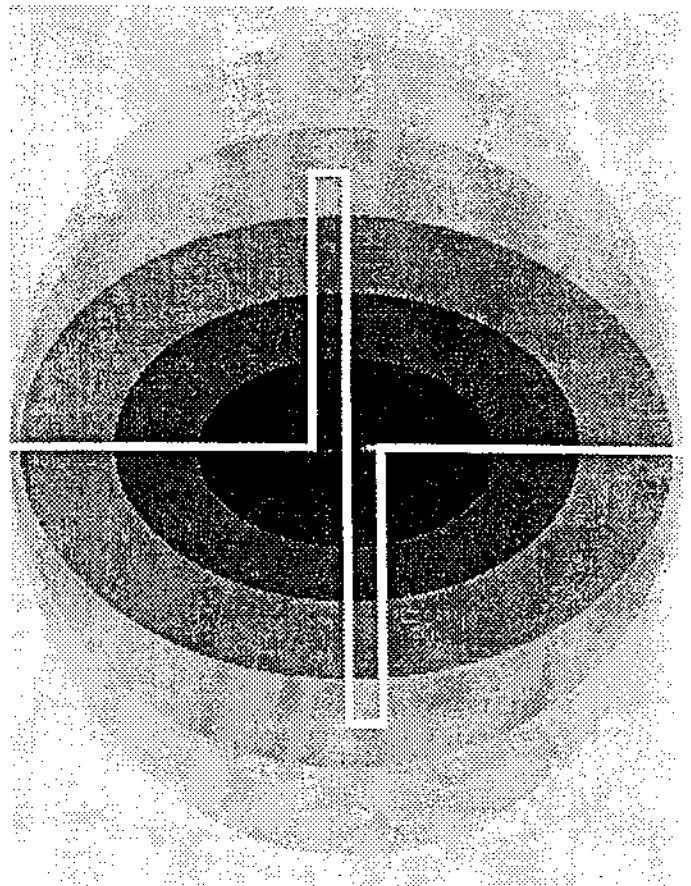


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MODEL WDP-Y8/6/4

EPROM 860929

ISSUE DATE

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GENERAL INFORMATION

The WDP-Y8/6/4 is a microprocessor controlled yearly programming unit capable of controlling 8 output circuits (expandable to 32 circuits) related to time. One or two pair of the output circuits may be programmed to operate 2 clock systems simultaneously. The unit automatically corrects for Standard/Daylight Savings Time and leap years. A key switch is provided to stop unauthorized programming or tampering.

DISPLAY

The WDP-Y8/6/4 features a sixteen (16) character LCD programming information display. Each character consists of a 5 x 7 dot matrix. In normal operation (R-mode), the following information is shown: Day of the week, date, hours and minutes (in 12 or 24 hour format). The display shows: { MON 29 DEC 16:48}

OUTPUTS

Eight (8) output circuits are available for programming. Each clock system, if chosen, will occupy 2 output circuits each (#5 & #6 and/or #7 & #8). 460 memory locations are available for programming output circuits for events on weekdays, dates, or holidays.

TOGGLE SWITCHES

Each output circuit has a 3 position toggle switch for manual control:

Position "1" (manual) - closes output relay

Position "A" (automatic) - output relay responds to output programming.

Position "O" (off) - output relay will remain open.

Note: The WDP-Y8/6/4 is shipped from the factory with switch #7 & #8 disabled. (See "Wiring & Start-Up Instructions" for more information.)

BUTTONS

The six (6) buttons on the front panel of the WDP-Y8/6/4 are defined as follows:

(R) button - Run or R mode (displays time & date and executes all programs)

(F) button - Functions menu or F mode (selects each of 12 programmable functions)

- (P) button - Program or P mode selects field within the specific program function.
- (S) button - This button does not have a function on this model.
- (+) button - Increases flashing character "value" (i.e., 1 to 2 to 3 etc.) when in P mode.
- (-) button - Decreases flashing character "value" (i.e., 3 to 2 to 1, etc.) when in P mode.

