

**SYSTEM CENTURY®
DIGITAL CENTRAL OFFICE****BASIC MAINTENANCE PANEL
OPERATING INSTRUCTIONS**

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1. INTRODUCTION

1.01 This section describes the operating features of the SYSTEM CENTURY Digital Central Office (DCO) basic maintenance panel and provides instructions for its use.

1.02 This section is reissued to provide information on optional alarm classifications required by the Rural Electrification Administration (REA). An asterisk (*) indicates an alarm used only on the standard panel; a dagger (†) indicates an alarm used only on the REA panel. Significant changes and additions are indicated by bars in the margins.

2. RELATED INFORMATION**2.01 General.**

A Sales and Instructional Literature Index of latest available publications can be obtained from your Stromberg-Carlson sales representative or from Publications Services, Stromberg-Carlson Corporation, P.O. Box 1698, Sanford, Florida 32771.

2.02 Related Section.

The following section is recommended for use with this document:

23-001-53 Fault Printout Interpretation

2.03 Related Drawings.

The circuit schematic diagrams and available circuit descriptions for the following circuits are recommended for use with this document. Each circuit is identified by a six-digit base number. Drawings are identified by prefixing the base number either with an S- for circuit schematic or DS- for circuit description. The base numbers and circuit names are as follows:

<u>BASE NUMBER</u>	<u>NAME</u>
814428	Basic Maintenance Panel Logic Card 1
814429	Basic Maintenance Panel Logic Card 2
814430	Basic Maintenance Panel Logic Card 3
814460	Basic Maintenance Panel

3. PURPOSE AND USE

3.01 The basic maintenance panel monitors faults detected by the diagnostic circuits throughout the system and by the maintenance processor. The panel contains visual status and alarm indicators, audible alarms, and control transfer switches.

4. CONTROLS AND INDICATORS

4.01 The controls and indicators on the basic maintenance panel (fig. 1 and 2) are listed alphabetically in table 1; a brief functional description of each is also provided.

5. PANEL OPERATION

5.01 Alarms.

When the maintenance processor detects a fault, an alarm signal is sent to the basic maintenance panel. This sounds one of the audible alarms, lights the associated alarm LED, and lights one or more other LEDs to further classify the type of fault. If two alarms occur simultaneously, both alarm LEDs light but only the higher priority audible alarm sounds. An audible alarm can be silenced by momentarily pressing the **ALARM STOP** button. If another fault occurs after silencing the alarm indicator, an audible alarm sounds again.

5.02 Remote Alarm Sending.

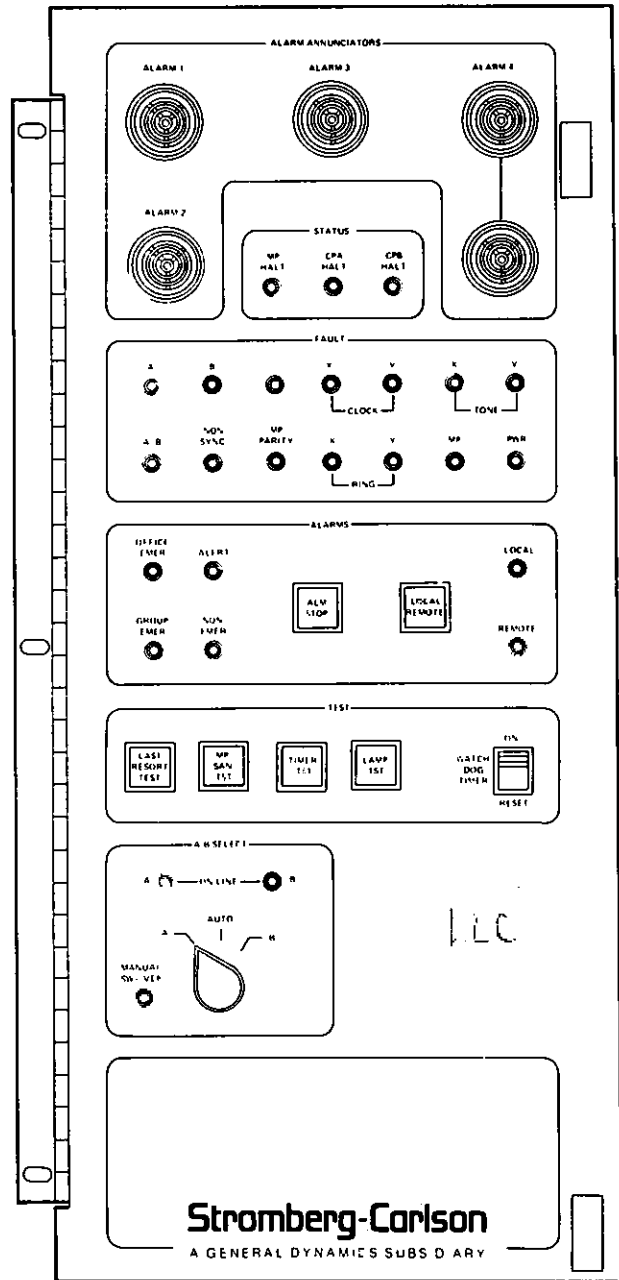
Alarms can be sent to a remote location by selecting the remote mode with the **LOCAL REMOTE** button. Pressing the button a second time causes the alarm to be indicated on the basic maintenance panel. **LOCAL** and **REMOTE** LEDs indicate the status of the button. If an audible alarm is not silenced within 5 minutes, while the panel is in the local mode, an automatic switchover to the remote mode occurs. To test this time-out function, momentarily press the **TIMER TEST** button. The **REMOTE** LED lights for 5 minutes and then goes dark if the timer circuit is functioning properly.

