Magnetic and Transistorized Digital Modules
The TF2 Dual Flip-Flop Module holds two identical and independent Eccles-Jordan flip-flop circuits. The transistors are operated either at cut-off or at saturation. The TF2 is designed primarily for use in counting applications. For this purpose a toggle input is provided which changes the state of the flip-flop each time a suitable positive step is applied. Each side of a TF2 flip-flop can accept inputs from a diode gate or another flip-flop while only one of the two sides can accept an auxiliary input from an IC4 Input Circuit.

**SPECIFICATIONS**

**INPUT**
(To set, reset or toggle inputs directly or through diode gates and to auxiliary inputs through IC4, IC2 input circuits)
A positive step with the following characteristics:
- Minimum amplitude: 8 volts
- Maximum rise time: 1 microsecond
- Maximum repetition rate: 200 kilocycles

**OUTPUT**

- Voltage:
  - "One": -9 to -12 volts
  - "Zero": 0 to -0.25 volt
- Maximum rise time:
  - No load: 0.25 microsecond
  - Full load: 1.0 microsecond
- Maximum load per output as a flip-flop:
  - Clocked or d.c. diode gates: 10
  - Unclocked diode gates operating input circuits: 8
  - NOR inputs: 30
- Maximum load per output as a toggle:
  - Clocked or d.c. diode gates: 10
  - Unclocked diode gates operating input circuits: 6
  - NOR inputs: 30

**POWER REQUIREMENTS FOR ENTIRE MODULE**
- -12 volts: 30 milliamperes
- +6 volts: 0.9 milliamperes
The TF3 Dual Flip-Flop Module holds two identical and independent Eccles-Jordan flip-flop circuits. The transistors are operated either at cut-off or at saturation. Each side of a TF3 flip-flop has two inputs: one which will accept inputs from a diode gate or another flip-flop, and an auxiliary which will accept inputs from an IC4 Input Circuit.

**SPECIFICATIONS**

**INPUT** (To set, reset inputs directly or through diode gates, and to auxiliary inputs through IC4, IC2 Input Circuits)

A positive step with the following characteristics:

- Minimum amplitude: 8 volts
- Maximum rise time: 1 microsecond
- Maximum repetition rate: 200 kilocycles

**OUTPUT**

- Voltage:
  - "One": 9 to 12 volts
  - "Zero": 0 to 0.25 volt
- Maximum rise time:
  - No load: 0.25 microsecond
  - Full load: 1.0 microsecond
- Maximum load per output:
  - Clocked or d.c. diode gates: 10
  - Unclocked diode gates operating input circuits: 8
  - NOR inputs: 30

**POWER REQUIREMENTS FOR ENTIRE MODULE**

- -12 volts: 30 milliamperes
- +6 volts: 0.9 milliampere
The TI3 Amplifier-Inverter Module holds six identical and independent single-stage preloaded amplifier circuits. In addition to providing the logical operation of negation, the TI3 serves to amplify the outputs of flip-flops and diode gates.

**SPECIFICATIONS**

**INPUT**

- Voltage
  - "One": 9 to -12 volts
  - "Zero": 0 to -1 volt
- Maximum rise time: 1.0 microsecond
- Maximum fall time: 2.0 microseconds
- Maximum repetition rate: 200 kilocycles

**OUTPUT**

- Voltage
  - "One": 9 to -12 volts
  - "Zero": 0 to -0.25 volt
- Maximum rise time
  - No load: 0.25 microsecond
  - Full load: 1.0 microsecond
- Maximum load per output: 10 diode gates or 30 NOR inputs
  (When a TI3 inverter is operated from a diode gate the "One" input drops to -7.5 volts and the maximum load becomes 7 gates.)

**POWER REQUIREMENTS FOR ENTIRE MODULE**

- -12 volts: 51 milliamperes with all units at "Zero"
- +6 volts: 2.4 milliamperes
- 13 milliamperes with all units at "One"
The EF1 Emitter-Follower Module holds six identical and independent amplifier circuits. In conjunction with Diode Gate Modules, the EF1 provides for the construction of d.c. OR and AND-OR gates. EF1 outputs, then, may be employed as inputs to other gates so as to provide multilevel gating. The EF1 also can be used to provide a low impedance output for driving long lines and similar devices.

**SPECIFICATIONS**

**INPUT** (Directly or through a d.c. diode gate)
- **Voltage**
  - "One": 0 to -0.25 volt
  - "Zero": 0 to -12 volts
- **Maximum rise time**: 1 microsecond

**OUTPUT**
- **Voltage**
  - "One": -8 to -12 volts
  - "Zero": +0.25 to -0.25 volt
- **Maximum rise time**: 1.5 microseconds
- **Maximum load per output**:
  - Clocked or d.c. diode gates: 2
  - NOR inputs: 6
- **Additional load capability of directly operated emitter-follower**:
  - Maximum capacity: 1000 micromicrofarads
  - Minimum resistance to ground: 500 ohms

**POWER REQUIREMENTS FOR ENTIRE MODULE**
- **-12 volts**
  - 90 milliamperes with all units at "One"
  - 30 milliamperes with all units at "Zero"
- **+6 volts**
  - 90 milliamperes with all units at "One"
  - 30 milliamperes with all units at "Zero"
The DC1 Decade Counter Module holds four standard flip-flop circuits gated to count from zero through nine in the 8-4-2-1 binary coded decimal code. A reset input is provided and both collectors of each flip-flop are available at the connector. The true output of the most significant bit also serves as a carry signal to subsequent decimal stages. A preset value can be entered from external switches. In an alternate configuration of the DC1, one base and one collector of each flip-flop are made available.

**SPECIFICATIONS**

**INPUT** (Count and Reset)
- A positive step with the following characteristics:
  - Minimum amplitude: 8 volts
  - Maximum rise time: 1 microsecond
  - Maximum count rate: 200 kilocycles

**OUTPUT**
- Voltage:
  - "One": -9 to -12 volts
  - "Zero": 0 to 0.25 volt
- Maximum rise time:
  - No load: 0.25 microsecond
  - Full load: 1.0 microsecond
- Maximum load per output:
  - Clocked or d.c. diode gates: 8
  - Unclocked diode gates: 5
  - NOR inputs: 24

**POWER REQUIREMENTS FOR ENTIRE MODULE**
- -12 volts: 62 milliamperes
- +6 volts: 1.8 milliamperes
The BC1 Binary Counter Module holds four flip-flop circuits which count from zero through fifteen in pure binary. A reset input is provided and both collectors of each flip-flop are available at the connector. The true output of the most significant bit also serves as a carry signal to subsequent stages. A preset value can be entered from external switches. In an alternate configuration of the BC1, one base and one collector of each flip-flop are made available.

