Analog Data Control System
TMC Model ADC-1-()

- ● Remote control via any transmission medium
- ● Extremely accurate
- ● On-off reporting

- ● Fully transistorized
- ● Unlimited versatility
- ● Infinite variation reporting

- ● Automatic mark and space hold

The Technical Material Corporation's Analog Data Control System is a solid-state device to electrically translate analog (infinitely-variable) voltages to digital information that may be readily transmitted over common communication circuits such as wire, cable or radio, including HF, VHF, UHF and Microwave links. On-off reporting and control is also available.

The system provides a means to:

1. Gradually turn a knob at a remote control panel and have the output of the system gradually affect an electronic circuit *or* gradually manipulate a mechanical device.

2. Read voltages in an electrical circuit *or* read the position or condition of a mechanism and transmit such readings to a remote location.

Of special interest is the inherent "infinite resolution" capability of the Analog Data Control circuit. The circuit design is such that an infinitely small change at the system input will be indicated by a corresponding infinitely small change in output.

For purposes of this discussion, an "Analog Voltage" is defined as a voltage that may vary or be varied in infinitely small increments over its entire range. By proper combinations and circuitry hook-up, an accuracy factor in control and/or readback of .05% (.0005 of total) may be achieved when necessary.

Analog Data Control System

The Analog Data Control System may be used in two distinct ways:

1. To remotely control a device, either electronically or mechanically.
2. To read information, either electronic or mechanical, from a remote point.

In high-frequency transmitting and receiving equipments, the system may be used to remotely-control and monitor:

<table>
<tr><td>VARIABLE OPERATING FUNCTIONS</td><td>METER READINGS</td></tr>
<tr><td>
1. RF Gain
2. Audio Gain
3. Squelch Level Adjust
4. BFO Tune
5. AFC Scan
6. Antenna Tune (Receivers)
</td><td>
1. RF output Level (Transmitters)
2. Signal input Level
3. AFC Meter position
4. Line Level
5. Etc.
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</table>

The system may also be used in fields normally unrelated to communications. It is especially suitable for control of, or signalling information from unattended equipment such as motors, generators, pumps, etc. In this field, it may be used to control the position of such mechanisms as valves, handles, gates, speed controls, throttles, governors, etc., and to signal the position of these devices.

Another use would be to transmit information regarding environmental conditions such as temperature, barometric pressure, wind speed etc.

The system may be used to remotely read certain conditions of performance relating to unattended equipments such as speed, repetition rate, fuel, cooling, pressure and critical equipment temperatures.

One of the most effective uses of the Analog Data Control System principle is in the transfer of meter readings between locations. Simple input circuit additions will allow the system to be used to remotely read output results of electrical power equipment and to monitor rate of flow and pressure of gas or liquid.

Input converter to the Analog Data Control System equipment is simple and readily available. In fact, some converters such as RPM-to-voltage, oil-pressure-to-voltage, etc., are in common use in automobiles.

TECHNICAL SPECIFICATIONS

RASA-1 (Send Unit)

FUNCTION:	Linear conversion of DC voltage to frequency-shifted tones.
RESOLUTION:	Infinite, a function of the input voltage.
LINEARITY:	Typically better than 1%.
DC INPUTS:	Up to 16 DC voltage inputs, 0 to —10V.
KEYING SPEED:	Varies as a function of DC input signal.
INPUT IMPEDANCE:	Greater than 15,000 ohms.

OUTPUT FREQUENCIES:

Composite tone output at:
1. National (U.S.) Standard frequencies: Any center frequency from 425 cps to 3315 cps in 170 cps steps, with $\pm$ 42.5 cps frequency shift.
2. CCITT Standard frequencies: Any center frequency from 420 cps to 3180 cps in 120 cps steps, with $\pm$ 35 cps frequency shift.
3. Other center frequencies and shifts: see OPTIONS/ACCESSORIES.

FREQUENCY ACCURACY:

Better than .7 cps.

FREQUENCY STABILITY:

Short term stability (8 hours) better than .5 cps for a power supply variation of $\pm$ 10% and/or a temperature variation of $\pm$ 25°C with respect to 25°C.

LEVEL:

0 to —30 dbm, each channel, continuously adjustable.

OUTPUT IMPEDANCE:

Nominal 600 ohms, unbalanced.

OUTPUT DIRECTION:

Shift rate decrease with increasing negative input voltage.

