

May 6, 2005

## Fire Alarm and Clock System Documentation

# New Alma Middle School

Alma Public Schools



Alma, Michigan

INTEGRATED DESIGNS, INC.

- Reviewed
- Revise and Resubmit
- Non-Compliant

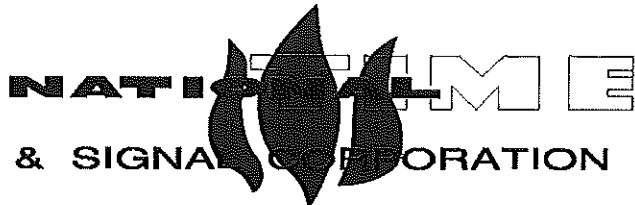
Signed: \_\_\_\_\_

Date: 5/10/05

# REVIEWED

MAY 12 '05 SUB # 41

CLARK CONSTRUCTION COMPANY



21800 Wyoming Avenue  
Oak Park, Michigan, 48237-3195  
**Telephone:** (248) 547-4555  
**Fax:** (248) 543-3250  
**Website:** www.natsco.net

28045 Oakland Oaks Court  
Wixom, Michigan 48393-3342  
(248) 380-6264  
(248) 380-6268

**RECEIVED**  
MAY 10 2005  
TAUNT ELECTRIC  
RECEIVED B. Day  
16721 / 16730

May 6, 2005

JOB/CONTACT INFORMATION

JOB SITE: **NEW ALMA MIDDLE SCHOOL**

OWNER: **ALMA PUBLIC SCHOOLS**

ARCHITECT: **INTEGRATED DESIGNS INC.**

ELECTRICAL ENGINEER: **INTEGRATED DESIGNS INC.**

GENERAL CONTRACTOR: **CLARK CONSTRUCTION**

ELECTRICAL CONTRACTOR: **TAUNT ELECTRIC**

EQUIPMENT SUPPLIER: **NATIONAL TIME & SIGNAL**

SALES ENGINEER: **DAVE WILLIAMS**

APPLICATIONS ENGINEER: **JEFF WICKMAN**

SERVICE MANAGER: **JOE CADOVICH**

SERVICE DISPATCH: **DAVID BONKA/KIM FISCHER**

OFS INFORMATION: **KAREN DELANEY/SHELLIE MARTIN**

FACTORY ORDER NUMBER(S): **82392 & 82393**

OFS NUMBER(S): **TBD**

Price includes Final Test & Inspection & State Certification **(If Required)**

**Note:** Fire alarm equipment provided herein meets or exceeds applicable standards of the NFPA and Underwriters Laboratories, Inc. Due to changing construction standards system design requirements and local authority code interpretations, the manufacturer extends no guarantee of system installation approval.

# Fire Alarm Sequence Matrix

Control Unit				Notification				Auxiliary Function(s)			User Defined							
Activate Alarm L.E.D.	Activate Supervisory L.E.D.	Activate Trouble L.E.D.	Activate Internal Sounder	Display Change in Status	Activate Annunciator(s)	Transmit Alarm Signal	Transmit Supervisory Signal	Transmit Trouble Signal	Activate Audiable Signals	Activate Visual Signals	Release Held Open Doors	Shut Down Associated Fan	Control Associated Damper(s)	User Defined	User Defined	User Defined	User Defined	User Defined

System Inputs	Activate Alarm L.E.D.	Activate Supervisory L.E.D.	Activate Trouble L.E.D.	Activate Internal Sounder	Display Change in Status	Activate Annunciator(s)	Transmit Alarm Signal	Transmit Supervisory Signal	Transmit Trouble Signal	Activate Audiable Signals	Activate Visual Signals	Release Held Open Doors	Shut Down Associated Fan	Control Associated Damper(s)	User Defined	User Defined	User Defined	User Defined	User Defined
Pull Station	●			●	●	●	●			●	●	●			●				
Smoke Detector	●			●	●	●	●			●	●	●			●				
Single Station Detector		●		●	●	●		●											
Heat Detector	●			●	●	●	●			●	●	●			●				
Duct Detector	●			●	●	●	●			●	●	●	●	●	●				
Low Pressure Switch	●			●	●	●	●			●	●	●			●				
Water Flow Switch	●			●	●	●	●			●	●	●			●				
Kitchen Suppression	●			●	●	●	●			●	●	●			●				
Tamper Switch		●		●	●	●		●											
High Pressure Switch		●		●	●	●		●											
Fire Pump Running		●		●	●	●		●											
Fire Pump Reversal		●		●	●	●		●											
Fire Pump Trouble		●		●	●	●		●											
Generator Running		●		●	●	●		●											
Generator Trouble		●		●	●	●		●											
AC Power Failure			●	●	●				●										
Low Battery			●	●	●				●										
Open Circuit			●	●	●				●										
Short Circuit			●	●	●				●										
Ground Fault			●	●	●				●										
N.A.C. Open Circuit			●	●	●				●										
N.A.C. Short Circuit			●	●	●				●										
N.A.C. Power Failure			●	●	●				●										
N.A.C. Low Battery			●	●	●				●										
User Defined																			
User Defined																			
User Defined																			
User Defined																			
User Defined																			
User Defined																			

Notes:

28045 OAKLAND OAKS COURT WIXOM, MICHIGAN 4839 PHONE (248) 380-6264 FAX (248) 380-6268

**Equipment List**

	Qty.	Model Number	Description
<b>Control Panel</b>	1	A902-FACP-SG	2 ZONE ADDRESSABLE FA CONTROL PANEL -
<b>Power Supplies</b>	4	D900-RPS-SG	DUAL 2.5A, 24VDC SYNC CAC CKTS; .5A AUX,
<b>Batteries</b>	1	B-18.0	SLA1116, 18.0 AH, 24VDC BATTERY PACK
	4	B-5.0	SLA1055, 5.0 AH, 24VDC BATTERY PACK
<b>Initiating Devices</b>	19	541S	SPST, SINGLE ACTION STATION, KEY RESET
	19	D900-MINI-P	DIGICOMM MINI PRIORITY MONITOR MODULE
	8	D900-PHOTO	ANALOG PHOTOELECTRIC DETECTOR
	8	D900-BASE4	4" ANALOG DETECTOR MTG BASE W/ XPERT CRD
	28	D900-DD PHOTO	ANALOG PHOTO DUCT DETECTOR
	28	D900-RMT LED	SMOKE DETR. REMOTE ALARM INDICATOR
	28	D900-TUBE-5	5FT SAMPLING TUBE FOR DUCT DETECTOR
	3	D900-MONITOR	DIGICOMM MONITOR MODULE
	16	D900-CTRL I/O	DIGICOMM CONTROL IN/OUT MODULE
<b>Initiating Devices</b>	102	SG-C3NSZ	STROBE 24VDC MULTI-CND WALL MT- RED
	78	SG-C3HSZ	HORN/STROBE 24VDC MULTI-CND WALL MT- RED
<b>Enclosures</b>	10	8046-	SMOKE DETR./ HORN WIRE GUARD
	3	ST-FRC01	PULL STATION FRONT COVER
<b>Control Panel</b>	1	MC100	WALL MT MASTER W/ 4 PROGRAM CIRCUITS
<b>Power Supplies</b>	1	PS-12	120VAC/24VAC SURFACE CLK POWER SUPPLY
<b>Secondary Clocks</b>	78	D225	24VAC 2.25" DIGITAL CLK W MTG PLATE
	27	D400	24VAC 4" DIGITAL CLK W MTG PLATE
	11	D4M-COOR KIT	D4M CORRIDOR CONVERSION KIT SIDE OR TOP
	2	CV-GUARD-F	CLEAR VIEW DIGITAL CLK GUARD, SEMI-FL
	41	304-120	120VAC 4" VIBRATING GREY BELL
	4	310-120	120VAC 10" VIBRATING GREY BELL
	4	10FG	10", CAST BELL GUARD W/ MTG. STUD &

