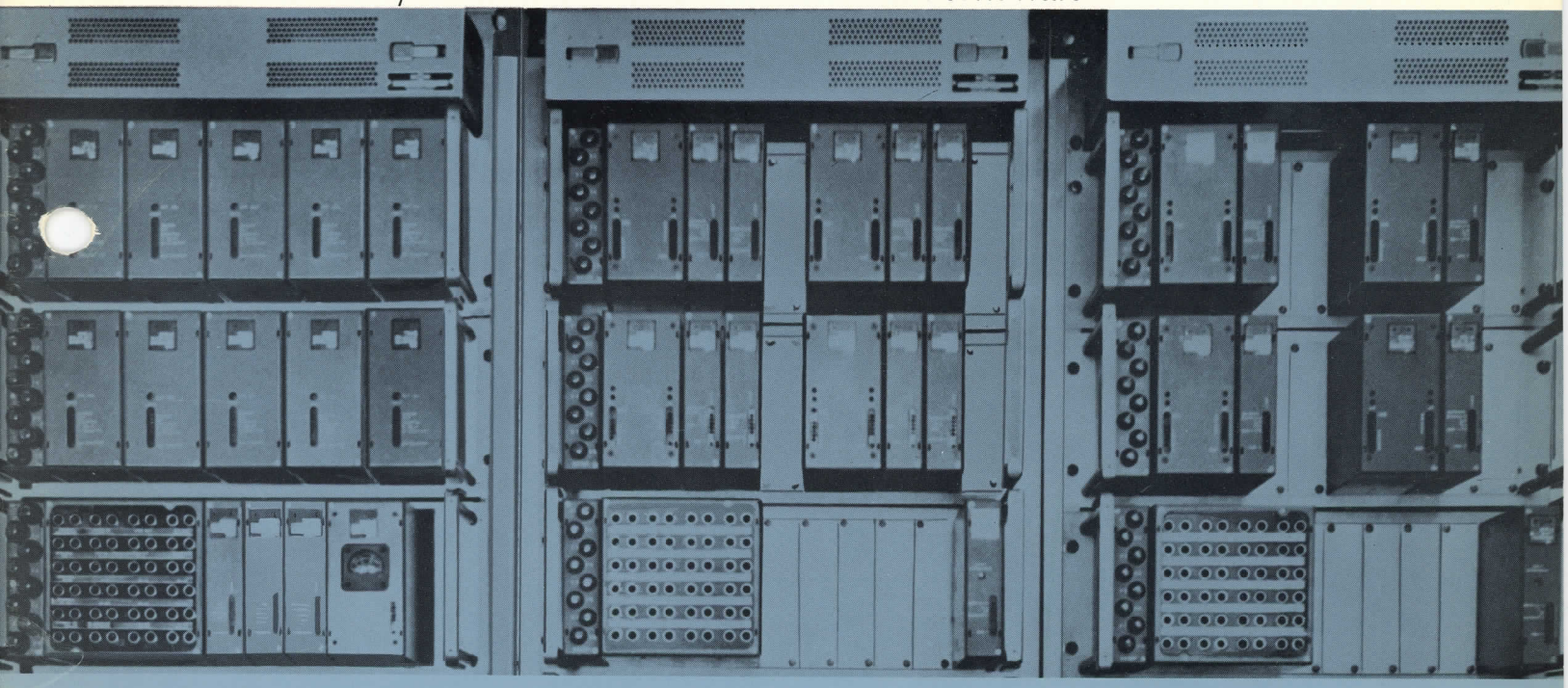
TE-202

TECHNICAL DESCRIPTION

COLLINS Kineplex® Parallel 3200 BPS Data Terminals



COMMUNICATION AND DATA SYSTEMS DIVISION

COLLINS

GENERAL SPECIFICATIONS

Cooling:

A blower assembly and cooling duct are provided with each rack to maintain internal equipment at suitable operating temperatures. In the event of cooling system failure, an airflow alarm sounds an audible signal and an interlock switch interrupts power to the receiver.

