

CALL CONTROL UNIT UCC29
FOR EIA AND DIRECT NEUTRAL INTERFACE
DESCRIPTION AND PRINCIPLES OF OPERATION

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1. GENERAL

1.01 This section contains information for call control unit UCC29 (Figure 1) as used with a set logic assembly or a direct neutral interface.

1.02 The purpose of call control unit UCC29 is to accommodate service offerings such as DATREX*, DATA-PHONE®, and PRIVATE LINE. The unit powers and interconnects a model 33 or 35 teletypewriter to a set logic assembly or directly to a data set. The specific logic assembly or data set used depends on the service offering selected for station operation. The unit mounts at the rear of the teletypewriter while the logic assembly or data set mounts at the front. A bezel plate covers the call control unit. Other bezel plates are optionally available.

1.03 Call control unit UCC29 consists of a power supply, selector magnet driver, motor control relay, wiring area and cable assembly, and an elapsed time indicator. For the UCC29 actual (8162WD) and schematic (8163WD) wiring diagrams refer to Section 574-100-401.

1.04 An optional break detector circuit card can be used with the selector magnet driver circuit card. The break detector receives its power and input from UCC29; its

output terminates at the UCC29. For description information refer to Section 574-010-100.

2. TECHNICAL DATA

2.01 Dimensions and Weight

Length	15 inches
Width	4-1/2 inches
Height	6 inches
Weight	10 pounds

ELECTRICAL CHARACTERISTICS

Power input 115 v ac $\pm 10\%$, 60 Hz ± 0.45 Hz

Note: If elapsed time indicator is removed, 50 or 60 Hz operation is permissible.

Signal line current	0.02 ampere at -20 v dc
Input to selector	0.5 ampere at 20 v dc
Power supplies	24 v dc at 2 amperes 20 v dc at 0.8 ampere
Fuses (SL-BL)	3.2 amperes, ac power input 2.0 amperes, 24 v dc supply 0.8 ampere, 20 v dc supply
Convenience outlet	115 v ac, 100 watts max, unfused

CIRCUIT DESCRIPTION

A. Power Supply

2.02 The power supply consists of a transformer assembly and a circuit card assembly. The 115 v ac input power is applied to the transformer primary. There are provisions for a 22 v ac output at terminals 7 and 8 of the circuit card assembly. This voltage is used to activate an alarm buzzer or bell, if so required. A 24 v dc supply is provided and is used to activate the motor control relay, distributor trip magnet, answer-back magnet, and supply power for the set logic assembly. Also, a 20 v dc supply is provided. This voltage is used for the selector magnet driver circuits and may be used for the set logic assembly if the current requirements do not exceed 0.8 of an ampere.

