# VIKING ©

**Telecommunication Peripheral Products**

# *Technical Practice*

**MLC-24**
**Message Waiting**
**Lamp Controller**

**March 2, 1998**

# Add Message Waiting Lamps for Voice Mail….On any Telephone System!

With Viking's **MLC-24** you can integrate visual message waiting indication with nearly any phone system...even those phone systems which do not support message lamps.

The **MLC-24** is compatible with virtually any voice messaging system with "out call" or "dispatch" feature. It can also be activated manually from a Touch Tone phone. The lamps can be reset by the voice mail system or from the user's telephone.

Commands are sent to the controller via C.O. line or analog PABX/KSU station or trunk port. Up to four **MLC-24** controllers can be connected to a single line.

## *http://www.VikingElectronics.com*

## *E-mail...Sales@VikingElectronics.com*

## Features

- Each MLC-24 controls up to 24 message waiting lamps

- Compatible with 90 to 125V message waiting phones

- Compatible with LED's or Viking **LM-1** or **LM-2** retrofit message waiting lamp kit

- Displays both steady lamp or flash for urgent messages

- Expandable in multiples of 24 lamps

- Uses existing C.O. lines or analog PABX/KSU stations

- Built in diagnostics to aid installer

## *Made in the U.S.A.*

## Applications

- Voice mail systems that don't provide message waiting voltage

- Remote voice mail systems

- Staff "In - Out" board
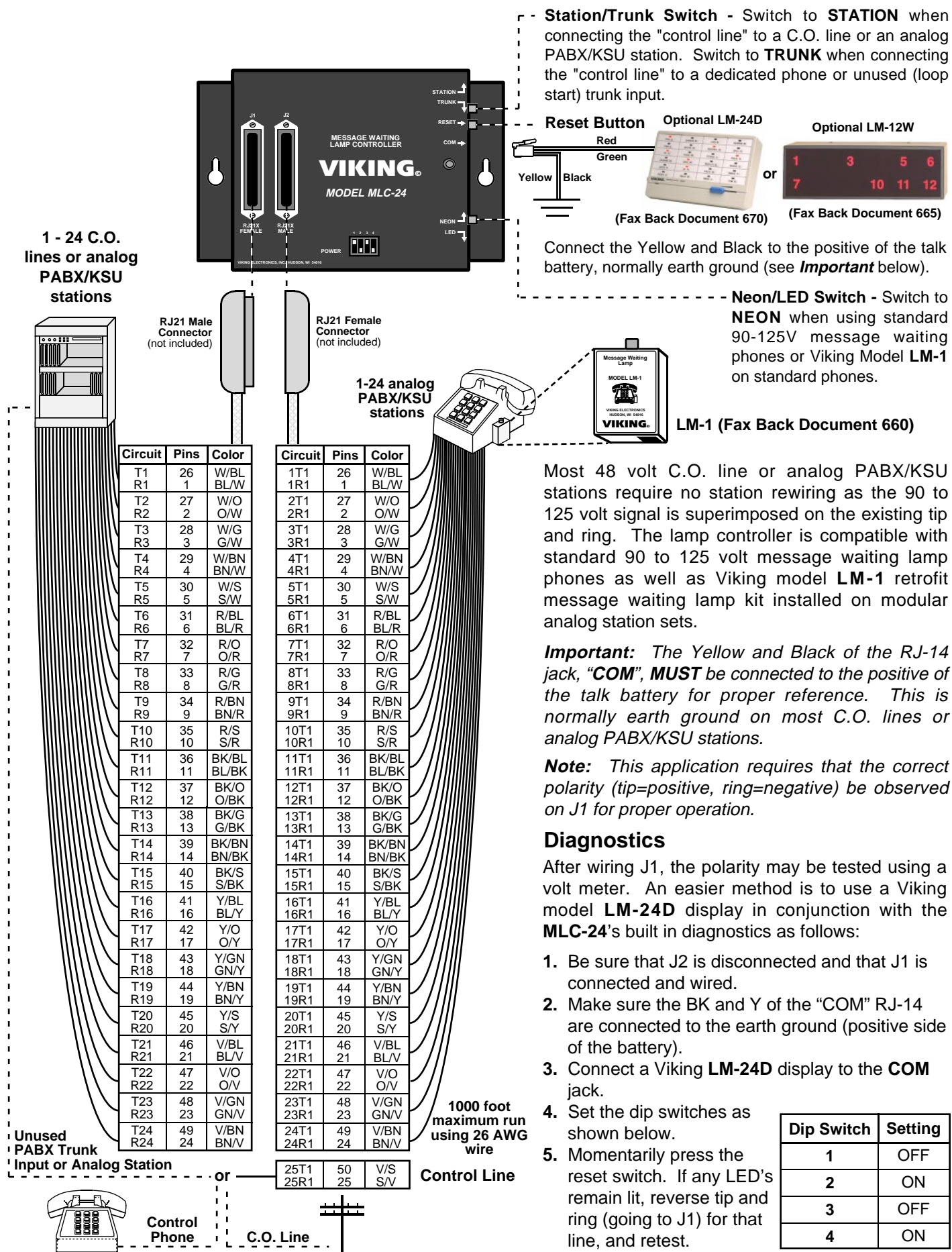
- "Do Not Disturb" lights