Environmental:

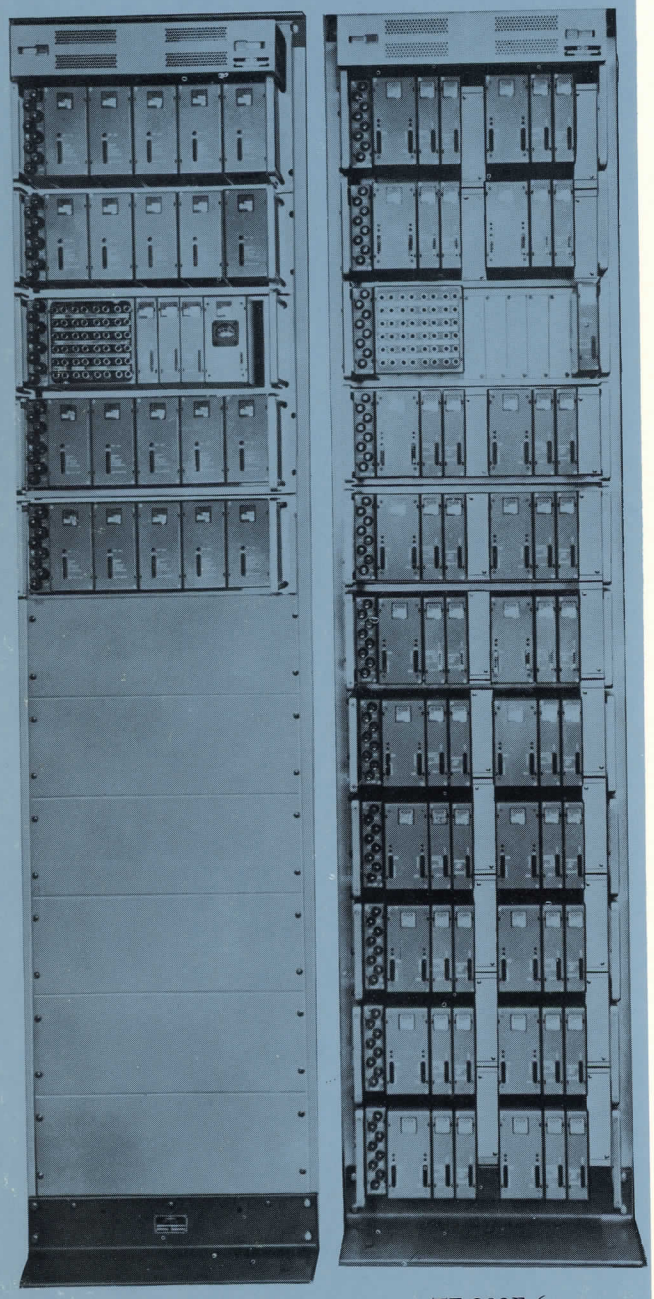
Temperature: 0°C to 45°C (32°F to 113°F).

Humidity: 0 to 95% relative without condensation.

Altitude: Sea level to 10,000 feet.

Reliability:

Mean time between failures, 590 hours, based on 40 channel operation. Mean time to repair, 30 minutes. Availability: 98%.



TE-202E-3 TE-202F-6

GENERAL DESCRIPTION

Collins TE-202 Data Terminals are the most efficient data communication equipment available for use over High Frequency radio circuits. They communicate up to 3200 bits-per-second of synchronous, parallel binary data over a standard 3 kc voice channel, which also can be derived on wireline or microwave.

Up to 40 channels of data service are provided by the terminals with data rates of 45, 56, 60, 75 or 80 bits-per-second on each channel. This is ideal for 100 words-per-minute per channel teletypewriter operation or for a high-capacity data link for computers, business machines, telemetry, supervisory control or other applications.

Designed for continuous operation, the terminals require only periodic performance checks after initial start-up to assure normal operation. Rack mounted, Collins Terminals feature solid-state circuitry, and over-all construction is modular. Modules may be removed or added in multiples of two channels to provide a minimum of four and a maximum of forty channels of data service.

Three TE-202 terminal configurations are offered. The TE-202E-3 Transmit Terminal, the TE-202F-6 Receive Terminal, and the TE-202G-6 Diversity Receive Terminal. A data channel tester, a power control and a patch panel are standard equipment on all terminals.

Each terminal furnishes simplex data service. The transmit terminal, combined with the TE-202F-6 Receive Terminal, provides duplex data service, or combined with the TE-202G-6, furnishes duplex diversity data service.

On long communication links, a duplex terminal can be used as an unattended digital relay station.

TE-202E-3 Transmit Terminal

The transmit terminal generates 20 audio tones spaced 110 cycles apart in a frequency range of 605 to 2695 cps. A 2915 cps synchronizing tone is also generated. Phase multiplexing combines two incoming data channels onto a single tone, and up to 40 separate data channels can be phase multiplexed onto the 20 tones. Data channels may be grouped together for the transmission of parallel data. A patch panel provides crosspatching for any input data line to any one of the data channels.

