The **Model 86** is a sophisticated, multi-purpose, Digital Timer & Controller designed for industrial process control and security system applications. Low Power requirements and compact size allow it to be installed in a very small space. Programming is easily done with DIP switches to select one of these five different functions:

- **Electronic Latching Relay** activated with any external momentary trigger voltage. Converts any positive (+) going pulse into an on/off/on/off (or flip/flop action) latched relay output. This Latching Mode is useful to convert the momentary voltage output of any device to a latching output. Primary usage is "shunting" security devices using just two digits of a Corby Keypad and locking/unlocking doors or gates for extended time periods using the momentary output of a Corby Key.

- **Digital Timer** accurately counts up, in 1 or 2 second increments, from 1 second to 510 seconds (8½ minute). This one-shot mode converts a short positive pulse into a long relay output. Once the timer is started, it will remain activated for the exact programmed time. Sustained or re-applied voltage triggers will not change or affect the programmed time period. Primary usage is opening doors, gates, and temporarily shunting security devices for exiting a building.

- **Digital Delay Timer** accurately counts down, in either 1 or 2 second increments, for any programmable time ranging from 510 seconds to 1 second. This mode requires the trigger voltage to be present during the entire countdown period and will "delay" an event from occuring for a programmed period of time. Primary uses include preventing a digital or tape dialer from reporting instantly, preventing a bell or siren from sounding instantly (which allows a "silent alarm" situation for up to 8½ minutes), and control of "fast swingers" in a protective alarm loop.

- **Pulsing Digital Timer** activates the relay for 130 milliseconds, waits for the programmed time (1 to 510 seconds), activates the relay again for 130 milliseconds, and repeats. This mode requires a constant positive trigger and is used to flash a LED/light, or sound an audible device as required by some fire codes.

- **Sensitive Low Level Relay** only requires one milliamp of positive trigger current to operate the heavy-duty relay. The SPDP relay will be active anytime a positive trigger voltage is present. This mode is used to convert low current LED or protective loop voltages into isolated relay contacts that can handle 5 amps.

SPECIFICATIONS

Operate Voltage Range	6 to 18 Volts DC Only
Idle Current Ranges	4 mA @ 6VDC 10mA @ 12VDC
Operating Current	42 mA @ 6VDC 71 mA @ 12VDC
Time Range	1 Second to 512 Seconds
Repeat Accuracy	1 Second or 2% of total
Trigger Voltages	4VDC minimum to 18VDC max.
Trigger Response	140 milliseconds +/- 10%
Trigger Conditions	Any Type Positive, Or Pulsed Negative
Available User Modes	Five, Fully Programmable
Temperature Range	−25C to +70C
Logic Circuits	Low Power CMOS
Relay Contacts	Rated 5 Amps @ 24VDC/VAC 60VDC Max.
Mounting Method	3M Double Sided Foam Tape
Connection Method	7 Pin Quick Disconnect Header
Size/in (mm)	1.6 X 2.3 X 0.75 (41 X 58 X 19)
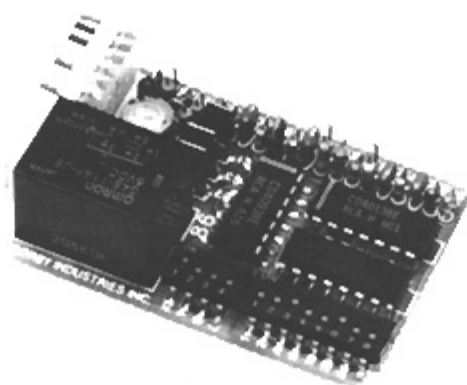
HOW TO PROGRAM THE MODE SELECT SWITCH

The Mode Switch is the small four (4) position DIP switch located next to the relay. All DIP positions must be "off" unless they are being used. To select the desired Mode, move the selected DIP switch/s using this selection chart.

