BOGEN®

COMMUNICATIONS, INC.

MULTICOM 2000®
Administrative Communication System

Installation Instructions

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Introduction

These document provides installation information for Bogen's MULTICOM 2000® Administrative Communication system. It is for use by trained contractor personnel only.

Installation is subject to compliance with local electrical codes and other factors which are determined by local codes and ordinances. Therefore, some of the installation instructions in this manual are generalized and apply to different installation environments and not to any one specific installation.

The actual operating software for MULTICOM 2000 exists in various versions. The software is contained in Read Only memory on various chips on the processor card. It is important to consult the applications engineering department of Bogen Communications, when software changes or updates are made. All user-determined program changes are made via an administrative phone. Instructions for customizing system programming, are found in Bogen publication 54-5911-n, where n equals the revision level (currently 0). User instructions are contained in Bogen publication 54-5912-n (currently -0).

Configurations

The MC2K system is built around a card frame that accommodates the processor card and station/analog card pairs. These card pairs are interconnected to each other and to a respective relay card through the card frame backplane. It is available factory assembled in three configurations:

Cabinet-mounted

The cabinet-mounted system uses the MCMF card frame and MCRC relay card. It holds one processor card and one station/analog card pair for each 24 stations. The cabinet system is designed for smaller installations where station capacity will not exceed 120 stations (or 96 stations plus up to 8 "telco" stations when using Model MCTC telephone option card). The cabinet-mount system includes the audio program interface and all necessary power supplies in a heavy gauge steel cabinet (semi-recessed or surface wall-mounting) cabinet.

Rack-mounted

The rack-mounted system uses the MCRMF card frame and the MCRM relay module. The MCRMF card frame has an extra slot not found in the cabinet-mount frame and provides capacity of up to 120 stations, plus the added capacity of 8 "telco" stations (when telephone option card is included). Two card frames can be linked together to accommodate as many as 240 stations (and as many as 16 "telco" stations).
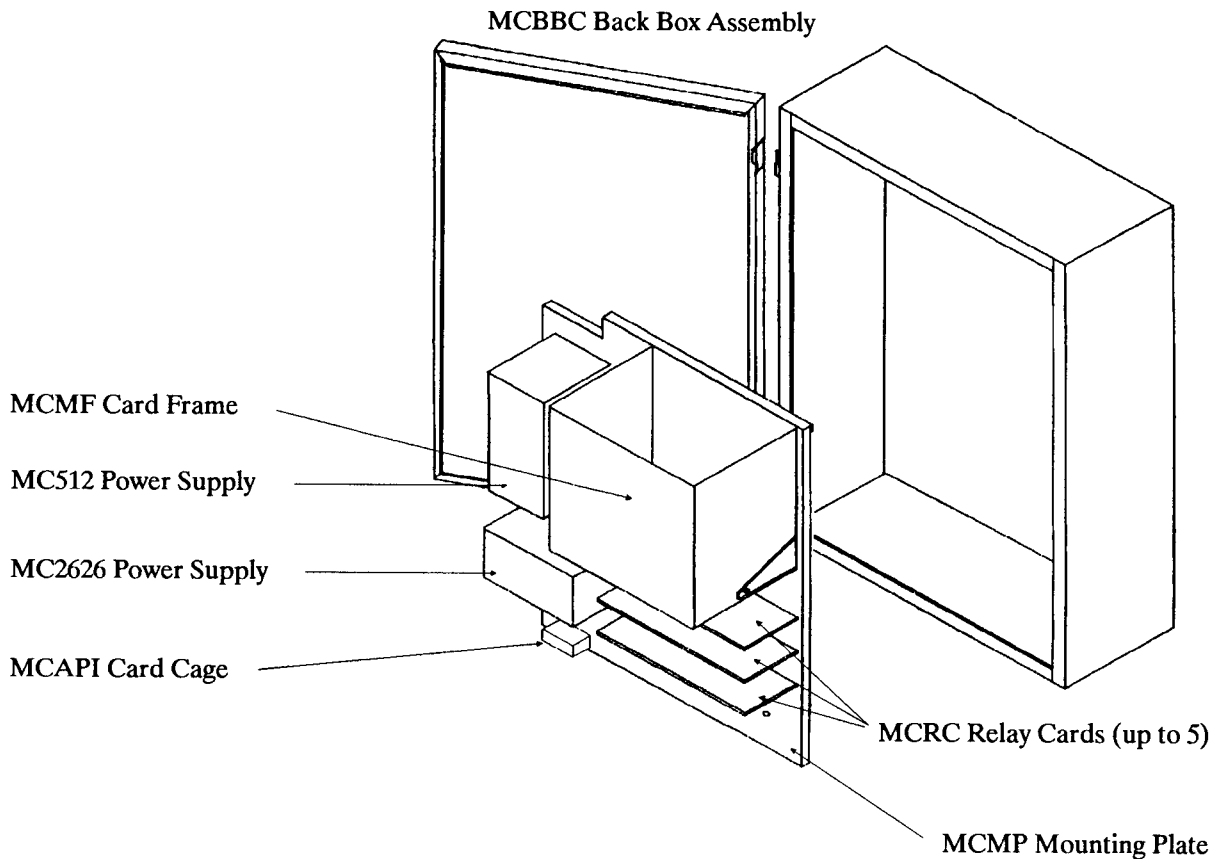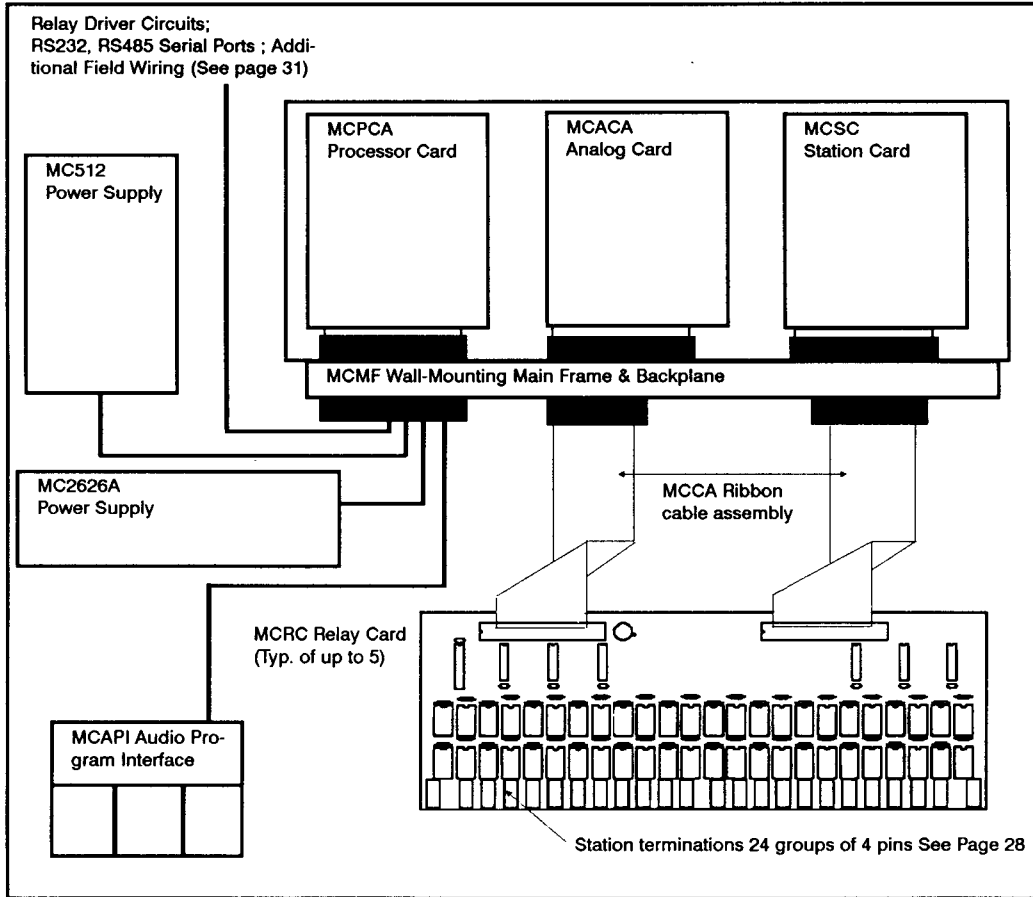
Rack-mounted with Bogen Multi-Graphic® equipment.

