

Model 6000D

Phone Charge Telephone Management
System with Multi-Station Call Down

DEALER INSTALLATION INSTRUCTIONS



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INTRODUCTION

Use of This Manual

This manual will provide all the necessary details to successfully install the TRIGON Model 6000D. Browse through all sections of the manual before starting installation. Particular attention should be paid to the terms you may not be familiar with.

Decisions will need to be made during installation that may affect reliability and ease of future support. A clear understanding of the system, its capabilities, and use will aid the installer and user.

Definitions

The following terms will be used throughout this manual:

TELCO—Refers to the Telephone Company providing service to the building where the Model 6000D is installed.

C.O.—Refers to the TELCO's Central Office and switching equipment.

Resident—Refers to the building's resident who is serviced by the Model 6000D system.

RJ-21C or RJ-71C Block — Refers to the Network Interface Block, or "jack", where telephone lines are "punched down" (attached). The Telco generally has control of lines on the C.O. (top) side of the block. The building owner controls subscriber lines on the bottom side.

Stack—Generally refers to the Model 6000D electronics and/or relay interface board that switches subscriber calls from the Telco service to entrance calls.

Concierge—Refers to a specific station/gate location manned by a guard, doorman, or building superintendent or similar person assigned to provide services and assistance to visitors and residents.

Station/gate—Refers to a service location i.e. concierge, management office, valet desk, doorman, etc. (up to eight) which can be simultaneously called resident to station and/or station to station.

Concierge Call—Refers to a telephone connection between a resident and the concierge. The connection is requested by the subscriber, and automatically returned or "called back" by the Concierge. This "call back" design removes the discretionary element of the call back and forces a response in accordance with system timing.

Non-subscriber resident—Resident without standard Telco service.

Entrance Telephone—Refers to an auto-dial entry telephone or doorman's telephone connected directly to Model 6000D station/gate board.

Entrance Call Blocking—Dialing *70 before making an outside call instructs the Model 6000D not to interrupt that call (especially useful for modem calls).

Product Overview

The Model 6000D helps establish what might be called a basic no phone charge intercom system. Unlike direct wired intercoms, it utilizes existing telephone lines within the building so that a resident's apartment local telephone network will operate for both Telco calls and intercom calls. The Model 6000D incorporates Patent Pending technology that automatically detects a change in Telco service and either applies the resident telephone with operating voltage if no Telco service is detected, or reconnects to Telco service when detected.

For a detailed description of functions and operation, see System Component Description page 4.

Installation Overview

For any given building, all Telco lines entering the building are punched down on RJ-21C Blocks. From these blocks, the wire pairs are then extended to the individual Resident telephones.

The Model 6000D is installed on the owner's side of this "Point of Demarcation". Each Telco wire pair that extends to a telephone within the building is passed through the Model 6000D Stack. An RJ-71C routing block is installed and wired between the Model 6000D stack, RJ-21C block, and the Subscriber's telephone.

Basic Installation Tools Required

- a. #1&2 Flat or Slot screwdriver.
- b. #1,2,&3 Phillips head screwdriver.
- c. Digital Multimeter.
- d. Telco ' Butt Set '.
- e. Standard DTMF telephone with open wire ends.

Programming Overview

The Model 6000D can either be programmed by direct computer connection or remote modem linking. This programming allows resident codes to differ from the hard wired relay and its associated default number. If programming to establish distinct resident codes is not required, the 6000D will assign the corresponding relay number as the default resident code for dialing purposes. This process is fully automatic requiring no extra effort in most installations. In installations where extra service features are offered, or integrated telephone entry devices need reprogramming, Model 6000D programming can be performed.

NOTE: The Model 6000D requires touch tone telephones.

SYSTEM COMPONENT DESCRIPTIONS

GENERAL

The Model 6000D is basically a no phone charge intercom system. Like most intercom systems, there is a point where the call is originated and a destination or receiving end. In the case of the Model 6000D the receiving end is the resident's standard telephone instead of a hard wired intercom unit.

For any given building, all telephone lines pass through a junction called the "Point of Demarcation". This is where the local Telephone Company system enters the building with a number of "Telco" wire pairs that are punched down on RJ-21C Blocks. From these blocks the Telco wire pairs are then extended to the individual "Resident" telephones within the building.

Since the breakup of the Bell System into smaller local Bell Companies, an agreement was reached that the Bell Companies' responsibility for maintenance of the Telco wiring stops at the Point of Demarcation. From there, the wires are now owned and maintained by the owner of the building.

The Model 6000D takes advantage of this situation by being installed at the Point of Demarcation on the owner's side. Each Telco wire pair that extends to a telephone within the building is passed through the Model 6000D Stack.

Normally, the passing of a telephone wire pair from the Central Office (C.O.) to a Resident through the Model 6000D Stack is invisible to all parties concerned. The stack board prohibits station/gate calls to a resident when that line is in use. The station / gate caller will get a busy signal. On rare cases, a rare condition may occur and the re-check of the line status is passed to the gate board. Then the 6000 will continue to monitor until one party hangs up. If the gate / station caller hangs up first, the system resets. If the resident hangs up first, the call is put through.

When a voice path is desired from a new calling source to a specific Resident, the Stack reroutes the current C.O. to Resident voice path through a monitoring circuit. The Resident telephone status is then determined.

If that line is in use, and System Call Blocking has not been set,

Note: If System Call Blocking has been set, the entrance caller is presented a busy signal.

If the Resident line was not in use, the C.O. side is separated from the Resident side and Ring Signal is injected into the Resident's telephone. This will continue for 10 rings or the Resident answers their telephone.

The Stack is a group of relays that, when not energized, will pass normal telephone operations through a closed set of contacts. There are 12 relays per Stack Board allowing service for 12 residents per board. The actual number of Stack Boards in a system is expandable to cover up to 1176 residents. For example, 144 residents would require 12 Stack Boards (12 x 12 = 144). The Stack board also incorporates Patent Pending technology that automatically detects the use of Telco service and either supplies the resident telephone with operating voltage if no Telco service is detected, or reconnects to Telco service when restored service is detected.

One Stack Board Cage will support 12 boards, and cages are connected via ribbon cables located on the back of the board cages. Eight cages would support 1152 residents (144 per cage times 8 cages).

The monitor circuits are physically located on a separate board from the Stack. This means that resident to resident calls are not possible within the system.

Cage Descriptions

The Model 6000D design is extremely modular and very expandable. It consists of one or more standard 19 inch rack mount card cages with a variety of function boards.

The cages come in three types:

1. The Multi-Bus Cage.
2. The Econo Cage.
3. The Stack Cage.

The Multi-Bus Cage will support eight (8) Station/Gate Boards (Stations) and two (2) Stack Boards. This cage can then link with additional Stack Cages for Stack expansion to hundreds of residents.

The Econo Cage will support two (2) Station/Gate Boards (Stations) and eight (8) Stack Boards for a total of 96 residents. Again, this cage can be linked to additional Stack Cages if there are more than 96 residents.