TRANSLATION PROPORTIONALITY CONSTANT:
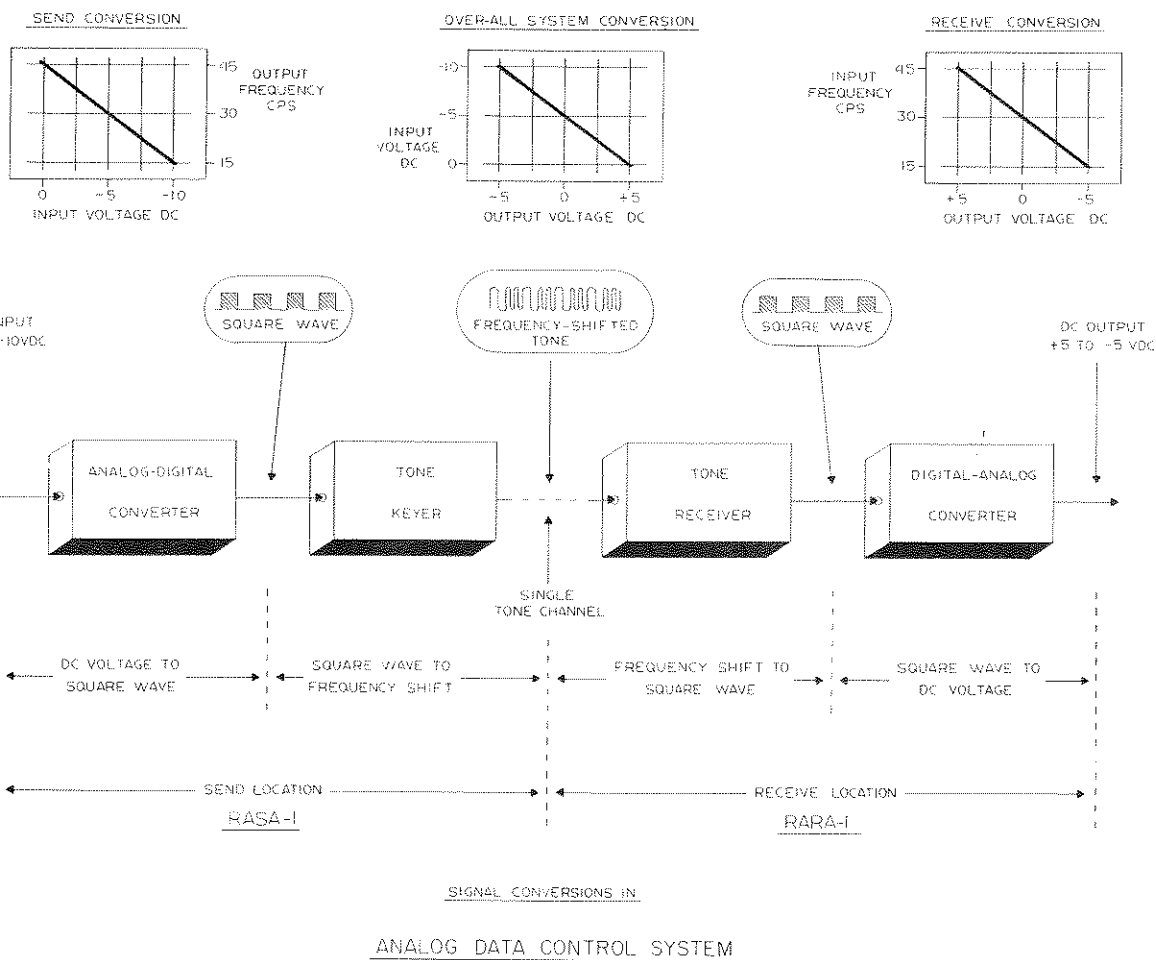
3 cps/volt.

RARA-1 (Receive Unit)

FUNCTION:

Linear conversion of frequency shifted tones to DC voltage.

LINEARITY:

Typically better than 2%.

RESPONSE SPEED:

Approximately 300 milliseconds rise time.

INPUT:

Audio composite tones from RASA-1.

KEYING SPEED:

Up to 150 bauds.

INPUT FREQUENCIES:

Individual channel frequencies compatible with National or CCITT tone frequency assignments (see RASA-1 output frequencies).

INPUT LEVEL:

+5 to —45 dbm per channel, nominal.

INPUT IMPEDANCE:

Nominal 600 ohms, unbalanced.

DC OUTPUTS:

Up to 16 DC outputs —5 to +5 VDC.

OUTPUT IMPEDANCE:

Approximately 1,000 ohms.

OUTPUT DIRECTION:

Voltage moves in positive direction with increasing shift rate.

TRANSLATION PROPORTIONALITY CONSTANT:

.333 volt/cps.

INSTALLATION DATA (BOTH UNITS)

SIZE:
   POWER SUPPLY

19" wide by 7" high by 18" deep.
19" wide by 3½" high by 18" deep

WEIGHT:
   POWER SUPPLY

22 lbs. approximately.

Analog Data Control System

OPERATING POWER REQUIRED:	115/230 VAC, 50/60 cps, 1 phase approximately 140 watts.
OPERATING TEMPERATURE RANGE:	—20 to 50°C. (—50 to +65° optional, Priced extra)
STORAGE TEMPERATURE RANGE:	—40 to +85°C. (—65 to +85°C optional, Priced extra)
RELATIVE HUMIDITY:	95% operating, 100% storage.
OPTIONS/ACCESSORIES: (priced separately)	1. Tone module center frequencies and shifts to customer's specifications. 2. National or CCITT Standard Frequencies extended to 5000 cps.

SIGNAL CONVERSIONS IN

ANALOG DATA CONTROL SYSTEM

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