## *Sales...(715) 386 - 8861*
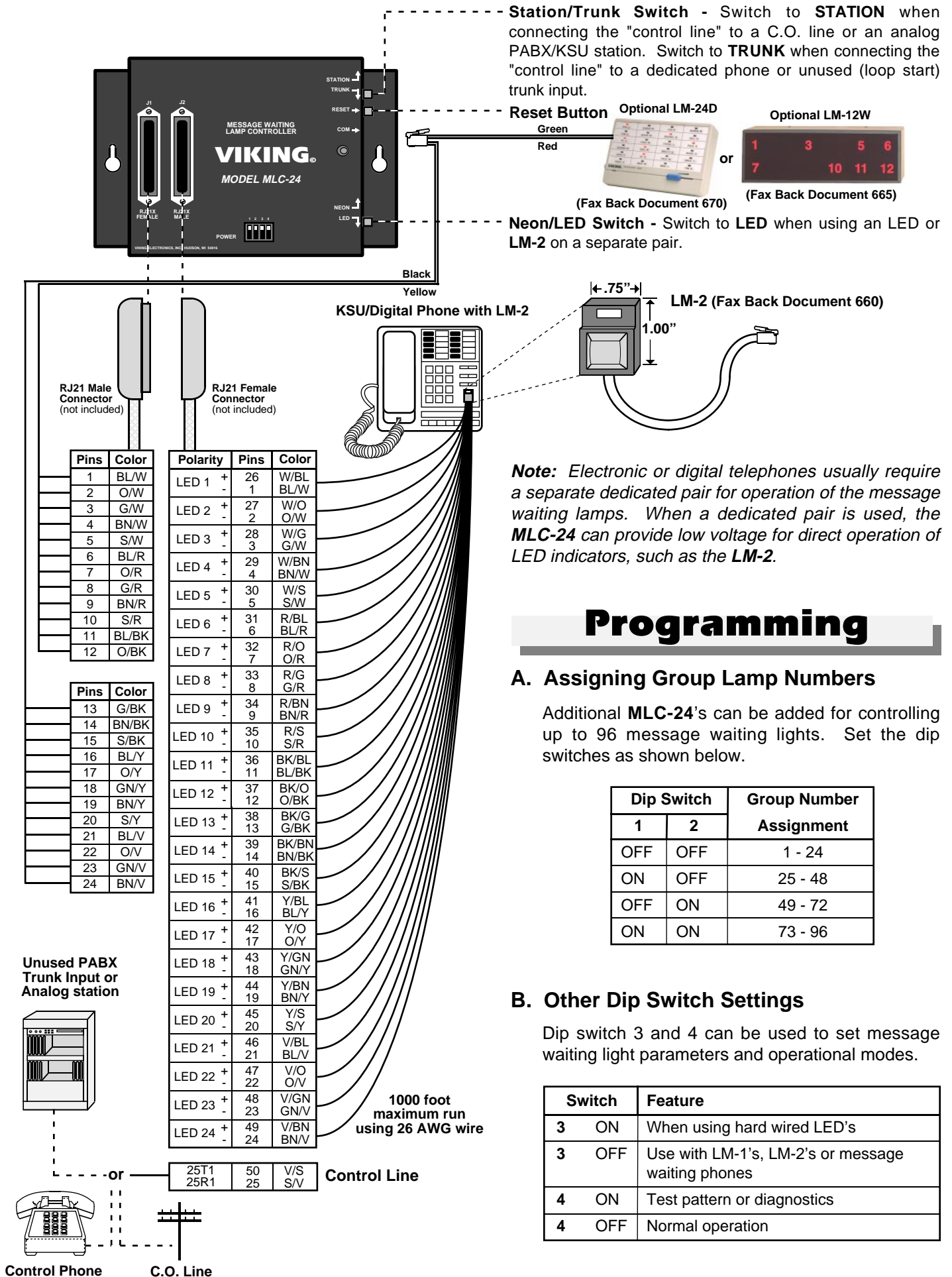
## Specifications

**Power:** 120V AC/13.8V AC 1.25A, UL listed, adapter provided
**Dimensions:** 8.25mm x 160mm x 44mm (8.25" x 6.25" x 1.75")
**Shipping Weight**: 1.36 kg (3 lbs.)
**Environmental:** 0°C to 32°C (32°F to 90°F) with 5% to 95% non-condensing humidity
**Connections:** (1) RJ21X male, (1) RJ21X female, (1) RJ11 com port

## A. Centrex or PABX Installation with Standard Phones

**Station/Trunk Switch -** Switch to **STATION** when connecting the "control line" to a C.O. line or an analog PABX/KSU station. Switch to **TRUNK** when connecting the "control line" to a dedicated phone or unused (loop start) trunk input.

**Reset Button**

Optional LM-24D

Optional LM-12W

Red
Green
Yellow   Black

or

(Fax Back Document 670)   (Fax Back Document 665)

Connect the Yellow and Black to the positive of the talk battery, normally earth ground (see *Important* below).

**Neon/LED Switch -** Switch to **NEON** when using standard 90-125V message waiting phones or Viking Model **LM-1** on standard phones.

STATION
TRUNK
RESET
COM

MESSAGE WAITING LAMP CONTROLLER

**VIKING**
*MODEL MLC-24*

NEON
LED

J1   J2

RJ21X FEMALE   RJ21X MALE

POWER   1 2 3 4

VIKING ELECTRONICS, INC. HUDSON, WI 54016

**1 - 24 C.O. lines or analog PABX/KSU stations**

**RJ21 Male Connector** (not included)

**RJ21 Female Connector** (not included)

**1-24 analog PABX/KSU stations**

Message Waiting Lamp