The Stack Cage will support 12 Stack Boards and each Stack Board can support 12 residents. Thus; one Stack Cage can accommodate 144 residents. Each Stack Cage can be linked to the next Stack Cage in daisy chain fashion.

Note: Stack Cages only support Stack Boards. All other types of boards must reside in either a Multi-Bus Cage or Econo Cage.

Board Descriptions

The two most significant function boards are the Stack Board and the Station/Gate Board.

Stack Board

The Stack Board is used to route a resident's private telephone line through a Gate/Station Board.

Stack Boards are numbered in ascending order starting

System Components (Continued)

with the board closest to the Station/Gate Board and ending with the last Stack Board. Each Stack Board supports 12 resident positions. See Table 1.

Board #	Subscriber Stack position
1	1-12
2	13-24
3	25-36
4	37-48
5	49-60
6	61-72
7	73-84 etc.

The Stack Board has two LEDs, Red and Green. The Green LED indicates interrogation is being performed on that Board. The Red LED, when lit, indicates a resident relay is active and resident service is being routed through this board to a Station/Gate Board.

The shifting green LED will always be active while power is applied. If a logic failure should ever occur on a Stack Board, the green LED will then not proceed past that board. Thus, the failure is either on the last board that lights or the next board in sequence. If a radical failure should occur, the Model 6000D will shut down the Stack and no green LEDs will appear. If this occurs, shut down power, pull all Stack Boards about 1 inch forward. From first to last: Insert Board 1 and apply power. If green LED appears soon, shut off power and push next board home and reapply power. Do this until system refuses to give any green. Replace last board inserted.

Note: Simply pulling a Stack Board from its slot will not disconnect resident telephone service until the Telco cable is removed from that board. Relays are numbered 1,2,3, etc. To call that relay add 100, i.e. 101, 102, 103, etc.

Station/Gate Board

The Station/Gate Boards provide circuits for switching voice paths, call progress monitoring, ring generators, voice current loops, signal generation and RS-232 communication linkages. It provides resident telephone line monitoring and creates a simulated telephone line interface to the telephone equipment located at the entrance, concierge desk, management office, valet desk, guard station, etc..

This board presents a standard telephone line wire pair (called Tip and Ring) to a standard telephone located at an entrance, concierge desk, management office, guard station, etc. Attaching a telephone to this wire pair allows a person to call anyone in the Stack by basically dialing the relay number of a resident.

For example, if the calling party dials 144 on a telephone connected to one of the Station/Gate Boards, the Model 6000D will create a voice path from the caller to the resident that is wired to relay 144 in the Stack. The person placing the call will hear dial tone, ring tone, and even busy tones.

Each Station/Gate Board must have a unique address (setting) on the dip switches in the upper corner of the board. DOWN on the letter side sets an OFF condition. DOWN on the opposite side sets an ON condition. For Example:

Address 0	or	Address 5
1 \ D = off (0)		1 / D = on (1)
2 \ C = off (0)		2 \ C = off (0)
3 \ B = off (0)		3 / B = on (1)

Address	Switch			
	A	B	C	D
0	0	0	0	0
1	1	0	0	0
2	0	1	0	0
3	1	1	0	0
4	0	0	1	0
5	1	0	1	0
6	0	1	1	0
7	1	1	1	0
8	0	0	0	1

4 \ A = off (0)	4 / A = off (0)
-----------------	-----------------

Table 2 defines the Station/Gate Board addresses.

The exact Address typically doesn't matter as long as all Station/Gate Boards have a different addresses. However, if Station to Station calling is desired or

System Components (Continued)

expected, document each Station/Gate Board's address for future reference.

Note: Up to four (4) Station to Station calls are possible at a time.

Power / Ring Board

The Power / Ring Board connects to a remote power supply via cable. This board provides all the power requirements for the entire system.

The Power / Ring Board has 5 red LEDs. All light when power is applied and logic power is valid.

Control Board

The Control Board has two primary functions. The first is system memory. This provides storage for lookup tables, an audit log, and various communication buffers.

The second function is general system control and arbitration. The Control Board supports a log printer, a 1200 baud modem option, and an RS-232 interface for direct connect to a local terminal for programming and display purposes.

U3	8k	32k	32k	32k
U4	0	0	8k	32k
Total Memory	8k	32k	40k	64k
Stack Subscribers	475	2000	2525	4050

Board devices U3 and U4 are memory sockets. 8k and 32k static RAM chips are supported in the combinations shown in Table 3.

Note: Any extra memory is used by the system for internal audit log storage. With no Stack, and maximum memory, 1600 events are stored. When the audit log is filled, the newer events are written over the oldest audit events.

Caution: DO NOT attempt to adjust the 4 trim-pots on the Control Board.

Multichannel voice support

An important feature of the Model 6000D is the fact that it supports 12 independent simultaneous voice channels. That means multiple resident-to-gate calls can be processed simultaneously.

Multichannel eliminates the problem known as "Bottle Necking" in single channel systems. Bottle Necking occurs in multiple entranced systems where only one voice channel is supported. While a visitor is talking to a resident, all other entrances and services are suspended. Traffic into a complex will stack up during busy periods of the day. This delay is not only annoying, it can be dangerous. Many driveways allow only two cars to stack up behind each other before the rest of the cars are stopped in the street.

System Call Blocking

The Model 6000D can recognize a resident's request to not interrupt a call. This is especially helpful during computer modem calls made by resident

Multi-Station Call Down capability (Up to eight (8) stations).

The Multi-Station Call Down capability allows resident-to Station/Gate board zero through seven (0-7) callback return calls. The station telephones connected to the Station/Gate boards can also directly call any resident and/or Station/Gates on the system.

When the system senses a resident's request for a Station Call (return call) via the resident's dial code (41# through 48#), the Model 6000D stores and flags the resident's system address. Multiple call back requests are all processed and stored. Multiple activities from the same resident are consolidated and stored as a single request. Requests are processed in the order received.

If any residents are flagged for a callback, the system looks at the status of the Station telephone. After it has been idle for 3 seconds, the system will ring it. When the Station answers this call, a ring tone signal is heard and the system places a call to the telephone of that resident.

The resident answers the Station call, identifies themselves, and states the purpose for the call. A few seconds are given to the Station between calls to begin dialing from that station before the next call back request is pushed through. This allows the Station to call maintenance or security as perhaps requested by the last communication.

The operation parameters of the Multi-Station Call back are:

1. When the resident acquires dial tone, they have the next 10 seconds to press the three digit call back code 41# through 48# and hang up.
2. If multiple residents connected to the same stack board attempt simultaneous call back requests, only the earliest will be successful. The other residents who went off-hook after the earliest resident will have to repeat their request after the 10 second operation timer is reset to zero.xxxxxx
3. If a resident does not receive their call back in a reasonable time, they should try again. Multiple requests will not result in multiple call backs.