### SPECIFICATIONS

**INPUT** (Count and Reset)
A positive step with the following characteristics:
- Minimum amplitude: 8 volts
- Maximum rise time: 1 microsecond
- Maximum count rate: 200 kilocycles

**OUTPUT**
- Voltage
  - "One": -9 to -12 volts
  - "Zero": 0 to -0.25 volt
- Maximum rise time
  - No load: 0.25 microsecond
  - Full load: 1.0 microsecond

Maximum load per output:
- Clocked or d.c. diode gates: 10
- Unclocked diode gates: 5
- NOR inputs: 30

**POWER REQUIREMENTS FOR ENTIRE MODULE**
- -12 volts: 58 milliamperes
- +6 volts: 1.8 milliamperes
The TD2 Relay or Lamp Driver Module consists of four independent and identical power amplifier circuits that can each provide sufficient current to energize the coil of a d.c. relay or to light an incandescent lamp. An input emitter-follower is included in each amplifier in order to minimize the input power requirements. Diodes are provided to protect the power transistors from inductive surges.

**SPECIFICATIONS**

**INPUT**
- Turn-on voltage: -8 to -12 volts
- Turn-off voltage: 0 to -1 volt
- Maximum repetition rate: 2 kilocycles

**OUTPUT**
- Maximum voltage: 28 volts d.c.
- Maximum load current per output: 350 milliamperes
- Maximum power per output: 10 watts

**POWER REQUIREMENTS FOR ENTIRE MODULE**
- -12 volts: 60 milliamperes, with all units ON
  - 15 milliamperes, with all units OFF
- +6 volts: 20 milliamperes
The Mounting Case for the Packard Bell Computer Corporation Digital Modules holds 72 cards and, if required, an internal Power Supply. This facilitates the construction of small digital systems economically and with a minimum of special design.

The Mounting Case requires 5 1/4 inches of a standard relay rack. Space is provided for input and output connectors, and plastic channels serve to hold and protect inter-row wiring. Top and bottom dust covers are apertured to permit vertical cooling.

Up to 60 Amperec 6977 indicators can be mounted on the front panel. These are low power devices that require very small signals and so represent no additional load on the drive circuits.

The Power Supply is completely Solid State and is mounted with two screws. It will power both the Packard Bell Computer Corporation's Medium Frequency and High Frequency Transistorized Modules. An additional tandem supply is required for the Magnetic Modules or -28V may be supplied externally. Both the +6V and the -12V supplies have controls which permit voltage variations that are adequate for the marginal checking of the digital modules. Supply voltages to power the indicators are included.

The MC72 is normally supplied without module connectors.
Blank Circuit Cards, with connectors, and Card Extenders are also available.

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**SPECIFICATIONS**

**INPUT**

105 to 125 volts, 50 to 60 cycle single phase a.c. power

**OUTPUT**

Regulated voltages for plug-in modules:

<table>
<thead>
<tr>
<th>Voltage</th>
<th>Current</th>
</tr>
</thead>
<tbody>
<tr>
<td>+6 volts d.c.</td>
<td>0.5 amperes</td>
</tr>
<tr>
<td>-12 volts d.c.</td>
<td>1.5 amperes</td>
</tr>
<tr>
<td>Load regulation</td>
<td>±1 per cent</td>
</tr>
<tr>
<td>Line regulation</td>
<td>±1 per cent</td>
</tr>
<tr>
<td>Ripple</td>
<td>0.8 per cent peak to peak</td>
</tr>
<tr>
<td>Efficiency</td>
<td>55 per cent</td>
</tr>
</tbody>
</table>

Unregulated power for indicators:

<table>
<thead>
<tr>
<th>Voltage</th>
<th>Current</th>
</tr>
</thead>
<tbody>
<tr>
<td>+50 volts d.c.</td>
<td>80 milliamperes</td>
</tr>
<tr>
<td>1 volt a.c.</td>
<td>1.8 amperes</td>
</tr>
</tbody>
</table>
The TO3 Dual One-Shot Multivibrator Module holds two identical and independent circuits that functionally can also serve as triggered blocking oscillators. A potentiometer in each circuit provides a fine adjustment over a 3 to 1 range. The coarse range is determined by a capacitor on the board that may operate in conjunction with an external capacitor for which connections are provided. This procedure maintains the absolute interchangeability of all modules with identical keying.

**SPECIFICATIONS**

**INPUT**
- A positive step with the following characteristics:
  - Minimum amplitude: 8 volts
  - Maximum rise time: 1 microsecond

**OUTPUT**
- Voltage:
  - "One": -10 to -12 volts
  - "Zero": 0 to -0.25 volt
  - Maximum rise time: 0.5 microsecond
- Maximum load per output:
  - Diode gates: 4
  - NOR inputs: 12
  - Delay range (no external capacity): 1 - 3 microseconds
- Approximate external capacity to increase delay range:
  - 10 - 30 microseconds: 0.005 microfarad
  - 0.1 - 0.3 milliseconds: 0.05 microfarad
  - 1 - 3 milliseconds: 0.5 microfarad
  - 10 - 30 milliseconds: 5.0 microfarads
  - 1 - 3 seconds: 50 microfarads

**POWER REQUIREMENTS FOR ENTIRE MODULE**
- -12 volts: 51 milliamperes
- +6 volts: 0.8 milliamperes
The ST1 Dual Schmitt Trigger Module holds two identical and independent trigger circuits that are designed to provide reshaping of degenerated waveforms and sensing of d.c. levels. In order to permit heavier loading, an output amplifier is included in each circuit.