The station capacity of the MC2K system is the same as the rack mounted systems described above. The Multi-Graphic equipment provides redundant system capabilities, additional (up to 2) program channels, custom emergency-page capabilities, high-power amplification, control of satellite systems, and control of Multi-Graphic system functions.

Cabinet-Mounted System Equipment

MCBBC	**Back Box Assembly, Complete**

MCMP*   **Mounting Plate with the following components:**

MCMF*	Mainframe assembly with the following circuit cards:
MCPCA	Processor Card (1 per system)
MCACA	Analog Card (1 per 24-stations)
MCSC	Station Card (1 per 24 stations)
MC512*	Power Supply (1 per system)
MC2626A*	Power Supply (1 per system)
MCAPI*	Audio Program Interface Assembly
MCRC	Relay Card (1 per 24 stations)
MCCA	Ribbon Cable Assembly

***Part of MCSA System Assembly**

MCTC   Optional Telco Access Card (occupies one MCSC Station Card slot). Includes **MCOC** Connector Card and **MCOCA** Cable Assembly

Modules   Up to 3 D-Series modules per system. Modules install in the MCAPI Assembly and interface with program sources (microphone, cassette tape player, tuner, etc.)

MCBBC Back Box Assembly

MCMF Card Frame

MC512 Power Supply

MC2626 Power Supply

MCAPI Card Cage

MCRC Relay Cards (up to 5)

MCMP Mounting Plate

Relay Driver Circuits;
RS232, RS485 Serial Ports ; Additional Field Wiring (See page 31)

MCPCA
Processor Card

MCACA
Analog Card

MCSC
Station Card

MC512
Power Supply

MCMF Wall-Mounting Main Frame & Backplane

MC2626A
Power Supply

MCCA Ribbon
cable assembly

MCRC Relay Card
(Typ. of up to 5)

MCAPI Audio Program Interface

Station terminations 24 groups of 4 pins See Page 28

Block Diagram — MC2K System, Cabinet-Mounted Configuration

Rack-Mounted System Equipment

TCPER42	Equipment Rack, 42" High
TCPER61	Equipment Rack, 61" High
TCPER70	Equipment Rack, 70" High

RCRMP   **Rack-Mounting Panel with the following components**

MC512	Power Supply (1 per system)
MC2626	Power Supply (1 for up to 120 stations, 2 for more than 120 stations)
MCAPI	Audio Program Module Interface Assembly (1 per system)

RCRMF   **Rack-Mounting Mainframe (1 per 120 stations).**
Includes built-in ventilation fans and the following circuit cards:

MCPCA	Processor Card (1 per MCRMF)
MCACA	Analog Card (1 per 24 stations)
MCSC	Station Card (1 per 24 stations)
MCJCA	Ribbon Cable Assembly interconnects 2 mainframes

RCRM   Relay Module (1 per 24 stations). RCRM is mounted to **RCRRP** in stand-alone system, or **SBA225/325** Switchbank in systems incorporating Bogen Multi-Graphic Equipment

MCRCA   Ribbon Cable Assemblies.

MCTC   Optional Telco Access Card (1 per RCRMF). Includes:
MCOC Connector Card
MCOCA Cable Assembly

Modules   Up to 3 D-Series modules per system. Modules install in MCAPI Assembly and interface with program sources (microphone, cassette tape player, tuner, etc.)

Bogen Multi-Graphic System Equipment

MCP35A   Master Control Panel

MCP-B   Channel "B" Control Panel (Used in 2233-Series Systems only)

SBA225   Switchbank for use in 2223-Series Systems
(25 3-position lever-action switches)

SBA325   Switchbank for use in 2233-Series Systems
(25 3-position lever-action switches and
25 2-position pushbutton switches)

Amplifiers   BPA60/HTA-125A/HTA-250A, as required by system capacity

CPT-Series   Cassette Tape Player/AM/FM Tuner

Relay Driver Cir-
cuits; RS232,
RS485 Serial
Ports; Addition-
al Field Wiring
(See page 31)

MCP35A/MCP-B(Series 2233)
Control Panels

Pgm. Source,
MIC, etc.

MCPCA
Processor Card

MCACA
Analog Card

MCSC
Station Card

MCRMF Rack-Mounting Main Frame & Backplane

MCRCA Rack
Ribbon Cable
Assembly

SBA225 (Series 2223) or SBA325 (Series 2233) Switchbank

MCRM Relay Module

Aux. Call-in
Switch

Station terminations 24 groups of 4 pins

MCAPI Audio Pro-
gram Interface

MC512
Power Supply

MC2626
Power Supply

MCRMP Rack Mounting Plate

Booster Amplifier (Optional for each Relay Module)

Booster Amplifier For MCP35A

Block Diagram — MC2K System with Multi-Graphic Equipment

MCP35A Control Panel

The MCP35A Master Control Panel is used in MULTICOM 2000/Multi-Graphic Series 2223 & 2233 Systems. It provides pushbutton selection of two microphones and one auxiliary program source, an additional ("A") program channel (with level control), an intercom channel, monitoring capability, and emergency call capability. For detailed information on the MCP35A, refer to Bogen Publication No. 54-5871.
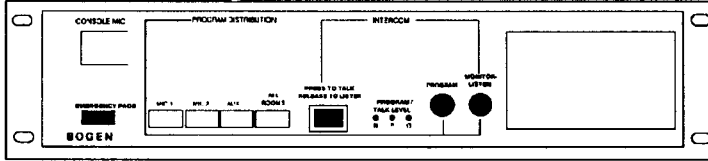
MCP-B Control Panel

The MCP-B Control Panel is used with MULTICOM 2000/Multi-Graphic Series 2233 Systems. It provides pushbutton selection of two microphones and one auxiliary program source, a ("B") program channel (with level control), and a monitor capability which permits listening to the "A" or "B" program over the monitor speaker of the MCP35A. For detailed information on the MCP-B panel, refer to Bogen Publication No. 54-5875.
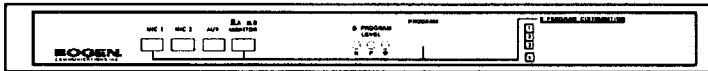
Switchbanks

The SBA225 and SBA325 Switchbanks are used in MULTICOM 2000/Multi-Graphic 2223 & 2233 Systems, respectively. The switchbanks connect directly to the MCRM Relay Module and provide the interface between Multi-Graphic and the MULTICOM 2000 System. The SBA225 has 25 3-position lever-action switches to select the "A" program channel, Intercom channel or Off. The SBA325 has 25 3-position lever-action switches to select the "A" program channel, "B" program channel, or OFF, and 25 pushbutton switches to connect each station to the Multi-Graphic Intercom channel.

Note: The 25th switch on each switchbank is reserved for Multi-Graphic operation.

SBA225
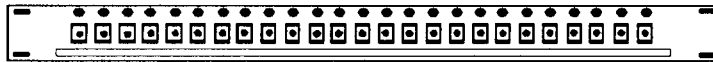
SBA325
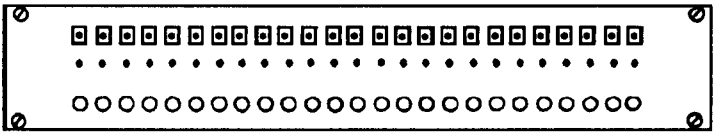
Installation

Location Planning

Both wall and rack-mounting versions of Multicom 2000 should be located centrally to the rooms to be served, to minimize the length of cable runs. Consider the following requirements when choosing a location.

- The location should be well ventilated and dry. Avoid rain or moisture or areas likely to be exposed to these hazards.
- Do not locate the system near heat-generating sources such as direct sunlight, radiators or warm air ducts.
- These should be enough room to open the door of the cabinet mounting system. In the case of a rack installation, there should be sufficient access to the rack door or enough room to move the rack to gain access.
- Where possible, do not locate in a carpeted room, especially one where a lot of static is present. If this is not possible, the installation of an antistatic mat below the control center is required.

Wiring Requirements

Class II wiring may be used for station wiring. Support wiring to prevent strain or sagging. Knockouts are provided on the wall-mounting enclosure or rack to admit wiring.

All stations use the same type shielded-pair plus 1-conductor wiring. The shielded pair and unshielded conductor should be in a jacketed cable, such as West Penn #358 or Belden #8724.

The cable from each station must be terminated to our 25-Series connectors, which are then connected to the interface pins on the relay card or module. Failure to use the proper connectors, recommended wire type, or use of solder to terminate the cable to the relay card pins will void the warranty.

