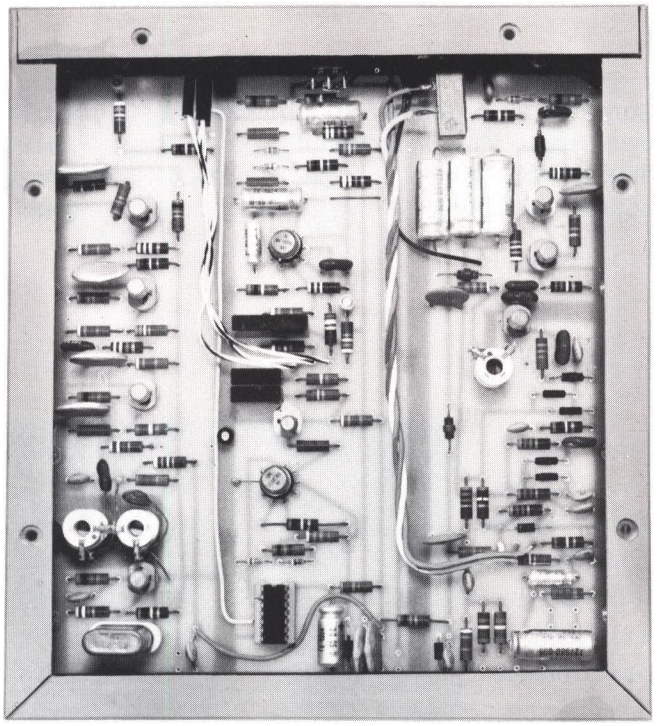
The output of the Solid State Exciter is a modulated RF carrier whose frequency is ¼ the desired frequency. This signal is amplified and multiplied by *three* inexpensive but reliable vacuum tubes whose total expense is less than ten dollars. Our inclusion at this point of conventional vacuum tubes rather 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.

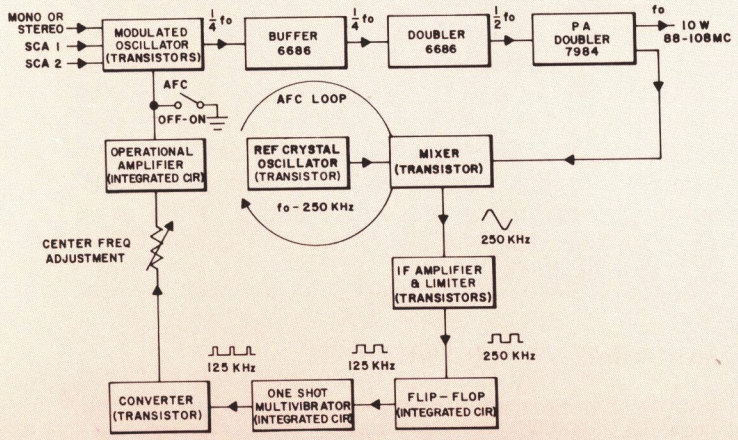
DESIGNED AND CONSTRUCTED BY *CCA* – SERVICEABLE BY *CCA*

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

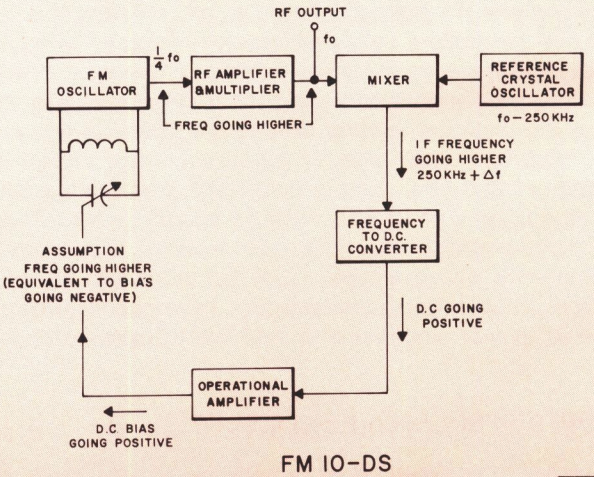
Power Output ..... 10 Watts Minimum
Frequency Range (Specify) ..... 50 to 150 mc
Type of Emission ..... F3—F9
Output Impedance ..... 50 Ohms
Output Connector ..... BNC
Modulation Capability ..... ±150 Kc
Carrier Frequency Stability ..... ±1000 cycles
Audio Input Impedance ..... 600 ohms
Audio Input Level
(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