**SPECIFICATIONS**

**INPUT**
- Maximum voltage range: ±20 volts
- Threshold level: −3.5 to −4.5 volts
- Maximum frequency: 200 kilocycles

**OUTPUT**
- "One" Voltage: −9 to −12 volts
- "Zero" Voltage: −0.8 to −1.5 volts
- "Zero" Set Outputs (Pins 11 and 5): 0 to −0.25 volt
- "Zero" Reset Outputs (Pins 10 and 6): 0 to −0.25 volt
- Maximum rise time: 1 microsecond
- Maximum load per Set Output:
  - Diode Gates: 3
  - NOR inputs: 9
- Maximum load per Reset Output:
  - Diode Gates: 10
  - NOR inputs: 30

**POWER REQUIREMENTS FOR ENTIRE MODULE**
- −12 volts: 30 milliamperes
- +6 volts: 2.2 milliamperes
The HF3 Clock Generator and Multivibrator Module consists of a self-starting astable multivibrator circuit and a two-stage amplifier. The multivibrator frequency is nominally set at 100 kilocycles. Contacts are provided for an external capacitor if a lower frequency is required.

**SPECIFICATIONS**

**OUTPUT**

| Voltage | "One" | 0 to −12 volts |
| Maximum load | No load | 30 diode gates |
| Maximum rise time | Full load | 0.1 microsecond |
| Maximum repetition rate | 200 kilocycles |
| Standard repetition rate | 100 kilocycles |
| Approximate value of external capacitors to reduce repetition rate: | |
| 10 kilocycles | 0.005 microfarad |
| 1 kilocycle | 0.05 microfarad |
| 100 cycles | 0.5 microfarads |
| 10 cycles | 5.0 microfarads |
| 1 cycle | 50.0 microfarads |

**POWER REQUIREMENTS**

| −12 volts | 37 milliamperes |
| +6 volts | 0.8 milliamperes |
The NE1 Dual NOR Module holds two independent and identical NOR circuits. Each NOR circuit has five inputs preloaded to present a more natural load for PNP transistor flip-flops and amplifiers. The NOR circuit can be operated by the TF2 or TF3 flip-flop, by the TI3 amplifier, as well as by other NOR elements. In turn, the NOR element can drive diode gates as well as other NOR modules. The NE1 is particularly applicable in the construction of large decoding matrices.

**SPECIFICATIONS**

**INPUT**
- Voltage "One" .................... -8 to -12 volts
- Voltage "Zero" ..................... 0 to -0.25 volt
- Unused inputs must be connected to ground

**OUTPUT**
- Voltage "One" .................... -8 to -12 volts
- Voltage "Zero" ..................... 0 to -0.25 volt
- Maximum inherent switching time .... 10 microseconds
- Maximum load per output:
  - NOR elements ..................... 9
  - Clocked or d.c. diode gates ...... 3

**POWER REQUIREMENTS FOR ENTIRE MODULE**
- -12 volts ......................... 9 milliamperes
- +6 volts .......................... 0.15 milliamperes
The CD3 Clock Driver Module is a multi-output amplifier which accepts a single input signal from a suitable clock source, shapes it, and provides a high power output. The input signal can be provided by an HF3, a TI3 or any other source fulfilling the input requirements. The CD3 is designed to drive up to 400 gates.

**SPECIFICATIONS**

**INPUT**
- Voltage
  - "One": -8 to -12 volts
  - "Zero": 0 to -1 volt
- Maximum rise time: 1 microsecond
- Maximum repetition rate: 200 kilocycles

**OUTPUT**
- Voltage
  - "One": -10 to -12 volts
  - "Zero": 0 to -0.25 volt
- Maximum load per output: 50 diode gates
- Maximum rise time
  - No load: 0.1 microsecond
  - Full load: 1 microsecond

**POWER REQUIREMENTS FOR ENTIRE MODULE**
- -12 volts: 100 milliamperes (Average for 50% duty factor)
- +6 volts: 3 milliamperes
The CS1 Dual Clock Shaper Module holds two identical and independent amplifiers which provide shaping and power amplification for clock signals. The input signal can be provided by an HF3, a TI3, or any other source fulfilling the input requirements. The CS1 is designed to drive up to 30 gates from each amplifier.

**SPECIFICATIONS**

**INPUT**

<table>
<thead>
<tr>
<th>Voltage</th>
<th>[ \text{&quot;One&quot;} ]</th>
<th>[ \text{&quot;Zero&quot;} ]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage</td>
<td>-8 to -12 volts</td>
<td>0 to -1 volt</td>
</tr>
<tr>
<td>Maximum rise time</td>
<td>1 microsecond</td>
<td></td>
</tr>
<tr>
<td>Maximum repetition rate</td>
<td>200 kilocycles</td>
<td></td>
</tr>
</tbody>
</table>

**OUTPUT**

<table>
<thead>
<tr>
<th>Voltage</th>
<th>[ \text{&quot;One&quot;} ]</th>
<th>[ \text{&quot;Zero&quot;} ]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage</td>
<td>-10 to -12 volts</td>
<td>0 to -0.25 volt</td>
</tr>
<tr>
<td>Maximum load per output</td>
<td>30 diode gates</td>
<td></td>
</tr>
<tr>
<td>Maximum rise time</td>
<td>{ No load }</td>
<td>{ Full load }</td>
</tr>
<tr>
<td></td>
<td>0.1 microsecond</td>
<td>0.8 microsecond</td>
</tr>
</tbody>
</table>

**POWER REQUIREMENTS FOR ENTIRE MODULE**

<table>
<thead>
<tr>
<th>Voltage</th>
<th>Current</th>
</tr>
</thead>
<tbody>
<tr>
<td>-12 volts</td>
<td>50 milliamperes</td>
</tr>
<tr>
<td>+6 volts</td>
<td>1.6 milliamperes</td>
</tr>
</tbody>
</table>
The DG3 Diode Gate Module consists of five AND gates, each with two or three diodes. The gates are independent, except for one common input applied to one diode in each gate. Each AND gate may drive a flip-flop input circuit, an inverter, or an emitter-follower.

In conjunction with an emitter-follower, the DG3 may be operated as a d.c. AND-OR gate. The common input now becomes the output of the multilevel gate, and is connected to the emitter-follower. Additional terms may be connected to each AND gate from a DG4 Module.