SWITCH POSITION			MODE
L	4	ON	= Latching Relay
D	3	ON	= Delay Timer
T	2	ON	= Regular Timer
X1	1	OFF	= Seconds X 2
X1	1	ON	= Seconds X 1

HOW TO PROGRAM THE MINUTES & SECONDS SWITCH

The "Set Time DIP Switch" is the eight (8) position switch located next to the Mode switch. It uses a Binary Encoded Decimal (BCD) method to accurately count seconds. When each numbered switch is in the "ON" position, the programmed time is equal to the following seconds:

DIP POSITION			SECONDS X 1		SECONDS X 2
1	ON	=	1	or	2
2	ON	=	2	or	4
3	ON	=	4	or	8
4	ON	=	8	or	16
5	ON	=	16	or	32
6	ON	=	32	or	64
7	ON	=	64	or	128
8	ON	=	128	or	256

If ALL switches are "ON":
Total Seconds Available = 255 or **510**

As you can see from the above chart, the programmed time is equal to the **SUM of all ON** switches MULTIPLIED BY 1 if the Mode Switch "X1" is **ON**. The "time" is MULTIPLIED BY 2 if the Mode Switch "X1" is **OFF**.

Example: 15 Second Timer (Mode Switch X1 is ON)

DIP POSITION			SECONDS X 1
1	ON	=	1
2	ON	=	2
3	ON	=	4
4	ON	=	8
Total Seconds Programmed		=	15

Example: 5 Minute Timer (Mode Switch X1 is OFF)

DIP POSITION			SECONDS X 2
2	ON	=	4
3	ON	=	8
5	ON	=	32
8	ON	=	256
Total Seconds Programmed		=	300

seconds or five minutes

SELECT MODE OF OPERATION

Five full Modes are available but only one (1) Mode can be programmed at any given time. If multiple Modes (functions) are desired, two or more Model 86's must be used.

Electronic Latching Relay Set Mode **Switch 4-L ON.** ALL OTHER SWITCHES MUST BE **OFF**.

Any positive voltage or pulse which appears on the brown Trigger Wire will latch the Model 86 relay in the "ON" position AND the yellow LED Driver Wire will switch negative (zero volts). This "ON" condition will continue until all power is removed from the unit or a new positive voltage or pulse is applied to the Trigger Wire. When the unit receives the new trigger pulse, the relay will deactivate and the LED Driver Wire will "float". The unit can now be re-triggered resulting in an on-off-on-off Latching function. Now, the unit is ready to be reactivated again.

Regular Timer or Pulse extender Set Mode **Switch 2-T ON.** Mode Switch #1-X1 may be on or off. ALL OTHER MODE SWITCHES MUST BE **OFF**. Program the number of "seconds" into the "Time DIP Switch".

Any positive voltage or positive pulse on the brown Trigger Wire will activate the relay in the "on" position AND the yellow LED Drive Wire will switch negative (zero volts) for the duration of the programmed time period. If the Timer Mode is started, it will continue timing until the programmed time period has elapsed. It CANNOT be STOPPED or RE-TRIGGERED.

Delay On Timer Set Mode **Switch 3-D ON.** Mode Switch 1-X1 may be on or off. ALL OTHER MODE SWITCHES MUST BE **OFF**. Program the number of "delay seconds" into the "Time DIP Switch"

A constant positive voltage must be applied to the brown Trigger Wire for the programmed number of seconds BEFORE the relay will activate. When the "Time Delay" period (in seconds) has elapsed, the yellow LED Driver Wire will switch negative (zero volts), the relay will activate and remain activated until the positive voltage is removed from the Trigger.

The Delay Timer is started with an initial trigger voltage pulse. Then, any positive voltage on the trigger is ignored during the timing cycle BUT the positive voltage MUST be present at the exact second the timer logic switches the relay on. If trigger voltage is not present at that exact moment, the relay will NEVER activate.

Pulsing Timer Set Mode **Switch 3-D ON.** Mode Switch 1-X1 may be on or off. ALL OTHER MODE SWITCHES MUST BE **OFF**. Program the number of "delay seconds" into the "Time DIP Switch".

Install the supplied 10K ohm resistor between the Red and Brown wires. Connect the Brown and Yellow wires together.