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.

Front View of FM-10D

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.

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.

CCA ELECTRONICS CORPORATION
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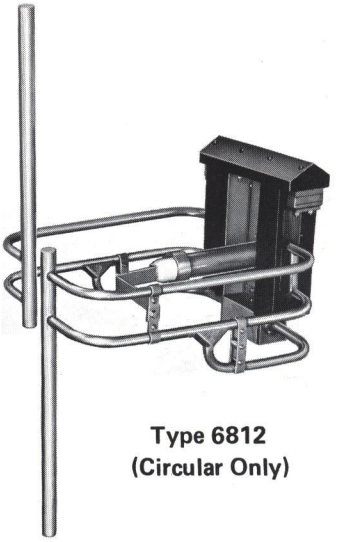
CCA - FM EDUCATIONAL BROADCAST ANTENNAS

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

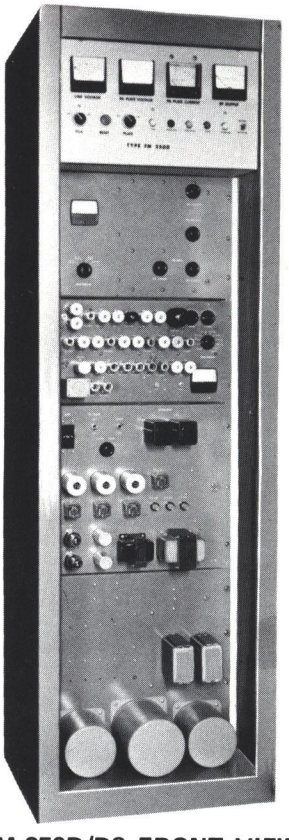
FEATURES

- 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

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

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

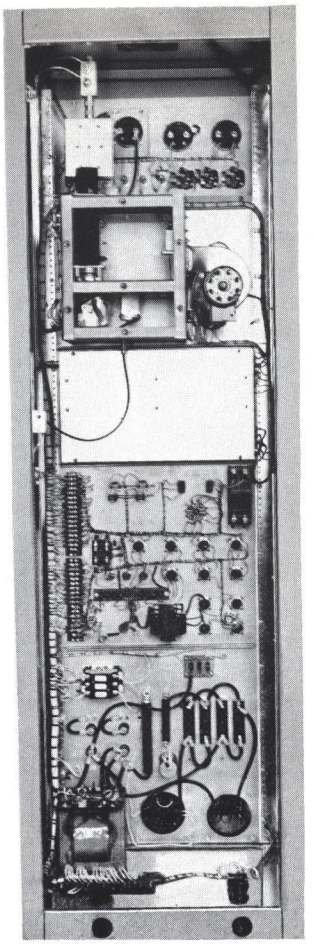
An essential unit in every broadcast facility is a device to prevent overmodulation of the carrier. The CCA LA-1D efficiently and inexpensively performs this task by preventing audio peaks from modulating the transmitter. Details available in a separate catalog sheet.

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.