Installation Precautions

The following precautions are mandatory when installing the MC2K system, or when making changes to the equipment and wiring after the initial installation.

- **Disconnect all 120VAC power sources before making any changes in system equipment or wiring.**
- **Wear a properly grounded conductive wrist strap when working at the control center or at any staff station where the wiring for the staff station is connected to equipment at the control center.**
- **Use care when running wire from the station equipment to the control center. Keep all wiring well isolated from 120 Volt (and higher) AC power lines.**

Cabinet System Installation

Back Box

Supply AC power to the unit through conduit, BX or Romex **in accordance with local electrical codes.**

Snap the AC receptacle into the junction box (GND down) and connect wires using wire nuts.

Install the junction box into the back box and secure with 4 #6-32 x 3/8 screws and keps nuts (surface-mount) or 4 #6 x 3/8 screws (recessed-mount).

Surface-Mount

Install the back box on the wall making sure that the box is squarely mounted. Allow access above box for AC wiring. Remove knockouts from bottom or rear panels, as desired, to admit station wiring.

Bring AC power to the upper left-hand corner of the box.

Secure the back box to wall with screws through keyhole slots and back holes (16" on center).

Recessed-Mount

Prepare mounting hole for back box. Hole size should be 24" wide x 32"H x 4"D minimum opening with studs or mounting surfaces on each side. The back box is designed to be recessed approximately 4-inches. Remove knockouts from bottom or rear panels, as desired, to admit station wiring.

Bring AC power to the upper left-hand corner of the box.

Install the back box into the wall making sure that it is squarely mounted. Secure the box to the mounting surfaces with screws through holes in side panels (2 per side, 2" from rear panel). Attach trim strips (MCTS) to outside panels and finished wall.
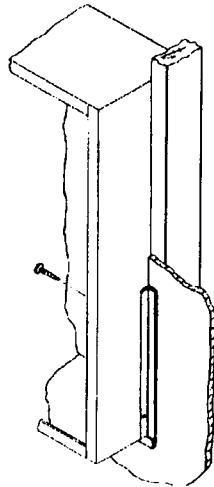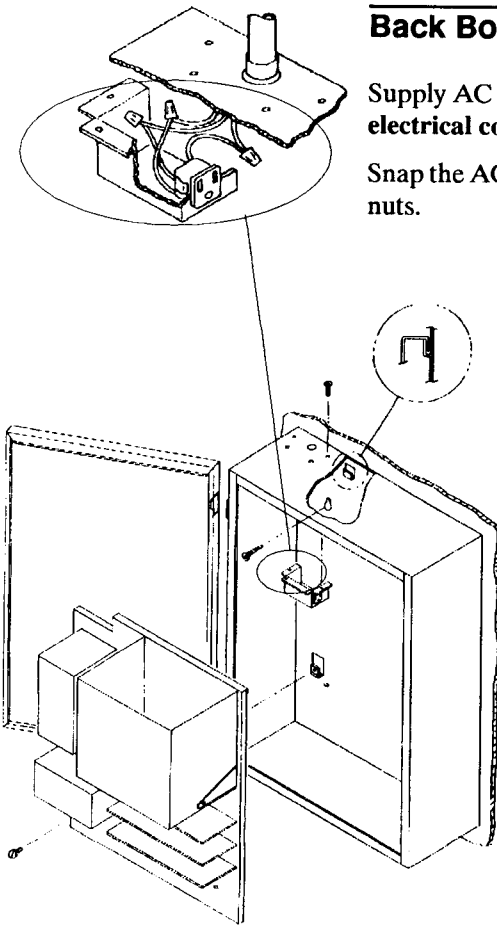
System Assembly Installation

Make sure Tinnerman clips are installed on tabs on the lower part of back panel of box.

Lift the system assembly panel (hold by power supply and main card cage) and insert into box. Mount the panel to the box by engaging the lip on top of the panel with tabs in the upper part of back panel of box as shown in inset.

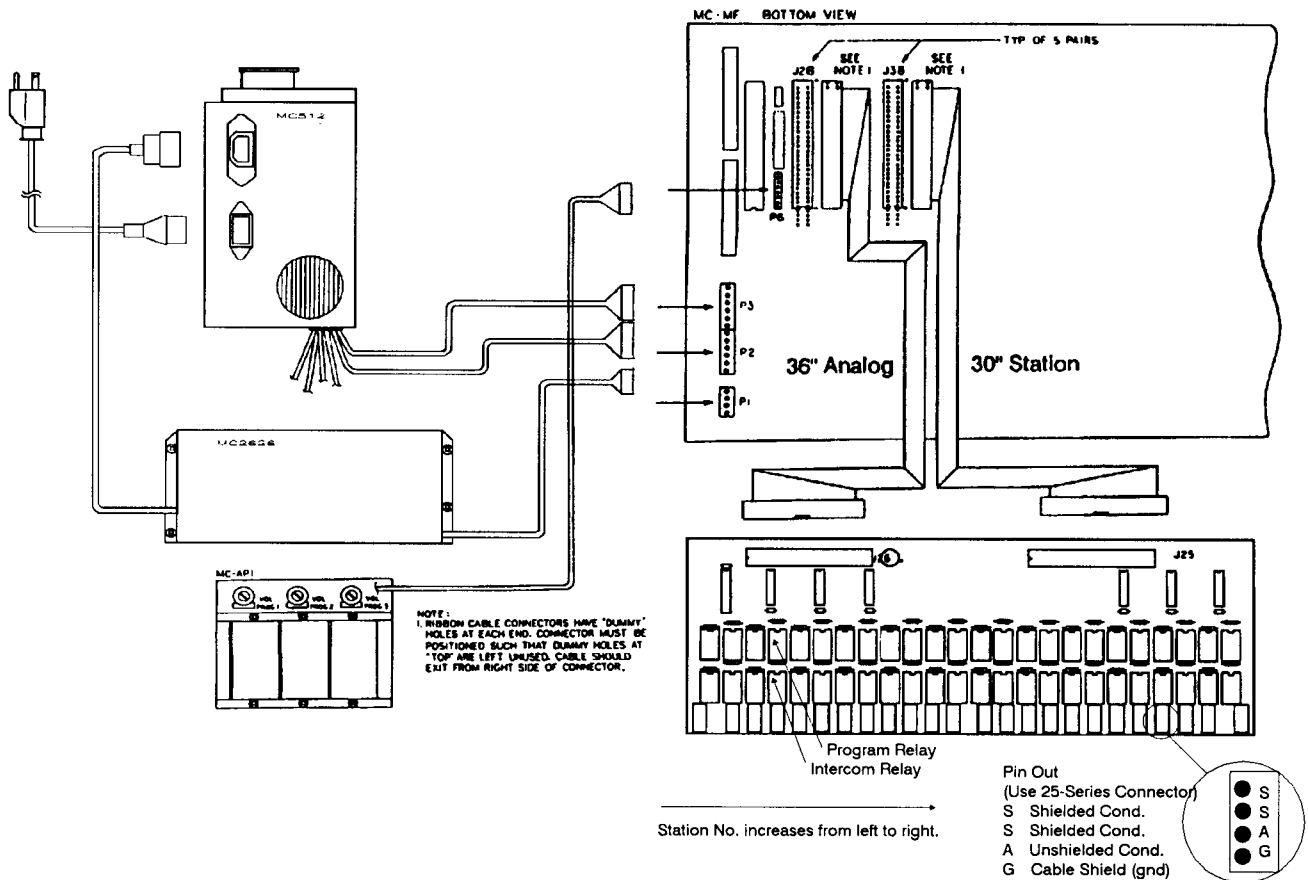Secure the panel to the box with screws through Tinnerman clips, as shown.

System Wiring Connections

System wiring is shown in the diagram below.

Power Supplies

The AC power cord from the MC512 power supply is plugged into the receptacle on the cabinet junction box. The power cord from the MC2626 power supply is plugged into the auxiliary receptacle on the MC512.

Power supply output wiring is grouped into cables, each ending with a keyed connector. Two of the cables from the MC512 are connected to P3 and P3 on the card frame backplane. The cable from the MC2626A is connected to P1 on the back plane.

Program Relay
Intercom Relay

Station No. increases from left to right.