ADDITIONAL NOTES:

## 902 SERIES FIRE ALARM SYSTEM OPERATING INSTRUCTIONS

### SYSTEM NORMAL

The Normal Led is on steady and the LCD display indicates "National Time and Signal Corp." with the time and date.

### PANEL TONE SILENCE

Depression of the Panel Tone Silence Switch will silence the panel beeper.

### ALARM CONDITION

The Alarm Led will flash, the local panel beeper sounds and the LCD display indicates the alarm location on receipt of an alarm condition. Depression of the Alarm switch acknowledges the alarm condition and illuminating the alarm led steady.

### SUPERVISORY CONDITION

The Supervisory Led will flash, the local panel beeper sounds and the LCD display indicates the supervisory location on receipt of a supervisory condition. Depression of the Supervisory switch acknowledges the supervisory condition and illuminating the supervisory led steady.

### TROUBLE CONDITION

The Trouble Led will flash, the local panel beeper sounds and the LCD display indicates the trouble location on receipt of a trouble condition. Depression of the Trouble switch acknowledges the trouble condition and illuminating the trouble led steady.

### MONITOR CONDITION

The Monitor Led will flash, the local panel beeper sounds and the LCD display indicates the monitor location on receipt of a monitor condition. Depression of the Monitor switch acknowledges the monitor condition and illuminating the monitor led steady.

### ALARM SILENCE

Depression of the Alarm Silence switch will alarm silence all networked panels in alarm and turn the Alarm Silence Led on steady.

### DRILL

Activation of the Drill switch will sound all alarm outputs at the evacuation rate. The Drill Led is on steady.

### SYSTEM RESET

Activation of the System Reset switch will return the system to normal if no off normal status conditions exist.

### DOWN ARROW

Depression of the Down Arrow will scroll operator downward through the selected queue (Alarm, Supervisory, Trouble or Monitor).

### UP ARROW

Depression of the Up Arrow will scroll operator upward through the selected queue (Alarm, Supervisory, Trouble or Monitor).

### FOR SERVICE CALL

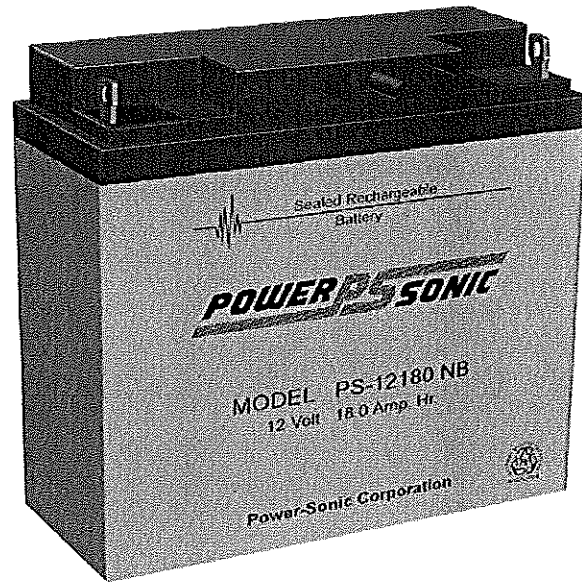
Company Name: National Time & Signal Corporation  
Address: 28045 Oakland Oaks Court, Wixom, Michigan, 48393  
Telephone Number: 1-800-326-8456

~~Note: Mount this Operating Instruction sheet adjacent to the Fire Alarm Control Panel~~

Drawing Number 10602.doc, Issue 980414



## Rechargeable Sealed Lead-Acid Battery



### PS-12180

Power-Sonic rechargeable batteries are lead-lead dioxide systems. The dilute sulphuric acid electrolyte is suspended and thus immobilized. Should the battery be accidentally overcharged producing hydrogen and oxygen, special one-way valves allow the gases to escape thus avoiding excessive pressure build-up. Otherwise, the battery is completely sealed and is, therefore, maintenance-free and leak proof.

PS-12180 is air transport approved, and meets all current requirements set forth by the C.A.B., F.A.A., I.A.T.A. and D.O.T.

U.L. recognizes model PS-12180 under file number MH 14328.



#### PERFORMANCE SPECIFICATIONS

Nominal Voltage.....	12 volts (6 cells in series)
Nominal Capacity	
20 hour rate (900mA to 10.50 volts) .....	18.0 A.H.
10 hour rate (1700mA to 10.50 volts) .....	17.0 A.H.
5 hour rate (3000mA to 10.20 volts) .....	15.0 A.H.
1 hour rate (12A to 09.00 volts) .....	12.0 A.H.
Approximate Weight.....	13.1 pounds (5.9 kg)
Energy Density (20 hour rate).....	1.54 Watt-hours/cubic inch (94.0 Watt-hours/l)
Specific Energy (20 hour rate).....	16.5 Watt-hours/pound (36.6 Watt-hours/kg)
Internal Resistance (Fully Charged Battery).....	15 milliohms (approximately)
Maximum Discharge Current ( ≤ 7 Min.).....	54 amperes
Maximum Short-Duration Discharge Current ( ≤ 10 Sec.).....	180 amperes
Terminal configurations .....	PS-12180 NB: Tin plated brass nut and bolt connectors (5mm) PS-12180 F: Quick disconnected AMP, INC. Faston tabs, 0.250" x 0.032"
Vibration Test (2000 cycles/minute, 0.10 inch excursion, 2 hours).....	No loss in capacity or performance
Shelf Life — % of nominal capacity at 68° F (20° C)	
1 Month.....	97%
3 Months.....	91%
6 Months.....	83%
Operating Temperature Range	
Charge.....	-4°F (-20°C) to 122°F (50°C)
Discharge.....	-4°F (-20°C) to 140°F (60°C)
Case .....	High-impact Polystyrene

**MONITOR MODULES**

IGNORE THE WORD 'ON' PRINTED ON THE SWITCH

A device address is provided on the Fire Alarm System Plan or the Programming Sheet. Set the 8 position DIP switch labeled 'SW1' to the value of the module's address. The switches can sit in two positions: '0' and '1' (printed at the end next to switch #1). Each switch (1-7) corresponds to an address value (1, 2, 4, 8, 16, 32, 64 respectively). Certain switches will therefore need to be set to the active '1' position, that is, towards the printed numbers on the DIP switch. Only set the switches where the total of the address values will equal the address needed.