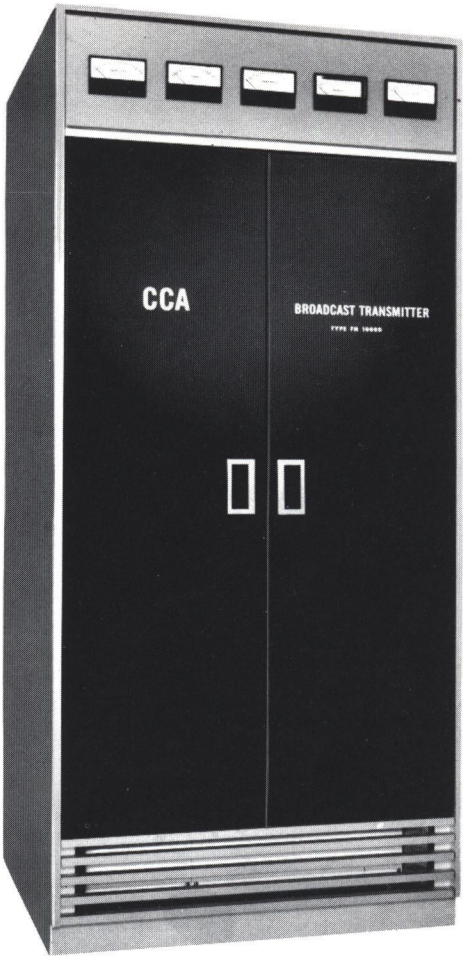
TECHNICAL SPECIFICATIONS

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 - 1000D/DS, 1KW FM BROADCAST TRANSMITTER

FEATURES

- High Mu Zero Bias Triode in Pa
- True Grounded Grid Circuitry
- No Requirement for Neutralization
- Modern Inexpensive 3CX1000A7 in PA
- Conservatively Rate — Tube Capability is 2KW Output
- Available with Monaural or Stereo Exciters
- Designed for Subsidiary Service
- Solid State Silicon Rectifiers
- Automatic Overload Recycling
- Minimum Floor Space — One Cabinet
- Conversion to 3KW and 5KW



FM-1000D/DS — Front View

MECHANICAL DESCRIPTION

The FM-1000D/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-1000D/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 within the equipment and are supplied with the original price.

ELECTRICAL DESCRIPTION

EXCITER

The FM-1000D/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. 200w output—much greater than the 50 watts required from this stage. There is no requirement for neutralization of this tube.

PA

The modern 3CX1000A7 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 40% 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-1000D/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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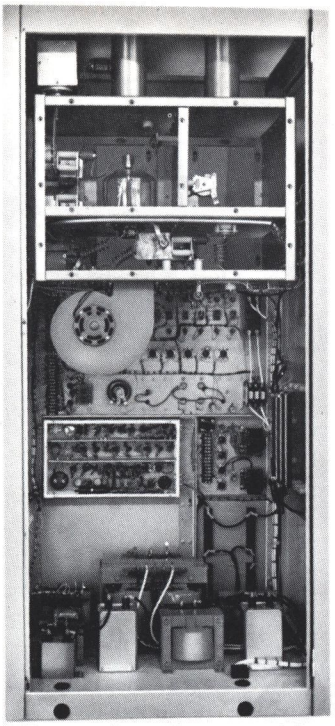
716 JERSEY AVE., GLOUCESTER CITY, NEW JERSEY 08030



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.

3KW/5KW CONVERSION

The FM-1000D/DS contains the basic form factor of CCA 3KW and 5KW Transmitters. CCA personnel can convert, in one evening, the FM-1000D/DS to a type approved higher power transmitter. Thus, broadcasters may reduce their capital requirements by initially investing in a 1KW Transmitter and converting it at a future date when expansion is desired.

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 1KW FM Transmitter commercially available.