PROGRAMMING STEPS

1. Enter the F-mode by pressing the (F) button.
2. Select desired function you wish to program (See MENU OF FUNCTION below) by repeatedly pressing the (F) button. This advances the menu of functions in order. (If you wish to back up on the menu just press the (-) button.)

Note: Some or all of these functions may be inaccessible with the key switch locked. (See Appendix #1 for more information on key switch.)

3. With the desired function displayed enter the programming (P) mode by pressing the (P) button.
4. Programming may now be done from left to right with the (P), (+) and (-) buttons. The character to be programmed will always be flashing. The (+) button will increase the value of the flashing character. The (-) button will decrease the value of the flashing character. The (P) button will move the flashing character to the next character to be programmed to the right. (See PROGRAMMING OF FUNCTIONS for definition of character values.)
5. Programming may be completed in three different ways:
 - A. Step through all flashing characters using P-mode. The program is entered and the display returns to the F-mode.
 - B. Press button (F) before all characters are programmed. The program display is entered. Returns to F-mode.
 - C. Button (R) = escape. The program displayed is not entered. Returns to R-mode.

If neither button is pressed within 120 seconds (2 minutes), the R-mode is entered automatically. This is an automatic time out.

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MENU OF PROGRAMMABLE FUNCTIONS

- A {Year } Entering of Year
- B {Date and Time } Entering Date and master time.
- C {Correction } Correction of time system.
- D {Winter to Summer } Winter/Summer time correction.
- E {Summer to Winter } Summer/Winter time correction.
- F {Output-Weekday } Program weekly/daily event.
- G {Output-Date } Program events on a specific date.
- H {Display Outputs } Review or delete program events.
- I {Holidays } Enter Holidays.
- J {Display Holidays } Review or delete Holiday programs.
- K {Reset } Restart the WDP-Y8/6/4.
- L {Spec. Functions } Special Functions.

PROGRAMMING OF FUNCTIONS

After you have entered the P-mode, the following will be displayed depending upon the function selected:

Year- The display shows: { Year YY }

YY is the last 2 digits of 1986 to 2085 AD. Change to desired year as described above and press (P) or (F) to enter new year.

Date and Time- Display shows: { YY-LL-DD HH:MM }

YY is already set above. LL is the numerical month, DD is the numerical day, and HH:MM are the hours and minutes. Change to the desired setting for the master and enter using (P) or (F).

NOTE: The synchronization of accurate seconds is accomplished upon exiting the P-mode. One full minute will elapse before the minutes get incremented. By not exiting the P-mode no update of time will take place.

Correction- The display shows: { SCCCC SHH:MM }

(Used only to correct time for Impulse Type Slave Systems)

If a correction is in progress SCCCC will show the number of 1/2 minute intervals existing in the correction memory. This will normally be all zeros. The S shows

either a + or - correction. SHH:MM will show the current master time. Change the display to the correct time in 24 hour format. If S is a +, rapid impulsing will occur until the correct time is reached. If S is a minus, impulses will not be sent out until the correct time is reached. If a new correction is programmed, the earlier correction will be removed. During correction the outputs are blocked. When correct time is reached the outputs will return to their programmed position.

NOTE: Seconds synchronization will change if correction is entered within 30 seconds of entering Date and Time.

Winter to Summer- Display reads: { YY-LL-DD OH }
Summer to Winter-

LL is the month, DD is the day, H is the hour (0 to 5). If this date is correct, exit using (R). If you wish to eliminate the change, program a date that has passed and exit using (P) or (F).

Output Weekday- Display is: {R PPDDDDD HH:MM}

R is the output circuit number, PP is either ON, OFF or DURATION from 01 to 59 seconds, DDDDD is a menu of days programmed for the event, HH:MM is the time when the event occurs. See details below:

Output Number (R): 1 to 4 (running of 2 clocks systems)
1 to 6 (running 1 clock system)
1 to 8 (without any clock system)
01 to 32 is for expanded WDP-Y's

Duration (PP): -0 Open output relay on OFF
-1 Close output relay on ON.
-2 Open output relay immediately
-3 Close output relay immediately
01 to 59 Close output relay in this many seconds

NOTE: -2 and -3 commands are not stored in memory and do not need a day or time specified. Also, the output will respond later to programmed commands.

