The LCD-80TM
Liquid Crystal Display
for the Notifier AM2020/AFP1010 and AFP-200
Fire Alarm Control Panels
Installation Precautions - Adherence to the following will aid in problem-free installation with long-term reliability:

**WARNING** - Several different sources of power can be connected to the fire alarm control panel. Disconnect all sources of power before servicing. Control unit and associated equipment may be damaged by removing and/or inserting cards, modules, or interconnecting cables while the unit is energized. Do not attempt to install, service, or operate this unit until this manual is read and understood.

**CAUTION** - System Reacceptance Test after Software Changes: To ensure proper system operation, this product must be tested in accordance with NFPA 72-1993 Chapter 7 after any programming operation or change in site-specific software. Reacceptance testing is required after any change, addition or deletion of system components, or after any modification, repair or adjustment to system hardware or wiring.

All components, circuits, system operations, or software functions known to be affected by a change must be 100% tested. In addition, to ensure that other operations are not inadvertently affected, at least 10% of initiating devices that are not directly affected by the change, up to a maximum of 50 devices, must also be tested and proper system operation verified.

This system meets NFPA requirements for operation at 0-49°C/32-120°F and at a relative humidity of 85% RH (non-condensing) at 30°C/86°F. However, the useful life of the system’s standby batteries and the electronic components may be adversely affected by extreme temperature ranges and humidity. Therefore, it is recommended that this system and its peripherals be installed in an environment with a nominal room temperature of 15-27°C/60-80°F.

Verify that wire sizes are adequate for all initiating and indicating device loops. Most devices cannot tolerate more than a 10% I.R. drop from the specified device voltage.

Fire Alarm System Limitations

Fire alarm systems are designed to provide early warning of a developing fire. Such a system, however, does not assure protection against property damage or loss of life resulting from a fire.

Any fire alarm system may fail for a variety of reasons:

Smoke detectors may not sense fire where smoke cannot reach the detectors such as in chimneys, in walls, or roofs, or on the other side of closed doors. Smoke detectors also may not sense a fire on another level or floor of a building. A second floor detector, for example, may not sense a first floor or basement fire. Furthermore, all types of smoke detectors - both ionization and photoelectric types, have sensing limitations. No type of smoke detector can sense every kind of fire caused by carelessness and safety hazards like smoking in bed, violent explosions, escaping gas, improper storage of flammable materials, overloaded electrical circuits, children playing with matches, or arson.

**IMPORTANT!** Smoke detectors must be installed in the same room as the control panel and in rooms used by the system for the connection of alarm transmission wiring, communications, signaling, and/or power. If detectors are not so located, a developing fire may damage the alarm system, crippling its ability to report a fire.

Like all solid state electronic devices, this system may operate erratically or can be damaged when subjected to lightning induced transients. Although no system is completely immune from lightning transients and interferences, proper grounding will reduce susceptibility. Overhead or outside aerial wiring is not recommended, due to an increased susceptibility to nearby lightning strikes. Consult with the Technical Services Department if any problems are anticipated or encountered.

Disconnect AC power and batteries prior to removing or inserting circuit boards. Failure to do so can damage circuits.

Do not tighten screw terminals more than 9 in-lbs. Over tightening may damage threads, resulting in reduced terminal contact pressure and difficulty with screw terminal removal.

This system contains static-sensitive components. Always ground yourself with a proper wrist strap before handling any circuits so that static charges are removed from the body. Use static suppressive packaging to protect electronic assemblies removed from the unit.

Follow the instructions in the installation, operating, and programming manuals. These instructions must be followed to avoid damage to the control panel and associated equipment. FACD operation and reliability depend upon proper installation.

**FCC Warning**

**WARNING:** This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instruction manual, may cause interference to radio communications. It has been tested and found to comply with the limits for class A computing device pursuant to Subpart B of Part 15 of FCC Rules, which is designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference, in which case the user will be required to correct the interference at his own expense.

**Canadian Requirements**

This digital apparatus does not exceed the Class A limits for radiation noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

Le present appareil numerique n’emet pas de bruits radioelectriques depassant les limites applicables aux appareils numeriques de la classe A prescrits dans le Reglement sur le brouillage radioelectric edite par le ministere des Communications du Canada.
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Section One: LCD-80TM Features

The LCD-80TM alphanumeric display module is an ancillary display and control device that may be used with the AM2020/AFP1010 and AFP-200 Fire Alarm Control Panels.