Pin Out
(Use 25-Series Connector)
S Shielded Cond.
S Shielded Cond.
S Shielded Cond.
A Unshielded Cond.
G Cable Shield (gnd)

4-pin connector, typical of 25

Relay Cards and Ribbon Cables

The MCRC relay card is used only in the cabinet-mounting version of the MC2K system.

The card contains 24 (each) program and intercom relays and 24 sets of terminals (4-pins per set) for connection with station wiring. Station numbers are assigned to the relay card in ascending order, from left to right.

Each station/analog card pair connects to a corresponding relay card via the card frame back plane "J" connectors, using two ribbon cables (MCCA ribbon cable assembly). The 36" long cable connects to the analog card "J" connector (on the back plane) to connector J26 on the relay card. The 30" long cable connects to the station card "J" connector (on back plane) to connector J25 on the relay card.

Audio Program Interface

The MCAPI audio program interface is connected to P6 on the backplane. Up to three D-Series modules can be installed in the MCAPI. The modules slide into the MCAPI and plug into an edge connector as shown:

Card Frame/Circuit Card Installation

The MCMF card frame used in the cabinet-mounting system includes a swivel mount to make it easy to install circuit cards. Turn the knob on one end of the card frame to release the mount and tilt the frame towards you.

Install the circuit cards in the order shown below. Slide the card into the frame to engage the edge connectors. Align the locking tabs so that they close when the card is pressed into the connectors. Be sure that each card is properly seated in the card edge connectors. The cards will fit one way only!

Refer to the section on Telephone Card Installation in the Components section of this manual for instructions relating to telephone circuit card installation and connections. i

Mounting panel side
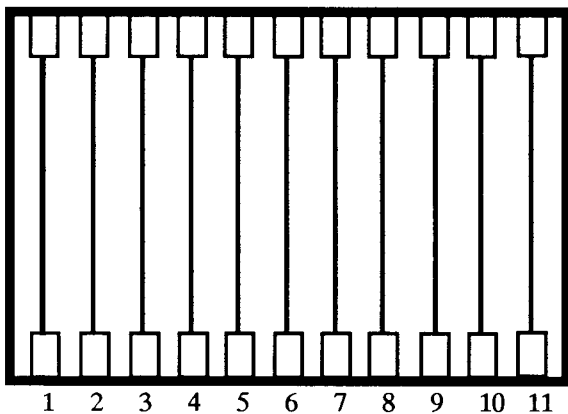
MCMF Card Frame, Top View

Position	Part No.	Type of Card	Station Nos.
1	MCPCA	Processor Card	
2	MCACA	Analog Card	
3	MCSC	Station Card	1 - 24
4	MCACA	Analog Card	
5	MCSC	Station Card	25 -48
6	MCACA	Analog Card	
7	MCSC	Station Card	49 - 72
8	MCACA	Analog Card	
9	MCSC	Station Card	73 - 96
10	MCACA	Analog Card	
11	MCSC	Station Card	97 - 120
	or MCTC	Telephone Card	97 - 105

Station Wiring

Knockouts are provided to admit station wiring. Station wiring is described is detail in the **Station Installation** section of this manual.

Other Back Plane Connections

Connectors are provided on the back plane to accommodate some of the options available to MC2K systems (relay driver circuits, external clock control, serial port, etc. These connections are described in **Other Back Plane Connections** in the Rack-System Installation Instructions section of this manual.

Rack System Installation

Location and Power Guidelines

Follow the guidelines in the Location, Wiring Requirements and Installation Precautions Sections of this manual when choosing a location for the rack.

When choosing a location, consider that if the rear panel of the rack is not accessible, there must be enough space to move the rack to gain access. Also provide enough cable slack so that station wiring does not interfere with the ability to move the rack.

Knockouts are provided in the rack to admit station cabling. Support all cables to prevent sagging or strain.

Power Supplies

The rack system uses the MC512 and MC2626A power supplies. These supplies, and the API program interface are mounted to the MCRMP panel which is itself mounted to the rack. For systems with more than 120 stations, a second MC2626 power supply can be mounted.

The MC512 power cord is usually plugged into an ACFDS surge suppressor/power strip. The MC2626A power cord plugs into the auxiliary socket on the MC512 supply. When a second MC2626A is used, its power cord plugs into the auxiliary socket of the first MC2626A supply.

Auxiliary equipment (power amplifier, Multi-Graphic equipment, etc.) may be plugged into the ACFDS. The ACFDS, and any auxiliary equipment not plugged directly into the ACFDS must be plugged into a properly grounded three wire outlet or connected directly to AC by a qualified electrician.

The block diagram on page __ of tis manual shows the various system wiring connections of a typical rack system.

Relay Modules & Ribbon Cable

The MCRM relay module is used only in the rack-mounting system. The module contains (24 each) program and intercom relays and 24 sets of terminals (4-pins per set) for connection with MC2K station wiring. Station numbers on the card increase from right to left, as shown below.

Relay modules are mounted to the MCRRP rack panel, or to SBA-series switch banks when used with Multi-Graphic equipment. One relay module is required for each analog/station card pair installed.

Each analog/station card pair connects to the corresponding relay module via the card frame back plane"J" connectors, using two ribbon cables (model MCRCA ribbon cable assembly). Connect one end of a cable to the analog card "J" connector (on the back plane) and the other end to connector J26 on the relay module. Connect one end of the other cable to the station card "J" connector (on the back plane) and the other endd to connector J25 on the relay module.

The module has the ability to handle a maximum of 250 watts of power (10 watts per station; connection for a booster amplifier is provided at RCA1 & J39). J41 & J42 connect to the backplane of the MCRMF (and associated station and analog cards) with MCRCA ribbon cable assemblies. The module also has connectors to interface with an

SBA-Series switchbank, emergency contacts from the MCP35A Master Control Panel, and auxiliary call-in switches. An accessory connector (J40, see below provides relay driver capability whenever a station relay goes active. Refer to the illustrations and notes below.
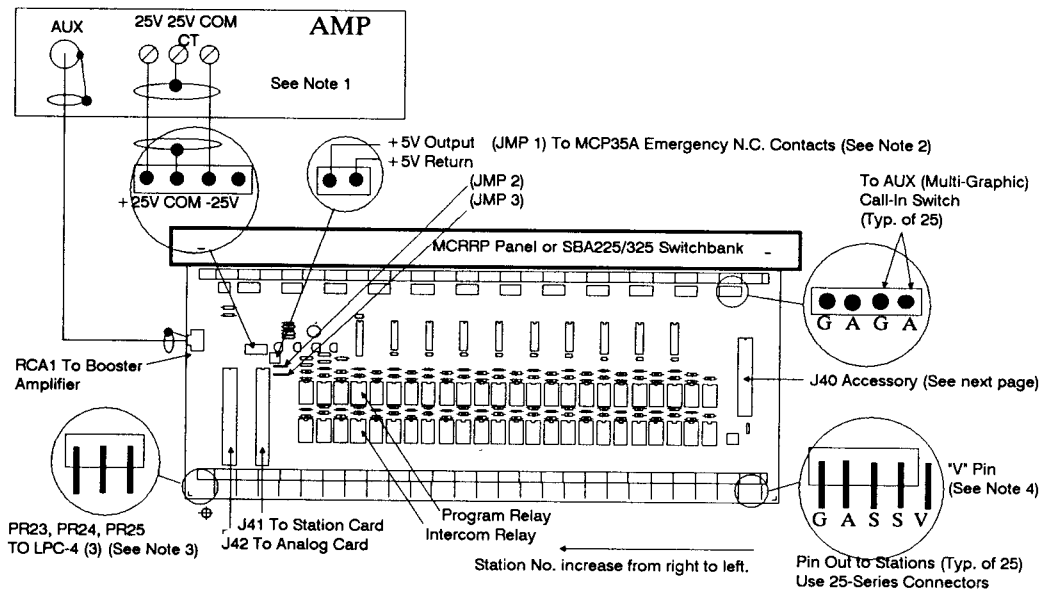
Note 1: When an external booster amplifier is used, remove jumpers JMP2 & JMP3. Each Relay Module must use a separate booster amplifier.

Note 2: If this option is used with multiple relay modules, parallel the "output" and "return" wires to the pins on JMP 1 on each relay module. If only a single relay module is used, connect a wire between the two pins of JMP1.

Note 3: Only the first 24 stations and PR23 & PR24 can be used by the MC2K system.