System Components (Continued)

Assembly Procedures

Although the Model 6000D is factory assembled for test and quality assurance, the following section may be useful for troubleshooting or servicing a system.

Stack Boards

Locate the Multi-Bus or Econo Cage and look into the cage at the Mother Board. Find the slot marked Stack-1. This is where the FIRST Stack Board MUST be put. The TOP of each board is clearly identified. Insert boards such that the components are on the left side. If the board doesn't want to fit, don't force it!

All boards are designed so that they can only be inserted with the correct side up and in the correct type of slot (Stack type or general type).

To the right of the first Stack Board insert the next Stack board WITHOUT leaving an empty slot. Continue inserting Stack Boards, each to the right of the last, until all Stack Boards are inserted or that cage is filled to the right. If more Stack Boards are required, locate the next cage in the daisy chain. This can only be a Stack Cage. Begin by inserting the next Stack Board in the extreme left most slot marked STACK 1. Again, fill to the right without skipping a slot. Continue until all Stack Boards are installed in cages.

Note: There may be some bowing of the cage frame when the locking levers are used to secure the board. It may help not to lock the levers until all boards for a cage are in the card guides and nearly seated. To be safe, use a flashlight and look to see if the gold pins on the card edges are aligned with the contacts of the Mother Board connectors before pushing the board all the way in.

Control, Station/Gate and Power/Ring Boards

Locate the Multi-Bus or Econo Cage and look into the cage at the Mother Board. Find the furthest left slot marked POWER. In it, install the Power/Ring Board.

After placing the Power/Ring Board, put the Control Board in the next slot to the immediate right.

Lastly, starting from the next available slot of the Main Card Cage, install the Station/Gate Boards.

Note: The Control Board, Power/Ring Board, and Station/Gate boards are slot interchangeable. They will work in any slot not marked Stack#.

Caution: Verify all Station/Gate Boards have different settings on the dip switch in the upper corner. See Table 2, Page 5 for a list of settings.

INSTALLATION FORM

Use the following formula to find the Stack Position of a Relay: (Block or Stack No. - 1) x 12) + Relay No.)

Example: Stack Position of Relay 7 on Stack Card 12 = 139

Solution: For the Stack Card Number (12 in this case) Subtract 1 from it, result = 11, multiply x 12 =132.
Add 7 (the relay number) Your answer is 139

Copy this form for use during installation.

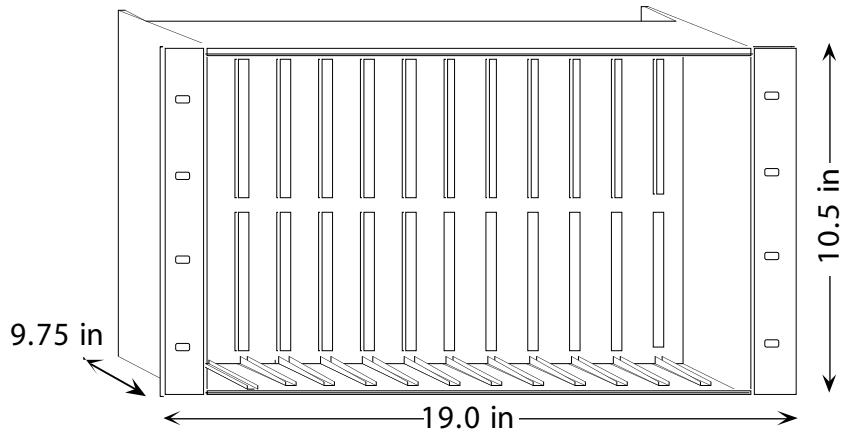
Block/Stack Number:			
Relay	Unit or Residence Number	Stack Position	Directory Code
01			
02			
03			
04			
05			
06			
07			
08			
09			
10			
11			
12			

Block/Stack Number:			
Relay	Unit or Residence Number	Stack Position	Directory Code
01			
02			
03			
04			
05			
06			
07			
08			
09			
10			
11			
12			

Block/Stack Number:			
Relay	Unit or Residence Number	Stack Position	Directory Code
01			
02			
03			
04			
05			
06			
07			
08			
09			
10			
11			
12			

Block/Stack Number:			
Relay	Unit or Residence Number	Stack Position	Directory Code
01			
02			
03			
04			
05			
06			
07			
08			
09			
10			
11			
12			

Dimensions



Specification Notes

Capacity: Up to 1176 residents, each with up to 5 telephones with 1.0B Ringer Equivalence each.

Power: 120V / +5V, +12V, -5V, +48V Power Supply. UPS recommended (450 VA or higher) for protection during brown out and electrical disturbances.

Maximum Resistance: Telephone line pair from residence to Model 6000D must have less than 2.0 OHMS of resistance for each 100 ft. of 24 AWG wire, when shorted together at the RJ-71C block. Measurement to be taken from the resident's RJ-11C jack.

Call Down ID Option

General: The Call Down ID Option allows the Concierge or any Station to identify the resident that has requested a call back via the Model 6000D. The Decoder III is employed to facilitate the caller's identification. When installed, the option displays the caller's data on the Decoder III after the Concierge/Station telephone handset has been picked up and before the resident answers their telephone.

The Call Down ID Option requires the optional firmware in the Model 6000D, the Decoder III with memory matched to the Model 6000D, and a Concierge telephone with a ringer equivalence of 1.0 A or less (standard 2500 set).

Refer to the Decoder III manual for instructions on how to program the resident's ID information into the unit. The "Site ID" referred to in the Decoder III manual is the Relay Number of the particular resident for whom information is being programmed. That is; relay 1 is Site ID "101" relay 2 is Site ID "102" etc.

Installation: Place the Decoder III near the desired location of the Concierge/Station telephone. Following the instructions in the Decoder III Manual, plug the Concierge telephone into the Decoder III "Phone" jack. Plug the phone line from the Model 6000D Station/Gate Board into the Decoder III at the "Telco" jack.

The use of concierge/station telephone sets with

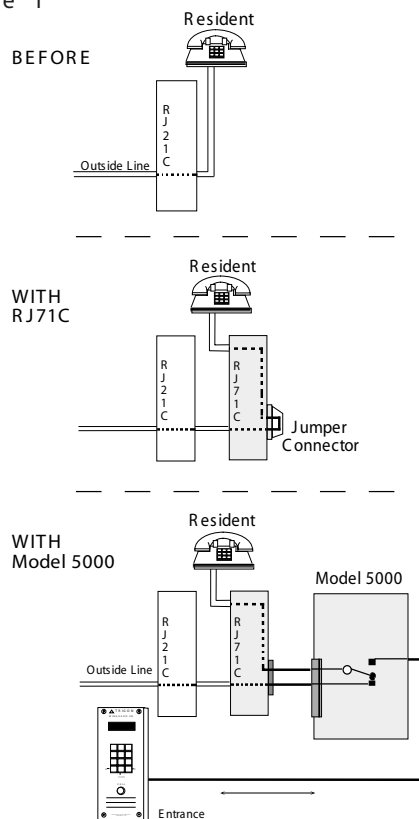
INSTALLATION and WIRING

The Model 5000/5000D is assembled and tested before leaving the Factory. After wiring of the RJ-71-C blocks is complete, cabinets or racks can be mounted. The assembled cages are then bolted to the cabinet or rack.