* Service Mark of AT&TCo

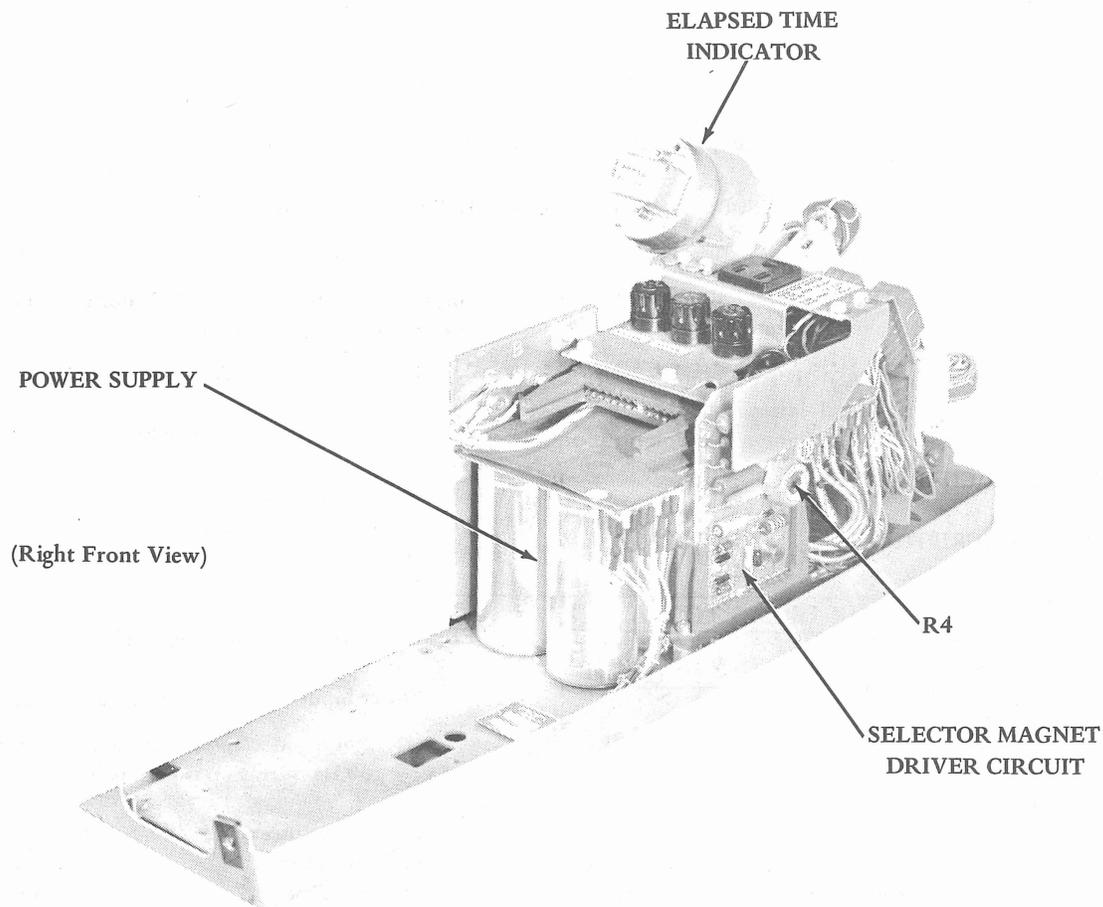


Figure 1 - Call Control Unit UCC29

B. Selector Magnet Driver

2.03 Call control unit UCC29 has a selector magnet driver circuit assembly. Figure 2 is a schematic diagram of that assembly. When a 0.02 ampere dc signal is received by the selector magnet driver, it is amplified to 0.5 in order to operate the typing unit selector magnet.

2.04 The selector magnet driver is a two-stage transistor amplifier powered from a 115 v ac source through a step down isolation transformer. Diodes CR1 and CR2 provide full wave rectification for the -20 v dc produced across the transformer secondary. Circuit common is derived from the center-tapped secondary and connects to filter capacitor CSM and one side of the signal line. The signal input can be directly connected, or through alternate connection R10. Resistor R10 provides current limiting.

2.05 **Open Line:** When the line circuit is open (spacing), transistor Q1 will be turned on by the regulated current flowing through R1 into its base. This current, which

is controlled by R1, will be set near the desired switching level. With Q1 conducting, Q2 will be cut off, since the potential at the base of Q2 will be more positive than at the emitter. In this condition, only small leakage currents will flow in the collector circuit.

2.06 **Space-to-Mark Transition:** As the space-to-mark transition begins, the negative bias current flowing in the base of Q1 is fed to the line circuit. As the line current rises toward the marking current value, it draws base current from Q1. When the line current approaches the total current supplied to the base of Q1 to within 0.001 ampere, which is about one-half the nominal mark current value, Q1 begins to turn off. Q2 will then begin to receive forward bias current from R8 and begin to turn on. The base current will then be amplified by Q2, and a current which is a multiple of the base current will appear in the emitter circuit. This increase in emitter current results in an increase in the negative potential measured across R3. The increase in the negative potential at the emitter of Q1 causes it to go further into cutoff. The feedback process continues until the current in