Hint: First select the highest switch value which is lower than the desired address. Then add on.

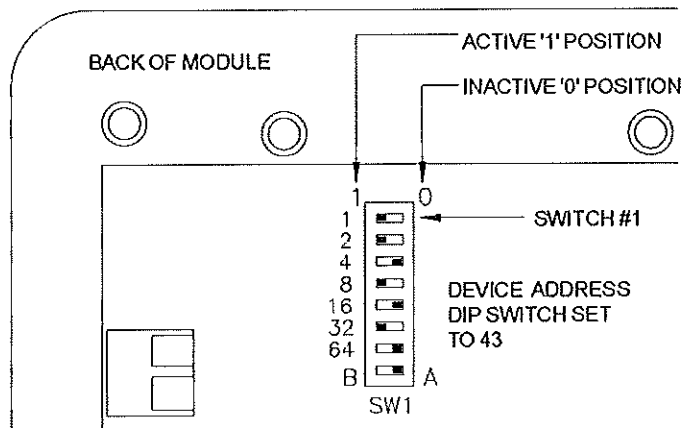
For example: If the required address is 17, set the switches that have 16 and 1.

$(16 + 1 = 17)$

If the required address is 43, set the switches that have 32, 8, 2 and 1.

$(32 + 8 + 2 + 1 = 43)$

Switch #8 is used to determine which wiring class is used from that device. A and B are printed on either side of the switch. Set this switch accordingly.



**MINI MONITOR MODULE**

IGNORE THE WORD 'ON' PRINTED ON THE SWITCH

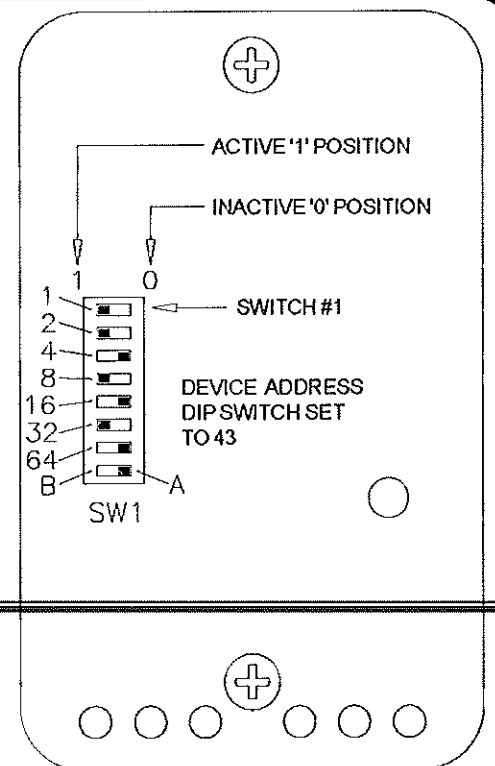
A device address is provided on the Fire Alarm System Plan or the Programming Sheet. Hold the device so that it looks like the picture and set the 8 position DIP switch to the value of the module's address. The switches can sit in two positions: '0' and '1' (shown here at the top next to switch #1). Each switch (1-7) corresponds to an address value (1, 2, 4, 8, 16, 32, 64 respectively). Certain switches will therefore need to be set to the active '1' position, that is, to the left towards the printed numbers on the DIP switch. Only set the switches where the total of the address values will equal the address needed.

Hint: First select the highest switch value which is lower than the desired address. Then add on.

For example: If the required address is 17, set the switches that have 16 and 1 ( $16 + 1 = 17$ ).

If the required address is 43, set the switches that have 32, 8, 2 and 1 ( $32 + 8 + 2 + 1 = 43$ ).

Switch #8 is used to determine which wiring class (A or B) is used from that device. A and B are shown here on either side of the switch. Set this switch accordingly.



# IMPORTANT

- READ BEFORE INSTALLING -

## ADDRESSING MODULES

The address setting is determined by adding the individual switch values selected. The sum of the switches selected equals the address.

**STEP #1** - Orient the switch as shown in the example below, ON in the upper right corner. **Flip all the switches to the side indicated by "ON" position.** (this is address 0, class "A")

**STEP #2** - Determine the address needed from the Fire Alarm System Plan or the Programming sheet.

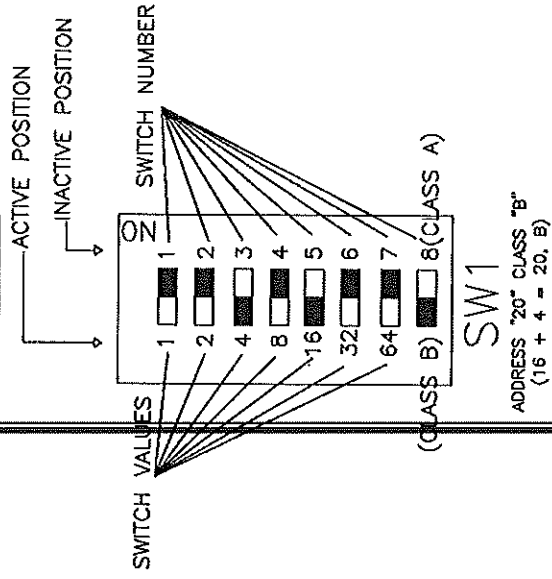
**STEP #3** - Flip to the left (opposite of "ON") those switches which add to the sum equal to the desired address.

**STEP #4** - Select the class of the circuit needed as indicated by the installation drawings. A and B are shown here on either side of the switch. Set this switch accordingly.

**Hint:** First select the highest switch value which is lower than the desired address. Then add on.

**For example:** If the required address is 17, set the switches that have 16 and  $1(16 + 1 = 17)$  if the required address is 43, set the switches that have 32, 8, 2, and  $1(32 + 8 + 2 + 1 = 43)$ .