STEP 1 - Wiring the RJ-71-C Blocks

Before installing the Model 5000/5000D electronics, arrangements should be made to have RJ-71-C Blocks installed in series with each 12 Subscriber telephone lines. See Figures 1 and 2.

Figure 1



The RJ-71-C block creates a means of attaching both the Telco lines and a switching device (in this case the Model 5000/5000D) to a subscriber's telephone. The RJ-71-C is equipped with a connector that is used to jumper all incoming Telco wiring directly to the subscriber telephone lines when the Model 5000/5000D is not present.

RJ-71-C Blocks should be installed within an enclosed secured area, preferably leaving space for the Model 5000D card racks and frame. Standard cable length from an RJ-71-C Block to a Stack Board is 15 feet.

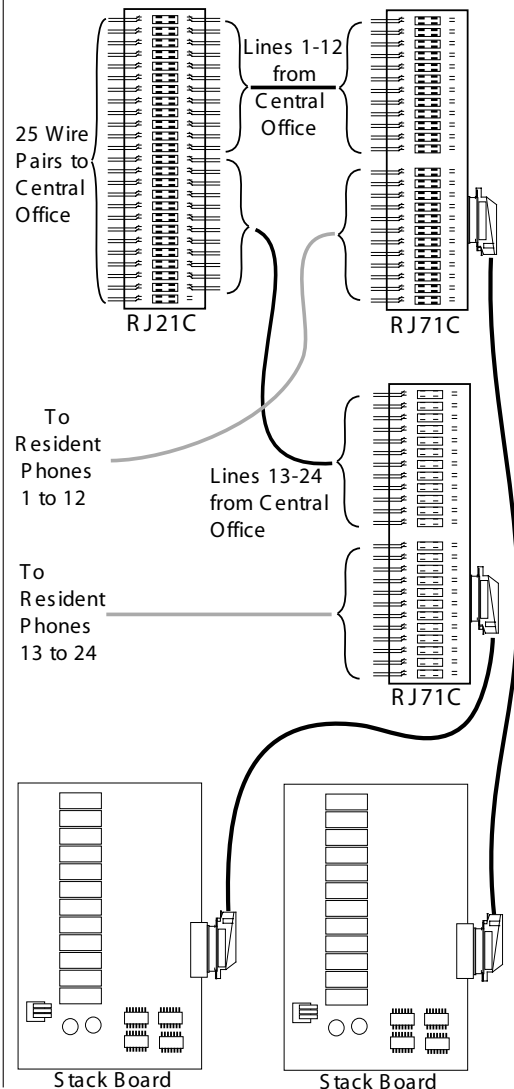
RJ-71-C Blocks and Bridge Clips can be purchased from TRIGON Electronics.

Make sure the Installer clearly labels the blocks by unit or apartment number.

When requesting the installation of the connector blocks, the Telephone Company will require the following information:

- FCC Registration: EYE5Q2-71115-MA-N (Telco interface)
- FCC Registration: DWE6TM-72963-WP-E (Modem interface)
- Ringer Equivalence: 0.08b
- Connector type: USOC RJ-71-C

Figure 2
RJ-71-C Wiring



INSTALLATION and WIRING (Continued)

STEP 2 - Mounting

The Model 6000D is housed in standard 19" wide by 10.5" high by 9.75" deep card cages. The card cages must be supported in a card cage rack or cabinet(s). Bolt the card cages into a rack or cabinet. Be sure the rack or cabinet is attached to a true earth ground.

Note: For best protection, Trigon recommends all systems be mounted in a secure cabinet mounted to the wall or floor. Be certain cages are not mounted near any source of extreme heat. Also avoid mounting the system near strong sources of electrical noise, such as power generators or air conditioners.

Mounting Order

The number 1 (Econo or Multibus) cage is probably best located at the bottom of the rack in a multi-cage system. Mount the other Stack Cages above it (See Figure 3). TRIGON will have marked the cages 1, 2, 3, etc. Each Mother Board has each slot position clearly labeled at the top of each connector set.

Stack Cages are cabled in daisy chain fashion. Therefore, mount each cage so as to keep a minimum distance between it and the next Stack Cage in the daisy chain.

Link the card cages on the back as shown in Figure 3 using the supplied ribbon cable. As a rule: Looking into an empty cage, the cage type is written on the left side front surface of the Mother Board.

Note: The Multi-Bus or Econo Cage has no connectors on the left side (as viewed from the front). They do have connectors on the right side which link to the left side of the next cage. This next cage then outputs on the right side to the next cage's left side, and so on. Right sides are outputs, left sides are inputs. Outputs go to inputs.

Also note that two cables are required for each link. They are Top cable and Bottom cable. Tops go to tops and Bottoms go to bottoms. The cables are polarized so top to bottom connection is impossible.

CAUTION: Be sure to use TRIGON supplied flat ribbon cable and not telephone cables. Ribbon cable allows physical separation of control signals from resident telephone lines for noise immunity. Keep ribbon cables loose and not pinched. Do not tuck, fold or try to dress up these cables. **DO NOT APPLY POWER AT THIS TIME.**