MODEL LM-1
VIKING ELECTRONICS HUDSON, WI 54016
**VIKING**

**LM-1 (Fax Back Document 660)**

Most 48 volt C.O. line or analog PABX/KSU stations require no station rewiring as the 90 to 125 volt signal is superimposed on the existing tip and ring. The lamp controller is compatible with standard 90 to 125 volt message waiting lamp phones as well as Viking model **LM-1** retrofit message waiting lamp kit installed on modular analog station sets.

| Circuit | Pins | Color |
|---------|------|-------|
| T1 | 26 | W/BL |
| R1 | 1 | BL/W |
| T2 | 27 | W/O |
| R2 | 2 | O/W |
| T3 | 28 | W/G |
| R3 | 3 | G/W |
| T4 | 29 | W/BN |
| R4 | 4 | BN/W |
| T5 | 30 | W/S |
| R5 | 5 | S/W |
| T6 | 31 | R/BL |
| R6 | 6 | BL/R |
| T7 | 32 | R/O |
| R7 | 7 | O/R |
| T8 | 33 | R/G |
| R8 | 8 | G/R |
| T9 | 34 | R/BN |
| R9 | 9 | BN/R |
| T10 | 35 | R/S |
| R10 | 10 | S/R |
| T11 | 36 | BK/BL |
| R11 | 11 | BL/BK |
| T12 | 37 | BK/O |
| R12 | 12 | O/BK |
| T13 | 38 | BK/G |
| R13 | 13 | G/BK |
| T14 | 39 | BK/BN |
| R14 | 14 | BN/BK |
| T15 | 40 | BK/S |
| R15 | 15 | S/BK |
| T16 | 41 | Y/BL |
| R16 | 16 | BL/Y |
| T17 | 42 | Y/O |
| R17 | 17 | O/Y |
| T18 | 43 | Y/GN |
| R18 | 18 | GN/Y |
| T19 | 44 | Y/BN |
| R19 | 19 | BN/Y |
| T20 | 45 | Y/S |
| R20 | 20 | S/Y |
| T21 | 46 | V/BL |
| R21 | 21 | BL/V |
| T22 | 47 | V/O |
| R22 | 22 | O/V |
| T23 | 48 | V/GN |
| R23 | 23 | GN/V |
| T24 | 49 | V/BN |
| R24 | 24 | BN/V |