**SPECIFICATIONS**

**INPUT**

<table>
<thead>
<tr>
<th>Voltage</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;One&quot;</td>
<td>-9 to -12 volts</td>
</tr>
<tr>
<td>&quot;Zero&quot;</td>
<td>0 to -0.25 volt</td>
</tr>
</tbody>
</table>

Clock or Trigger:

- Minimum dwell at either level: 2 microseconds
- Maximum rise time: 1 microsecond
- Maximum repetition rate: 200 kilocycles

**POWER REQUIREMENTS**

- 12 volts: 10 milliamperes
The DG4 Diode Gate Module consists of three independent AND gates, two of which are detached from their resistors to allow their combination with other AND gates in a DG3 or DG4 Module requiring additional terms or inputs. AND gates with almost any number of terms may thus be formed. Each DG4 AND gate may operate a flip-flop input circuit, an inverter or an emitter-follower.

**SPECIFICATIONS**

**INPUT**

- Voltage
  - "One": -9 to -12 volts
  - "Zero": 0 to -0.25 volt
- Clock or Trigger:
  - Minimum dwell at either level: 2 microseconds
  - Maximum rise time: 1 microsecond
  - Maximum repetition rate: 200 kilocycles

**POWER REQUIREMENTS**

- -12 volts: 6 milliamperes
The IC4 Input Circuit Module contains nine a.c. coupled trigger circuits, identical to those used in the TF2, TF3, TO3, etc. The nine input circuits are connected together in four groups of two and three each, to form a.c. OR gates. These groups are applied either singly or in combination to the auxiliary input of a TF2 or TF3 flip-flop, to provide alternate trigger sources. The IC4 may be operated from DG3 or DG4 diode AND gates to form an a.c. AND-OR gate.

POWER REQUIREMENTS

-12 volts ........................................... 3 milliamperes
The IC2 Input Circuit Module consists of four toggle trigger circuits identical to those used in the TF2. Instead of being operated at a fixed bias, however, contacts are available for controlling the bias of each pair of trigger circuits, thus gating the toggle trigger inputs. The IC2 is designed primarily for use with the TF3 Flip-Flop Module to form bidirectional counters.

**POWER REQUIREMENTS**

-12 volts ........................... 0.7 milliamperes
The CR50-1 Magnetic Core Register Module holds six stages of a 50 kilocycle magnetic core shift register. Input information is entered serially while the output can be either six parallel signals or a single serial signal. For system flexibility, the input and output can be referenced at different d.c. levels. Core modules can also be provided which will accept parallel inputs and produce a serial output.

**SPECIFICATIONS**

- **Shift frequency**: 0—50 kilocycles
- **Recommended shift pulse:**
  - Rise time: 1.0 microsecond
  - Fall time: 1.0 microsecond
  - Duration (at half amplitude): 3.5 microseconds
  - Amplitude: 1.3 amperes
  - Voltage drop: 0.55 volt per stage for a "one" signal
- **Operating range at 1.3 ampere drive**: 1.5—9.0 microseconds
- **Minimum operating current**: 0.75 amperes
- **Power consumption (per stage)**: 0.065 watt for repetitive switching at 50 kilocycles

**OUTPUT**

- Amplitude: 8 volts
- "One" to "zero" ratio: 8:1
- Minimum load impedance: 5 kilohms
- Minimum load current: 10 milliamperes for 10 microseconds

**SIGNAL INPUT**

- 0—50 kilocycles
- 1.0 microsecond
- 1.0 microsecond
- 3.5 microseconds
- 1.3 amperes
- 0.55 volt per stage for a "one" signal
- 1.5—9.0 microseconds
- 0.75 amperes
- 0.065 watt for repetitive switching at 50 kilocycles
- 8 volts
- 8:1
- 5 kilohms
- 10 milliamperes for 10 microseconds
The MCD1 Low Frequency Core Driver Module provides shift pulses for the CR50-1 Magnetic Core Register. The MCD1 consists of a one-shot multivibrator, a two stage amplifier, and a power output stage capable of driving 50 core stages. A clear input is provided to permit resetting of the register. For high power applications a heat sink is available.

### SPECIFICATIONS

**INPUT** (Trigger and Clear)
- A positive step with the following characteristics:
  - Minimum amplitude: 8 volts
  - Minimum rise time: 1 microsecond
  - Maximum Trigger repetition rate: 50 kilocycles
  - Minimum Clear duration: 16 microseconds

**OUTPUT**
- Current pulse with the following characteristics:
  - Amplitude: 1.3 ampere
  - Rise time: 1.0 microsecond
  - Fall time: 1.0 microsecond
  - Duration (at half amplitude): 3.5 microseconds
  - Output voltage: 0 to 27 volts
  - Power rating of output transistor at 45°C:
    - No heat sink: 1.0 watt
    - With heat sink: 8.0 watts

**POWER REQUIREMENTS**
- +6 volts: 30 milliamperes
- -12 volts: 18 milliamperes
- -28 volts: Current dependent on duty factor

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![Diagram of the MCD1 Low Frequency Core Driver Module](image)
The TF4 Dual Flip-Flop Module holds two identical and independent Eccles-Jordan flip-flop circuits capable of switching up to 3 million times per second. The transistors are operated either at cut-off or at saturation. Each side of a TF4 flip-flop has two inputs, one which will accept signals from a diode gate or another flip-flop, and an auxiliary which will accept signals from an IC5 Input Circuit.

**SPECIFICATIONS**

**INPUT** (To set or reset inputs directly or through diode gates and to auxiliary inputs through IC5 Input Circuits)

A positive step with the following characteristics:

- Minimum amplitude: 7 volts
- Maximum rise time: 0.06 microsecond
- Maximum repetition rate: 3 megacycles

**OUTPUT**

- Voltage
  - "One": -7 to -10 volts
  - "Zero": 0 to -0.3 volt
- Maximum rise time
  - No load: 0.04 microsecond
  - Full load: 0.06 microsecond

Maximum load per output:

- Number of clocked or d.c. gates: 7
- Wiring capacity: 50 micromicrofarads

Note: When driving TI4 Amplifier-Inverter, the output of the flip-flop should be preloaded with 5.6 kilohms to -12 volts.

**POWER REQUIREMENTS FOR ENTIRE MODULE**

- -12 volts: 24 milliamperes
- +6 volts: 0.4 milliamperes
The AG1 Adder Gate Module contains all the gates required for a 3 megacycle serial adder. The “Sum” output is buffered by an emitter follower, and an amplifier is used to provide the “Inverted Sum.” The AG1 contains carry gates, so that a full serial adder can be constructed by merely adding a “carry” flip-flop (half a TF4 module). The “Sum Gating Input” permits ON-OFF control of the adder.