### EXAMPLE

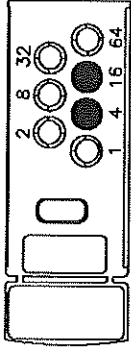


## ADDRESSING DETECTORS

ADDRESS	REMOVE BUTTONS	ADDRESS	REMOVE BUTTONS	ADDRESS	REMOVE BUTTONS	ADDRESS	REMOVE BUTTONS
1	(1)	43	(1)(2)	85	(1)	129	(1)
2	(2)	44	(4)	86	(2)	130	(2)
3	(1)(2)	45	(1)(4)	87	(1)(2)	131	(1)(2)
4	(4)	46	(2)(4)	88	(4)	132	(4)
5	(1)(4)	47	(1)(2)(4)	89	(1)(2)	133	(1)(2)
6	(2)(4)	48	(1)(4)	90	(4)	134	(4)
7	(1)(2)(4)	49	(1)	91	(1)(2)	135	(1)(2)
8	(8)	50	(2)	92	(4)	136	(4)
9	(1)(8)	51	(1)(2)	93	(1)(2)	137	(1)(2)
10	(2)(8)	52	(4)(8)	94	(4)(8)	138	(4)(8)
11	(1)(2)(8)	53	(1)(4)(8)	95	(1)(2)(8)	139	(1)(2)(8)
12	(4)(8)	54	(2)(4)(8)	96	(4)(8)	140	(4)(8)
13	(1)(4)(8)	55	(1)(2)(4)(8)	97	(1)(4)(8)	141	(1)(4)(8)
14	(2)(4)(8)	56	(1)(4)(8)	98	(2)(4)(8)	142	(2)(4)(8)
15	(1)(2)(4)(8)	57	(1)(2)(8)	99	(1)(2)(8)	143	(1)(2)(8)
16	(16)	58	(8)	100	(8)	144	(8)
17	(1)(16)	59	(1)(8)	101	(1)(8)	145	(1)(8)
18	(2)(16)	60	(2)(8)	102	(2)(8)	146	(2)(8)
19	(1)(2)(16)	61	(1)(2)(8)	103	(1)(2)(8)	147	(1)(2)(8)
20	(17)	62	(4)(8)	104	(4)(8)	148	(4)(8)
21	(1)(17)	63	(1)(4)(8)	105	(1)(4)(8)	149	(1)(4)(8)
22	(2)(17)	64	(2)(4)(8)	106	(2)(4)(8)	150	(2)(4)(8)
23	(1)(2)(17)	65	(1)(2)(4)(8)	107	(1)(2)(4)(8)	151	(1)(2)(4)(8)
24	(4)(17)	66	(4)(8)	108	(4)(8)	152	(4)(8)
25	(1)(4)(17)	67	(1)(4)(8)	109	(1)(4)(8)	153	(1)(4)(8)
26	(2)(4)(17)	68	(2)(4)(8)	110	(2)(4)(8)	154	(2)(4)(8)
27	(1)(2)(4)(17)	69	(1)(2)(4)(8)	111	(1)(2)(4)(8)	155	(1)(2)(4)(8)
28	(8)(17)	70	(8)(8)	112	(8)(8)	156	(8)(8)
29	(1)(8)(17)	71	(1)(8)(8)	113	(1)(8)(8)	157	(1)(8)(8)
30	(2)(8)(17)	72	(2)(8)(8)	114	(2)(8)(8)	158	(2)(8)(8)
31	(1)(2)(8)(17)	73	(1)(2)(8)(8)	115	(1)(2)(8)(8)	159	(1)(2)(8)(8)
32	(16)	74	(16)	116	(16)	160	(16)
33	(1)(16)	75	(1)(16)	117	(1)(16)	161	(1)(16)
34	(2)(16)	76	(2)(16)	118	(2)(16)	162	(2)(16)
35	(1)(2)(16)	77	(1)(2)(16)	119	(1)(2)(16)	163	(1)(2)(16)
36	(4)(16)	78	(4)(16)	120	(4)(16)	164	(4)(16)
37	(1)(4)(16)	79	(1)(4)(16)	121	(1)(4)(16)	165	(1)(4)(16)
38	(2)(4)(16)	80	(2)(4)(16)	122	(2)(4)(16)	166	(2)(4)(16)
39	(1)(2)(4)(16)	81	(1)(2)(4)(16)	123	(1)(2)(4)(16)	167	(1)(2)(4)(16)
40	(8)(16)	82	(8)(16)	124	(8)(16)	168	(8)(16)
41	(1)(8)(16)	83	(1)(8)(16)	125	(1)(8)(16)	169	(1)(8)(16)
42	(2)(8)(16)	84	(2)(8)(16)	126	(2)(8)(16)	170	(2)(8)(16)

REMOVE ADDRESS IDENTIFICATION CARD FROM DETECTOR BASE TO PROGRAM ADDRESS. PUNCH OUT THE BUTTONS INDICATED FROM THE CHART TO THE LEFT FOR DESIRED ADDRESS IDENTIFICATION

### ADDRESS TAB



D900-IDENT  
ADDRESS "20" SHOWN  
(16 + 4 = 20, B)



Panel: C:\panel\Alma MS 6may05jw.db

<u>Pan</u>	<u>Lp</u>	<u>Ckt</u>	<u>Message</u>
1	1	1	Pull Station Kitchen Exit
	1	2	Kitchen Ansul System
	1	4	Duct Det RTU-3 Hall by Art Room
	1	5	Fan Ctrl RTU-3 Hall by Art Room
	1	6	Duct Det RTU-3 Hall by Art Room
	1	7	Pull Station Art Room Exit
	1	8	Smk Det Main Office at Fire Panel
	1	9	Pull Station Hall Exit by Main Office
	1	10	Fan Ctrl RTU-5 Hall by Main Office
	1	11	Duct Det RTU-5 Hall by Main Office
	1	12	Duct Det RTU-5 Hall by Main Office
	1	13	Duct Det RTU-4 Main Office by Principal
	1	14	Duct Det RTU-4 Main Office by Principal
	1	15	Fan Ctrl RTU-4 Main Office by Principal
	1	16	Duct Det RTU-6 Hall by Staff Lounge
	1	17	Duct Det RTU-6 Hall by Staff Lounge
	1	18	Fan Ctrl RTU-6 Hall by Staff Lounge
	1	19	Duct Det RTU-7 Hall by Computer Lab
	1	20	Duct Det RTU-7 Hall by Computer Lab
	1	21	Fan Ctrl RTU-7 Hall by Computer Lab
	1	22	Pull Station Chior Room Exit
	1	23	Duct Det AHU-1 Band Hall Area
	1	24	Duct Det AHU-1 Band Hall Area
	1	25	Fan Ctrl AHU-1 Band Hall Area
	1	26	Pull Station Band Room Exit
	1	27	Pull Station Hall Exit by Band Room
	1	28	Duct Det AHU-2 Cafeteria Stage
	1	29	Duct Det AHU-2 Cafeteria Stage
	1	30	Fan Ctrl AHU-2 Cafeteria Stage
	1	31	Pull Station Hall Exit by Kitchen/Cafe
	1	32	Flow Switch Kitchen Dry Store Room
	1	33	Tamper Switch Kitchen Dry Store Room
	1	34	Pull Station Nth East Wing Exit
	1	35	Duct Det ERV-3 Nth East Wing
	1	36	Duct Det ERV-3 Nth East Wing
	1	37	Fan Ctrl ERV-3 Nth East Wing
	1	38	Pull Station Nth Wing Exit
	1	39	Duct Det ERV-1 Nth Wing
	1	40	Duct Det ERV-1 Nth Wing
	1	41	Fan Ctrl ERV-1 Nth Wing
	1	42	<del>Duct Det RTU-1 Science Rm Nth Wing</del>
	1	43	Duct Det RTU-1 Science Rm Nth Wing
	1	44	Fan Ctrl RTU-1 Science Rm Nth Wing
	1	45	Pull Station Nth Science Rm Exit
	1	46	Pull Station Nth Science Rm Exit
	1	47	Duct Det ERV-2 Nth West Wing