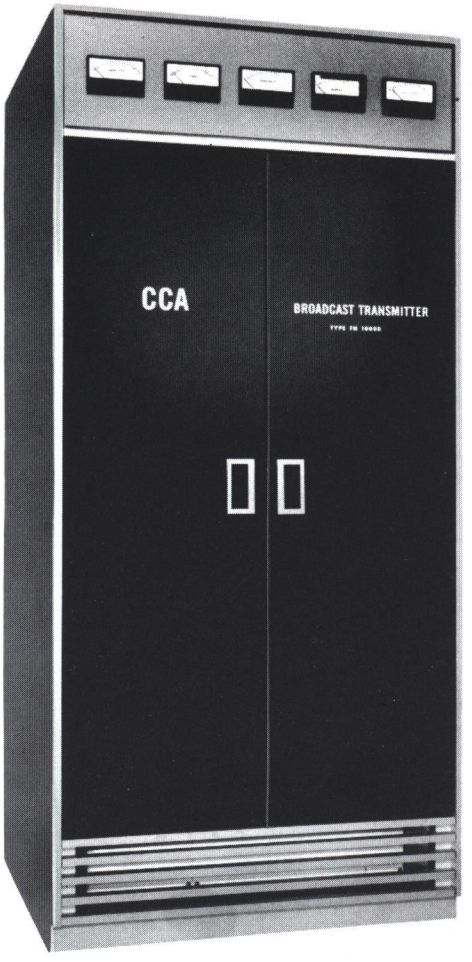
TECHNICAL SPECIFICATIONS

Power Output Capability	1.5KW
Frequency Range	50 - 150 MHz
Frequency Stability	.001%
RF Output Impedance	50 ohms
(fitting)	7/8"
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 (Monaural)	± 1 db
AF Distortion (Maximum)	1%
Noise (below 100% Mod.)	-65 db
Line Voltage	208/230V
Line Frequency	50/60 Hz
Phase	1
Power Consumption (Approx.)	2.4KW
Net Dimensions (W x H x D) inches	34 x 76 x 33
Gross Cubeage Cu. Ft.	110
Gross Weight Lbs.	1200
PA Tube	3CX1000A7
Harmonic Level (below carrier)	-80 db

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.

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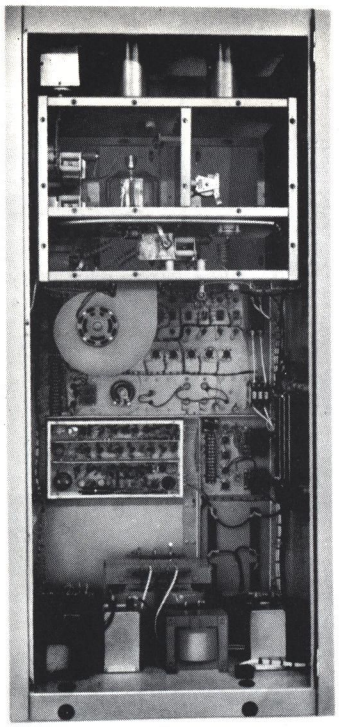


Rear View — Note Full Accessibility, Complete RF Shielding, Silicon Rectifiers, and Rugged, Substantial Power Supply Components.

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 3KW FM Transmitter commercially available.