Figure 3
Ribbon Cable Connections

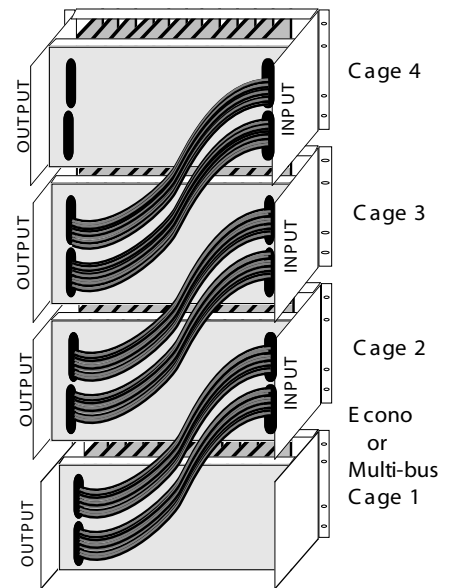
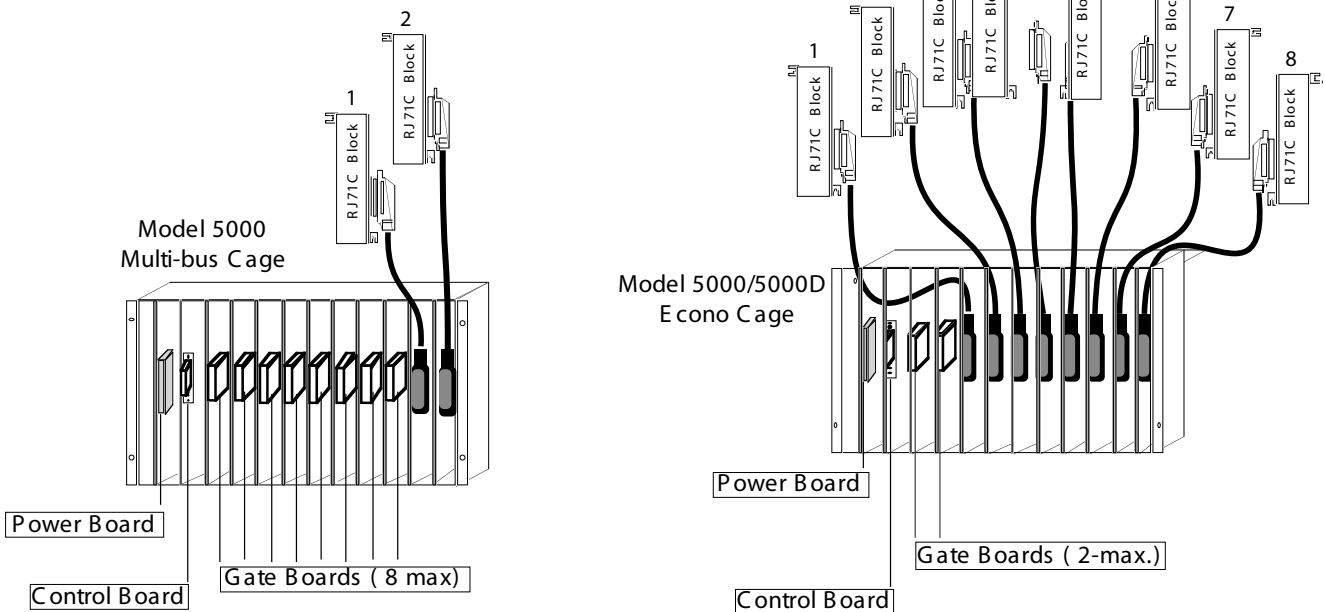


Figure 4
General System Layouts



INSTALLATION and WIRING (Continued)

STEP 3 - Stack Board

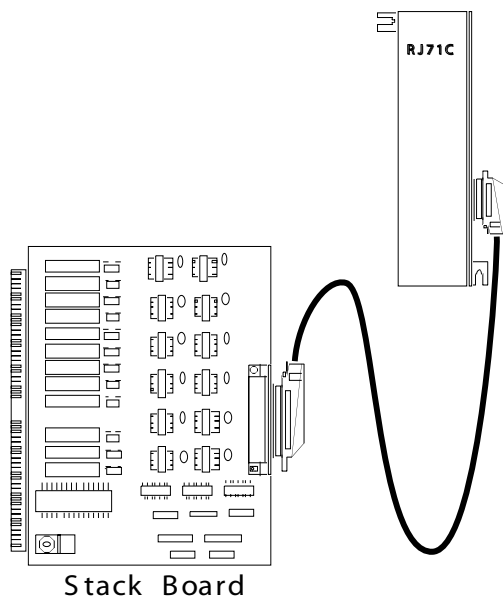
The Stack Board has two LEDs, Red and Green. The Green LED indicates diagnostics are being performed on that Board. The Red LED, when lit, indicates a Resident relay is active and Resident service is being routed through this board to a Station/Gate Board.

Run 25 pair cable from stack boards to RJ-71C's. Tie in place but do not connect until all cables have been run. This will minimize connection time. To complete Resident wiring, connect a Telco style cable with a 50 pin male D-style connector on each end to the 1st Stack Board. Locking hardware is provided to secure cable. Locate the 1st RJ-71-C Block. Remove the keeper connector on the side of the block and attach the loose end of the Telco cable to the block. Use locking method supplied to secure that end. Repeat this procedure until all RJ-71C blocks are routed to installed Stack Boards. Secure all loose cables to remove strain and stress on connections.

Note: Inform management that during this procedure Residents may experience temporary loss of normal telephone service. Store the keeper connectors locally. If repair work is ever required, they will be useful to minimize interruption of Resident services whenever cables are disconnected.

Note: Be sure cables are not secured to anything that may get hot or in any way damage the cables. Secure all loose cables to remove strain and stress on connections.

Figure 5
Stack Board
Connection



STEP 4 - Station/Gate Board

The Station/Gate Boards can provide connections to an Entry Telephones, Concierge Desk, Doorman Station, Management Office, Valet Desk etc.. Station/Gate boards will be factory installed from left to right beginning with board "0".

Note: The standard connection for the Concierge Desk telephone is to Station/Gate Board "0". Although, this is not the only position that supports Resident-to-Station calls, it has been the standard for Trigon systems.

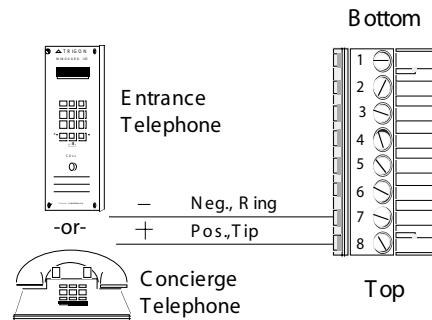
The interface to the Station telephones is via the 8 pin female socket (see figure 6).

From top down, the pins are defined on figure 6.

Station Telephone Circuits

Pull 2 wires, 22 AWG twisted, to each station desk. Connect the remote end to the station telephone. Connect the local end to terminals 8 and 7 (tip and ring) of the corresponding Station/Gate Board. Maximum wire run is 2000 feet.

Figure 6
Gate Board
Connection



INSTALLATION and WIRING (Continued)

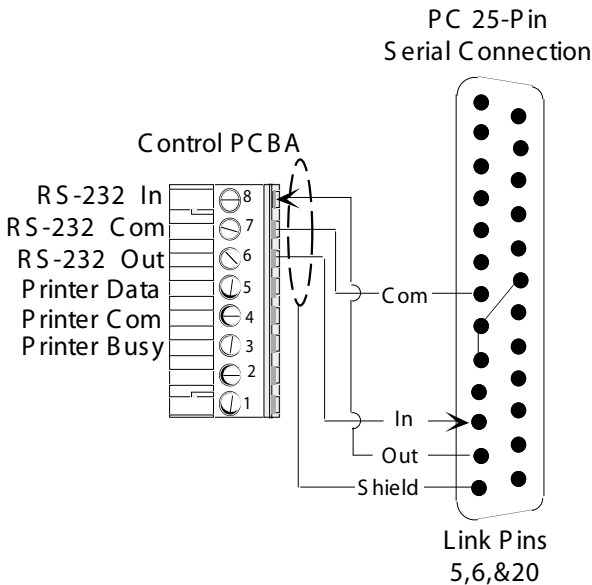
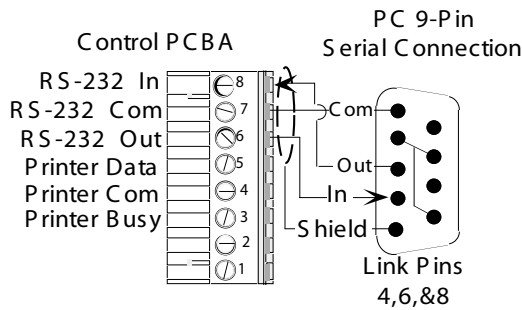
STEP 5 - Control Board

The connections to the Control Board support the RS-232 communications interface and the printer interface.