Panel: C:\panel\Alma MS 6may05jw.db

<u>Pan</u>	<u>Lp</u>	<u>Ckt</u>	<u>Message</u>
1	1	48	Duct Det ERV-2 Nth West Wing
	1	49	Fan Ctrl ERV-2 Nth West Wing
	1	50	Pull Station Nth West Hall Exit
	1	51	Smk Det Store Room Center Wing Area
	1	52	Rmt Pwr Supply Store Rm Center Wing
	1	53	Rmt Pwr Supply Store Rm Center Wing
	1	54	Smk Det Hall Doors by Art Room
	1	55	Door Ctrl Hall Doors by Art Room
	1	56	Smk Det Hall Doors by Art Room
	1	57	Rmt Pwr Supply Computer Store Room
	1	58	Smk Det Computer Store Room
2	1		Pull Station Library Exit
	2	2	Duct Det RTU-8 Library
	2	3	Duct Det RTU-8 Library
	2	4	Fan Ctrl RTU-8 Library
	2	5	Smk Det Hall Doors by Library
	2	6	Smk Det Hall Doors by Library
	2	7	Door Ctrl Hall Doors by Library
	2	8	Duct Det AHU-3 Gym Mech Rm
	2	9	Duct Det AHU-3 Gym Mech Rm
	2	10	Fan Ctrl AHU-3 Gym Mech Rm
<del>2</del>	<del>11</del>		<del>Pull Station Gym Exit</del>
	2	12	Pull Station Gym Exit
	2	13	Pull Station Gym Lobby Exit
	2	14	Duct Det AHU-5 Girls Gym Lockers
	2	15	Duct Det AHU-5 Girls Gym Lockers
	2	16	Fan Ctrl AHU-5 Girls Gym Lockers
	2	17	Pull Station Hall Exit by Boys Locker Rm
	2	18	Pull Station Aux. Gym Exit
	2	19	Pull Station Gym Mech Rm Exit
	2	20	Rmt Pwr Supply Gym Mech Rm
	2	21	Smk Det Gym Mech Rm

## Power Supply Driver Interface

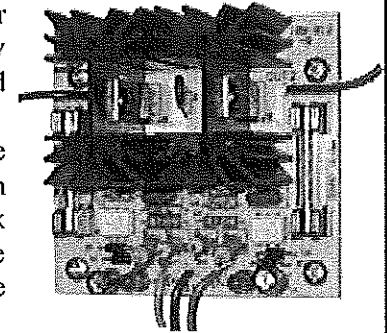
The PS-DRIVER-2/5A output module provides general purpose solid state outputs to be used in conjunction with other National Time products to either add additional outputs or to enhance the performance of a standard relay output. "Zero-Cross" turn on technology greatly reduces inrush currents and contact arcing exhibited by standard relay type control circuits.

A standard MC100 Master Clock's relay output performance may be enhanced with the addition of the PS-DRIVER-2/5A output module. When On-Demand resets are superimposed on an existing synchronous clock circuit, it is recommended to utilize this solid state output to eliminate the contact damaging arcing and high currents caused by high inductive loads like synchronous clock motors.

The 5 amp outputs share a common feed which may be either 120VAC or 24VAC depending upon the clock or auxiliary device requirements. The outputs are individually fused with standard glass fuses.

The PS-DRIVER-2/5A module may be controlled with equipment by others since the outputs are controlled via two open-collector inputs of either AC or DC power with a wide operating range of 5 to 24 volts.

Control Input Power Range: 5-28VAC; 52mA @ 24VAC; 11mA @ 5VDC  
 Load Power Input Voltage: 19-132VAC  
 Load Output Voltage: (Load Input Power Voltage - 1)VAC  
 Load Output Power: 5A @ 24VAC; 5A @ 120VAC  
 Dimensions: 2.75"W x 3.0"L x 1.75"H (board only)  
 9" x 8" x 4" (w/ enclosure)

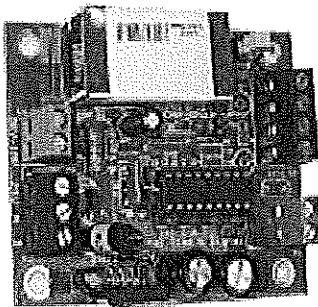


Mounting Plate will mount in place of an EXP-4 Relay board and allow mounting of an additional PS-DRIVER-2/5A-BO

Order No.	Description
PS-DRIVER-2/5A	Dual 5A Solid State Output Module in 8x9x4 enclosure
PS-DRIVER-2/5A-BO	Dual 5A Solid State Output Module; Board Only
PS-DRIVER-2/5A-MP	Dual 5A Solid State Output Module; Board w/ mounting plate

See C-439 Installation Instructions for additional information

## MC-100 LAN Interface



The MC100-LAN Interface will allow the MC100 Master Clock to communicate with a Local Area Network. This communication allows the MC100 to synchronize its time display, and therefore every clock of your system, to a network time base. The time base is user selectable and can range from any PC on the network, the network server, any Simple Network Time Protocol SNTP server, or even the National Institute of Standards and Technology NIST over the internet. The MC100 can automatically connect to the network using the latest in DHCP technology and will auto negotiate 10/100 Mbit communication. The LAN interface is easily configured either through the MC100 keypad or through a convenient browser based interface from any PC on the network.

The MC100-LAN mounts directly into the MC100 enclosure to provide a standard RJ-45 connection to the network. The MC100-LAN-WiFi offers wireless LAN connection to an existing wireless network. Both LAN interfaces communicate to the MC100 through a 3-wire serial connection. Power to the interface is provided by the MC100.