Note 4: The "V" pin is provided for special applications. **DO NOT connect any station to this pin.**

Connector J40

J40 Connector (not all pins shown)

Connector J40 provides relay driver outputs for each station which goes active whenever the program or intercom relay for that station goes active. The pin-outs for J40 are shown in the schematic diagram. By cutting the proper diode, the output can be made to go active when one or the other relay activates. Refer to the schematic diagram and the following example: If diode D49 (near program relay K1) is removed, the output S1RY (on the J40 connector) will go active only when relay K25 (intercom) is activated. Conversely, if diode D73 (near intercom relay K2) is removed, the output S1RY will go active only when relay K1 (program) is activated.

Optional circuitry is available at the J40 accessory which can be used to control external bells or other external devices. Contact Bogen Application Engineering for assistance.
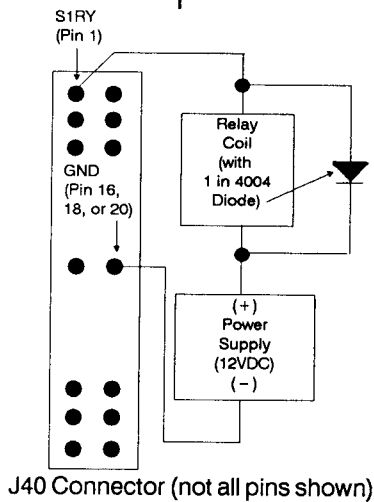
Audio Program Interface

The MCAPI audio program interface is connected to P6 on the backplane. Up to three D-Series modules can be installed in the MCAPI. The modules slide into the MCAPI and plug into an edge connector as shown:
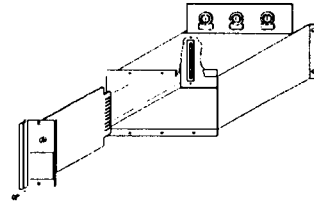
Card Frame(s) & Circuit Cards

The MCRMF card frame is used in rack-mounting versions of the MC2K systems only. It has 12 card slots, accessible from the front of the rack (slot numbers run left to right, 1 - 12, as shown in the following illustration). Each card frame will support up to 120 stations (5 station/analog card pairs) plus a telephone access card. Each circuit card plugs into the connectors on the card frame and is connected to the associated relay module via the MCRCA ribbon cable assemblies.
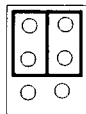
Slot # 1
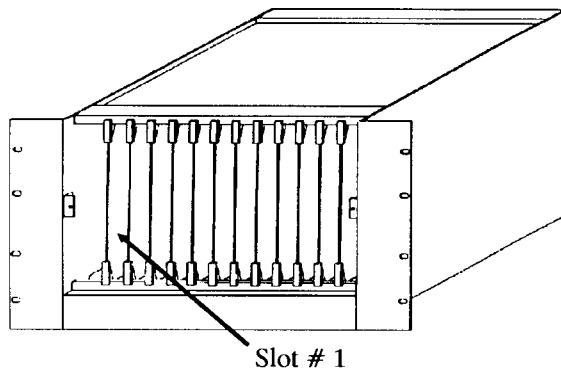
First Card Frame

Slot #	Part No.	Type of Card	Station Nos.
1	MCPCA	Processor Card	
2	MCACA	Analog Card	
3	MCSC	Station Card	1 - 24
4	MCACA	Analog Card	
5	MCSC	Station Card	25 - 48
6	MCACA	Analog Card	
7	MCSC	Station Card	49 - 72
8	MCACA	Analog Card	
9	MCSC	Station Card	73 - 96
10	MCACA	Analog Card	
11	MCSC	Station Card	97 - 120
12	MCTC (Optional)	Telephone Card	121 - 129

Second Card Frame in Systems with over 120 Stations

1	Blank	
2	MCACA	Analog Card
3	MCSC	Station Card
4	MCACA	Analog Card
5	MCSC	Station Card
6	MCACA	Analog Card
7	MCSC	Station Card
8	MCACA	Analog Card
9	MCSC	Station Card
10	MCACA	Analog Card
11	MCSC	Station Card
12	MCTC (Optional)	Telephone Card

UPPER

LOWER
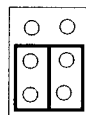
A second card frame is used in rack-mounting systems when capacity exceeds 120 stations; however, only one processor card is used per system.

The processor card is usually installed in slot # 1 of the upper card frame. A jumper block on the backplane of each card frame must be placed in the proper position, as shown in the diagram above. Select upper when using only one card frame.

Two card frames are interconnected by the MCJCA ribbon cable assemblies, as shown in the diagram on the next page. **Note that the upper ribbon cable connector on both card frames must be installed so that the top four pins on each row of pins are left**

exposed. The lower ribbon cable connector on both card frames must be installed so that the bottom four pins on each row of pins are exposed (disregard the schematic representation of the connector printed on the backplane when connecting the lower ribbon cable assembly).
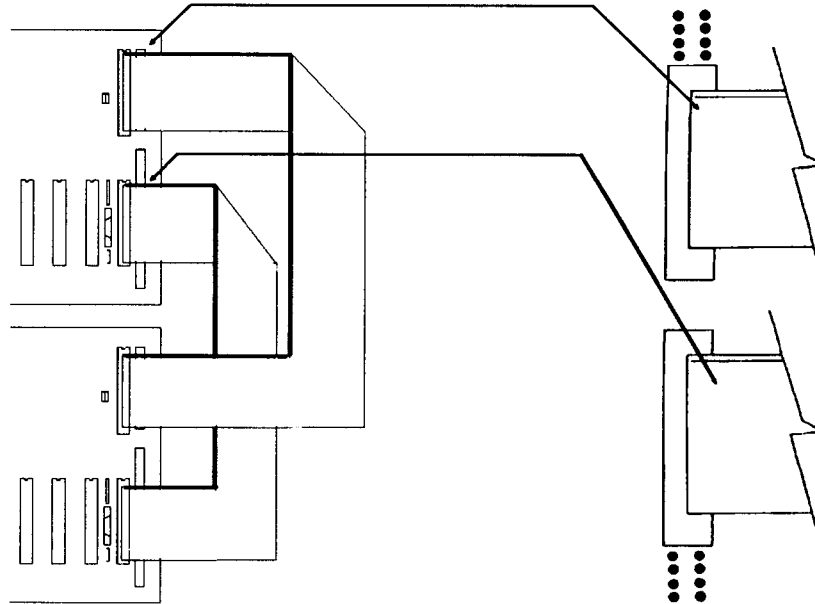
Station Wiring

Knockouts are provided to admit station wiring. Station wiring is described is detail in the **Station Installation** section of this manual.

Other Back Plane Connections

Connectors are provided on the back plane to accommodate some of the options available to MC2K systems (relay driver circuits, external clock control, serial port, etc. The diagram on the next page shows the backplane of the card frame assembly (typical of MCMF and MCRMF). It illustrates the location and designations of the connectors used to wire external function relay drivers, Master clock, and 911 control inputs, and communication ports (future addition).