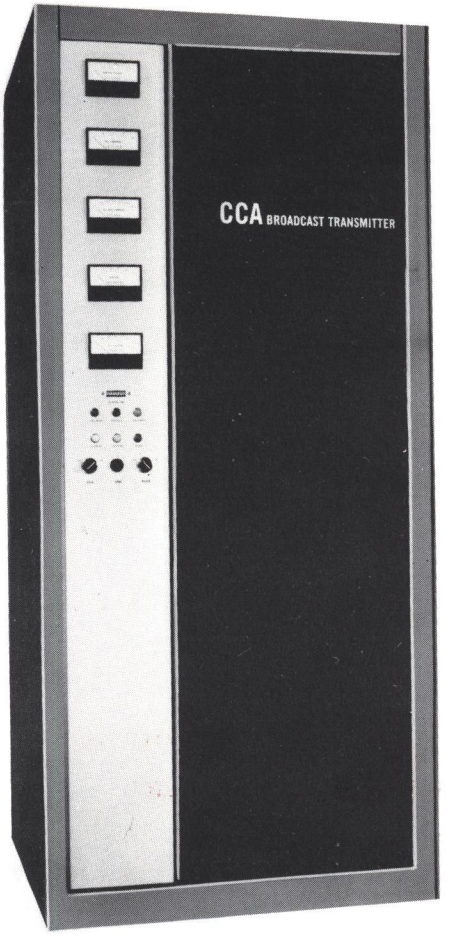
TECHNICAL SPECIFICATIONS

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

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



FM-5,000D/DS — FRONT VIEW

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

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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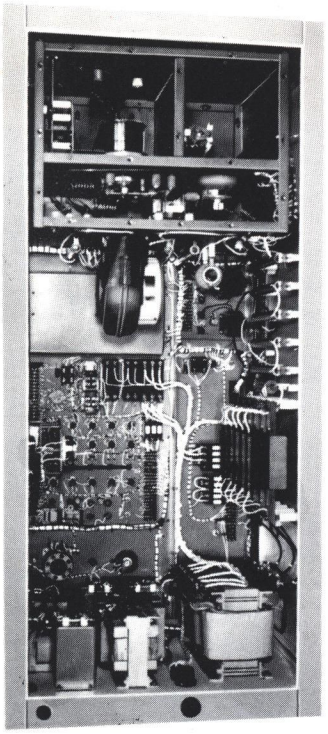

Rear View — Note Full Accessibility, Complete RF Shielding, Silicon Rectifiers, and Rugged, Substantial Power Supply Components.

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 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.

FM-10,000D/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-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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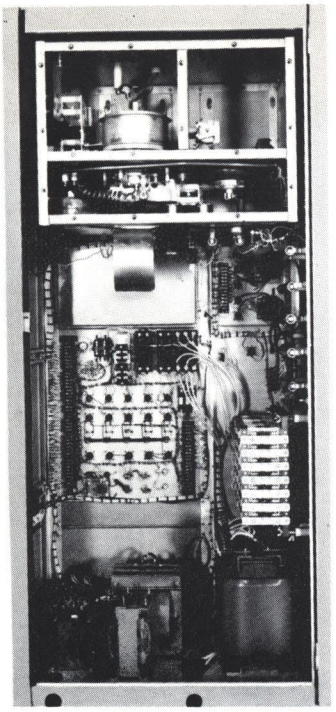

Rear View — Note Full Accessibility, Complete RF Shielding, Silicon Rectifiers, and Rugged, Substantial Power Supply Components.

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

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RC-1D REMOTE CONTROL

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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.

TECHNICAL SPECIFICATIONS

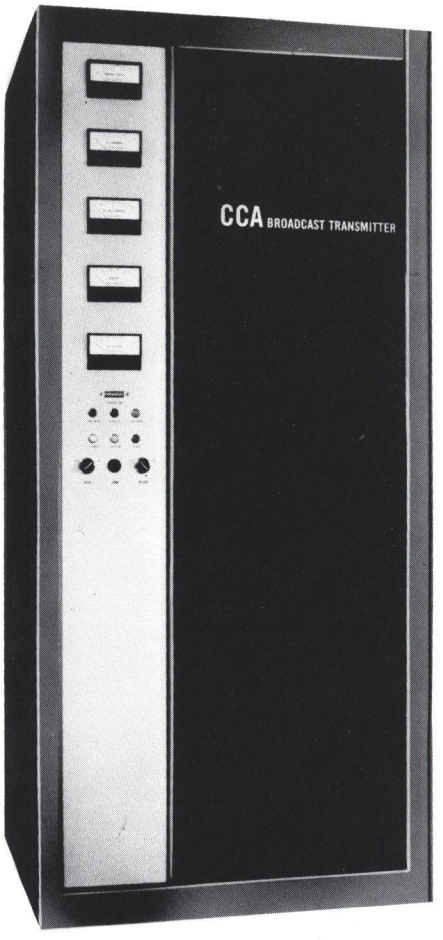
Power Output Capability	12,000W
Frequency Range	50 - 150MHz
Frequency Stability	.001%
RF Output Impedance	50 ohms
(fitting)	3⅛"
AF Input Impedance	150/600 ohms
AF Input Level @ 100% Mod.	+10 dbm Max.
AF Response (with 75 us pre-emphasis) 50 - 15,000 Hz (Mono)	±1 db
AF Distortion (Maximum) (Mono)	1%
Noise (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