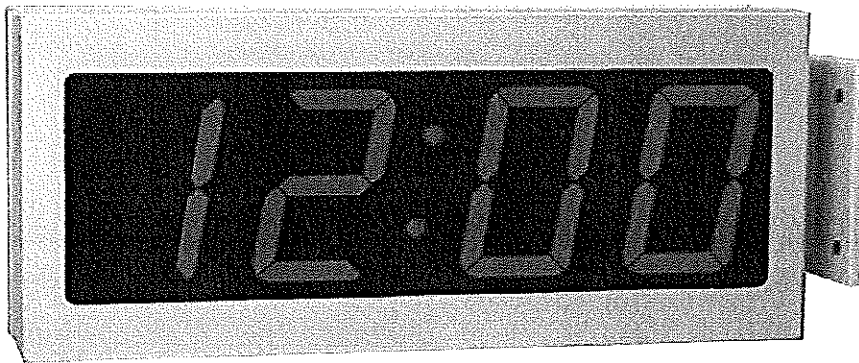
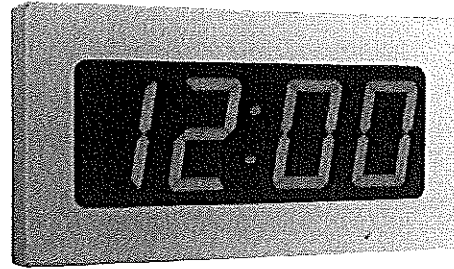
MC100-LAN: 10/100Mbit auto-negotiating.

MC100-LAN-WiFi: 802.11b 11Mbit

Protocols: TCP/IP; DNS; DHCP; SNTP; TIME; HTTP; FTP

Order No.	Description
MC100-LAN	LAN Interface for MC100 Master Clock
MC100-LAN-WiFi	Wireless LAN (802.11b) Interface for MC100 Master Clock

D225 Digital Clock



D400 Digital Clock  
Shown with Corridor Kit

NATIONAL TIME offers a digital clock series with improved features over previous models. This new microprocessor based secondary clock and the MC-100 Master Clock form a unique time keeping system offering *on demand* time correction. This digital communication format can provide power and instantly correct all secondary clocks to any time of day using only two conductor low voltage wire. This format eliminates costly battery replacement and lengthy reset schemes. National's new energy saving *power algorithm* and current control circuitry combine to provide a low current, constant brightness LED display. 24VAC units are available in attractive 4" or 2.25" high visibility, wide-bar digits. For extremely long wire runs, 120VAC power and communication may leave the Master Clock when the appropriate 24VAC transformer is mounted at each clock or double face unit.

For systems not utilizing National's Master Clocks, 12-hour resets may be accomplished with a short power interruption each 12:00.

The durable steel housing, plug-in connectors and universal mounting plate simplify installation. An optional low profile surface box allows for surface mounted conduit entry. The corridor conversion kit will support top or side mounting, single or double face. Powder grey finish standard, other colors upon request.

## FEATURES

On-Demand Correction

2-Wire Operation

Accurate 60hz Timekeeping

Low Power Consumption

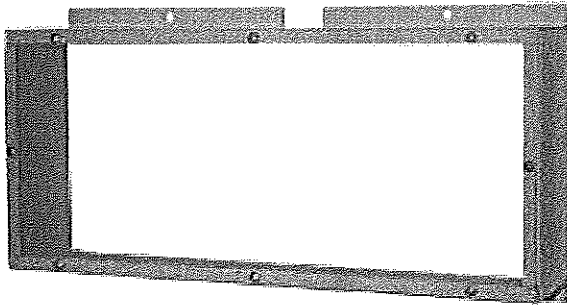
Long-Life Sealed Display

Microprocessor Based

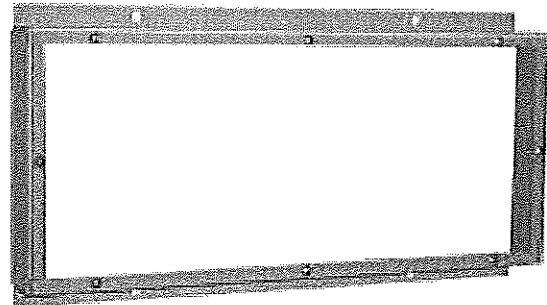
Durable Steel Housing

High Visibility

Plug-in Connectors



**CV-GUARD-S**



**CV-GUARD-F**

NATIONAL TIME now offers a digital clock protective guard superior to other models. Manufactured with heavy duty 18 gauge steel, this guard will stand up to the most demanding installations. The tough polycarbonate window provides obstruction-free viewing of the clock not found in wire guard versions.

The Semi-flush Clear-View Guard will protect up to a 4" digital clock when installed using a flush mounted electrical box.

The Surface Clear-View Guard is used when a surface mount enclosure such as D4M-SURF BOX is used. (See Bulletin C-394) This deeper guard has a slot centered on one side to accommodate surface conduit or other surface mount wire raceways.

The guards are finished with Powder Gray paint to match the standard digital clock finishes.

Other colors are available upon request.

## **FEATURES**

**Durable Welded Steel Housing**

**Tough Polycarbonate Window**

**Obstruction-Free Viewing**

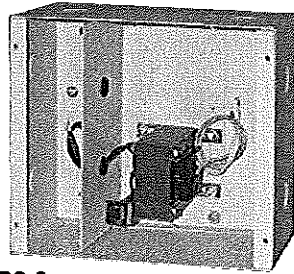
**Surface and Semi-flush Models**

**Protects up to 4" Digital Clock**

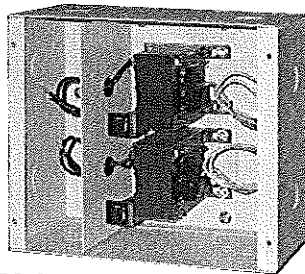
**Easy Installation**

# NATIONAL TIME & SIGNAL CORPORATION

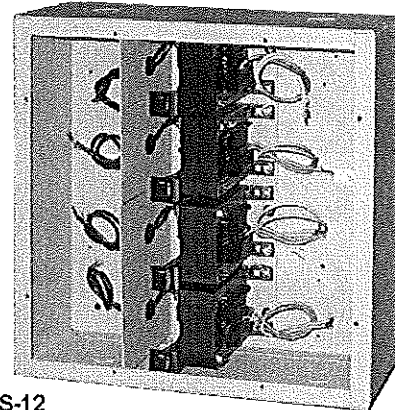
## PS-3, PS-6, PS-12 24VAC Power Supplies



PS-3



PS-6



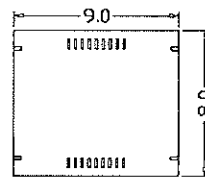
PS-12

The NATIONAL TIME PS-3, PS-6, PS-12 Power Supplies are designed to compliment National's Master Clocks with low voltage digital and/or analog clocks. Each offers power limited transformer(s) with individual circuit breakers to allow less costly Class 2 wiring installations. Each transformer can supply 3.12A of 24VAC. For 2-wire clock systems, each transformer supports a clock circuit, while for 3-wire systems one transformer supplies 'run' power while another supplies the 'reset' power for a clock circuit. The power supplies may be converted to Remote Power Boosters with the addition of the optional PS-Relays. Each power supply is housed in a durable steel enclosure designed to match National's Master Clocks and create an integrated and attractive installation.