| Circuit | Pins | Color |
|---------|------|-------|
| 1T1 | 26 | W/BL |
| 1R1 | 1 | BL/W |
| 2T1 | 27 | W/O |
| 2R1 | 2 | O/W |
| 3T1 | 28 | W/G |
| 3R1 | 3 | G/W |
| 4T1 | 29 | W/BN |
| 4R1 | 4 | BN/W |
| 5T1 | 30 | W/S |
| 5R1 | 5 | S/W |
| 6T1 | 31 | R/BL |
| 6R1 | 6 | BL/R |
| 7T1 | 32 | R/O |
| 7R1 | 7 | O/R |
| 8T1 | 33 | R/G |
| 8R1 | 8 | G/R |
| 9T1 | 34 | R/BN |
| 9R1 | 9 | BN/R |
| 10T1 | 35 | R/S |
| 10R1 | 10 | S/R |
| 11T1 | 36 | BK/BL |
| 11R1 | 11 | BL/BK |
| 12T1 | 37 | BK/O |
| 12R1 | 12 | O/BK |
| 13T1 | 38 | BK/G |
| 13R1 | 13 | G/BK |
| 14T1 | 39 | BK/BN |
| 14R1 | 14 | BN/BK |
| 15T1 | 40 | BK/S |
| 15R1 | 15 | S/BK |
| 16T1 | 41 | Y/BL |
| 16R1 | 16 | BL/Y |
| 17T1 | 42 | Y/O |
| 17R1 | 17 | O/Y |
| 18T1 | 43 | Y/GN |
| 18R1 | 18 | GN/Y |
| 19T1 | 44 | Y/BN |
| 19R1 | 19 | BN/Y |
| 20T1 | 45 | Y/S |
| 20R1 | 20 | S/Y |
| 21T1 | 46 | V/BL |
| 21R1 | 21 | BL/V |
| 22T1 | 47 | V/O |
| 22R1 | 22 | O/V |
| 23T1 | 48 | V/GN |
| 23R1 | 23 | GN/V |
| 24T1 | 49 | V/BN |
| 24R1 | 24 | BN/V |
| 25T1 | 50 | V/S |
| 25R1 | 25 | S/V |

*Important: The Yellow and Black of the RJ-14 jack, "COM", MUST be connected to the positive of the talk battery for proper reference. This is normally earth ground on most C.O. lines or analog PABX/KSU stations.*

*Note: This application requires that the correct polarity (tip=positive, ring=negative) be observed on J1 for proper operation.*

### Diagnostics

After wiring J1, the polarity may be tested using a volt meter. An easier method is to use a Viking model **LM-24D** display in conjunction with the **MLC-24**'s built in diagnostics as follows:

1. Be sure that J2 is disconnected and that J1 is connected and wired.
2. Make sure the BK and Y of the "COM" RJ-14 are connected to the earth ground (positive side of the battery).
3. Connect a Viking **LM-24D** display to the **COM** jack.
4. Set the dip switches as shown below.
5. Momentarily press the reset switch. If any LED's remain lit, reverse tip and ring (going to J1) for that line, and retest.

**1000 foot maximum run using 26 AWG wire**

**Control Line**

**Unused PABX Trunk Input or Analog Station**

or

**Control Phone**   **C.O. Line**

| Dip Switch | Setting |
|------------|---------|
| 1 | OFF |
| 2 | ON |
| 3 | OFF |
| 4 | ON |

## B. Electronic or Digital Phone Installation with LM-2 Message Waiting Lamps

**Station/Trunk Switch -** Switch to **STATION** when connecting the "control line" to a C.O. line or an analog PABX/KSU station. Switch to **TRUNK** when connecting the "control line" to a dedicated phone or unused (loop start) trunk input.