The Control Board connector has 8 positions and are defined top to bottom in Figure 7.

Red, Black and Green wire colors stated in tables are for simple identification only. Any three colors are fine.

Figure 7
Control Board
Connections



Communications Interface

Jumper Blocks B1 and B2 enable the Modem or Direct PC Link (See Table 4).

Interface:	Direct		
	None B1 B2	RS-232 B1 B2	MODEM B1 B2
RS-232	○ ○		○ ○
MODEM	○ ○	○ ○	

Modem

For Modem operation, jump center pins to Modem pins on B1 & B2.

Note: Modem use requires the Modem Option be installed. If jumpered for Modem Option, verify modem circuit devices are installed at board locations U6 and U7 and a telephone line is connected via RJ-11 jack on the Control Board.

Direct Link

For Direct connection, jump center pins to RS-232 pins on B1 & B2

If using a direct link to a PC., use 22 AWG 3-wire shielded cable from the Control Board to Remote Personal Computer.

See Figure 7 for Control Board connections. See Table 5 for connections to PC.

Control	9 pin:	Control	25 pin:
Red 8	pin 3	Red 8	pin 2
Black 7	pin 5	Black 7	pin 7
Green 6	pin 2	Green 6	pin 3
Null	pins 4-6-8	Null	pins 5-6-20
Shield	pin 1	Shield	pin 1

Note: Null (4-6-8 or 5-6-20) are three pins that must be tied together at the PC to Null Modem Signals. Only connect the shield at the PC end of the cable.

INSTALLATION and WIRING (Continued)

Printer Interface

Printer interface requires a 3 wire with shield, 22 AWG to a 25 pin Male D-Sub connector. See Table 6.

Set printer for 4800 baud, 8 bit, no parity. This printer interface is for audit log output to a 40 character wide serial printer. Cable length should not exceed 100'.

System log in, log out, and audit data received at each Station/Gate Board are redirected to this single printer output for local hard copy.

Table 6 RS-232 at Printer Connections		Control Board Connections
Data wire	pin 3	pin 5
Busy wire	pin 20	pin 3
Common	pin 7	pin 4
Shield	pin 1	

STEP 6 - Power / Ring Board, and Supply

Before making any power connections, position the Power Supply such that the Power Cable with the 9 position connector can reach any position in the first card cage, and the 3-Prong Power Cord can plug into a standard 120 VAC wall receptacle.

CAUTION: Make sure the power present at the 120 VAC receptacle is clean. This means Air Conditioners, Heaters, Washing Machines, Vending Machines or any other heavy duty equipment does not share this line. The Model 6000D is a sophisticated computer and should be treated as such.

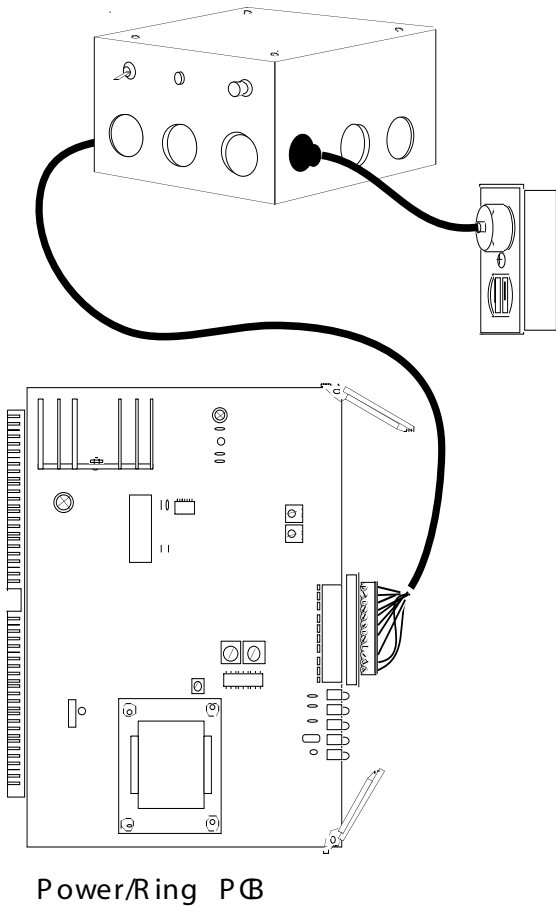
If the site is prone to power fluctuation, install an Uninterruptable Power Supply (UPS) or similar power conditioning device. Install it between the system and the power line. Sudden power failures will not interrupt Resident service, but brownouts can create an intolerable condition for the system and its behavior may become unpredictable. The system will draw from 20 watts to a maximum of 60 watts depending upon number of boards.

CAUTION: DO NOT switch on the power supply until all wiring is completed.

Making sure the Power Supply switch is set to OFF, plug the 9 pin male plug from the Power Supply into the 9 pin female socket of the Power Board. Plug the 3-Prong Power Cord into the wall socket.

If all boards are inserted and the cages are daisy chained properly with the supplied ribbon connectors on the backs, you may try an initial power test at this time. Proceed as described next in the TESTING Section.

Figure 8
Power Board
Connection



CAUTION

This system is subject to operational malfunctions caused by Brown Outs, Power Surges, Spikes, and other power problems.

Therefore, the use of an Uninterruptible Power Supply (UPS) is recommended. The UPS should be rated at 450VA or higher.

TESTING and VERIFICATION

Initial Power UP

Verify that all boards are properly seated, locked down, and all cables are correctly installed.

Switch the Power Supply to ON. Allow a maximum of 30 seconds for system diagnostics to complete. At this time a green LED should light on the first Stack Board. The lighted LED should shift to the next Stack Board in sequence every one second. After reaching the last board, the green LED should start over again on Stack Board number One.

If the LED doesn't touch on all Stack Boards, there must be a gap (skipped slot) between two Stack Boards, or a mis-wire of the ribbon cables between cages. After powering down the system, recheck your installation and close up any gaps. If an open Stack Board slot is noted, remove the last Stack Board and put it into the skipped slot.

If a problem still exists, shut off power again and check all connections. Use a flashlight to verify all boards are properly seated and mated with the edge connectors to Mother Board connectors.

Resident Call Test

Power the system down. Attach a Butt-set or standard telephone across the simulated telephone wire pair on an Gate Board (pins 8 and 7 at the top of the Station/Gate Board connector).