When constant power is applied to the Red (+) and Black (−) wires of the Model 86, the relay will continuously pulse on and off. The "ON" time of the relay is fixed at or about 130 milliseconds and the "OFF" time is determined by programming the "Time DIP Switch".

If you set Mode Switch 3 D to OFF and Mode Switch 2-T to ON, the relay will continuously pulse "ON" for the programmed time and "OFF" for 130 milliseconds.

Super Sensitive Relay Set Mode **Switch 3-D ON.** ALL OTHER MODE SWITCHES MUST BE **OFF**. All positions of the "Time DIP Switch" must be **OFF**.

Any positive voltage applied to the Brown Trigger Wire will cause the Yellow LED Driver Wire to switch negative (zero volts) and also activate the relay. If the Trigger voltage is removed, the LED Driver Wire will return to a "float" condition and the relay will cease to be in the active state.

If the Model 86 is used to "monitor" the condition of another device, LED, etc. the Black wire (−) must be connected to the constant negative (−) of that device. A positive voltage from the "other" device will trigger the Model 86.

Less than 1 ma @ 12VDC applied to the brown Trigger Wire is required to activate the Model 86.

USING TWO DIGITS OF A CORBY DIGITAL KEY

In Burglar Alarm and Security System installations, a Model 7030 or 7040 Corby Digital Key is often used with a four or five digit Main Code to arm or disarm the Alarm Control Panel. This arm/disarm function of the Digital Key only requires 4 or 5 digits of the 12 digit Corby Keypad. That means there are at least 7 Keypad buttons "not used". The trigger/s of any Model 86/s may be connected to the output of ANY of these "unused" Keypad buttons.

This gives the user a simple, but secure "Two Button Control" for "shunting alarm zones" in/out of a Security System. The "7030" and "7040" Corby Digital Keypads even have extra LEDs to indicate the current "Zone" or "Home/Away" status. The user may also "start a timer" for exit purposes or turning on outside lights for a few minutes.

For two button Corby Key operation, the 1st Keypad control button always WILL be the 1st digit of the Main Code. The 2nd Keypad control button is programmable and may be any one of the seven Keypad digits which were NOT used in the Main Code.

A special Model 70 Program Wire is included with each Model 86 Digital Timer-Controller. Connected to the wire is a small 1N4148 protection diode inside the black heat shrink. Remove the 7100 Decoder Board from the rear of the Corby Key and locate the 17 socket position Code Bank. Insert the solid end of the Program Wire in the Code Bank socket position number that corresponds with your selected 2nd control button. Connect the stranded end of the Program Wire to the brown trigger wire of the Model 86. Touching the 1st button of the Main Code AND the 2nd control button SIMULTANEOUSLY will trigger the Model 86.

CORBY 7100 KEYPAD DECODER
is attached at the rear
of all Corby Keys

13 POSITION KEYBOARD CONNECTOR

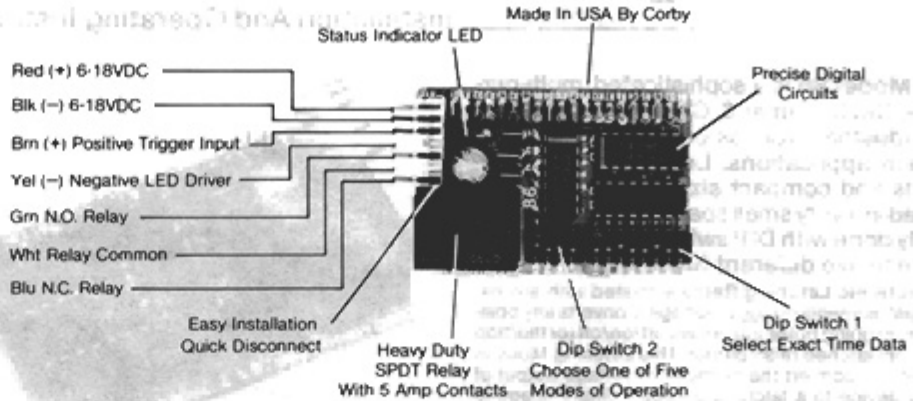CODE BANK

JUMPER WIRES TO SET MAIN CODE

PRINTED CIRCUIT BOARD

MODEL 70 PROGRAM WIRE USED FOR TWO DIGIT TRANSFER

TO MODEL 86 TRIGGER

Example: If the Corby Key Main Code is 4-3-2-1-#, touching buttons 4 and 6 produces a positive voltage at the "Code Bank" (socket #6) which will trigger the Model 86. The voltage will remain on the Model 70 Program Wire as long as the two buttons remain touched. This feature is available 24 hours a day.