TE-202F-6 Receive Terminal

The TE-202F-6 receives up to 40 channels of parallel data. Audio tones are separated from the received signal by kinematic filtering in both the time and frequency domains. The tones are decoded and converted into binary data. In decoding, two keyed filters are used for each tone. While one is being driven by the signal, the other stores the previously received phase. At the end of the drive period, the detector circuitry converts the phase difference between the two signals into binary information.

TE-202G-6 Diversity Receive Terminal

The TE-202G-6 uses diversity to protect against multipath and selective fading encountered in HF radio communication. Two receivers detect, separate, decode and convert audio tones into binary data. The diversity unit reassembles the data through continuous linear combination of the signals for delivery to output data converters.

The operating characteristics of the two receivers are identical to those of the TE-202F-6.

Data Channel Tester

The data channel tester provides back-to-back testing or test with a remote terminal over the voice channel for preventive maintenance or fault location. Visual error count indicator lamps quickly isolate marginal or fault conditions by group, channel and state (binary one or zero). Modular construction of the TE-202 permits rapid correction of the indicated marginal or fault condition.

TE-202E-3 Transmit Terminal Specifications

Transmit Input:

One to 40 channels, parallel, synchronous binary data signals, each at 45, 56, 60, 75 or 80 bits-per-second. Data inputs are voltage levels with respect to ground; — 12 v dc ± 10% for binary zero (0) and — 21 v dc ± 10% for binary one (1). Input impedance is 12,000 ohms.

Transmit Output:

Composite signal composed of 20 phase-shifted audio tones and one synchronizing tone. The 20 data tones, spaced 110 cycles apart, range in frequency from 605 cps to 2695 cps. The 2915 cps synchronizing tone is ON-OFF modulated at ½ the transmitted data rate. Output level is — 1 dbm maximum into a 600 ohms line with peaks to + 16 dbm.

Timing:

The transmit time base accepts a 100 kc sine wave from a high stability standard and provides timing signals for the transmit terminal and associated equipment. Data timing is a symmetrical square wave, 0 ± 0.5 v to — 10 ± 0.5 v, with repetition rate equal to data rate.

Power Requirements:

115 v ac ± 10%, single phase, 60 cps, 2.5 amps.

Mechanical:

Single rack, 86¼" high, 20¼" wide, 20" deep. Weight: 265 pounds.

TE-202F-6, G-6 Receive Terminal Specifications

Receive Input:

Composite signal composed of 20 phase-shifted audio tones and one synchronizing tone. The 20 data tones, spaced 110 cycles apart, range in frequency from 605 cps to 2695 cps. The 2915 cps synchronizing tone is ON-OFF modulated at one-half received data rate. Nominal input level is —22 dbm. Input impedance is 600 ohms at 1000 cps.

Receive Output:

One to 40 channels, parallel, synchronous binary data signals, each at 45, 56, 60, 75 or 80 bits-per-second. Data outputs are voltage levels with respect to ground; — 12 v dc ± 10% for binary zero (0) and — 21 v dc ± 10% for binary one (1). Output load impedance is 10,000 ohms.

Timing:

The receive time base accepts a 100 kc sine wave from a high stability standard and provides timing signals for the data receiver and associated equipments. Data timing is a symmetrical square wave, 0 ± 0.5 v to — 10 ± 0.5 v. Timing signal for operation and synchronization of external equipment is available at the output data rate.

TE-202F-6 Power Requirements:

115 v ac ± 10%, single phase, 60 cps, 4.2 amps.

TE-202F-6 Mechanical:

