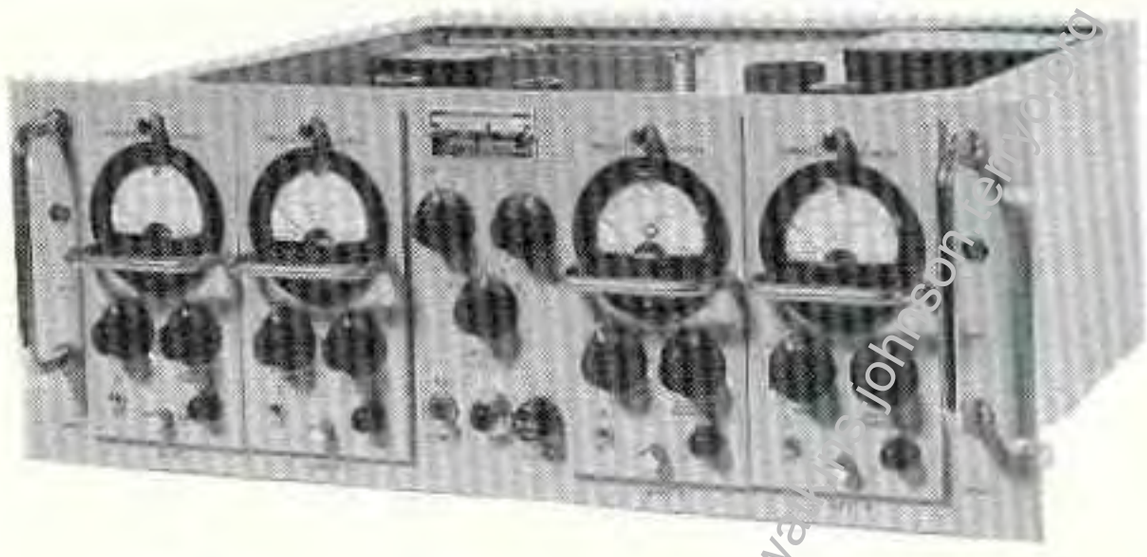
DIVERSITY COMBINER
NEMS-CLARKE DCA-1000-A AND DCA-500-A

IMPROVES SIGNAL-TO-NOISE RATIO BY COMBINING THE OUTPUTS OF UP TO 4 RECEIVERS



The Nems-Clarke Diversity Combiners are designed for use in installations in which several Nems-Clarke 1400 Series Receivers with 500kc and 100kc bandwidths receive the same RF transmission simultaneously from different antennas. The outputs of the receivers are connected to the inputs of the combiner, and the combiner mixes these signals into a single output, the signal-to-noise ratio of which is at least as good as the best input s/n ratio. When one of the combiner inputs has an s/n ratio much higher than the others, the output s/n ratio is equal to the high input; and, when all the input s/n ratios are equal, the output s/n is higher than any single input. Since combining is acomplished electronically, the units will respond instantly to rapid changes in signal-to-noise ratios.

Combining Action is obtained by sampling the noise output of each receiver by means of high-pass filters. A control voltage is developed from the output of the sampling filters, and this voltage controls the contribution of each receiver to the combined output. The contribution of each signal is thus made smaller as the noise in the signal becomes greater. When the input s/n ratios are equal, an improvement in output s/n is possible because the noise output of the receivers is uncorrelated, and the noises do not add in the way in which the signals add. A cancellation circuit is used to prevent fluctuation in the control voltages from appearing in the combined output.

Two Fail-Safe Circuits are employed to guard against failure. One circuit prevents loss of one of the input video signals from causing degradation of the output signal; the other circuit connects the output terminal directly to a preselected input terminal to prevent complete loss of data if the combiner output should fail.

The DCA-1000A can handle the outputs of up to four receivers; while the DCA-500A can handle the outputs of two receivers. Either the 500kc or the 100kc bandwidth of the 1400 series receivers can be used. A switch on the combiner is set for operation on the desired bandwidth. Although the combiners are designed to handle FM/FM and PDM/FM telemetry signals, they can be modified for non-standard signals.

The combiner is contained in a 15-inch deep chassis mounted on a standard 19 inch rack panel seven inches high. PLUG-IN UNITS with operating controls on the front panel contain the circuits which are repeated for each input, and each may be removed from the chassis for servicing while the others continue to operate.