Day Menu (DDDDD): These display characters are shown in order from the menu below. They can be advanced forward or backward using the (+) or (-) buttons and entered using (P).

SA-SU = Saturday & Sunday FRI = Friday only
MON = Monday only SAT = Saturday only
TUE = Tuesday only MO-FR = Mon. to Fri. incl.
WED = Wednesday only ALL = All days
THU = Thursday only

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MODEL WDP-Y8/6/4

EPROM 860929

Bring up the (SPEC. FUNCTIONS) on the WDP-Y display. Now, press (P).

The display shows: { CODE ? O }

The O will be flashing. Pressing (+) will change the O to a code number. The following describes each code number and its' function. After selecting the number press (P) twice to program the function.

The special functions are:

CODE O REV. = Revision. This tells the serviceman the internal microprocessor program or EPROM date and current DIP switch settings.

The display shows: { YYMMDD CCCC XX }

YYMMDD = EPROM date: YY year, MM month, DD day.

CCCC = Program code of EPROM.

XX = Present setting of DIP switch (binary to hex conversion).

CODE 1 CORR. = Drift correction. All quartz time bases can vary over time, due to aging of the crystal, and can cause the time base to be fast or slow. This special function is used to enter a correction factor for this drift.

The display shows: { XS.CC S/24 H }

S.CC = Correction in seconds and hundredths of seconds per day.

X = use "+" sign when the clock has been slow and "-" when the clock has been fast.

After entering the desired correction, reset the master's time to the correct time. Drift correction takes place every 24 hours just before Midnight.

Note: A good way to accurately determine the necessary drift correction is to study the time error for three or more days and then divide by the number of days for the daily correction. Better time standards are National Bureau of Standards, TV station break signals.

CODE 2 DISP = Display format. This is used to change unit's time display format when in the R-mode.

The display shows: { CODE 2 X DISP }

X = 0 the format is: {Wed 07 Oct 16:48} 24 hour

X = 1 the format is: {850115 16:48:10} 24 hour

X = 2 the format is: {We 15 Oct 4:48} 12 hour

X = 3 the format is: {100785 4:48:10} 12 hour

Appendix #1 Special Functions Instructions for the WDP-Y8/6/4

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Note: Programming of outputs is always done in 24 hour format.

CODE 3 LINK = Echo to computer link. This is used with the optional RS-232C computer connection to select computer parameters (number of data and stop bits and parity) and types of automatic messages. The baud rate is selected internally in the WDP-Y unit. This special function is described in more detail in Appendix #2 "RS232C Output".

CODE 4 SYS. = Clock systems. This special function is used to select the slave clock system(s) for the WDP-Y8/6/4 to run.

The display shows: { CODE 4 XY SYS }

They are selected by entering a digit code into the X and Y positions. The X position is for system #1 which controls relays #7 and #8. The Y position is for system #2 which controls relays #5 and #6.

The digit codes are as follows:

0 = None (Relays will operate as output relays)

1 = BIPI bi-polar impulse, minutes (MARK 5)

2 = 58th minute impulse corrective 2 or 3 wire (MARK 7)

3 = 59th minute impulse corrective 2 or 3 wire (MARK 7)

4 = National Time & Rauland (MARK 6)

5 = Sync-wired or electronic (MARK 4)

6 = Standard electric dual motor (MARK 6)

7 = Cincinnati D8 (MARK 6)

CODE 5 BASE. = External time base. Three different external time bases may be connected to the WDP-Y to add atomic time accuracy.

The display shows: { CODE 5 XBASE }

X = 0 is WWVB radio input or external time base

X = 1 1/1 minute impulses from an external source

X = 2 1/2 minute impulses from an external source

(Franklin Instrument Company has the options to add these and other features.)

KEY SWITCH The key switch has ability to prevent unauthorized access to any or all WDP-Y functions. To program, turn key to unlock position. Then, select the functions you wish to protect by pressing (F) until they appear. Then, press the (+) button and an "X" will show on the right side of the display. Turn key to complete.