Switch on the Power Supply. Within 30 seconds the Green LEDs should start proper sequencing across the Stack Boards. Verify all Stack Boards get a green LED in turn.

When you are satisfied everything appears to be working, engage the Butt-set. You should hear simulated Dial Tone. Dial the Resident position for specific Resident's telephone line. If the Resident is tied to the 1st Stack position of the 1st Stack Board then dial 101.

A Red LED should light on the Stack Board selected. You should hear Ring Tones. Verify clear voice when answered, then terminate call. The Red LED should go out.

Station to Station Calling

In a multi-station system, you may call from station to station. To do so, dial '0' and wait. In about 3 seconds, a secondary Dial Tone will be heard. Now dial the logical address (0 through 7) of the Station/Gate Board that you wish to call. Verify voice and hang up.

System is now installed and on line.

Installation Wrap-Up and Programming

The Model 6000D can supply a no phone charge telephone line to each entrance. Program each Entry telephone such that it dials the Resident Stack position (or assigned resident code if so programmed) for the Resident to be called by a visitor.

For example:

The Directory at the entrance indicates Mr. Brown may be called by dialing 123. If Mr. Brown is wired to Stack position 247, then program the access equipment to dial 247 when a visitor enters the resident code 123.

If the telephone entry equipment is already programmed to dial Mr. Brown's actual telephone number, you may bypass reprogramming the equipment and instead program the Model 6000D. See Modifying Residents Records, DUMB TERMINAL OPERATION in the PROGRAMMING Section.

Next, from the entrance, dial the resident code for Mr. Brown (123). Assuming Mr. Brown is home, he should answer. Verify that entrance control tones operate the entrance properly.

Note: It is not necessary for a resident to have active telephone service for the Model 6000D to ring that person.

Installation and testing is complete. If any problems occur call TRIGON Electronics at (714) 633-7442.

ADAPTING EXISTING ACCESS EQUIPMENT

If an existing telephone entry system is already installed, and this original equipment uses direct dialing through the telephone company for voice communications, that equipment can remain on site. Simply disconnect the telephone line from the Telco connection and reconnect it to a Station/Gate Board in the Model 6000D. The Model 6000D will translate the tone dialing into direct connect to a specified Resident.

As mentioned earlier, normally, a telephone at an entrance dials the relay number that has been hard wired to a particular Resident. If a telephone entry unit is already installed at an entrance and is inconvenient to reprogram, the Model 6000D can be programmed. It will then translate any pre-programmed number, up to 12 digits, into the correct hard wired Stack number for a given Resident. See the next section on Programming to see how this is accomplished.

PROGRAMMING

The Model 6000D will automatically program itself into a default operating mode on power up. Such programming will be appropriate for all situations except those where special programming is required. Examples are: when residence telephone numbers will be programmed into the Model 6000D rather than the telephone entry unit, or, if operation parameters must be changed due to conflicts in local telephone service characteristics.

Automatic Programming

The Model 6000D automatically programs itself on initial power up. It takes inventory of all hardware and boards installed and creates a LINK record for each Stack position and assigns that record certain preset values.

The primary purpose of these RECORDS is to offer various options as to how a dialed number from an entrance or guard is translated to a hard wired Resident. At installation time a decision must be made on ONE of TWO methods for connecting a dialed number to a Resident!

METHOD ONE: Dial the hard wired Resident by their exact numerical position in the Stack.

This is the best choice if new dialing equipment is employed at an entrance as it may be easier to program the new equipment to dial the exact Resident Stack position number.

METHOD TWO: Dial a full number and let the 6000D system translate the full number into a Stack position number.

This is the best choice if a preexisting telephone entry unit is employed at the entrance, or a Security Guard/Concierge must dial from a telephone list or directory.

The secondary purpose of these records is to redirect entrance calls within the system, enable Station Call Forwarding to another resident or alter Resident Ring control.

Field Definitions:

Record number: The first link record is assigned the value '1'. Each record is numbered in sequence up to the maximum number of Residents supported by the installed Stack hardware. These numbers cannot be modified except by installing more Stack Boards or removing Stack Boards.

Stack Number: This number identifies the Resident Stack position that will be engaged for a specific number dialed at an entrance.

Call Number: This is the number dialed at a Station telephone. A match with this number will direct the call being placed to the hard wired Stack position identified by "Stack Number" within this same record. It is alterable and can be up to 12 digits in length.

Ring Frequency: Normally set at 20, it controls the ring frequency sent to a Resident's telephone. Its only use is to accommodate older telephones that require a ring frequency other than 20 hertz. Some older party-line telephones still use 12 to 70 hertz to cause ringing.

Ring Style: Initialized to (S) for Special, this value is used to generate a unique ring cadence to distinguish an entrance call from a normal call. Special sounds like: RING-RING-PAUSE....RING-RING-PAUSE....etc. The other value is (R) for Regular. This sounds like: RING-PAUSE.....RING-PAUSE.....etc.

Note: Some cordless telephones may not respond to Special ring cadence.

Dumb Terminal Programming Mode

Dumb terminal operation was designed into the Model 6000D to allow changing any of the automatically assigned values in the Model 6000D data base quickly and easily. The Dumb Terminal Mode may be accessed remotely via Modem, or locally via Direct Connection.

This Mode is the fastest and most direct method of quickly altering a Resident record. It is also useful in listing system hardware inventory and reviewing the system audit log. You may want to change the system password to prevent someone from accessing your system and making alterations.

Note: Accessing this system via the Direct or Modem Link will not interfere with normal ongoing operations.

Modem Connection / Remote Programming

To gain DUMB access, call the Model 6000D via modem using any terminal program on your computer. The computer must be set at:

- 1200 baud
- 8-bit
- no-parity
- full duplex mode
- Auto LF on CR enabled

Calling the Model 6000D assumes the unit has the Modem Option installed on the Control Board.

Programming (Continued)

Direct Connection / Local Programming

If there is no modem installed, the Dumb Terminal Mode Program can be accessed via a direct RS-232 link to a local computer using the same settings as above. Press the [RETURN/ENTER] key on the computer once it is in terminal mode.

Note: Some computers will require a null modem adapter for direct linkage. This system uses only a three wire serial interface (Serial in, Serial out, and Common). See WIRING Section Table 5, page 13.

The Model 6000D will respond with a sign-on message requesting a password. Type the word "HELLO" (do not type the quotes) and then press the RETURN or ENTER key on your keyboard. The system will not echo your keystrokes. A menu will appear and the system is in Dumb Terminal Mode.

Entering the DUMB TERMINAL Program

When the system answers with a request for a password, enter 'HELLO' and press the ENTER/RETURN key. You should see a menu.

All entries must be terminated with the [RETURN or ENTER] key. Rubout/backspace Keys will usually remove the last character entry, depending on the type of computer being used, the terminal program, and keyboard ability.