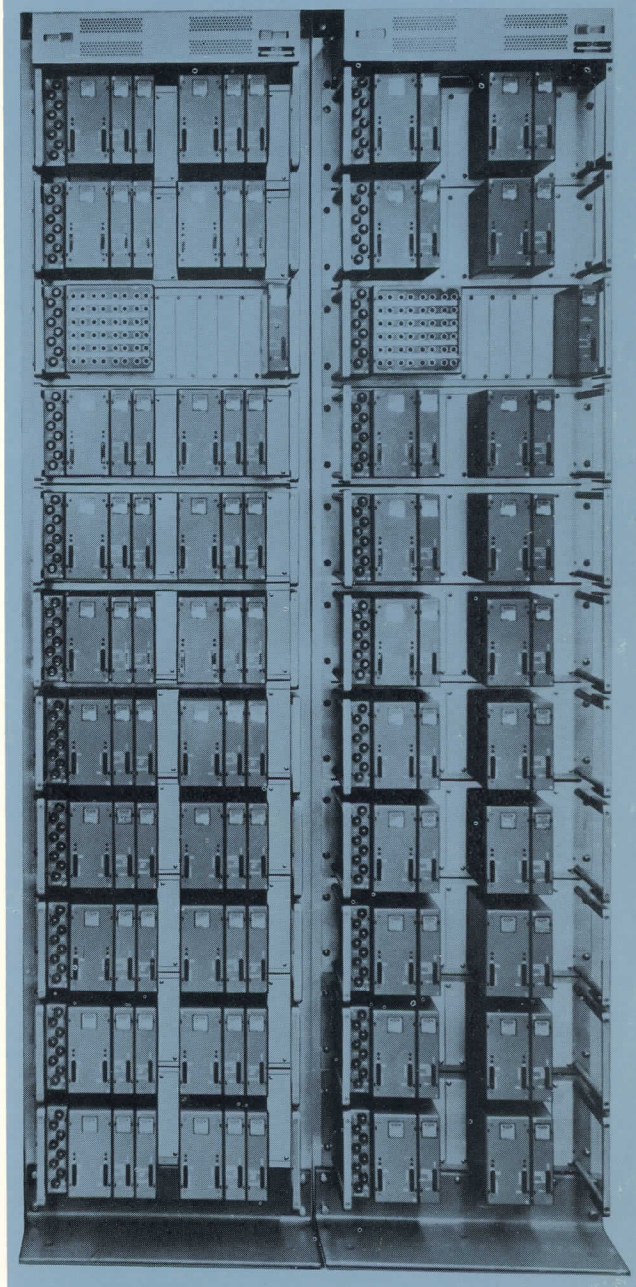
Single rack, 86¼" high, 20¼" wide, 20" deep. Weight: 450 pounds.

TE-202G-6 Power Requirements:

115 v ac ± 10%, single phase, 60 cps, 6.0 amps.

TE-202G-6 Mechanical:

Double rack, each 86¼" high, 20¼" wide and 20" deep. Weight: 750 pounds.



TE-202G-6

Transmission Facility Requirements

TE-202 Terminals can be operated over any voice facility meeting the requirements listed in the table below. TE-202 equipment complies with the requirements of good telephone practice with respect to transmitting levels, balance and dielectric strength. Normal subscriber station protection devices are satisfactory in this application.

HF Radio Equipment

Transmitter:

Audio Response: 2.5 db, 450 to 3050 cps; 30 db, 4000 cps above carrier; 40 db, 400 cps below carrier.

Differential Delay: 0.5 msec, 800 to 3050 cps; 0.9 msec, 500 to 800 cps.

Frequency Stability: 1 part in 10^8 per day.

Frequency Deviation: Not more than 0.5 cps, audio output.

Phase Stability: Not more than 4° per bit-period.

SSB Distortion: At full PEP, all distortion products are 35 db below either tone of a two-tone test signal.

Spurious Signals: At least 50 db below rated PEP.

Noise: 40 db below either tone of a two-tone test signal.

Audio Input: 600 ohms.

ALC: Adjustable to more than 90% of PEP.

Receiver:

Audio Response: 2.5 db, 450 to 3050 cps; 30 db, 4000 cps above carrier; 40 db, 400 cps below carrier.

Differential Delay: 0.5 msec, 800 to 3050 cps; 0.9 msec, 500 to 800 cps.

Frequency Stability: 1 part in 10^8 per day.

Frequency Deviation: Not more than 0.5 cps, audio output.

Phase Stability: Not more than 4° per bit-period.

IM Distortion: 3rd order distortion products are 40 db below either tone of a two-tone test signal.

Audio Distortion: Not more than 1% total.

Spurious Signals: More than 80 db down including images.

Audio Output: 600 ohms, 8 db max. variation due to AGC control.

AGC: Attack and release time constant of 200 msec.

Gain Stability: Not more than 2 db difference between the audio output levels of the dual diversity receiver.

Wireline

Frequency Response:	3 db, 600 to 2700 6 db, 300 to 3000
Differential Delay:	1.5 msec, 600 to 2700 3.0 msec, 500 to 3000
Circuit Net Loss:	20 db
Net Loss Variation:	±8 db
Line Impedance:	600 ohms at 1000 cps
Frequency Translation Max.:	±1 cps
Broadband Noise (3kc NBW):	20 db

For further information contact
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COLLINS

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