**SPECIFICATIONS**

**INPUT**
- A, B, C, Ĉ
- Clock

**OUTPUT**
- Sum: Outputs from TF4 flip-flops
- Inverted Sum: Output from CD4 clock driver
- Carry set and reset: Same as EF2 operated from diode AND-OR gate

**POWER REQUIREMENTS**
- -12 volts: 28 milliamperes
- +6 volts: 13 milliamperes
The TI4 Amplifier-Inverter Module holds six identical and independent single-stage amplifier circuits capable of operating at pulse rates up to 3 megacycles. In addition to providing the logical operation of negation, the TI4 serves to amplify the outputs of flip-flops, emitter-followers, and diode AND gates.

**INPUT SPECIFICATIONS**
- Voltage
  - "One": -7 to -12 volts
  - "Zero": +1 to -1 volt
- Maximum rise time: 0.10 microsecond
- Maximum fall time: 0.20 microsecond
- Maximum pulse rate: 3 megacycles

**OUTPUT SPECIFICATIONS**
- Voltage
  - "One": -7 to -10 volts
  - "Zero": 0 to -0.3 volt
- Maximum rise time
  - No load: 0.02 microsecond
  - Full load: 0.04 microsecond
- Maximum load per output:
  1. Number of clocked or d.c. diode gates: 7
  2. Wiring capacity: 75 micromicrofarads

Note 1. When TI4 is operated from a diode AND gate the "One" input drops to -6 volts and the maximum load becomes 5 gates. Preloading the input of the TI4 with 10 kilohms to -12 volts provides full input voltage and allows full loading.

Note 2. When one TI4 inverter is operated from another, its input should be preloaded with 5.6 kilohms to -12 volts.

**POWER REQUIREMENTS FOR ENTIRE MODULE**
- -12 volts: 33 milliamperes with all units at "One"
- +6 volts: 1 milliamperes with all units at "Zero"
The EF2 Emitter-Follower Module holds six identical and independent amplifier circuits capable of operating at pulse rates up to 3 megacycles. In conjunction with Diode Gate Modules, the EF2 provides for the construction of d.c. AND-OR gates. EF2 outputs, then, may be employed as inputs to other gates so as to provide multilevel gating. The emitter-follower output is also suitable for driving a TI4 Amplifier Inverter.

When operated directly from a TF4 Flip-Flop or TI4 Amplifier-Inverter, the EF2 provides a low impedance output for driving long lines or other substantial capacitive and resistive loads. Under these conditions, the EF2 absorbs any current supplied by the load, while the inverter or flip-flop supplies the current required by the load. Any part of the flip-flop or inverter load may be transferred to the output of the emitter follower.

**SPECIFICATIONS**

**INPUT** (Directly or through a d.c. diode gate)
- Voltage
  - "One": -7 to -12 volts
  - "Zero": 0 to -0.3 volt
- Maximum rise time: 0.08 microsecond
- Maximum pulse rate: 3 megacycles

**OUTPUT**
- Voltage
  - "One": -6.8 to -12 volts
  - "Zero": +0.2 to -0.3 volt
- Maximum rise time:
  - Operated through d.c. AND-OR gate: 0.2 microsecond
  - Operated directly or through d.c. AND gate: Equal to input rise time
- Maximum load per output:
  1. Number of clocked or d.c. diode gates: 2
  2. Wiring capacity: 50 micromicrofarads
- Additional load capability of directly operated emitter follower:
  1. Maximum capacity: 150 micromicrofarads
  2. Minimum resistance to ground: 750 ohms

**POWER REQUIREMENTS FOR ENTIRE MODULE**
- -12 volts: 80 milliamperes with all units at "One"
- -12 volts: 30 milliamperes with all units at "Zero"
- +6 volts: 85 milliamperes with all units at "One"
- +6 volts: 32 milliamperes with all units at "Zero"
The CD4 Clock Driver Module is a multi-output amplifier which accepts a single input signal from a suitable clock source, shapes it, and provides a high power output. The input signal can be provided by an XCG1, TF4, TI4 or any other source fulfilling the input requirements. The CD4 is designed to drive up to 80 gates.

**SPECIFICATIONS**

**INPUT**
- Voltage
  - "One": $-7$ to $-12$ volts
  - "Zero": $+1.0$ to $-1.0$ volt
- Maximum rise time: $0.1$ microsecond
- Maximum repetition rate: $3$ megacycles

**OUTPUT**
- Voltage
  - "One": $-7$ to $-10$ volts
  - "Zero": $0$ to $-0.3$ volt
- Maximum load per output:
  1. Number of gates: $16$
  2. Flip-flops triggered: $8$
  3. Wiring capacity: $75$ micromicrofarads
- Maximum rise time:
  - No load: $0.02$ microsecond
  - Full load: $0.04$ microsecond

**POWER REQUIREMENTS FOR ENTIRE MODULE**
- $-12$ volts: $65$ milliamperes (at $50\%$ duty factor)
- $+6$ volts: $10$ milliamperes
The XCG1 Clock Generator Module consists of a crystal controlled oscillator and shaping amplifier. The output is a pulse train suitable for operating up to 10 CD4 clock drivers. The standard frequency is 3 megacycles. (Other frequencies between 1 and 3 megacycles can be made to order.) The duty factor is adjustable over the range 0.42 to 0.58.