P5 Relay Driver Outputs

Each relay driver output is an open collector output that goes low towards ground when activated. The number of each output (916, 917, 918, 919), refers to the number used to activate the output from the administrative telephone. Connect the external relay and power supply (12VDC) between the desired output and one of the ground terminals.
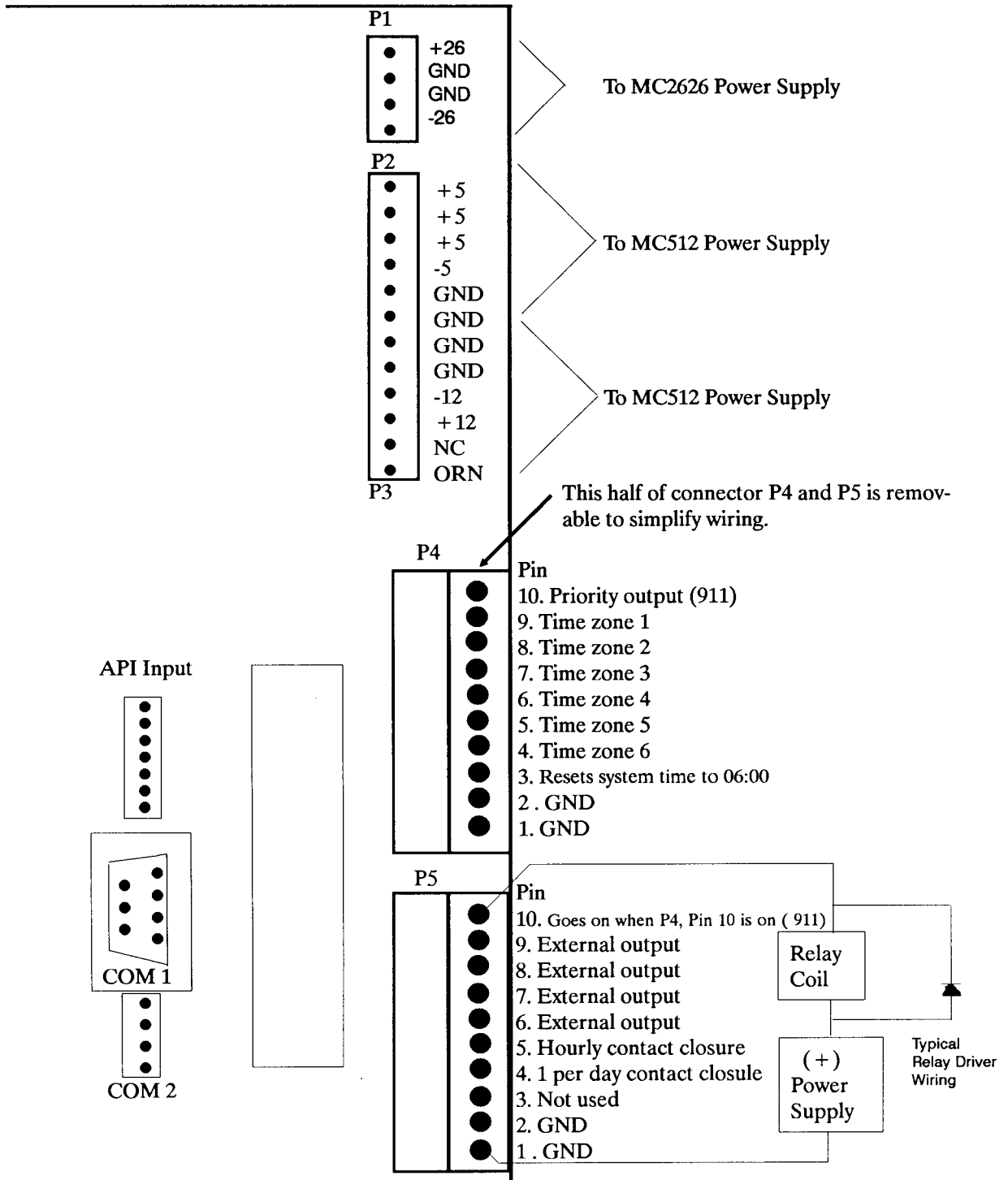
P4 External Control Inputs

The terminal labelled **CLOCK** will reset the system time to 06:00 (6am) when shorted through a dry contact closure from an external (customer-supplied) master clock.

The terminal labelled **911** will give Audio Program Input #3 emergency priority when shorted to ground through a (customer-supplied) contact closure.

COM 1/COM 2

These connectors are for use with future software versions to permit external communication and external programming.

P1

	+26
	GND
	GND
	-26

To MC2626 Power Supply

P2

	+5
	+5
	+5
	-5
	GND
	GND
	GND
	GND
	-12
	+12
	NC
	ORN

To MC512 Power Supply

To MC512 Power Supply

P3

This half of connector P4 and P5 is removable to simplify wiring.

P4

Pin
10. Priority output (911)
9. Time zone 1
8. Time zone 2
7. Time zone 3
6. Time zone 4
5. Time zone 5
4. Time zone 6
3. Resets system time to 06:00
2 . GND
1. GND

API Input

COM 1

COM 2

P5

Pin
10. Goes on when P4, Pin 10 is on (911)
9. External output
8. External output
7. External output
6. External output
5. Hourly contact closure
4. 1 per day contact closule
3. Not used
2. GND
1 . GND

Relay Coil

(+) Power Supply

Typical Relay Driver Wiring

Station Equipment Installation

The following is a list of staff station equipment that can be connected to the Multicom 2000 system.

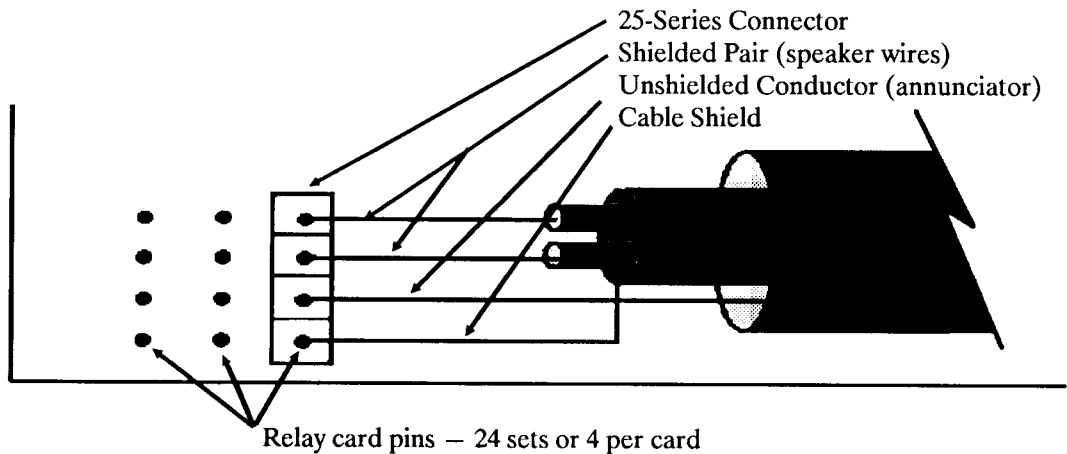|	
MCDS	Administrative Telephone (DTMF dialing with 4-line x 16-character LCD display panel)
MCESS	DTMF Dialing, Enhanced Staff Telephone, Desk Mount
MCWESS	DTMF Dialing Enhanced Staff Telephone, Wall-Mounting
HS201C	Staff Handset (single-gang plate)
HS202C	Staff Handset (double-gang plate)
CA15B	Call-In Switch (Press to Call)
CA21	Call-In Switch (Press to Call/Privacy)

In addition to the telephone/handset at each location, the system is designed so that there can be a ceiling- or wall-mounting speaker at each location for the purpose of intercom communication, paging, program material distribution and dissemination of time signals and alarm tones.

We recommend the Bogen S86 loudspeaker equipped with the T725 line matching transformer as the speaker of choice at each station location. This speaker is available mounted to a ceiling grille or enclosed in a wall-mounting baffle. The illustrations which follow show wiring diagrams for connection to each type of staff station equipment. In these illustrations, the transformer is tapped at 1/2-watt. **The transformer may be tapped at any desired power level; however, 1/2-watt is the recommended load for each speaker.** In any event, make sure that the total load to relay card or relay module (group of 24 stations) **does not exceed** 20 watts. Contact our Applications Engineering Department if the load on a card must exceed 20 watts.

The illustration below shows the termination of one station's cable at the relay card or relay module.

Important: Termination of staff station wiring at the control center must be made via our 25-Series connector kits to maintain warranty coverage.

Attach the conductors to the connector as shown, using the TL156 tool. The connector is then placed on the corresponding pins on the relay card or relay module.