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

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



FM-20,000D/DS — FRONT VIEW

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.

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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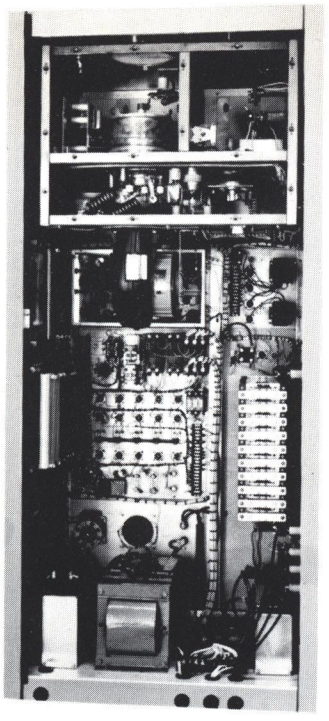


Rear View — Note Full Accessibility, Complete RF Shielding, Silicon Rectifiers, and Rugged, Substantial Power Supply Components.

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.

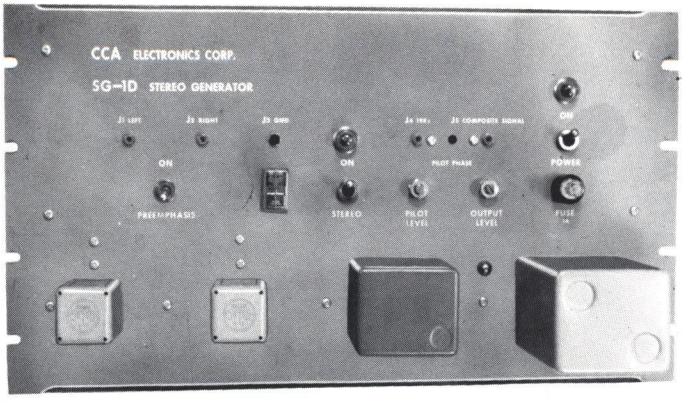
The "Second Generation" designs that were introduced in 1958 utilize high gain tetrodes in their final stages. They required a minimum of RF drive but the necessity for neutralizing these tetrodes and their attendant instabilities have represented a constant source of technical problems for the modern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