- 80-character LCD display (backlit under normal & alarm conditions).
- No programming necessary — uses time and labels from the control panel.
- Local piezo sounder with alarm and trouble resound.
- Device type identifiers from the control panel.
- Device & zone custom alpha labels from the control panel.
- Time/date and device address from the control panel.
- EIA-485 connects to control panel terminal port.
- Time/date display field.
- Control buttons for:
  - Status Display
  - Contrast Adjustment
  - Lamp Test
  - Global Acknowledge
  - Signal Silence
  - System Reset

Mounting options:
- ABF-1 package with key switch & phone jack options
- ABF-1D package with keylock and door
  - Can be located up to 6000 feet from the panel

Current Consumption @ 24 VDC (Regulated and filtered)
- Normal (no activity): 100 mA
- Standby (trouble condition): 50 mA
- Alarm: 100 mA

Optional ABF-1D

Terminal Connections
- +24 VDC POWER
- EIA-485

AKS-1 Keyswitch connector
For connection of an optional AKS-1 keyswitch.
When the two pins on this interface are shorted, all six keys on the membrane panel will be ignored by the LCD-80TM.

Piezo Sounder
The LCD-80TM sounder will be activated when any new alarm or trouble is received from the panel. It is silenced by the ACKNOWLEDGE switch.

Last LCD-80TM Options (SW1)
SW1-1 Set "ON" to disable LCD-80TM piezo.
SW1-2 Set "ON" to disable Acknowledge, Signal Silence and Reset switches.

Last LCD-80TM Options (SW3)
SW3-1 Set "ON" if this LCD-80TM is the last LCD-80TM on the EIA-485 loop.
SW3-2 Set "ON" to enable terminal supervision.

Note: These connections must be power-limited and the +24 volt power must be regulated and filtered.
The LCD-80TM operates like a CRT terminal without full keyboard capability, but with the advantages of 24 VDC power, wall mount, and multiple terminal location with Acknowledge, Signal Silence and Reset. The LCD-80TM has full point-display capacity and requires no programming.

Optional CRT Display Monitor connection to CCM-1. One max - requires programming at the AM2020/AFP1010. If a CRT is not used, connect the LCD-80TM directly to DIA TB1.

NOTES:
EIA-485: Maximum of 6000 feet between units.
Up to 32 LCD-80TMs may be used on the EIA-485 circuit (3.2 amps regulated power max required - consult control panel’s battery calculations).
Between each LCD-80TM are four wires: A twisted-shielded pair for data communications and an open pair for 24 VDC power.
The return circuit only requires two wires for data communication.

**Figure 1-2: Typical LCD-80TM Connection**

**AM2020/AFP1010 Note:** The EIA-485 interface used for the LCD-80TM should not be confused with the EIA-485 circuit used for the ACS interface. The CCM-1 Convertor Module converts the EIA-232 Terminal Interface from the SIB-2048 into the EIA-485 standard required by the LCD-80TM. The DIA-2020N can support LCD-80TMs in terminal mode without the need for a CCM-1 converter module (if a CRT is not being used).
Section Two: Operating the LCD-80TM

Display Patterns
The LCD-80TM displays directly the information from the AFP-200 or AM2020/AFP1010 terminal interface without alteration.

Note: The ALARMS PENDING, TROUBLES PENDING, Alarm Count and Trouble Count information will not be displayed on the LCD-80TM.

If the LCD-80TM fails to receive communications from the panel for a period of over one minute, it will activate its local sounder and display the following message:

COMMUNICATIONS FAIL

Status Button
The LCD-80TM, when used with the AM2020/AFP1010 will keep a count of alarms in the system (number of alarm messages, minus alarm clear messages, since the last ALL SYSTEMS NORMAL message). When this key is pressed the alarm count is displayed in place of the time/date for 10 seconds.

Contrast Adjust
Repeatedly press this switch until the display's contrast is acceptable.

Lamp Test Button
If the backlight LCD display has been turned off due to a trouble condition in the system, pressing this switch will illuminate the display for 60 seconds. This switch also silences the local piezo. While it is held down, all segments on the display will be turned on and the piezo will sound.

Global Acknowledge Button
When the Global Acknowledge switch is pressed on the front panel, the LCD-80TM sends an Acknowledge command to the control panel, emulating a CRT terminal.

Silence Button
When the SILENCE switch is pressed on the front panel, the LCD-80TM sends a Signal Silence command to the control panel, emulating the CRT terminal.

Reset Button
When the System Reset switch is pressed on the front panel, the LCD-80TM sends a Reset command to the control panel, emulating the CRT terminal.