**SPECIFICATIONS**

**OUTPUT**

<table>
<thead>
<tr>
<th>Voltage</th>
<th>“One”</th>
<th>0 to +0.5 volt</th>
</tr>
</thead>
<tbody>
<tr>
<td>“Zero”</td>
<td></td>
<td>-8 to -11 volts</td>
</tr>
</tbody>
</table>

**Maximum load:**
- (a) Number of CD4 clock drivers: 10
- (b) Wiring capacity: 150 micromicrofarads

<table>
<thead>
<tr>
<th>Maximum rise time</th>
<th>No load</th>
<th>0.025 microsecond</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full load</td>
<td></td>
<td>0.05 microsecond</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Maximum fall time</th>
<th>No load</th>
<th>0.04 microsecond</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full load</td>
<td></td>
<td>0.08 microsecond</td>
</tr>
</tbody>
</table>

**Repetition rate**
- 3 megacycles ±0.01%

**POWER REQUIREMENTS FOR ENTIRE MODULE**

<table>
<thead>
<tr>
<th>Voltage</th>
<th>No load</th>
<th>Full load</th>
</tr>
</thead>
<tbody>
<tr>
<td>-12 volts</td>
<td>20 milliamperes</td>
<td>40 milliamperes</td>
</tr>
<tr>
<td>-6 volts</td>
<td>12 milliamperes</td>
<td>30 milliamperes</td>
</tr>
</tbody>
</table>
The DG5 Diode Gate Module consists of five 3 megacycle AND Gates, each with two or three diodes. The gates are independent, except for one common input applied to one diode in each gate. Each AND gate may drive a flip-flop input circuit (TF4 or IC5), an EF2, a CD4 or a TI4 (preloaded).

In conjunction with an EF2 emitter follower, the DG5 may be operated as a d.c. AND-OR gate. The common input now becomes the output of the multilevel gate and is connected to the emitter follower. Additional terms may be connected to each AND gate from a DG6 module.

The DG5 should be placed as close to its load as possible in order to minimize output wiring capacity.

**SPECIFICATIONS**

**INPUT**

- Voltage: 
  - "One" .............. -7 to -12 volts
  - "Zero" .......... 0 to -0.3 volt
- Clock or Trigger:
  - Maximum rise time ........ 0.06 microsecond
  - Maximum repetition rate ........ 3 megacycles

**POWER REQUIREMENTS**

- -12 volts ........ 10 milliamperes
The DG6 Diode Gate Module consists of three independent 3 megacycle AND gates, two of which are detached from their resistors to allow their combination with other AND gates in a DG5 or DG6 module requiring additional terms or inputs. AND gates with any desired number of terms may thus be formed. Each DG6 AND gate may operate a flip-flop input circuit (TF4 or IC5), an EF2, a CD4 or a TI4 (pre-loaded).

**SPECIFICATIONS**

**INPUT**

<table>
<thead>
<tr>
<th>Voltage</th>
<th>“One”</th>
<th>0 to −0.3 volt</th>
</tr>
</thead>
<tbody>
<tr>
<td>“Zero”</td>
<td>0 to −12 volts</td>
<td></td>
</tr>
<tr>
<td>Clock or Trigger: Maximum rise time</td>
<td>0.06 microsecond</td>
<td></td>
</tr>
<tr>
<td>Maximum repetition rate</td>
<td>3 megacycles</td>
<td></td>
</tr>
</tbody>
</table>

**POWER REQUIREMENTS**

-12 volts 6 milliamperes
The IC5 Input Circuit Module contains eight a.c. coupled trigger circuits identical to those used in the TF4. Six of the input circuits are connected together in three groups of two each to form a.c. OR gates. One IC5 output is applied to an auxiliary input of a TF4 flip-flop in order to provide alternate trigger sources. The IC5 may be operated from DG5 or DG6 diode AND gates to form an a.c. AND-OR gate. The IC5 module should be adjacent to the TF4 modules it operates in order to minimize wiring capacity.

**POWER REQUIREMENTS**

-12 volts ........................................... 1.5 milliamperes
The OD1 Output Driver Module holds six identical and independent amplifier circuits capable of operating at pulse rates up to 3 megacycles. The OD1 is used to provide a low impedance output for driving long lines or other substantial capacitive and resistive loads.

**SPECIFICATIONS**

**INPUT**
- **Voltage**
  - “One”: -7 to -12 volts
  - “Zero”: 0 to -0.3 volt
- **Maximum rise time**: 0.08 microsecond
- **Maximum pulse rate**: 3 megacycles

**OUTPUT**
- **Voltage**
  - “One”: -6.8 to -12 volts
  - “Zero”: +1 to -0.3 volt
- **Maximum rise time**: 0.12 microsecond
- **Maximum load per output**:
  - Number of d.c. diode gates: 4
  - Number of d.c. or clocked diode gates: 3
  - Resistance to ground: 500 ohms
  - Capacity to ground: 400 micromicrofarads

**POWER REQUIREMENTS FOR ENTIRE MODULE**
- **-12 volts**
  - No load: 1 milliampere
  - Maximum capacitive load at maximum frequency: 80 milliamperes
- **+6 volts**
  - No load: 1 milliampere
  - Maximum capacitive load at maximum frequency: 80 milliamperes
CR100-1 Magnetic Core Register

The CR100-1 Magnetic Core Register Module holds six stages of a 100 kilocycle magnetic core shift register. Input information is entered serially while the output can be either six parallel signals or a single serial signal. For system flexibility, the input and output can be referenced at different DC levels. An alternate version (CR100-2) will accept parallel inputs and produce a serial output.

SPECIFICATIONS

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shift frequency</td>
<td>0 - 100 kilocycles</td>
</tr>
<tr>
<td>Recommended shift pulse:</td>
<td></td>
</tr>
<tr>
<td>Rise time</td>
<td>0.5 microsecond</td>
</tr>
<tr>
<td>Fall time</td>
<td>0.5 microsecond</td>
</tr>
<tr>
<td>Duration (at half amplitude)</td>
<td>1.8 microseconds</td>
</tr>
<tr>
<td>Amplitude</td>
<td>1.0 ampere</td>
</tr>
<tr>
<td>Voltage drop</td>
<td>0.5 volt per stage</td>
</tr>
<tr>
<td></td>
<td>for a &quot;one&quot; signal</td>
</tr>
<tr>
<td>Operating range at 1.0 ampere drive</td>
<td>0.9 - 4.5 microseconds</td>
</tr>
<tr>
<td>Minimum operating current</td>
<td>0.55 ampere</td>
</tr>
<tr>
<td>Power consumption (per stage)</td>
<td>0.045 watt for repetitive switching at 100 kilocycles</td>
</tr>
</tbody>
</table>

OUTPUT

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amplitude</td>
<td>6.5 volts</td>
</tr>
<tr>
<td>&quot;One&quot; to &quot;Zero&quot; ratio</td>
<td>10:1</td>
</tr>
<tr>
<td>Minimum load impedance</td>
<td>7 kilohms</td>
</tr>
</tbody>
</table>

SIGNAL INPUT

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>10 milliamperes for</td>
</tr>
<tr>
<td></td>
<td>5 microseconds</td>
</tr>
</tbody>
</table>

(SEE REVERSE SIDE)
MCD2 Magnetic Core Driver

The MCD2 Medium Frequency Core Driver Module provides shift pulses for the CR100 Series Magnetic Core Registers. The MCD2 consists of a one-shot multivibrator and a power output stage capable of driving 54 core stages. A clear input is provided to permit resetting of the register. For high power applications, a heat sink should be specified when ordering.