### FEATURES

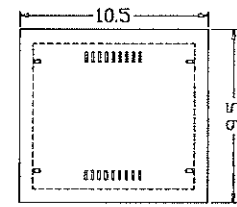
- 120VAC/24VAC Power Supply
- UL Recognized Power-Limited Isolation Transformers
- Individual Circuit Breakers
- Durable Steel Enclosure
- Integrated System Look
- Flush and Surface Mount Versions

**PS-3:** One 3.12A 120/24VAC Transformer will support one 2-wire clock circuit. Order one PS-Relay to create circuit booster supply. 9"x8"x4" Enclosure. Two knockouts each side.



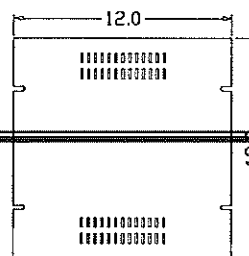
PS-3, PS-6

**PS-6:** Two 3.12A 120/24VAC Transformers will support either two 2-wire clock circuits, or one 3-wire clock circuit. Order one PS-Relay to create a dual circuit 2-wire booster, or two PS-Relays to create a 3-wire circuit booster supply. 9"x8"x4" Enclosure. Two knockouts each side.

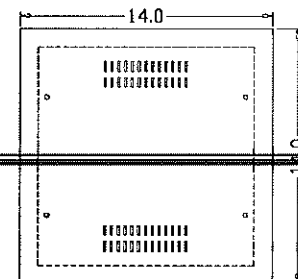


PS-3-FM, PS-6-FM  
Flush Mount

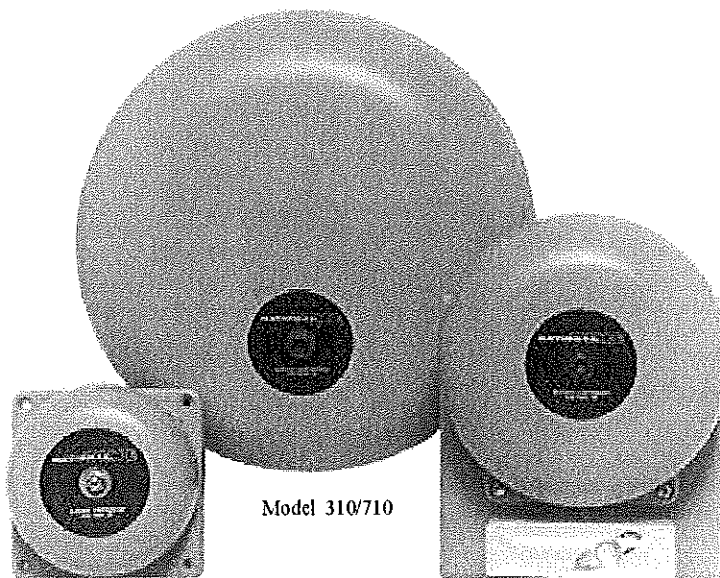
**PS-12:** Four 3.12A 120/24VAC Transformers will support either four 2-wire clock circuits, or two 3-wire circuits. Order one PS-Relay to create a quad circuit 2-wire booster, or two PS-Relays to create a dual 3-wire circuit booster supply. 12"x12"x4" Enclosure. Two knockouts top and bottom.



PS-12



PS-12-FM  
Flush Mount



Model 304/704

Model 310/710

Model 306/706  
(Shown with 551 Strobe Plate)

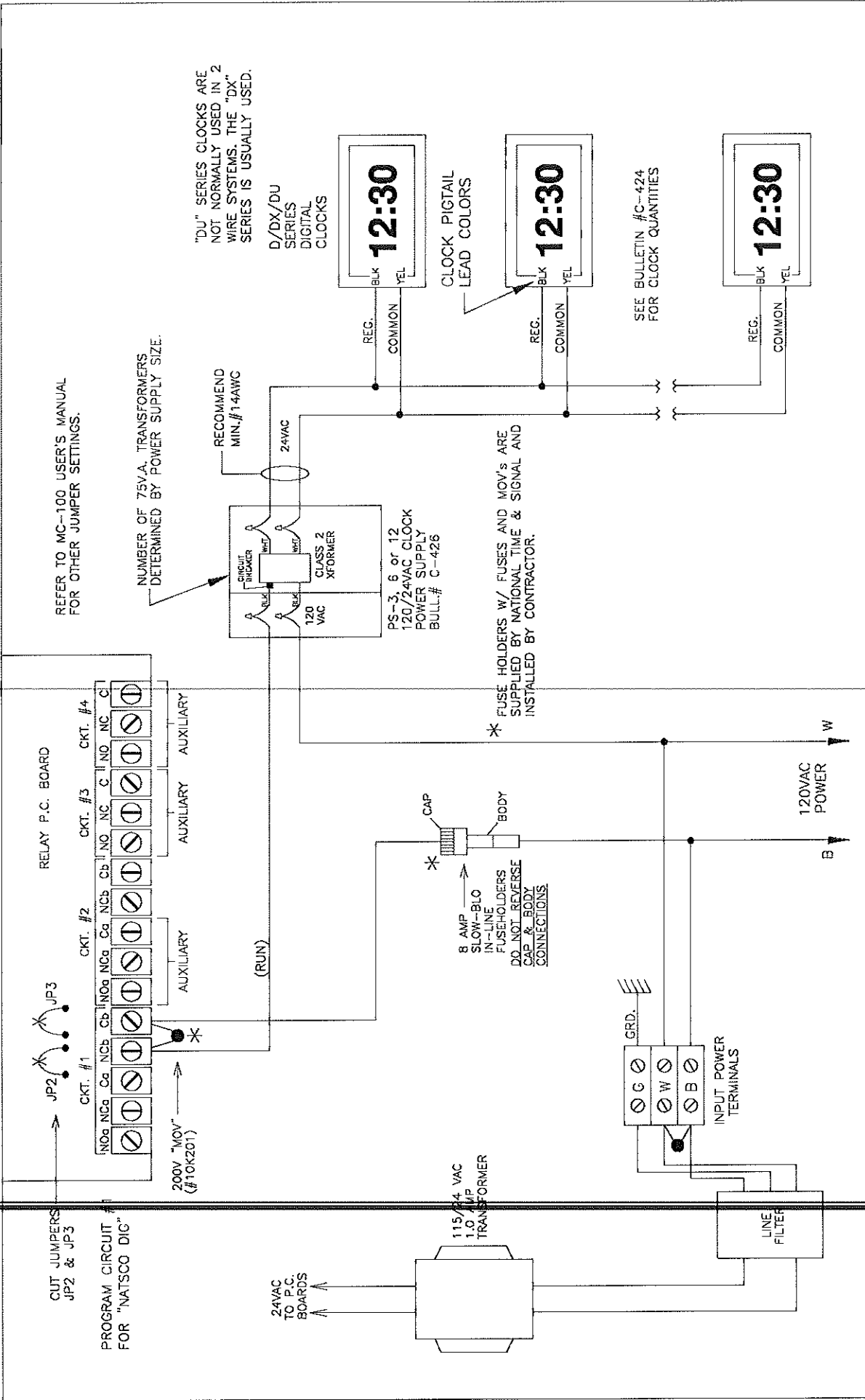
NATIONAL TIME alarm bells feature low power consumption with high sound output. Indoor or outdoor and single stroke or vibrating models available in 4", 6", and 10" shell sizes. Standard mounting options are provided for installation convenience.