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Output Date: Display shows: { R PPLL-DD HH:MM }

The programming of outputs on a specific date is very similar to OUTPUT-WEEKDAY except LL-DD is the month and day for the event. That is, DDDDD is replaced by LL-DD.

Display Outputs: Display is: { Output No? R NNN }

This program review function makes it possible to check the output programs, and if desired, remove any of them. R is flashing and questions which relay program you wish to examine. NNN is the number of free memory locations remaining for time events. To review all output circuits key in 0. Or, key in only the circuit number that you wish to review. The programs are reviewed in chronological order in the same order format as they were when programmed. The WEEKDAY programs are shown first and then the DATE programs are shown for each output circuit. If you wish to remove the program shown on the display press the (-) button once. Press (P) to review the next program.

Holiday: Display shows: { YY-LL-DD }

LL- DD is the month and day. Output circuits will follow only events scheduled for a Sunday. Holidays are entered with a (+), (-) and (P).

Display Holidays: Display is: { YY-LL-DD }

This function is used to review Holiday programs or to remove unwanted Holidays. The operation is similar to DISPLAY-OUTPUTS above using the (P) or (-) buttons.

Reset: Display shows: { ARE YOU SURE? }

This functions restarts WDP-Y unit. ALL PROGRAMS CAN BE ERASED FROM MEMORY. So that the memory is not cleared accidentally the WDP-Y asks the question "ARE YOU SURE?". The only button that will cause a RESET, at this point is the (+) button. All other buttons will return to F-mode or R-mode.

Spec. Functions:

This function carries out the programming of special features of the WDP-Y unit. See Appendix #1 for details.

ERROR MESSAGES:

If an error is made during programming, an error message will be shown on the display. Some of these messages are defined as follows:

{ Memory Full } = Program memory full
{ Existing Program } = This program already exists
{ Illegal Sign } = e.g., if output #0 is programmed
{ Illegal Date } = e.g., { 4 0302-31 12:30 } is no date
Press (F) or (R) to return to normal after an error.

AT MIDNIGHT, NEW YEAR'S EVE, THE FOLLOWING WILL HAPPEN:

1. All programmed holidays for the old year will be erased.
2. The date for the change from Standard Time to Daylight Saving Time (and vice-versa) will be automatically programmed to take place on the first Sunday in April at 2:00 am, and the last Sunday in October at 3:00 am.

NOTE: The WDP-Y is an excellent Master Clock & Event Programmer. It is noted for it's reliability, flexibility, and accurate time keeping ability. One of the WDP-Y8/6/4's major advantages is the ease with which it is programmed for clock systems and building/schedule events.

If you should have any questions please call us at Franklin Instrument Company at (215) 355-7942. We will be happy to assist you.

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GENERAL DESCRIPTION

This appendix describes the optional RS-232C ASCII output of the Franklin WDP-Y8/6/4 Master Clock. This output connection permits the computer (CPU) to control all functions and programming of the WDP-Y8/6/4 from its own keyboard, or the computer can receive data from the WDP-Y8/6/4 on request or continuously. Various baud rates can be selected internally (inside the WDP-Y8/6/4 unit) between 300 and 19,200 bps. Also the transmission parameters may be selected. With this RS-232C option it is possible to store all manual program entries for re-entry after RESET of the WDP-Y unit thereby saving a lengthy manual re-programming.

BAUD RATE AND PARAMETER SET-UP

1. Remove front display panel to gain access to baud rate jumper and DIP switches located on printed circuit board mounted to the back side of the display panel. If you are unfamiliar with doing this follow steps #4 and #5 in "Wiring and Start-Up" instructions for the WDP-Y8/6/4. Note: For safety, the power should be OFF.