SPECIFICATIONS

INPUT (Trigger and Clear)
A positive step with the following characteristics:
Minimum amplitude.................. 8 volts
Minimum rise time.................... 1 microsecond
Maximum Trigger repetition rate..... 100 kilocycles
Minimum Clear duration............ 8 microseconds

OUTPUT
Current pulse with the following characteristics:
Amplitude......................... 1.0 ampere
Rise time......................... 0.5 microsecond
Fall time......................... 0.5 microsecond
Duration (at half amplitude)........ 1.8 microseconds
Output voltage.................... 0 to 27 volts dependent on load

Power rating of output transistor at 45°C:
No heat sink...................... 1.0 watt
With heat sink.................. 8.0 watts

POWER REQUIREMENTS
+ 6 volts............... 20 milliamperes
-12 volts.............. 30 milliamperes
-28 volts.............. Current dependent on duty factor

(SEE REVERSE SIDE)
MS-1

MAGNETIC CORE DRIVER POWER SUPPLY

The MS-1 is a 28-volt supply that mounts in standard Packard Bell Computer Corporation module cases such as the MC72. Connections to the supply are made through a standard 15-pin Elco Connector and eight module spaces are required. The MS-1 will power three Magnetic Core Drivers (MCD) at maximum shifting frequencies and a proportionately larger number at lower frequencies. When the number of drivers exceeds nine, external filter capacitance may be required to average-out the load current.

The following chart indicates typical configurations:

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Maximum Number of Drivers</th>
<th>Maximum Number of core stages</th>
</tr>
</thead>
<tbody>
<tr>
<td>MCD-1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>50 KC</td>
<td>3</td>
<td>48</td>
</tr>
<tr>
<td>10 KC</td>
<td>15</td>
<td>240</td>
</tr>
<tr>
<td>MCD-2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>100 KC</td>
<td>3</td>
<td>48</td>
</tr>
<tr>
<td>25 KC</td>
<td>12</td>
<td>192</td>
</tr>
<tr>
<td>5 KC</td>
<td>60</td>
<td>960</td>
</tr>
</tbody>
</table>

SPECIFICATIONS

**Input**

105 to 125 volts, 50 to 60 cycle single-phase AC power

**Output**

Voltage: 28 volts DC
Current: 1.0 ampere
Load Regulation: ±1% maximum
Line Regulation: ±1% maximum
Ripple: 0.1% (peak-to-peak)

**PRICE:** $200
**TERMS:** Net 30 days
            FOB Los Angeles

(SEE REVERSE SIDE)
The MC 72A Mounting Case is identical to the MC 72 with the exception that tilt-up slides are employed. This permits easy access to the inter-module wiring without removing the case from a relay rack.

**PRICE OF MC 72A**

<table>
<thead>
<tr>
<th>With Power Supply</th>
<th>$680.00</th>
</tr>
</thead>
<tbody>
<tr>
<td>Without Power Supply</td>
<td>$315.00</td>
</tr>
</tbody>
</table>

The MC 250 Mounting Case is a rack-mounted case that holds 250 digital modules. It consists of a cast aluminum spine to which are connected two vertical hinged frames, each of which holds 125 modules. Slides permit the entire assembly to be removed from the rack in which it is mounted and opened, as a book, to provide access to wiring side of the frames. The spine has provision for mounting input/output connectors, while a front panel can hold indicators and control switches. The dimensions of the MC 250 are: 19" wide, 31-1/2" high and 25-1/4" deep. It may be mounted in a 28" deep relay rack with vertical support in the rear.

A power supply, the PS 7, is available for operation with the MC 250. It employs magnetic regulation exclusively and has circuit breakers on all voltages for overload protection. The dimensions of an MC 250 with a PS 7 are: 19" wide, 33-1/4" high and 25-1/4" deep.

**PS 7 SPECIFICATIONS**

**INPUT**

105 to 125 VAC, 60 cycles

**OUTPUT**

- Regulated
  - + 6 volts DC ................................ 2 amperes
  - - 12 volts DC ................................ 8 amperes

- Unregulated
  - + 50 volts DC ................................ 0.15 amperes
  - 1 volt AC .................................... 6 amperes

**PRICE OF MC 250**

<table>
<thead>
<tr>
<th>With PS 7 Power Supply</th>
<th>$2300.00</th>
</tr>
</thead>
<tbody>
<tr>
<td>Without PS 7 Power Supply</td>
<td>$1200.00</td>
</tr>
</tbody>
</table>

(SEE REVERSE SIDE)
SR1 SHIFT REGISTER

The SR1 Shift Register Module contains three flip-flop circuits and interconnecting diode gates forming a complete shift register. Any number of these modules may be cascaded directly to form a long register. Both serial and parallel input and output has been provided. Parallel input is effected by means of a common reset line and individual set lines. The set lines may be driven from standard diode AND gates, if desired. Both the "Set" and "Reset" outputs of each stage are available at the connector, except for the "Reset 2" output. Where required, this signal may be generated from the "Set 2" output by means of a TI3 inverter stage.

SPECIFICATIONS

INPUT (To set, reset inputs directly or through diode gates)
A positive step with the following characteristics:

- Minimum amplitude: 8 volts
- Maximum rise time: 1 microsecond
- Maximum repetition rate: 200 kilocycles

OUTPUT

- Voltage:
  - "One": -9 to -12 volts
  - "Zero": 0 to -0.25 volts
- Maximum rise time:
  - No load: 0.25 microsecond
  - Full load: 1.0 microsecond

Maximum load per output:
- Clocked or DC diode gates: 9
- Unclocked diode gates operating
  - input circuits: 7
- NOR inputs: 27

POWER REQUIREMENTS FOR ENTIRE MODULE
- -12 volts: 55 milliamperes
- +6 volts: 1.4 milliamperes

PRICE: $75.00
CIRCUIT CARD HANDLE

An etched circuit card handle made of high impact cycolac plastic that easily spring-locks on the top edge of the card. This simply-designed accessory installs or removes digital module cards. Valuable for laboratory work and for production or field maintenance.