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RANGE CHARACTERISTICS

Recommended IRIG Telemetry Signals Modifications for non-standard signal reception, are available — PDM/FM

Bandwidth Position — 500kc

Maximum Data Frequency Range — 30cps to 35kc

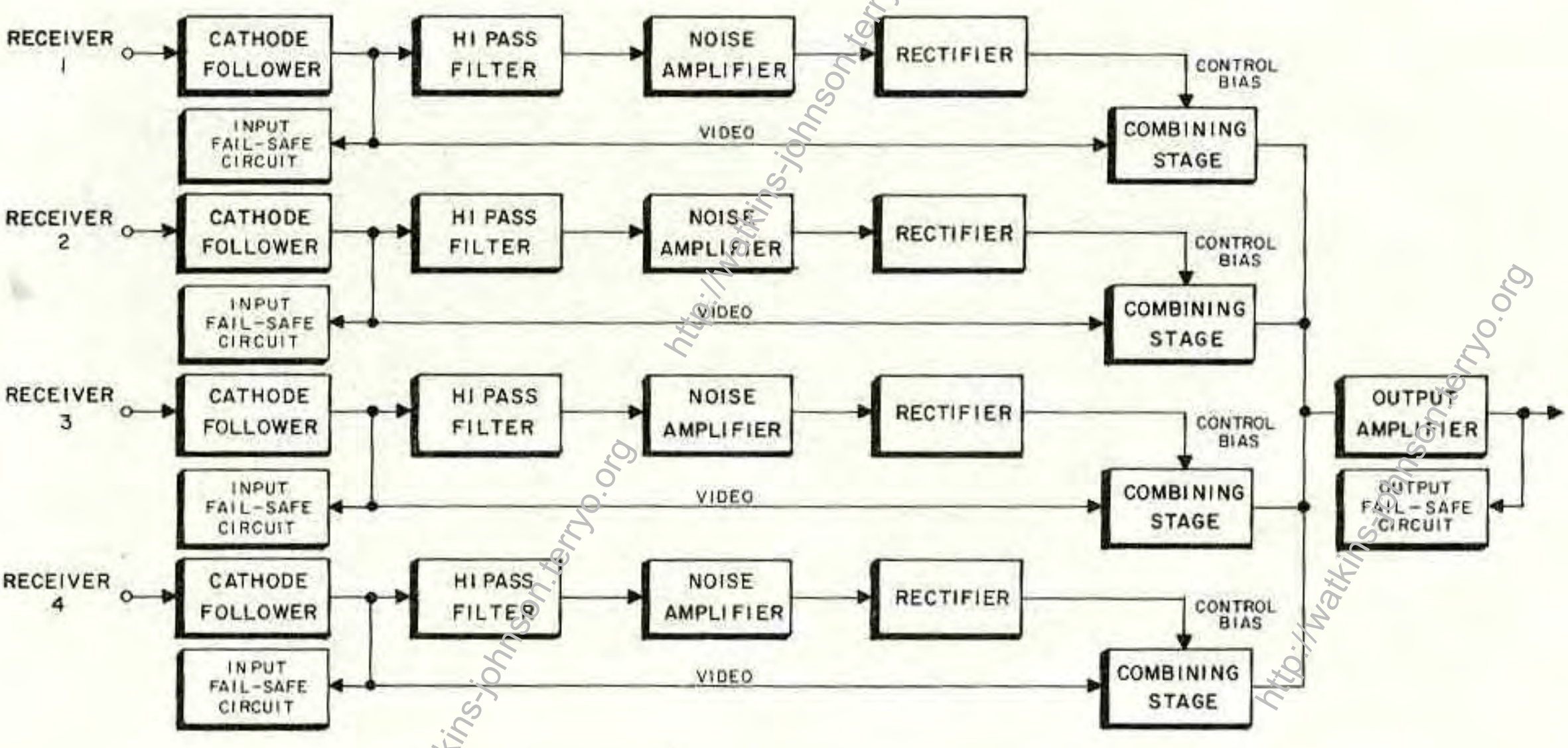
Minimum Available Noise-frequency Range — up to 70kc

Recommended IRIG Telemetry Signals Modifications for non-standard signal reception, are available — FM/FM