2. Set baud rate jumper as desired and as shown on drawing #1 in the "Wiring and Start-Up" instructions.

3. Set DIP switches #5, #6 and #7 as desired according to:

DIP SWITCH #			NUMBER OF DATA-BITS	NUMBER OF STOP-BITS	PARITY
7	6	5			
0	0	0	7	2	EVEN
0	0	1	7	2	ODD
0	1	0	7	1	EVEN
0	1	1	7	1	ODD
1	0	0	8	2	NONE
1	0	1	8	1	NONE
1	1	0	8	1	EVEN
1	1	1	8	1	ODD

(0 = OFF, 1 = ON)

4. Re-install display panel.

PORT CONNECTIONS

Use a standard RS-232C cable for connecting the WDP-Y8/6/4 to a terminal. A null adaptor is necessary when connection is made to a computer.

PROGRAMMING THE WDP-Y8/6/4 FROM THE CPU

Because of the many variations in computers and keyboards we have listed the following table to let you understand the interface language to be sent from the CPU that will operate the WDP-y8/6/4 in the same manner as if the panel buttons were being pressed.

WDP-Y Button	Normal Keyboard Key	Hexidecimal Value
(R)	<ESC>	\$1B
(F)	<CR> or <CTRL-M>	\$0D
(P)	<LF> or <CTRL-J>	\$0A
(-)	<>	\$3A
(+)	<>	\$3B

Note: The \$ sign will be used in these instructions to give you Hexidecimal values (Number base 16). Regular decimal values (base 10) will be expressed without the \$ sign.

Programming is done in a sequence very similar to the manual entry that is done with the panel buttons. However, computer programming is faster and has some shortcuts. When programming from the keyboard you will not have to send repeated (+) or (-) signs because the WDP-Y8/6/4 understands the digits 0 to 9 as ASCII characters for direct entry. Also, the capital letters A thru L will be codes for direct entry into the P- mode of a desired function. These codes are as follows:

A = YEAR	G = OUTPUT DISPLAY
B = DATE AND TIME	H = DISPLAY OUTPUTS
C = CORRECTION	I = HOLIDAY
D = WINTER TO SUMMER	J = DISPLAY HOLIDAYS
E = SUMMER TO WINTER	K = RESET
F = OUTPUT WEEKDAY	L = SPEC. FUNCTIONS

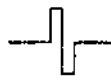
To program a function the CPU sends: <ESC> [CODE] [DATA] <CR> The data is the same as what would have been entered during manual programming for that desired function. (Refer to Operating Instructions.)

EXAMPLE #1

To close output relay #4 for 03 seconds all Wednesdays at 1200 hours the following sequence is sent to the WDP-Y8/6/4:

```
<ESC> F 4 0 3 3 1 2 0 0 <CR>
```

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This sequence gives the WDP-Y8/6/4 commands as follows:

<ESC> says "R- mode", the WDP-Y8/6/4 must be in the R- mode to be ready to receive a string of data. (F) says "OUTPUT WEEKDAY", (4) says relay #4, (03) says how many seconds, (3) says WED from the table below, and (1200) is the time for the event.

Menu of Weekdays:

- | | |
|--------------------|--------------------|
| 0 = SA-SU (2 days) | 5 = FRI |
| 1 = MON | 6 = SAT |
| 2 = TUE | 7 = SUN |
| 3 = WED | 8 = MO-FR (5 days) |
| 4 = THU | 9 = ALL (7 days) |

This sequence of data may be sent as a continuous string or by individual characters such as from a terminal mode. Also, by programming automatic messages (described below) to include the Display status, the WDP-Y8/6/4 will then be sending back data whenever the display changes thus giving an indication of programming. This is helpful while in a full duplex mode.

EXAMPLE #2

To close output-relay #1 at 16:00, all days the CPU sends:

```
<ESC> F 1 - 1 9 1 6 0 0 <CR>
($2D)
```

EXAMPLE #3

To enter a positive or + correction the CPU sends:

```
<ESC> C + 1 5 3 9 <CR>
($2B)
```

For a negative correction use a - (\$2D) instead of a + (\$2B).

EXAMPLE #4

To display seconds using Special Functions code #2:

```
<ESC> L 2 <LF> 1 <CR>
(CTRL J)
```

EXAMPLE #5

To view or to remove output programs using Display Outputs:

```
<ESC> H 2 <LF> <:> etc. <CR>
($3A)
```

The 2 would be for viewing output channel #2 or use a 0 to view all output channels. Then, use a <LF> to view the next program or use a <:> to remove the program.