5.03 Hard-Copy Alarm Recording.

Every fault produces a fault printout and diagnostic message on the teletypewriter (TTY) or CRT terminal, as well as causing an audible and visual indication on the basic maintenance panel. As long as faults remain in the system, periodic reminders are issued by way of the TTY. For further information, refer to the section titled *Fault Printout Interpretation*, referenced in paragraph 2.02.

5.04 Last-Resort Alarm.

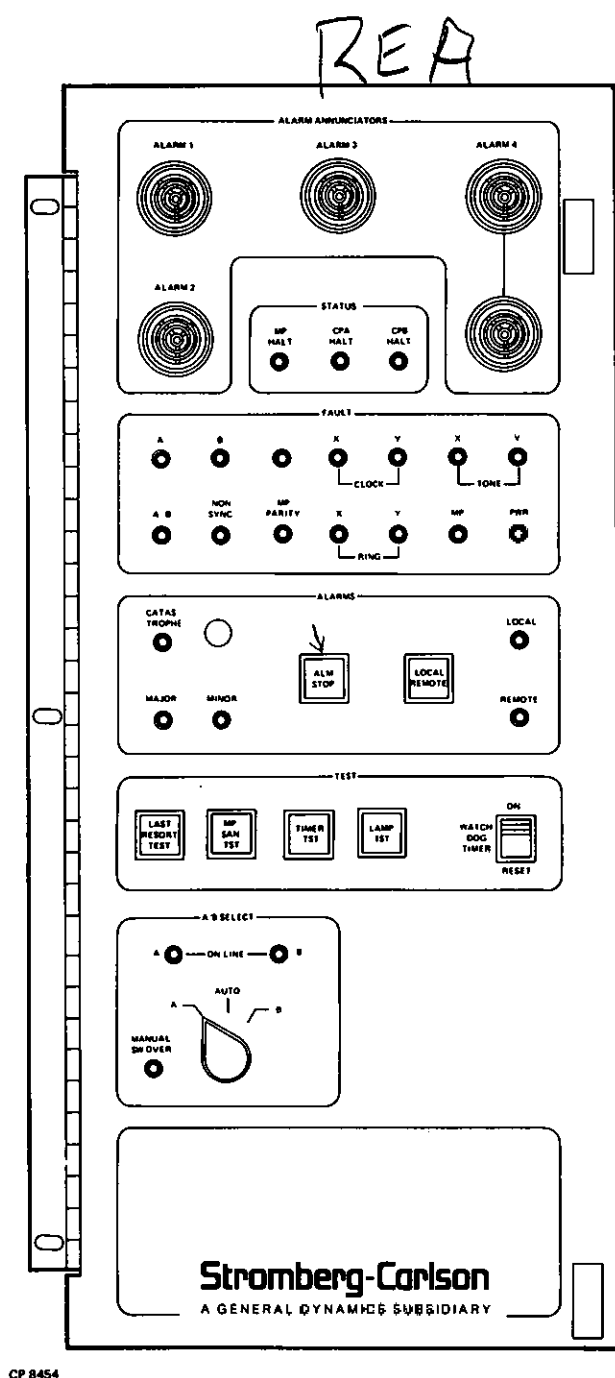
- a. A last-resort alarm is indicated by lighting a large lamp external to the system. This alarm is initiated when condition 1 or 2 occurs while the panel is in the remote mode:



CP 8455

Figure 1. Standard Basic Maintenance Panel

1. The maintenance processor does not provide a class of alarm within 1 second of the detection of a hardware fault.
2. The maintenance processor times out and one of the following also occurs:



CP 8454

Figure 2. REA-Type Basic Maintenance Panel

- Call processor sanity error, parity error, or watchdog timeout.
- Maintenance processor sanity error or parity error.
- Port control store parity error.
- Call processor bus mismatch.