25-Series Connector
Shielded Pair (speaker wires)
Unshielded Conductor (annunciator)
Cable Shield

Relay card pins — 24 sets or 4 per card

Administrative and Enhanced Staff Station Wiring

Administrative and enhanced staff stations are wired to the control center through a junction box as shown below. The administrative station is equipped with a PRS40C power supply which must be plugged into a 120V, 60Hz wall outlet.
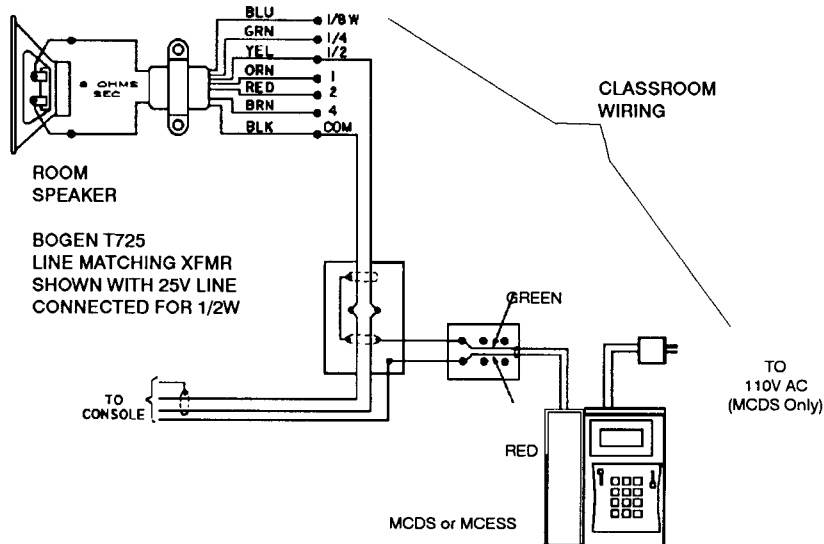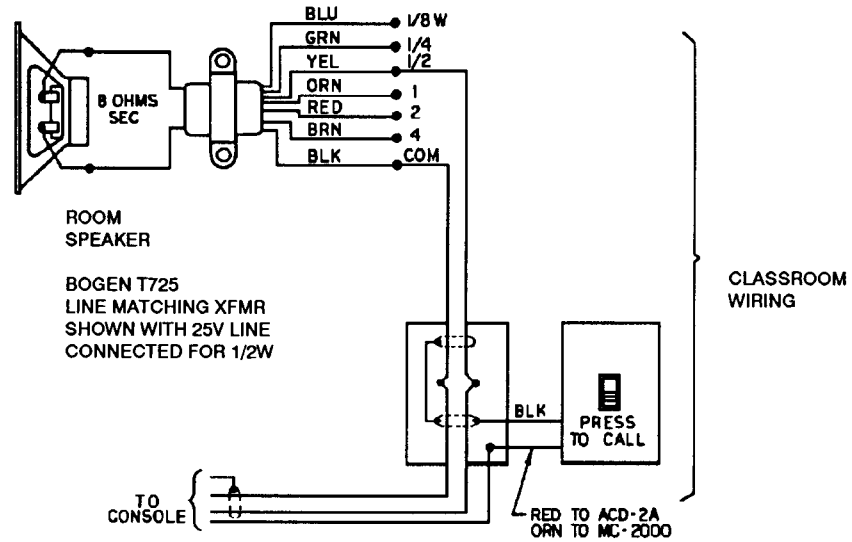

CA21 Call-In/Privacy Switch Wiring

When a station includes the CA21, the white wire from the CA21 must be connected to the center tap of the station speaker transformer. The center tap of the transformer depends upon the power tap chosen for the speaker. To determine the appropriate center tap, determine the power tap of the station speaker and use the illustration below to determine the color of the wire that is the center tap of the transformer. Connect the white wire of the CA21 to the center tap. Note the 4-watt power tap does not have a center tap; the privacy feature cannot be used in this case.
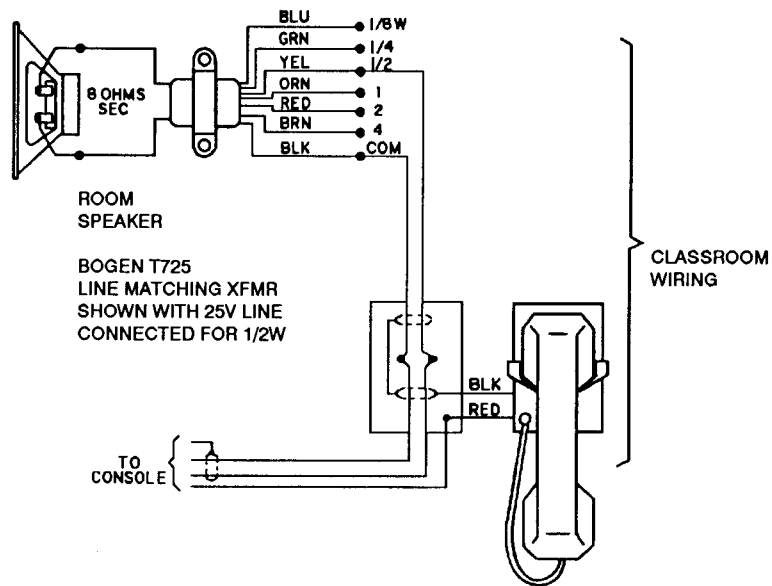

POWER TAP	CENTER TAP
1/8 W	YELLOW
1/4 W	ORANGE
1/2 W	RED
1 W	BROWN
2 W	BROWN
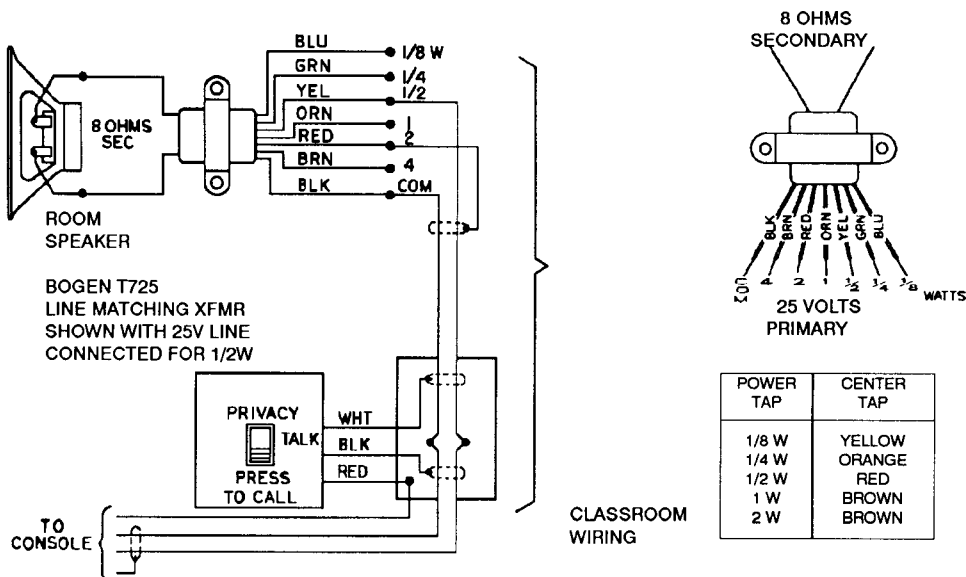
CA15B Call-In Switch Wiring

The CA15B Call-In switch is designed for use with Bogen MULTICOM and COM-MUNITEL 2A Systems. When using the switch with MULTICOM Systems, the orange wire connects to the unshielded conductor, as shown below. The red wire is unused in MULTICOM Systems.

BLU   1/8 W
GRN   1/4
YEL   1/2
ORN   1
RED   2
BRN   4
BLK   COM

8 OHMS SEC

ROOM
SPEAKER

BOGEN T725
LINE MATCHING XFMR
SHOWN WITH 25V LINE
CONNECTED FOR 1/2W

CLASSROOM
WIRING

BLK

PRESS
TO CALL

TO CONSOLE

RED TO ACD-2A
ORN TO MC-2000

HS201C and HS202C Handset Wiring

The HS201C and HS202C handsets include a mounting plate which contains the switching mechanism and wiring. The wire jumper on the underside of the printed circuit board (next to the resistor) must be cut when the handset is used with MULTI-COM systems (See instructions provided with HS201C/2B handset). Connect the red wire to the unshielded conductor and the black lead to the cable shield, as shown in the diagram below.

BLU   1/8 W
GRN   1/4
YEL   1/2
ORN   1
RED   2
BRN   4
BLK   COM

8 OHMS SEC

ROOM
SPEAKER

BOGEN T725
LINE MATCHING XFMR
SHOWN WITH 25V LINE
CONNECTED FOR 1/2W

CLASSROOM
WIRING

BLK
RED

TO CONSOLE

Component Information

Circuit Cards

The following circuit cards (Processor/Station/Analog) can be used in the wall-mounted system and the rack-mounted system. Circuit card are mounted in the card frame assembly.