**Reset Button**

Optional LM-24D
(Fax Back Document 670)

or

Optional LM-12W
(Fax Back Document 665)

**Neon/LED Switch -** Switch to **LED** when using an LED or **LM-2** on a separate pair.

**STATION**
**TRUNK**
**RESET**
**COM**

J1    J2

MESSAGE WAITING
LAMP CONTROLLER

**VIKING.**

*MODEL MLC-24*

RJ21X FEMALE    RJ21X MALE

**NEON**
**LED**

POWER    1 2 3 4

VIKING ELECTRONICS, INC. HUDSON, WI 54016

Green
Red

Black
Yellow

**KSU/Digital Phone with LM-2**

|← .75" →|

**LM-2 (Fax Back Document 660)**

1.00"

*Note: Electronic or digital telephones usually require a separate dedicated pair for operation of the message waiting lamps. When a dedicated pair is used, the **MLC-24** can provide low voltage for direct operation of LED indicators, such as the **LM-2**.*

**RJ21 Male Connector**
(not included)

| Pins | Color |
|------|-------|
| 1 | BL/W |
| 2 | O/W |
| 3 | G/W |
| 4 | BN/W |
| 5 | S/W |
| 6 | BL/R |
| 7 | O/R |
| 8 | G/R |
| 9 | BN/R |
| 10 | S/R |
| 11 | BL/BK |
| 12 | O/BK |

| Pins | Color |
|------|-------|
| 13 | G/BK |
| 14 | BN/BK |
| 15 | S/BK |
| 16 | BL/Y |
| 17 | O/Y |
| 18 | GN/Y |
| 19 | BN/Y |
| 20 | S/Y |
| 21 | BL/V |
| 22 | O/V |
| 23 | GN/V |
| 24 | BN/V |

**RJ21 Female Connector**
(not included)

| Polarity | Pins | Color |
|----------|------|-------|
| LED 1 +/- | 26 / 1 | W/BL / BL/W |
| LED 2 +/- | 27 / 2 | W/O / O/W |
| LED 3 +/- | 28 / 3 | W/G / G/W |
| LED 4 +/- | 29 / 4 | W/BN / BN/W |
| LED 5 +/- | 30 / 5 | W/S / S/W |
| LED 6 +/- | 31 / 6 | R/BL / BL/R |
| LED 7 +/- | 32 / 7 | R/O / O/R |
| LED 8 +/- | 33 / 8 | R/G / G/R |
| LED 9 +/- | 34 / 9 | R/BN / BN/R |
| LED 10 +/- | 35 / 10 | R/S / S/R |
| LED 11 +/- | 36 / 11 | BK/BL / BL/BK |
| LED 12 +/- | 37 / 12 | BK/O / O/BK |
| LED 13 +/- | 38 / 13 | BK/G / G/BK |
| LED 14 +/- | 39 / 14 | BK/BN / BN/BK |
| LED 15 +/- | 40 / 15 | BK/S / S/BK |
| LED 16 +/- | 41 / 16 | Y/BL / BL/Y |
| LED 17 +/- | 42 / 17 | Y/O / O/Y |
| LED 18 +/- | 43 / 18 | Y/GN / GN/Y |
| LED 19 +/- | 44 / 19 | Y/BN / BN/Y |
| LED 20 +/- | 45 / 20 | Y/S / S/Y |
| LED 21 +/- | 46 / 21 | V/BL / BL/V |
| LED 22 +/- | 47 / 22 | V/O / O/V |
| LED 23 +/- | 48 / 23 | V/GN / GN/V |
| LED 24 +/- | 49 / 24 | V/BN / BN/V |
| Control Line | 25T1 / 50 | V/S |
| | 25R1 / 25 | S/V |

**Unused PABX Trunk Input or Analog station**

**1000 foot maximum run using 26 AWG wire**

**Control Line**

- - - or ───

**Control Phone**     **C.O. Line**

# Programming

## A. Assigning Group Lamp Numbers

Additional **MLC-24**'s can be added for controlling up to 96 message waiting lights. Set the dip switches as shown below.

| Dip Switch | | Group Number |
|------------|------|--------------|
| **1** | **2** | **Assignment** |
| OFF | OFF | 1 - 24 |
| ON | OFF | 25 - 48 |
| OFF | ON | 49 - 72 |
| ON | ON | 73 - 96 |