- Nonsynchronous operation.
- Clock fault.
- Ringing fault.
- Combined power fault.
- Tone fault.

b. To test the last-resort alarm circuitry, momentarily press the **LAST RESORT TEST** button while the panel is in the remote mode. The external lamp should light.

c. To remove the alarm condition, momentarily press the **ALM STOP** button on the panel. External lamp goes dark.

5.05 Maintenance Processor Watchdog Timer.

A watchdog timer is used as a running check of the maintenance processor operation. When the **WATCHDOG TIMER** toggle switch is in the **ON** position, the timer runs continuously; it is reset by the maintenance processor at least once every 500 milliseconds. If the maintenance processor does not reset the timer before the time expires, the maintenance processor is automatically reloaded, the red **MP** and **OFFICE EMER*** or **CATASTROPHE†** LEDs light, and **ALARM 1** sounds. Momentarily setting the **WATCHDOG TIMER** switch to the **RESET** position resets the timer. When the switch is returned to the **ON** position, the alarm indications stop if the fault is cleared.

5.06 Sanity Test.

The sanity test is a program sequence in the call processor memory that is used to exercise as many processor instructions as possible within a designated time period. To manually initiate a sanity test, press and hold the **MP SANITY TEST** button on the basic maintenance panel. This starts an 8-millisecond timer in the basic maintenance panel circuitry and sends a flag to the maintenance processor. The maintenance processor starts the sanity test and, when the test is completed, sends a signal back to the basic maintenance panel to reset the timer before the 8-millisecond period expires. If a sanity-test-complete signal is not received before the timer times out, the red **MP** and **OFFICE EMER*** or **CATASTROPHE†** LEDs light and **ALARM 1** sounds. Releasing the **MP SANITY TEST** button resets the timer and clears

the fault indication (if one occurred). Because no call processing can be done during a sanity test, the test should be used with discretion.

5.07 Call Processor Switchover.

During normal operation, the MANUAL SW-OVER switch is left in the AUTO position to permit automatic switchover when a fault occurs in the on-line side. If it is desired to force calls through one side during testing or maintenance, set the MANUAL SW-OVER switch to either the A or B position. The red MANUAL SW-OVER LED lights when in this mode, to alert maintenance personnel that automatic switchover is disabled. The ON LINE A or B LED indicates which side is on-line at any time.

5.08 Nonsynchronous Operation.

If one of the synchronizers determines that call processors A and B are out of synchronization, the red NON SYNC and OFFICE EMER* or CATASTROPHE† LEDs light and ALARM 1 sounds. The maintenance processor then does a maintenance routine to determine if one processor is faulty or if the nonsynchronous condition was caused by a transient pulse. If it was a transient pulse, the fault indications are removed by the maintenance processor. If one side is faulty, it is automatically taken off-line (if on-line), and further automatic maintenance routines are done to isolate the fault.

Table 1. Controls and Indicators

<i>CONTROL OR INDICATOR</i>	<i>TYPE</i>	<i>FUNCTION</i>
A/B SELECT AUTO, A, B	Rotary switch, 3-position	Used to put either side A or side B on-line. When in AUTO position, on-line side is determined by MP, and switchover is automatic if fault occurs in on-line side.
MANUAL SW-OVER	Light-emitting diode (LED), red	Lights when AUTO, A, B switch is not in AUTO position.
ON LINE, A, B,	LEDs, green	Indicates which side of system is on-line.
ALARM ANNUNCIATORS		
*ALARM 1	Annunciator, loud (2900-Hz pulses)	Sounds to indicate one of following office emergency conditions: System inoperative. All calls blocked. Calls blocked in one common control sector.
*ALARM 2	Annunciator, continuous (4500-Hz tone)	Sounds to indicate one of following group emergency conditions: Calls blocked in one port group. Degraded service throughout system.
*ALARM 3	Annunciator, continuous, loud (2900-Hz tone)	Sounds to indicate one of following nonemergency conditions: Administrative and diagnostic functions operative but degraded.