Note: If Acknowledge, Silence, and Reset switches are enabled for system control, access security must be provided by mounting the LCD-80TM in a locked Fire Alarm Cabinet, or Annunciator Backbox model ABF-1/1D or ABS-1T with AKS-1 key switch option.
Section Three: LCD-80TM Electrical Connections

IMPORTANT: The LCD-80TM requires the connection of 24 VDC power in addition to the EIA-485 interface to operate.

Notes:
1) All connections are power-limited and supervised.
2) A maximum of 32 LCD-80TMs may be connected to this circuit.
3) 6000 feet maximum distance (@ 16 AWG) between the panel and the first or last LCD-80TM and between each additional LCD-80TM.
4) Use overall foil/braided-shield twisted pair cable suitable for EIA-485 applications (refer to Appendix A for shield termination information).
5) The EIA-485 circuit is rated at 5.5 VDC maximum and 60 mA maximum.
6) Each LCD-80TM must have R-120 resistors installed across the in and out terminals as shown.

Figure 2-1: LCD-80TM EIA-485 Connection

<table>
<thead>
<tr>
<th>EIA-485</th>
<th>CCM-1 (AM2020/AFP1010)</th>
<th>AFP-200</th>
<th>DIA (AM2020/AFP1010)</th>
</tr>
</thead>
<tbody>
<tr>
<td>OUT (-) Term. 4</td>
<td>P3-4</td>
<td>TB5-2</td>
<td>TB 1-4</td>
</tr>
<tr>
<td>RET (-) Term. 3</td>
<td>P3-3</td>
<td>TB5-4</td>
<td>TB 1-3</td>
</tr>
<tr>
<td>OUT(+) Term. 2</td>
<td>P3-2</td>
<td>TB5-1</td>
<td>TB 1-2</td>
</tr>
<tr>
<td>RET(+) Term. 1</td>
<td>P3-1</td>
<td>TB5-3</td>
<td>TB 1-1</td>
</tr>
</tbody>
</table>

Table 2-1: EIA-485 Connection
The LCD-80TM can be powered by an MPS-24A Main Power Supply or by the AFP-200 power supply. The power run to the LCD-80TM must be power-limited but need not contain a power supervision relay since loss of power is inherently supervised through loss of communication with the LCD-80TM. Maximum LCD-80TM current draw from power supply (under normal and alarm conditions) is 100 mA. Maximum current draw from the control panel's secondary power source (batteries) under loss of AC power (or when the panel is in a trouble condition) is 50 mA.

Figure 2-2: Supplying Power to the LCD-80TM

<table>
<thead>
<tr>
<th></th>
<th>MPS-24A</th>
<th>AFP-200</th>
</tr>
</thead>
<tbody>
<tr>
<td>24 VDC (+)</td>
<td>TB3-3</td>
<td>TB1-3</td>
</tr>
<tr>
<td>Common (-)</td>
<td>TB3-4</td>
<td>TB1-4</td>
</tr>
</tbody>
</table>

Table 2-2: Power Connections
Appendix A: EIA-485 Shield Terminations

The EIA-485 circuit must be wired using a twisted-shielded pair cable having a characteristic impedance of 120 ohms, +/- 20%. Do not run cable adjacent to; or in the same conduit as; 120-volt AC service, noisy electrical circuits that are powering mechanical bells or horns, audio circuits above 25 Vrms, motor control circuits, or SCR power circuits.

**Note:** All enclosures, including the FACP backbox, must be connected to earth ground! Never use the shield for grounding purposes.

Terminate the EIA-485 shields at both the Out and Return ends of the CCM-1 (or the DIA-1010 or DIA-2020 Display Interface Board if employing that option), at either the cabinet (when not in conduit) or at system common (when in conduit) as outlined below:

**When the EIA-485 shield is not in conduit:** At each respective LCD-80TM enclosure (except the first on the loop), terminate the shield coming in from the previous LCD-80TM at the outside of the cabinet backbox (earth ground). Let the outgoing (to next LCD-80TM) shield float (no connection). Shield termination between LCD-80TMs can only occur at the receiving end - the end connected to P1 Terminals 2 and 4. For the first LCD-80TM on the loop, let the shield coming in from the CCM-1 or DIA float.

**When the EIA-485 shield is in conduit:** At each respective LCD-80TM enclosure (except the first on the loop), terminate the shield coming in from the previous LCD-80TM at system common. Let the shield going out to next LCD-80TM shield float (no connection). Shield termination between LCD-80TMs can only occur at the receiving end - the end connected to LCD-80TM P1 Terminals 2 and 4. For the first LCD-80TM on the loop, let the shield coming in from the CCM-1 or DIA float.
Notes
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