Unique strobe bell combinations also are available for effective audible and visual signaling. The new strobe bell combination signals consist of a standard bell and Lexan™ lens strobe attached to a plate that mounts directly to 4" square backboxes. The bell includes suppression to minimize RFI generated by the contacts. In-out connections are provided for both the strobe and the bell so they can be operated independently or in parallel.

Coded systems require separate wiring for the strobe.

## FEATURES

- "W" Series: UL Listed, 1971/464, for 15cd Non-Sleeping Areas. Also meets ADA 75cd for Public Areas
- "D" Series: UL Listed, 1971/464, for 75cd Non-Sleeping Areas. Also meets ADA 75cd for Public Areas
- "S" Series: UL Listed, 1971/464, for 110cd Sleeping



# NATIONAL TIME & SIGNAL CORPORATION

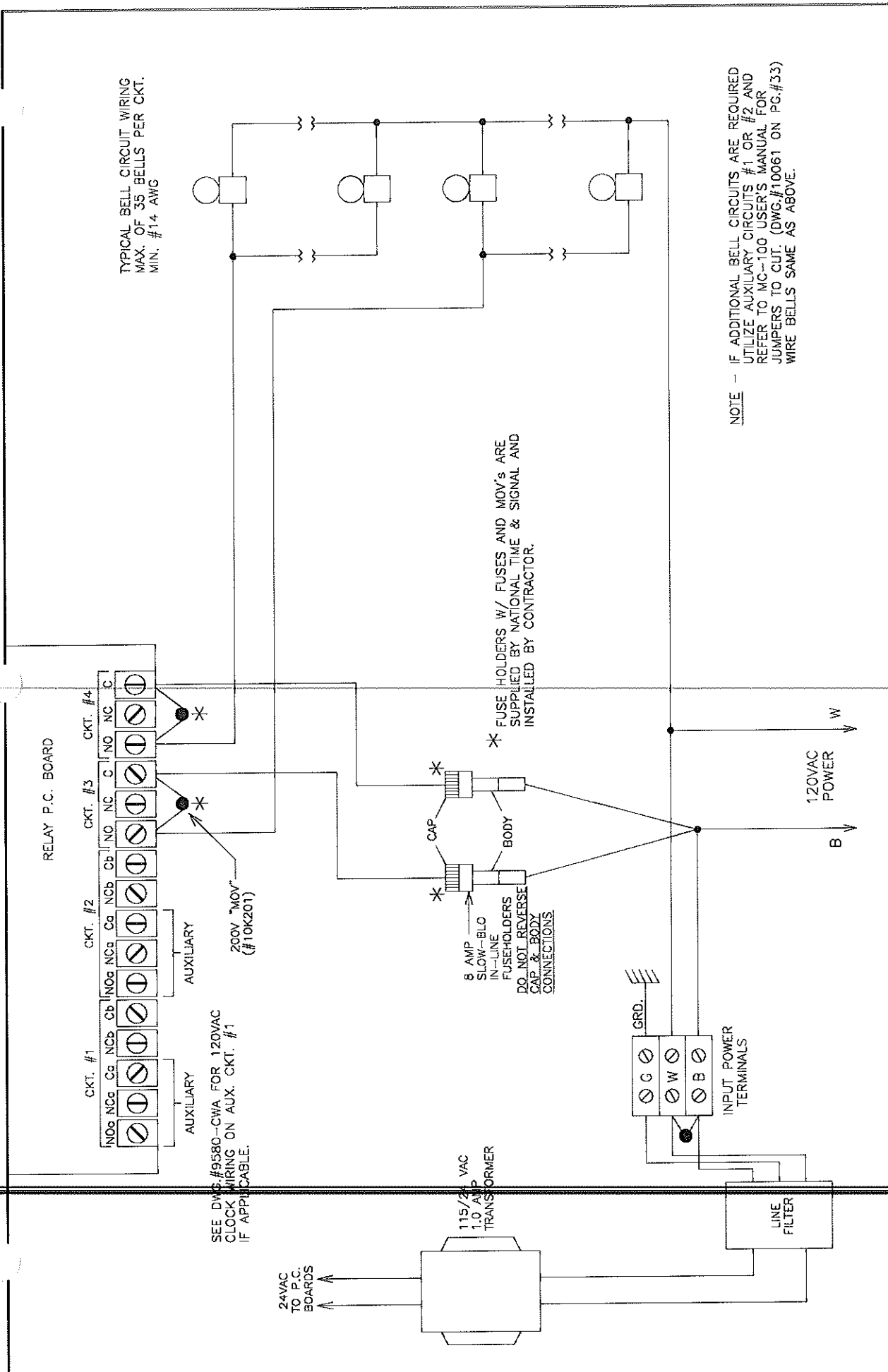
NAME MC-100 & 24VAC DIGITAL WALL CLOCK WIRING  
 DATE 02-09-04  
 FILE CODE 9702\_CWA

REVISIONS	DATE	MATERIAL
A	01-10-05	SCALE USED ON
B		
C		
D		
E		

LIMITS NOT OTHERWISE NOTED  
 FRACTIONS ± 0.010 ; DECIMALS ± 0.005

TLP 9702-CWA  
 DRAWN BY





NOTE - IF ADDITIONAL BELL CIRCUITS ARE REQUIRED UTILIZE AUXILIARY CIRCUITS #1 OR #2 AND REFER TO MC-100 USER'S MANUAL FOR JUMPERS TO CUT (DWG.#10061 ON PG.#33) WIRE BELLS SAME AS ABOVE.

SEE DWG. #9580-CWA FOR 120VAC CLOCK WIRING ON AUX. CKT. #1 IF APPLICABLE.

FUSE HOLDERS W/ FUSES AND MOV'S ARE SUPPLIED BY NATIONAL TIME & SIGNAL AND INSTALLED BY CONTRACTOR.

**RAE SIGNAL**  
**& SIGNAL CORPORATION**

NAME MC-100 & 120VAC BELL WIRING  
 DATE 2-14-97  
 FILE CODE MC100BL1  
 9606-CWA  
 DRAWN BY DRAWING NO.

REVISIONS	DATE	MATERIAL
A		SCALE
B		USED ON
C		
D		
E		

LIMITS NOT OTHERWISE NOTED  
 FRACTIONS ± 0.010 ; DECIMALS ± 0.005