Bandwidth Position — 100kc

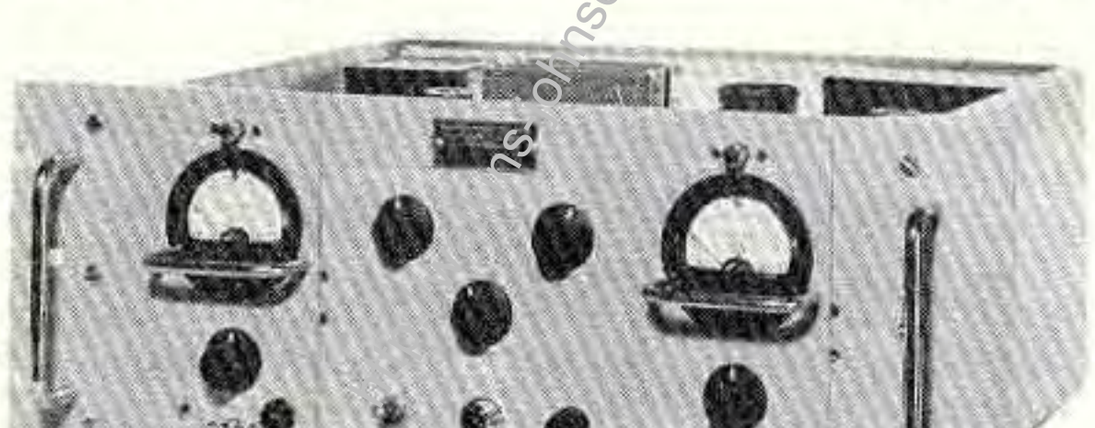
Maximum Data Frequency Range — 30cps to 85kc

Minimum Available Noise-frequency Range — up to 130kc



PERFORMANCE

S/N Improvements for equal Inputs	S/N ratio	4 inputs, 5-6 db 3 inputs, 4-4.7 db 2 inputs, 2-3 db
Input Level at .04 volt/kc deviation, approximate:		10% maximum difference between inputs; 8 volts RMS maximum
Input data Phase Shift		25 degrees maximum between any two inputs
Input Impedance		470,000 ohms in parellel with 30$\mu\mu$f
Load Impedance		500 ohms, minimum
Overall Gain		Variable up to +10db
Maximum Output Level		10 volts RMS
Overall Frequency Response		±2db, 30cps to 200kc
Response Time		2 milliseconds, approximate
Distortion		Less than 1%
Input Power		120 volts, 50-400cps, 150 watts
Size		19 × 7 × 15 inches
Weight DCA- 500A (2 channel)		Net 40 lbs: Shipping 60 lbs.
DCA-1000A (4 channel)		Net 45 lbs: Shipping 65 lbs.