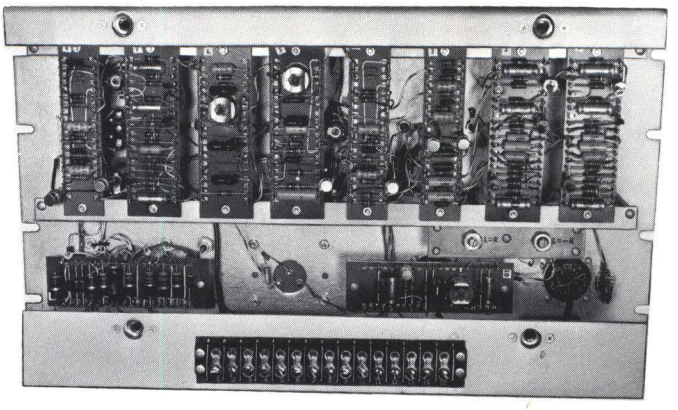
TECHNICAL SPECIFICATIONS

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

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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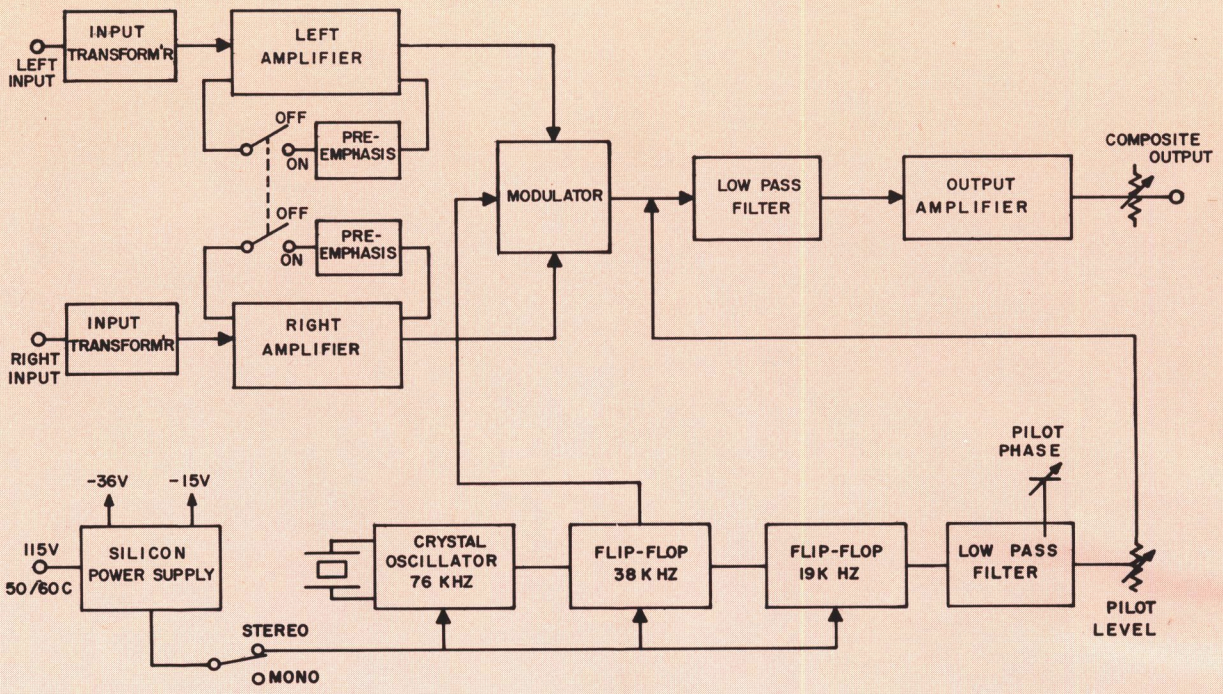

SG-ID STEREO GENERATOR
BLOCK DIAGRAM

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

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^{o} 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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716 JERSEY AVE., GLOUCESTER CITY, NEW JERSEY 08030

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

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

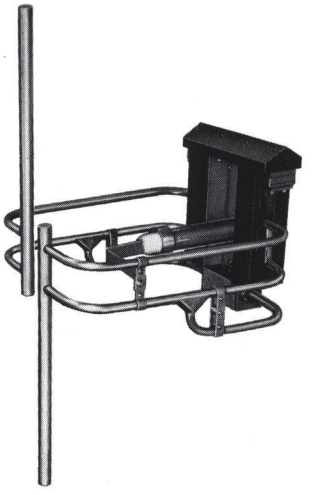
The CCA 6810 antenna is essentially a stainless steel tubing formed in a rectangular folded loop configuration with vertical elements. Its RF input is a standard 3⅛" EIA flange. Each bay plugs into a standard 3⅛" transmission line which serves as a feed line.

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.



Type 6810 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 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.