Processor Card (Model MCPCA)

U17 Microprocessor   U41 EPROM   U25 E2PROM   U29 E2PROM

The processor card is the functional heart of the MC2K system. It contains the microprocessor, DTMF encoder, memory, and system clock. One card is used per system regardless of system capacity and is installed in the first position of the MCMF card frame (wall-mount) or MCRMF card frame (rack-mount). (In rack-mount systems with greater than 120 stations, there are 2 MCRMF card frames. In this case, the processor card is installed in the first position of the *upper* card frame.)
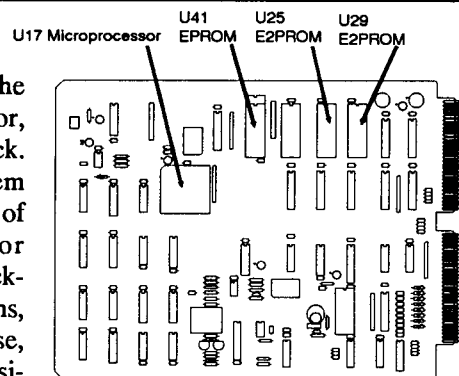
Station Card (Model MCSC)

(F1) 1A Slo-Blo Pigtail

The station card contains crosspoint switches, DTMF decoder, and talk battery circuits. The card handles the telephonic switching between the stations on that card and the system (one card is used for each 24 stations).

The station card is installed in alternating slots of the card frame, along with its associated analog card.

The fuse (Bogen Part No. 94-0001-30) is a 2AG submin. with pigtail, 1A Slo-Blo.
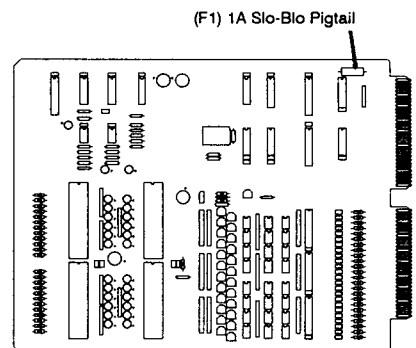
Analog Card (Model MCACA)

(F1, F2) 1A Slo-Blo Pigtail

The analog card contains a 20 watt program amplifier, 12 watt intercom amplifier and relay control circuits. The card handles all program amplification and intercom amplification, and talkback operation for the stations on that card (one card is used for each 24 stations). The analog card is installed in alternate slots of the card frame, along with its associated station card.

Fuses (Bogen Part No. 94-0001-30) are 2AG submin. with pigtail, 1A Slo-Blo.

R30   R120   R118   R75   R119   R53
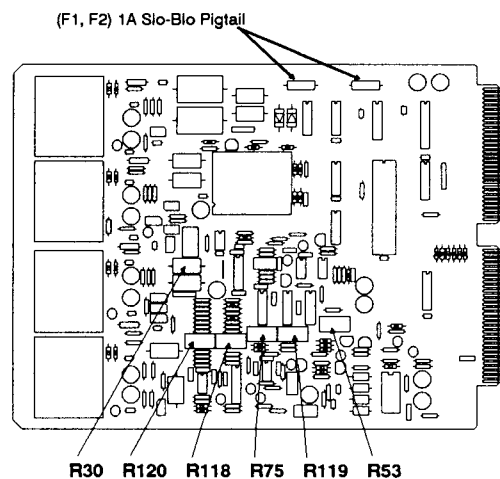
The MCACA includes controls to adjust the Program/Page Volume, Compression, Talkback Level, Switching Sensitivity and Switching Delay.

Analog Card Adjustment Procedure

Adjustment instructions for the analog card follows. **Note the following before adjusting the cards:**

1) Adjustment requires two people, one at a speaker station having the highest background noise level, and one at a telephone at the circuit card location.

2) Do not use a speaker near the telephone that is being used, as this may make it difficult to adjust properly.

3) In wall-mounted systems, the controls can be reached through the slots in the side of the card frame. In rack-mounted systems, adjustment requires the use of an extender card (Model MCEC).

4) *The adjustment instructions listed here are for use by qualified service personnel only.*

   Caution: System Power must be OFF prior to removing or installing circuit cards.

5) Adjustment controls operate as follows:

   Program Page Volume (R30): Clockwise rotation of this control increases program/page volume.

   Compression (Listen) Level (R120): The compression level on the MCACA card is factory set and not adjustable.

   Speaker Volume (R53): Clockwise rotation of the control increases volume at the station loudspeaker.

   Talkback Level (R75): Adjusts the talkback volume level in the handset earpiece. Clockwise rotation increases the level; counterclockwise rotation decreases the level.

   Switching Sensitivity (R119): Adjusts the point at which the VOX circuit will switch from talkback to talk modes. Clockwise rotation increases sensitivity; counterclockwise rotation decreases sensitivity.

   Switching Delay (R118): Adjusts the release time of the VOX circuit, allowing for short pauses between words without causing the unit to switch to the talkback mode in the middle of a sentence. Clockwise rotation increases the delay; counterclockwise rotation decreases delay.

Procedure

1) Set the switching sensitivity control (R119) at its full **counterclockwise** position.

2) Set the switching delay control (R118) at about **mid-rotation.**

3) Have the person at the speaker location speak in a voice loud enough to overcome the ambient background noise level. Rotate the Talkback Level control (R75) **clockwise** to obtain an acceptable volume level over the handset (should be set on the low side to improve intelligibility).

4) With the person at the loudspeaker silent, rotate Switching Sensitivity control (R119) **clockwise** until the switching becomes unstable (switches back and forth by itself). Rotate the control **counterclockwise** until the switching again becomes stable. At this point, the unit is critically stable; any noise on the telephone side will cause the unit to switch to the talk mode and any loud impulse-type noise at the loudspeaker wall cause the unit to switch to the talkback mode.

5) With the person at the speaker location speaking, rotate the Switching Sensitivity control (R119) **counterclockwise** so that the unit does not switch to the talk mode.

6) Have the person at the speaker location make loud impulse noises (such as hand clapping) that may be characteristic of the environment. If necessary, make additional adjustments to the Switching Sensitivity control so that the unit does not switch momentarily to the talk mode.

7) Speak into the telephone handset in a normal paging voice. The circuit should switch to the talk mode (switching will be apparent by the total absence of background noise in the handset earpiece). If the unit does not switch, increase the sensitivity by rotating the Switching Sensitivity (R119) control **clockwise** until switching becomes consistent. Recheck the unit's response to impulse noises (step 6), making sure that the person at the speaker location is not uncharacteristically close to the speaker.

8) To set the switching delay, start a moderately fast alternate count between the telephone side and the talkback side. Adjust the Switching Delay control (R118) so that the complete response from the talkback side can be heard. **(Clockwise rotation minimizes delay, counterclockwise rotation increases delay.)** Then, while speaking into the telephone handset, check the delay to ensure it will allow short pauses between words without switching into the talkback mode. Adjust for a slightly longer delay if the unit switches between words. A slight pause is generally advisable for speech continuity and intelligibility.

Power Supplies

The power supplies are used in both versions of the MC2K system. They are mounted to the MCMP mounting plate in wall-mounted systems, or to the MCRMP mounting plate in rack-mounted systems.

Model MC512
Type Regulated, switching
Output Voltage: +5V @ 15A, -5V @ 0.5A, +12V @ 5.5A, -12V @ 0.5A
Ripple: Less than 20mV p-p on any output
Power Consumption: 75 watts maximum (under normal operating conditions with 120 station system. Power supply is capable of 150 watts total output).
Power Required: 110/120 VAC ±20%
Fuse: 1 x 3A (internal) Part No. 94-0001-08
Output Connectors: 2 x 6-position, polarized; 4 x 4-position, polarized

Model MC2626A
Output Voltage: ±26V nominal, unregulated
Output Current: 4A
Power Consumption: 230 watts maximum
Power Required: 120 VAC ±10%
Fuses: 1 x 2A Part No. 94-0001-06; 2 x 4A Slo-Blo Part No. 94-0001-21
Output Connectors: 1 x 4-position, polarized

Telephone Station

Telephone Access Card (Model MCTC)

The Telephone access option consists of the Model MCTC circuit card, Model MCOC connector card and MCOCA ribbon cable assembly.

In wall-mounting systems, the MCTC is usually installed in slot #11 of the MCMF Mainframe (reduces system capacity).

In rack-mounting systems with one card cage (MCRMF), the MCTC installs in slot #12. In rack-mounted systems with two card cages, a second MCTC can be installed in slot #12 of the second card cage to provide additional outside telephone capacity.

The MCOC card contains eight 6-position modular telephone jacks which can be connected to station ports of a PBX system (the two center conductors are Tip & Ring).

Mainframe (MCMF or MCRMF) backplane
MCOCA Ribbon Cable Assy.

MCOC Connector Card
with 8 6-position Modular Plugs

PBX Station Port

Modular Connector Cord