Price: DCA-500A, $2,700.00

Price: DCA-1000A, $3,500.00

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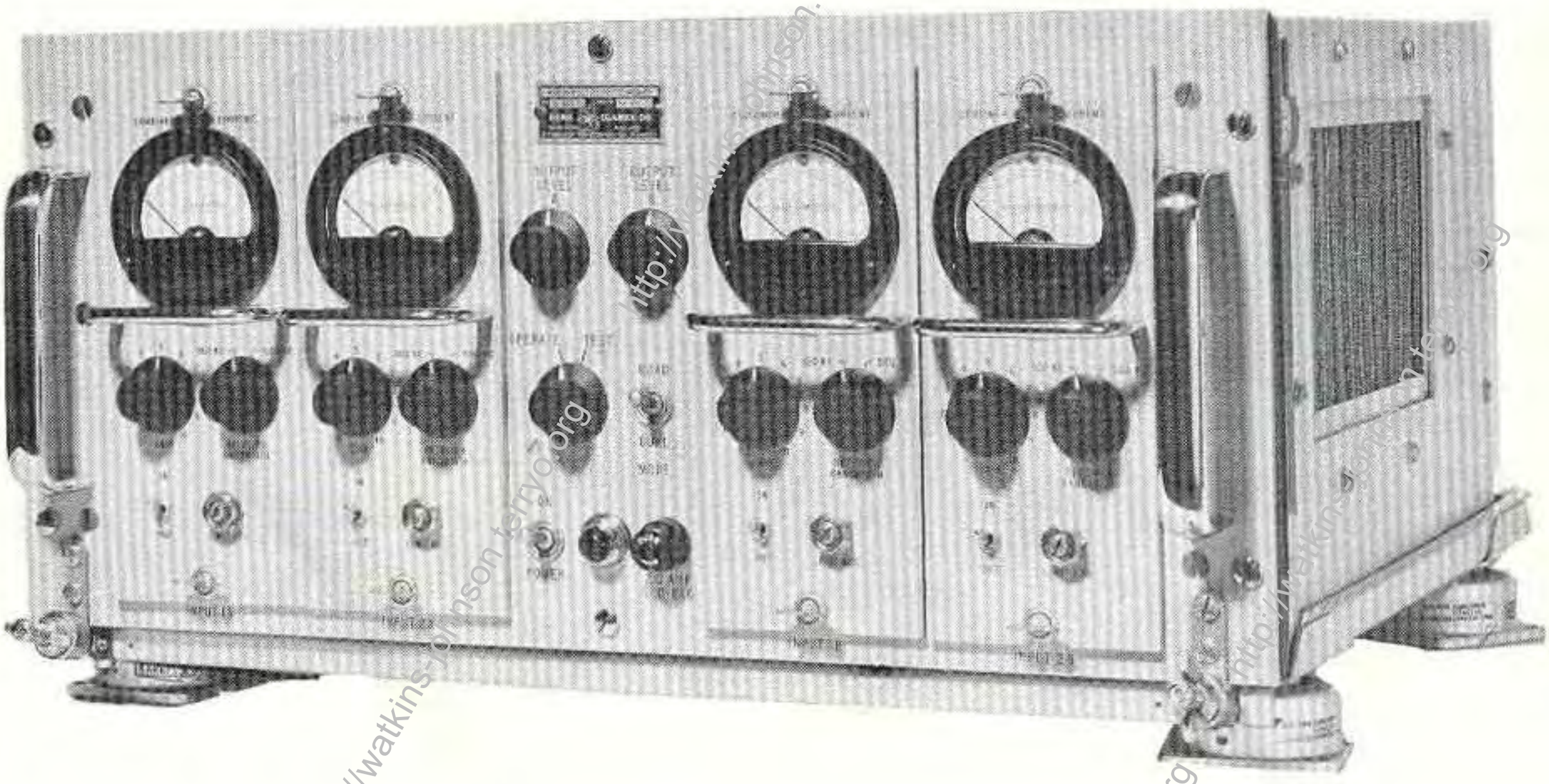
AIRBORNE DIVERSITY COMBINER
NEMS-CLARKE DCA-2000



The Nems-Clarke DCA-2000 airborne diversity combiner has been designed to operate in conjunction with 2, 3, or 4 model 1403 Airborne Telemetry receivers. Equipped with shock-mount tray, dust cover and 50-400cps power supply, it is capable of operating in a double-dual or single-quadruple mode. Common-cathode combining circuits are used to give signal-to-noise improvements similar to those attained with the DCA-1000 in ground station applications.

SPECIFICATIONS

Number of Receiver Outputs Accepted — 4, 3, 2, or 1

S/N Improvement, for Equal Input S/n's —
4 inputs, 5-6db;
3 inputs, 4-4.7db;
2 inputs, 2-3db

Response Time — 2 milliseconds, approximate

Bandwidth Position
500kc

Frequency Range — 30cps-85kc

Telemetry Signals — FM/FM

Noise-Frequency Range — up to 130kc

100kc

Frequency Range — 30cps-35kc

Telemetry Signals — PDM/FM

Noise-Frequency Range — up to 70kc

Input Level — 0.4 volt/kc deviation approximate: 10% maximum difference between inputs. 8 volts RMS maximum

Input Data Phase Shift — 25 degrees maximum between any two inputs

Input Impedance — 470,000 ohms in parallel with 30$\mu\mu$f

Load Impedance — 500 ohms, minimum

Overall Gain — Variable up to +10db

Maximum Output Level — 10 volts RMS

Overall Frequency Response — ±2db, 30cps-200kc

Distortion — less than 1%

Input Power — 120 volts, 50-450cps, 150 watts

Size — 19 × 8¾ × 15 inches

Weight — 45 pounds

Price: $3,600.00

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