Digital Timer Controller — Model 86

Status Indicator LED

Made In USA By Corby

Red (+) 6-18VDC

Blk (−) 6-18VDC

Brn (+) Positive Trigger Input

Yel (−) Negative LED Driver

Grn N.O. Relay

Wht Relay Common

Blu N.C. Relay

Precise Digital Circuits

Easy Installation Quick Disconnect

Heavy Duty SPDT Relay With 5 Amp Contacts

Dip Switch 2 Choose One of Five Modes of Operation

Dip Switch 1 Select Exact Time Data

MOUNTING THE MODEL 86

Double stick tape is supplied with the unit and it should be attached to the bottom of the Model 86 printed circuit board (PCB). The PCB is exactly the same size as the Corby Key Decoder Board (#7100) and is designed to be mounted on the rear of a Corby Key and still fit inside a standard electrical work box.

Before installation, set the DIP switches using a ball point pen or the end of a paper clip. If possible, to facilitate troubleshooting, install the "86" so the indicator LED is visible. Attach the 7 position wire harness and make the appropriate electrical connections.

WIRING THE CONNECTOR

A Quick-Disconnect, 7 position Molex socket with 14 inch color coded stranded wires is supplied with each "86". This unit has reverse polarity protection against most incorrect hook ups and the following wire color codes apply.

- **Red** Positive [+] power supply input, 6-18 DC ONLY

- **Black** Negative [−] power supply input. The black wire MUST be common to any Corby Keypad in the system when these Digital Keys are used to activate the "86" in any manner.

- **Brown** Positive [+] Trigger Input, requires a minimum of 4 volts to trigger the "86". This input is edge triggered by a rising positive voltage transition. The response time of this input is approximately 130 ms.

- **Yellow** Negative [−] LED Driver. This output switches to negative (zero volts) when the "86" activates. It is an open collector NPN transistor and the maximum current available from this output is 150 ma. A LED, or other device wired between the yellow[−] and red [+] wires will be activate whenever the "86" relay and status LED are active. When controlling any LEDs other than Corby LEDs (which have built-in resistors) with this output, YOU MUST install a current limiting resistor in series with the LED.

- **Green** Normally Open Dry Relay Contact All Relay Contacts are isolated from the PCB and are rated 5 amps @ 24 VDC/VAC with 60 VDC max.

- **White** Common Relay Contact

- **Blue** Normally Closed Dry Relay Contact

NEGATIVE TRIGGERING

The Model 86 will not trigger on a negative going voltage but it can be made to trigger "if and when" the negative (zero volts) trigger point returns to a positive [+] or a "float" (no voltage) condition.
When the trigger switches negative (zero volts), nothing will happen until the voltage rises positive. This action is accomplished by connecting the supplied 10k ohm resistor between the red and brown wires which forces the trigger positive. The negative trigger source, which must drop below 2.0 volts (zero prefered), is connected to the brown trigger wire of the "86".

CONTROLLING ADDITIONAL RELAYS

The yellow wire of the Model 86 is the negative LED driver. It can be used to operate relays and other devices. Devices wired between the red [+] and yellow [−] wires of the "86" will activate when the "86" is triggered. When using this output to operate a relay, you must install a protection diode (1N4002 or better) across the relay coil to supress harmful counter-EMF transients. The diode stripe (cathode) goes to the positive side of the relay coil. The non-stripe end (anode), goes to the negative side of the relay coil. Maximum current available from the yellow wire is 150 ma.

If it's Corby... It's the Best!