## B. Other Dip Switch Settings

Dip switch 3 and 4 can be used to set message waiting light parameters and operational modes.

| Switch | | Feature |
|--------|------|---------|
| **3** | ON | When using hard wired LED's |
| **3** | OFF | Use with LM-1's, LM-2's or message waiting phones |
| **4** | ON | Test pattern or diagnostics |
| **4** | OFF | Normal operation |

# Operation

A control phone connected directly to the **MLC-24**'s "control line" controls the lamps. The "control line" may also be connected to a C.O. line, analog PABX/KSU station, or an unused C.O. port.

One **MLC-24** controller can serve 24 different station lamps, plus up to three 24 line status displays (**LM-24D** or **LM-12W**) for the receptionist(s). Up to four **MLC-24**'s can be installed on a single extension or line.

In voice mail applications the "dispatch" or "out-call" feature is used to call the extension assigned to the **MLC-24**, which answers and provides a 500 Hz tone. The voice mail system then sends a three digit DTMF code that specifies the status of an individual lamp. For example, a Touch Tone code of "**1**, **24**" would cause lamp 24 to be off, a "**2**, **24**" would cause it to be on steady, a "**3**, **24**" would cause it to flash and a "**4**, **24**" would cause it to fast flash. When the three digit code is complete, the **MLC-24** hangs up. The 3 digit code can also be entered manually from any Touch Tone phone.

In applications where a ringing extension is not available, the **MLC-24** can be programmed to provide talk battery for direct connection to an unused trunk input, a standard DTMF phone or the voice mail "dispatch" or "out-call" port, if compatible.

## A. On Premise Operation

When the **MLC-2**4 is connected to a station circuit of a PABX, the voice mail system or user must first dial the station (extension) number connected to the **MLC-24**'s "control line." The **MLC-24** will answer with a steady tone. The command codes can then be entered as shown in the table to the right.

| Signaling the MLC-24... | Enter Digits |
|---|---|
| **1.** ...to turn lamp OFF at station xy* | **1 + xy*** |
| **2.** ...to turn lamp ON at station xy* | **2 + xy*** |
| **3.** ...to flash a lamp at station xy* | **3 + xy*** |
| **4.** ...to fast flash a lamp at station xy* | **4 + xy*** |
| **5.** ...to turn all lamps OFF | **1 - 4 + 99** |

*** xy** refers to numbers 1 - 96*

## B. Off Premise Operation

When the **MLC-24** is located in a remote facility, the voice mail system or user must call the telephone number of the phone line connected to the "control line" of the **MLC-24** (J2 Pins 25, 50). The **MLC-24** will answer with a steady tone. The command codes can then be entered as shown in the table.

## C. Message Waiting Lamp Illumination

### 1. Neon Message Waiting Phones and/or LM-1 Modular Message Waiting Lamp Retrofit Kit

This kit will illuminate when the receiver is on-hook. They will go out when the receiver is off-hook and go on as the receiver is returned on-hook. The lamp may be extinguished by an off Touch Tone code or by momentarily (.25 - 2 seconds) going off hook.

### 2. LM-2 LED Message Waiting Lamp Kit

This kit will illuminate immediately and remain on until the **LM-2** switch is depressed momentarily (.25 - 2 seconds) or an off Touch Tone code is issued to extinguish the LED.

### 3. LED's

These will illuminate immediately and remain on until an "off" Touch Tone code is issued to extinguish the LED.

## D. Power Failure

In the event of AC power failure, the message waiting lamps will not function. All telco operations will operate as normal.

## E. Special Features

**1.** With switch positions 1 and 3 in the OFF position and 2 and 4 in the ON position, the display will indicate on or off hook condition for 24 lines (off-hook = LED is on, on-hook = LED is off). ***Note:*** *Depress the reset button on the **MLC-24** after changing switch positions.*

**2.** With switch positions 2 and 3 in the "off" position and 1 and 4 in the "on" position, the installer can generate a test pattern that will aid in the installation. The **MLC-24** will turn the lamps on one at a time, then turn them all off. This will continue until the switches are placed back into position for normal operation.

## *Product Support Line...(715) 386-8666      Fax Back Line...(715) 386-4345*

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