FEATURES
1. REDUCES LIKELIHOOD OF BOARD BREAKAGE AND SOCKET DAMAGE
2. CARDS CAN BE STACKED AS CLOSE AS 1/2"
3. ALLOWS FULL USE OF BOARD FOR CIRCUIT
4. FINGER TIP RELEASE ACTION
5. POSITIVE GRIPPING - WILL NOT SLIP
## DIGITAL MODULES PRICE LIST

**1 July 1960**

### 200 KC Transistorized Digital Modules

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
<th>Unit Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>TF2</td>
<td>Dual Flip-Flop (2 circuits)</td>
<td>$45.00</td>
</tr>
<tr>
<td>TF3</td>
<td>Dual Flip-Flop (2 circuits)</td>
<td>$45.00</td>
</tr>
<tr>
<td>TI3</td>
<td>Amplifier Inverter (6 circuits)</td>
<td>$45.00</td>
</tr>
<tr>
<td>EF1</td>
<td>Emitter Follower (6 circuits)</td>
<td>$45.00</td>
</tr>
<tr>
<td>DC1</td>
<td>Decade Counter</td>
<td>$75.00</td>
</tr>
<tr>
<td>BC1</td>
<td>Binary Counter</td>
<td>$75.00</td>
</tr>
<tr>
<td>TD2</td>
<td>Relay or Lamp Driver (4 circuits)</td>
<td>$75.00</td>
</tr>
<tr>
<td>TO3</td>
<td>Dual One-Shot (2 circuits)</td>
<td>$65.00</td>
</tr>
<tr>
<td>ST1</td>
<td>Dual Schmitt Trigger (2 circuits)</td>
<td>$45.00</td>
</tr>
<tr>
<td>HF3</td>
<td>Clock Generator and Multivibrator</td>
<td>$65.00</td>
</tr>
<tr>
<td>CD3</td>
<td>Clock Driver (6 circuits)</td>
<td>$120.00</td>
</tr>
<tr>
<td>CS1</td>
<td>Dual Clock Shaper (2 circuits)</td>
<td>$65.00</td>
</tr>
<tr>
<td>NE1</td>
<td>Dual NOR (2 circuits)</td>
<td>$35.00</td>
</tr>
<tr>
<td>DG3</td>
<td>Diode Gate</td>
<td>$30.00</td>
</tr>
<tr>
<td>DG4</td>
<td>Diode Gate</td>
<td>$30.00</td>
</tr>
<tr>
<td>IC2</td>
<td>Input Gate</td>
<td>$30.00</td>
</tr>
<tr>
<td>IC4</td>
<td>Input Gate</td>
<td>$35.00</td>
</tr>
</tbody>
</table>

### Magnetic Modules

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
<th>Unit Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>CR50-1</td>
<td>Magnetic Core Register 50 KC (6 stages)</td>
<td>$75.00</td>
</tr>
<tr>
<td>MCD1</td>
<td>Magnetic Core Driver 50 KC</td>
<td>$90.00</td>
</tr>
<tr>
<td>CR100-1</td>
<td>Magnetic Core Register 100 KC (6 stages)</td>
<td>$90.00</td>
</tr>
<tr>
<td>MCD2</td>
<td>Magnetic Core Driver 100 KC</td>
<td>$90.00</td>
</tr>
<tr>
<td>MS1</td>
<td>Magnetic Core Driver Power Supply (28 volt)</td>
<td>$200.00</td>
</tr>
</tbody>
</table>

### *3 Megacycle Transistorized Digital Modules

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
<th>Unit Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>TF4</td>
<td>Dual Flip-Flop (2 circuits)</td>
<td>$100.00</td>
</tr>
<tr>
<td>TI4</td>
<td>Amplifier Inverter (6 circuits)</td>
<td>$125.00</td>
</tr>
<tr>
<td>EF2</td>
<td>Emitter Follower (6 circuits)</td>
<td>$90.00</td>
</tr>
<tr>
<td>CD4</td>
<td>Clock Driver (5 circuits)</td>
<td>$175.00</td>
</tr>
<tr>
<td>DG5</td>
<td>Diode Gate</td>
<td>$40.00</td>
</tr>
<tr>
<td>DG6</td>
<td>Diode Gate</td>
<td>$40.00</td>
</tr>
<tr>
<td>IC5</td>
<td>Input Gate</td>
<td>$40.00</td>
</tr>
<tr>
<td>XCG1</td>
<td>Crystal Clock Generator (similar to HF3 but with crystal)</td>
<td>$175.00</td>
</tr>
<tr>
<td>OD1</td>
<td>Output Driver (6 Low-Impedance Driver Circuits)</td>
<td>$175.00</td>
</tr>
<tr>
<td>AG1</td>
<td>Adder Gate (a complete Adder Gate with output amplifier)</td>
<td>$90.00</td>
</tr>
</tbody>
</table>

### Mounting Case, Power Supply, and Accessories

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
<th>Unit Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>BB1</td>
<td>Blank Circuit Board with connector</td>
<td>$10.00</td>
</tr>
<tr>
<td>Extender Board</td>
<td></td>
<td>$40.00</td>
</tr>
<tr>
<td>Circuit Card Handle</td>
<td></td>
<td>$20.00</td>
</tr>
<tr>
<td>MC72</td>
<td>Mounting Case:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>With Power Supply</td>
<td>$650.00</td>
</tr>
<tr>
<td></td>
<td>Without Power Supply</td>
<td>$285.00</td>
</tr>
<tr>
<td></td>
<td>17 Indicators mounted in MC72 case</td>
<td>$110.00</td>
</tr>
<tr>
<td></td>
<td>60 Indicators mounted in MC72 case</td>
<td>$250.00</td>
</tr>
</tbody>
</table>

### PRICES

FOB our plant, Los Angeles, California

Prices are subject to change without notice.

### TERMS

Net Cash, 30 Days

### Quantity Discount

5% on each purchase order over $10,000

All module prices include an ELCO 15-pin connector.

*All 3 Megacycle Modules are compatible with 200 KC and Magnetic Modules.