AUTOMATIC MESSAGES FROM THE WDP-Y TO THE COMPUTER (or ESC L 3 command)

The WDP-Y8/6/4 may be programmed to send out time and status information automatically. There are three different types of messages from which you can select any or all of them. Initiation of automatic messages can be started by use of Special Functions Code #3 by programming with display panel buttons or by sending a sequence from the CPU. The START automatic message sequence is:

```
<ESC> L 3 <LF> [DATA] <CR>
```

- | | |
|----------------|------------------------------------|
| Where DATA = 0 | Stop automatic messages |
| 1 | Display status |
| 2 | Relay status |
| 3 | Display status |
| 4 | Time info |
| 5 | Display status |
| 6 | Relay status |
| 7 | Display & Relay status & Time info |

Each message selected will then be automatically sent out whenever there is a change in that message. Each message is sent to 1 of 3 different rows by:

Row 1	LF	RELAY STATUS	CR	(34 bytes)
Row 2	LF LF	DISPLAY STATUS	CR	(19 bytes)
Row 3	LF LF LF	TIME INFO	CR	(19 bytes)

Relay Status = 32 characters (bytes) of 1's and 0's.
A 0 (zero) means that relay is off.
A 1 means that relay is on.

Display Status = 16 characters. The same as the display, except for Display Outputs where the number code for the menu of weekdays is also transmitted.

Time Information = 14 characters (bytes) of information with the format of:
WWVVYYLLDDHHMM

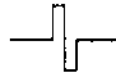
WW = Week 01-53, (2 bytes)	LL = Month 01-12, (2 bytes)
VV = Day 01-07, (2 bytes)	DD = Date 01-31, (2 bytes)
(01 = MON, 07 = SUN)	HH = Hour 00-23, (2 bytes)
YY = Year 00-99, (2 bytes)	MM = Mins 00-59, (2 bytes)

The Time Information message is sent from the WDP-Y8/6/4 at the 58th second each minute and the synchronization character (SUB or \$1A) is sent out at the exact minute.

To STOP automatic messages the sequence would be:

```
<ESC> L 3 <LF> 0 <CR>
```

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REQUEST FOR TIME FROM THE CPU (or ESC N command)

In addition to using the automatic messages it is possible to have the WDP-Y8/6/4 send a Time Information string which also includes the seconds upon request from the CPU. The request sequence is:

<ESC> N

This request sequence can be sent from the CPU at any time and the WDP-Y8/6/4 will reply with the following data string:

WWVYYLLDDHHMMSS LRC <CR> (19 bytes)

The values of WW thru MM are the same as they were for the automatic Time Information message described above.

SS = Seconds 00-59, (2 bytes) A- - (\$2D,\$2D) is sent when the seconds are inaccurate (during correction).

LRC = Check sum, (2 bytes) Exclusive OR of WW thru SS. A check sum equal to \$0E is sent as a 0 and an E (\$30 and \$45).

CR = Carriage return (\$0D).

It is possible to program a control sequence for the WDP-Y8/6/4 to send at the beginning of each message string. This preceding string is called a Startsign and can

be used to position the message on the CPU screen. All messages will then begin with this Startsign as part of its format. The CPU sends:

<ESC> M [SIGN] <CR>

Where SIGN is the Startsign desired in a hexadecimal form with a maximum length of 8 ASCII characters or bytes composed of up to 16 hexadecimal digits (each ASCII character requires 2 hex. digits). At RESET (start-up) no control sequence is defined and one must be programmed, if desired. The content of the SIGN depends on the particular application and CPU.

FOR EXAMPLE: For absolute positioning on a VT52 Compatible Terminal (DEC), the control sequence to display information on rows 6, 7 and 8 is:

ESC Y % +

(4 bytes which are: \$1B, \$59, \$25 and \$2B)

therefore, the programming sequence would be:

<ESC> M 1 B 5 9 2 5 2 B <CR>

|<-----SIGN----->|

To delete the Startsign after one has been programmed send:

<ESC> M <CR>

For further information on control characters for your particular application consult your computer manuals.

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