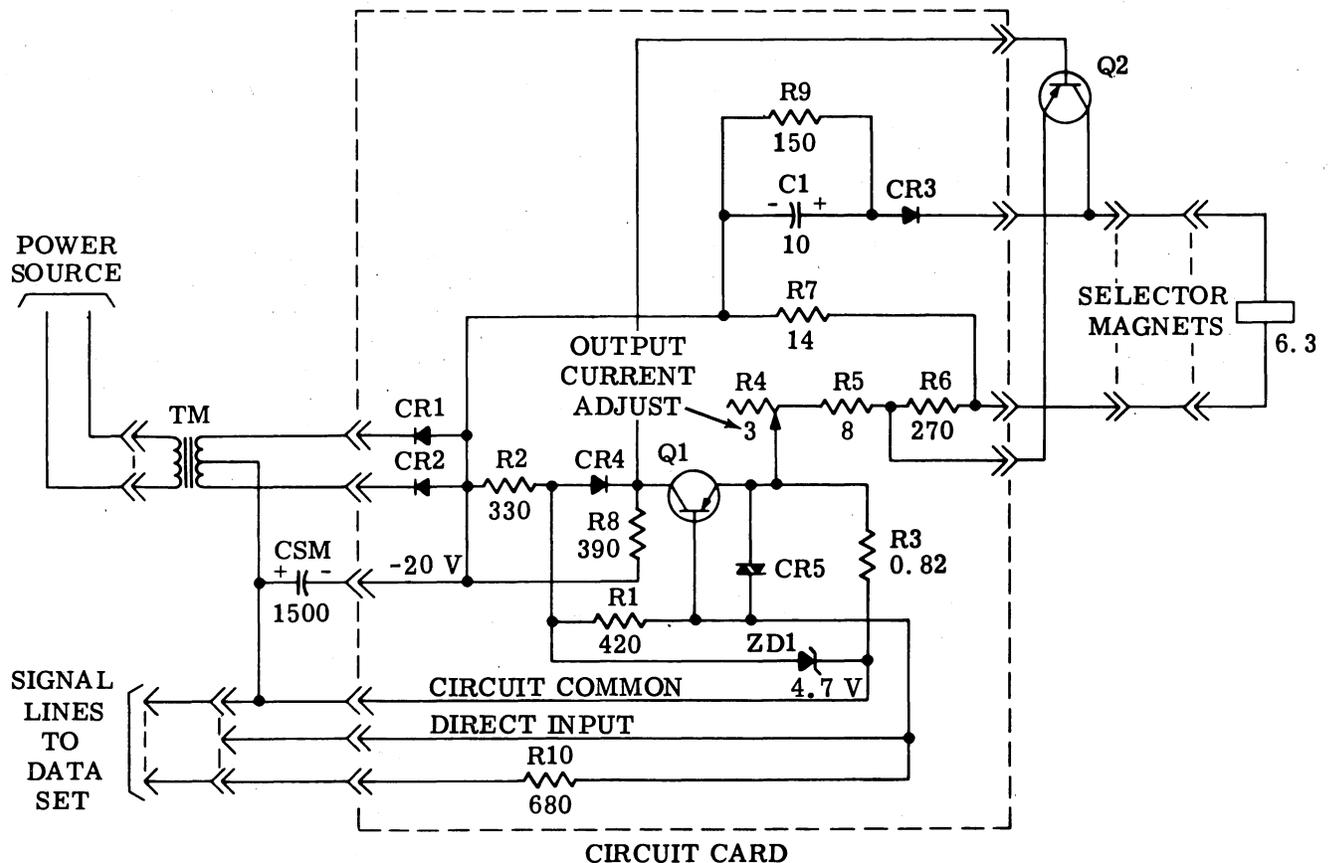


Figure 2 - Selector Magnet Driver Circuit

the selector magnet reaches a value which is determined by the Zener reference voltage, clamp diode CR4, and the emitter resistance of Q2 (the emitter resistance of Q2 is adjusted by R4 to compensate for component variations). As the line current completes the transition to the final marking current value, the base of Q1 becomes positively biased. The positive bias current will be about one-half the total marking line current. The positive potential to the base of Q1 is clamped to 0.6 volt by the input protecting varistor CR5.

