A877
Analog-to-Digital Converter

The A877 Analog-to-Digital Converter is used in the AD15 Analog Subsystem to convert the A405 Sample and Hold Amplifier output to a 13-bit digital word (12 bits plus a sign bit). A comparator amplifier compares the analog input voltage with a programmed sequence of internally-generated reference voltages to determine the polarity and amplitude of the input signal. The result is stored in a 13-bit data register. An A/D DONE signal is provided when the conversion is complete.

MAINTENANCE NOTE

The A877 uses special matched components to achieve specified measurement accuracy. If a fault is isolated to the A877, do not attempt to replace components in the field. Substitute a spare module and return the faulty module to DEC for service.

ANALOG INPUT SIGNAL:	Full scale range: ±10V Connections: Single-ended Impedance: 28K ohms Overvoltage limit: ±15V, maximum Settling time: 1 μs
ENCODING PROCESS:	Digitalizing resolution: 1 part in 8,190 (2.5 mV) Encoding word time: 36 μs, typical Encoding word rate: 28,000s, typical Code: Parallel, binary 2's complement
MEASUREMENT ACCURACY:	Full range: 0.015% Temperature coefficient: ±0.0020%/°C (over full operating temperature range)
CONTROL SIGNALS:	Input: Command to Convert (CTC) initiates encoding process on a logic 1-to-0 transition
	Output: End of Conversion (EOC) pulse is 100 ns logic 1 pulse
DATA OUTPUTS:	13 bits, held in storage until next CTC input.
POWER REQUIREMENTS:	+15V, ±5%, 100 mA, typical, pin AD -15V, ±5%, 50 mA, typical, pin AE +5V, ±10%, 400 mA, typical, pin BA

CONNECTOR PIN ASSIGNMENTS

Pin	Function	Pin	Function
AD1/2	+15V	BL2	Data Bit 4
AE1/2	-15V	BM2	Data Bit 5
AF1/2	±15V Common	BN2	Data Bit 6
AJ2	Analog Input	BP2	Data Bit 7
AK2	Analog Return	BR2	Data Bit 8
AU1	Command to Convert (CTC)	BS2	Data Bit 9
BA2	+5V	BT2	Data Bit 10
BC2	Logic Ground	BU2	Data Bit 11
BE2	Sign Bit, Complemented	BV2	Data Bit 12
BF2	Sign Bit	BJ1	Data Bit 13 (LSB)
BJ2	Data Bit 2	BF1	End of Conversion (EOC)
BK2	Data Bit 3		

ADJUSTMENT AND CALIBRATION

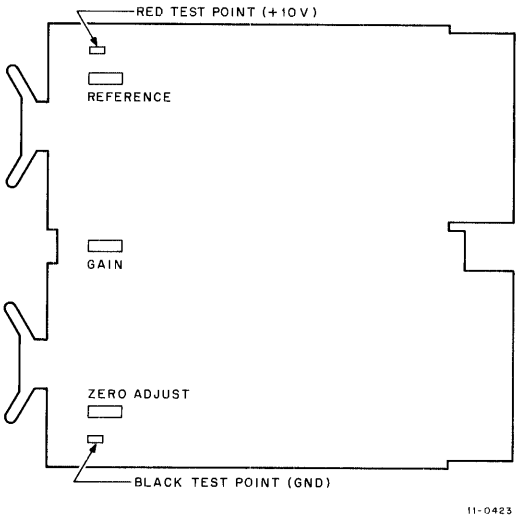
NOTE

Do not attempt to adjust any potentiometers other than the reference, gain, and zero adjust potentiometers at the rear of the module (see illustration).

Adjust the A877 while it is installed in slot C11 of the AD15. Remove the A405 module and allow 15 minutes warmup.

Reference Voltage Adjustment

Use Fluke 585A voltmeter (or equivalent voltmeter with 0.005% accuracy) to measure voltage between +10V test point (red) and ground (black). Adjust reference potentiometer (top) to obtain 10.0000V, ±1 mV.



Gain Adjustment

Connect EDC voltage standard (or equivalent voltage standard with 0.005% accuracy) between pins C11J2 and C11F2 (See drawing D-AD-7007029-0-0 in AD15 manual).

Run MAINDEC-15-D6GA-D(D), with any channel and gain setting. Adjust the EDC to find the most positive switching point (007776-007777). Record the voltage. Reverse the polarity of the EDC connections to find the most negative switching point. Record the voltage. The difference between the voltages should be 19.9995V, ±2 mV. Adjust the gain potentiometer and repeat these measurements until the difference is within the specified tolerance.

Zero Adjust

Short-circuit pins C11J2 and C11F2 and note the conversion value. If the reading is outside the range 77776-000002, adjust the zero adjust potentiometer (bottom) to bring it within range. This adjustment interacts with the gain adjustment and several passes may be required to bring both adjustments within their specified tolerances.