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

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

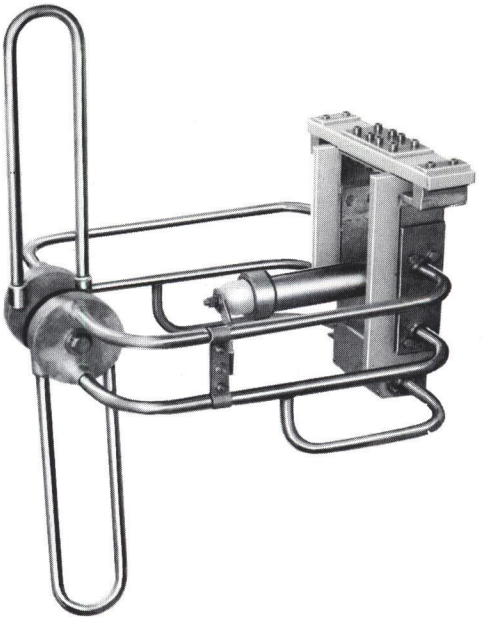
To obtain the effective free space field intensity at one mile in mv/m for one kilowatt antenna input power, multiply field gain by 138.

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

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.

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

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

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.

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

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

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

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

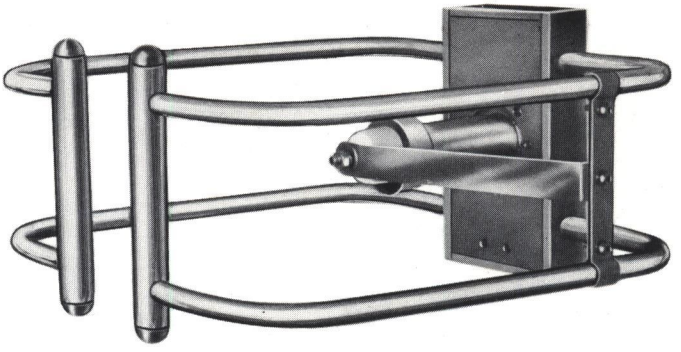
The CCA FMA-( ) D antenna is essentially a stainless steel tubing formed in a folded rectangular configuration. Its RF input is standard 3⅛" EIA flange. Each Bay plugs in to a standard 3⅛" ' transmission line which serves as a feed line.

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.

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

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

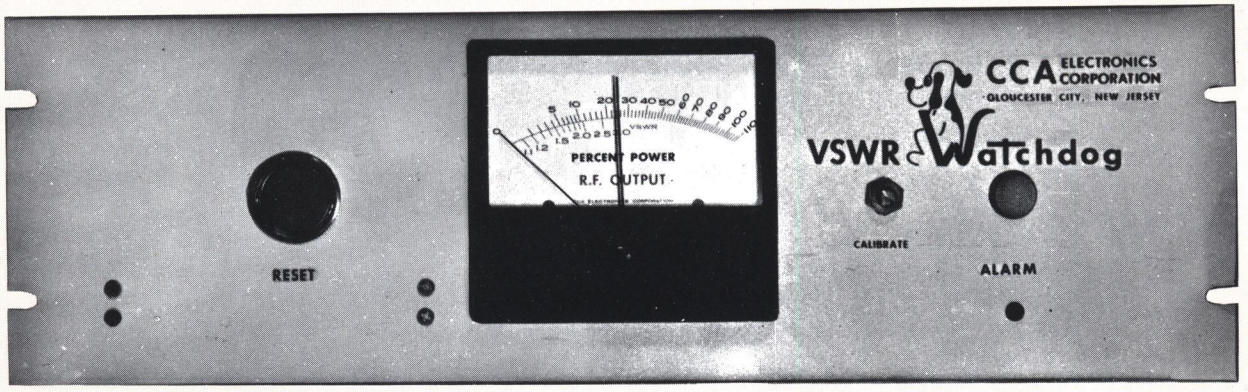
*To obtain the field gain, take the square root of the power gain

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.

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

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.