Table 1. Controls and Indicators (Cont)

<i>CONTROL OR INDICATOR</i>	<i>TYPE</i>	<i>FUNCTION</i>
*ALARM 4	Annunciators, alternating (1900- and 2900-Hz tones)	Sounds to indicate one of following alert conditions: Redundancy lost; on-line side functioning. Environment outside normal limits; system operational. Battery charger failure. Commercial ac power failure; standby ac generator inoperative. Nonservice-affecting fault (ringing generator, interrupter, test call generator, etc.). Sensor-reported fault (cable pressure, forced entry into building, etc.).
†ALARM 1	Annunciator, loud (2900-Hz pulses)	Sounds to indicate one of following catastrophic conditions: System inoperative. All calls blocked. Calls blocked in one common control sector. Administrative and diagnostic functions inoperative.
†ALARM 2	Annunciator, continuous (4500-Hz tone)	Sounds to indicate one of following major alarm conditions: Calls blocked in one port group. Degraded service throughout system. Redundancy lost; degraded service on active side. Redundancy lost; active side functioning properly. Charger failure.
†ALARM 3	Annunciator, continuous, loud (2900-Hz tone)	Sounds to indicate one of following minor alarm conditions: Nonservice-affecting fault (ringing generator, interrupter, test call generator, etc.) Environment outside normal limits; system operational.
†ALARM 4	-----	Not used for REA alarm classification.
ALARMS		
*ALERT	LED, red	Lights when ALARM 4 sounds.
ALM STOP	Pushbutton switch	When momentarily pressed, audible ALARM is silenced. Next alarm condition causes associated audible ALARM to sound.
†CATASTROPHE	LED, red	Lights when ALARM 1 sounds.
*GROUP EMER	LED, red	Lights when ALARM 2 sounds.

Table 1. Controls and Indicators (Cont)

<i>CONTROL OR INDICATOR</i>	<i>TYPE</i>	<i>FUNCTION</i>
LOCAL	LED, red	Lights to indicate that alarms cannot be sent to remote location. Depends on operation of LOCAL REMOTE button.
LOCAL REMOTE	Pushbutton switch	Selects either local or remote display of alarms. When button is momentarily pressed, condition reverses.
†MAJOR	LED, red	Lights when ALARM 2 sounds.
†MINOR	LED, red	Lights when ALARM 3 sounds.
*NON EMER	LED, red	Lights when ALARM 3 sounds.
*OFFICE EMER	LED, red	Lights when ALARM 1 sounds.
REMOTE	LED, green	Indicates that alarms will be sent to remote location. Depends on operation of LOCAL REMOTE button.
FAULT		
A	LED, red	Lights to indicate fault in side A of system. Other fault indicator(s) and annunciator(s) are activated to aid in fault isolation.
B	LED, red	Lights to indicate fault in side B of system. Other fault indicator(s) and annunciator(s) are activated to aid in fault isolation.
A B	LED, red	Lights when maintenance processor cannot determine which side is faulty and/or when match error is detected by synchronizer.
CLOCK X	LED, red	Lights when master clock X fails.
Y	LED, red	Lights when master clock Y fails.
MP	LED, red	Lights when either maintenance processor malfunctions or WATCHDOG TIMER switch is in RESET position.
MP PARITY	LED, red	Lights when maintenance processor memory parity error occurs.
NON SYNC	LED, red	Lights when A and B sides of system are not synchronized.
PWR	LED, red	Lights when service group diagnostics detects power fault.
RING X	LED, red	Lights when ringing generator X fails.

Table 1. Controls and Indicators (Cont)

<i>CONTROL OR INDICATOR</i>	<i>TYPE</i>	<i>FUNCTION</i>
Y	LED, red	Lights when ringing generator Y fails.
TONE X	LED, red	Lights when precise tone generator X fails.
Y	LED, red	Lights when precise tone generator Y fails.
STATUS		
CPA HALT	LED, red	Lights when CPA has halted.
CPB HALT	LED, red	Lights when CPB has halted.
MP HALT	LED, red	Lights when MP has halted.
TEST		
LAMP TST	Pushbutton switch (nonlocking)	While pressed, tests all visual indicators (lamps) on panel. (Faulty indicators stay dark.)
LAST RESORT TEST	Pushbutton switch	When pressed momentarily while panel in remote mode, simulates last-resort alarm condition. Cleared by ALARM STOP button.
MP SAN TEST	Pushbutton switch	When pressed momentarily, sends signal to maintenance processor and starts 8-ms timer on maintenance panel. Maintenance processor does sanity test and resets timer. If reset does not occur before timer reaches 0, red FAULT MP lamp lights.
TIMER TEST	Pushbutton switch	Used to check timer function. When panel is in local mode and alarm is not silenced within 5 minutes, automatic switchover to remote mode occurs. To test this timeout function, momentarily press TIMER TEST button. REMOTE lamp lights for 5 minutes and then goes dark if timer circuit is functioning properly.
WATCHDOG TIMER	Switch, 2-position	ON position causes watchdog timer to run continuously and be reset every 500 ms, or less, by maintenance processor. If reset does not occur within specified time, red FAULT MP lamp lights. RESET position disables timer.



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