2.07 Mark-to-Space Transition: The line current, in changing from mark to space, will finally reach the point where R1 will begin to supply some forward current to the base of Q1. The line current level at which this occurs will be a little more negative than the point at which the circuit switched from space to mark, due to the common emitter resistor voltage feedback. As Q1 begins to turn on, the current through R8 will be drawn from the base of Q2 causing it to begin to turn off. As Q2 turns off, the voltage across R4 will begin to go positive, causing Q1 to be further turned on. This effect gives regeneration to the mark-to-space transition.

2.08 Mark-to-Space Switching Transient: When Q2 is turned off during the mark-to-space transition, a negative voltage transient is developed at its collector. This transient is due to dissipation of the energy stored in the magnetic field of the driven magnet when energized by 0.500 ampere. If the high voltage developed at the collector of Q2 were not limited, it would continue to rise until it reaches the point where the collector-to-emitter breakdown voltage is exceeded. The transient-suppression network at the collector of Q2 prevents the transistor from exceeding its breakdown voltage. The network is a compromise which affords a minimum peak voltage combined with a magnet release time to provide for adequate teletypewriter margins. The network consists of C1 in parallel with R9. CR3 isolates the network from voltages more positive than negative battery potential.

C. Motor Control Relay

2.09 The motor control relay is located under the circuit card assembly. One side of the coil is brought out to the set logic assembly to control the relay. Grounding the set logic assembly lead operates the motor control relay and closes the contacts in series with the motor.

D. Wiring Area and Cable Assembly

2.10 The wiring area is located at the rear of the call control unit. It has eight 15-pin receptacles and two 15-pin connectors. Three of the receptacles (6, 7, and 8) are located on circuit card assembly TP186439. The circuit card interconnects the three receptacles. The wiring area interconnects the distributor, keyboard, reader, answer-back, and set logic assembly. All input, output and control leads are brought out of the call control unit to the two 15-pin connectors. The leads include the send contacts, receive circuit, function box contacts, motor control relay and power cord, paper alarms, and distributor trip and answer-back magnets. All leads are controlled by the set logic assembly or by the data set.

2.11 The call control unit does not contain the operator controls, indicators, or alarms. The unit brings out the control leads of the keyboard; printer; and reader control for the set logic assembly which houses the operator controls, indicators, or alarms.

E. Elapsed Time Indicator

2.12 The elapsed time indicator is operated by the motor control relay contacts. It is used to record the total running time of the motor.

2.13 Connectors 1 (CAH) and 2 (CAJ) contain the direct neutral interface leads. See chart for connector number, pin number, and function.

CHART FOR DIRECT NEUTRAL INTERFACE LEADS

CONNECTOR NO. 1 (CAH)		CONNECTOR NO. 2 (CAJ)	
PIN NO.	FUNCTION	PIN NO.	FUNCTION
1	EOT	1 and 14	Send Contacts
2	Motor Control Relay	2 and 3	Break Reset Switch
3	-20 Volts DC	4 and 15	Break Lamp
4	ENQ/EOT	5	-24 Volts DC
5	Automatic Reader Control	6 and 12	Reader Enable
6	Receive Circuit (neg side)	7 and 8	Stop all Senders
7	Frame Ground	9	Break Holding Circuit
8	Low Paper Contacts (normally closed)	10	ACK Contact
9	Break Key (normally closed)	11	24 Volts DC
10 and 14	22 Volts AC (alarm)	13	ACK Control Circuit
11	Break Key (opened)		
12	24 Volts DC		
13	Receive Circuit (pos side)		
15	Low Paper Contacts (normally open)		