Push "H" and [RETURN] to view the HELP screen. This will explain the basic menu options. Use the [ESC] key at any time you wish to return to the TOP MAIN MENU.

Avoid the "I" (Initialize) command! It should only be used if the system is re-configured sometime after being in service for a while. Its use will clear the Audit Log and restore factory presets. It will auto-generate Resident records based on system hardware inventory taken after the most recent system power up.

Modifying Resident Records

Go to Edit Tenant Records and find, by Stack Position number, the record to be modified.

In the earlier example from TESTING, wherein it was desired to change records to accept complete telephone number dialing, we would find 247, the record for Mr. Brown. Change the call number from 247 to the actual telephone number that the Entrance Equipment or Security Guard/Concierge (6000D only) would dial to

reach Mr. Brown. If his telephone number is 5551212 then change his CALL NUMBER from 247 to 5551212.

Changing the system PASSWORD

The password is factory preset to "HELLO" and can be changed to any combination of letters and numbers limited from 1 character minimum to 8 characters maximum. Be sure to document the new password if you decide to change it!

TriCom Pro Remote Programming Support

TriCom Pro is a TRIGON program released for Windows based Computers. It is a Self Configuring Communications Package. It can communicate with TRIGON products, including Model 6000D, and creates a unique database for that particular product. The database can then be edited and downloaded to that product. Preexisting data in a product that is already in service can be uploaded for review, editing, and subsequent downloading.

The TriCom Pro software allows changing Operational Parameters, Directory Names, Telephone Numbers, Direct Access Codes, and Audit Log uploading. If a TRIGON product must have its memory erased, then TriCom Pro removes the time and stress associated with reloading and reprogramming. Hard copy printout of the database is also possible.

Modem

The TriCom Pro software requires a Hayes Compatible Modem on the computer's Com ports. The Modem must handle 1200 Baud in full duplex mode.

USE AND OPERATION

Operation of the Model 6000D is, for the most part, transparent to the building's residents. The resident uses their telephone as usual, except now their telephone also serves as a type of intercom system. With it, they can attain building services and grant guest entry...from any phone in their residence...without telephone charges. Each resident should be familiar with the following operations.

Guest Entrance Control

Model 6000D provides a means for the resident to grant or deny entry to visitors. They do so by pressing keys on their telephone after receiving a visitor call from an entrance (building must have a Telephone entry unit on an entrance door). For more information, refer to the instructions provided with the installed Entrance Control Telephone.

Managing Visitor Calls and Outside Calls

If a resident is on a call to an entrance, and an outside call needs to be taken, Model 6000D will periodically inject ringing tones into the conversation. The resident should quickly finish the call to the entrance and hang up.

Station Call Blocking

Station Calls Waiting tones can be "turned off" or "blocked" during normal calls. This is especially helpful to those using their computer modems.

Residents with "Call Waiting" service from their telephone company dial *70 then proceed with their call.

Residents without "Call Waiting" service dial *70 and hang up, then within 90 seconds dial the call they do not want interrupted.

Call Waiting service will again become active as soon as that call is completed and the telephone is hung up again.

Station Calling

The Model 6000D has the capability of processing "Station Call Back" requests. The resident requests one of the multi-bus stations call back with the following steps:

- 1.) Lift Handset and listen for a dial tone.
- 2.) Press "41# through 48#" to request a Station to call back.
- 3.) Hang up the handset and wait for the call back.

The Model 6000D will not register a call back request if 10 or more seconds pass before the three keys are pressed. If a resident is interrupted while making a station call, they should hang up and try again.

The Model 6000D registers call back requests (one per resident) in its memory. It processes the call requests in the order received. The wait time for call back will depend on how many requests are registered in the memory... and how quickly the Station deals with each call. If the resident feels a bit too much time has passed and they have not received a call back, they may dial another call back request.

The Model 6000D processes call back requests by first ringing the Station's telephone. When the Station answers, he will hear the Model 6000D dialing the resident's telephone. When the resident answers, the call back sequence is complete.

Note: To terminate the call, the Station hangs up his telephone.

TROUBLESHOOTING GUIDE

Red LED's on Power Board Not Lit

1. Check fuse in the Power supply (5 AMP).
2. Check DC voltages to the Power / Ring Board.

DC Voltages to the Power / Ring Board

Note: Using an AC/DC voltmeter :

1. Measure voltage between J2-1 and J2-2. Should be around -5V.
2. Measure voltage between J2-3 and J2-4. Should be around +5V.
3. Measure voltage between J2-5 and J2-6. Should be around + 12V.
4. Measure voltage between J2-7 and J2-8. Should be around + 48V.

Green LED does not cycle and all Relays are busy.

1. Make sure all Gate Boards in the system are set to different addresses.
2. If the LED's still do not cycle;
 - a. Power down the system.
 - b. WAIT ONE MINUTE.
 - c. Remove the first Gate Board.
 - d. Power up the system to see if the LED's cycle.

Repeat this process for each Gate Board as necessary.

Note: There might be a problem with the Gate Board if after removing it, the green LED's start cycling

CAUTION

THE SYSTEM MUST BE TURNED OFF FOR AT LEAST ONE MINUTE BEFORE REMOVING ANY BOARD

3. Measure the AC and DC voltages if the LED's still do not cycle. (See section on DC Voltages out of the Power / Ring Board).
4. If voltages seem to be correct with all boards firmly plugged in, there may be a Control Board problem. (Contact the factory for further assistance).

5. If the DC voltages are not correct, (See section DC Voltages out of the Power / Ring Board).

DC Voltages out of the Power / Ring Board

Note: You will need an extender board to measure these voltages.

CAUTION

THE SYSTEM MUST BE TURNED OFF FOR AT LEAST ONE MINUTE BEFORE REMOVING ANY BOARD

The pin numbers are from top to bottom, 1 to 50 on the component side, and from 51 to 100 on the solder side. Set your volt meter to DC as all voltages are DC. Pins 45, 95, 47, and 97, are all ground and connected to each other. All voltages are in reference to the ground.

1. Measure between pin 43 and 47 (should be around +48VDC).
2. Measure between pin 44 and 47 (should be around +5VDC).
3. Measure between pin 94 and 47 (should be around -5VDC).
4. Measure between pin 46 and 47 (should be around +12VDC).
5. Measure between pin 48 and 47 (should be around +12V).
6. If the voltages are not correct, check to see if something is loading the Power / Ring Board.

CAUTION

THE SYSTEM MUST BE TURNED OFF FOR AT LEAST ONE MINUTE BEFORE REMOVING ANY BOARD

- a. Remove the Power / Ring Board and lay it on a Non-Conductive area.
 - b. Connect it to the Power Supply.
 - c. Turn on the power and measure the DC voltages. An incorrect reading indicates a problem with that board. (Contact the factory for further assistance).
7. If voltages are correct with the board removed from the cage, but incorrect when installed, another board may be causing the trouble.

TROUBLESHOOTING GUIDE Cont.

8. To trouble shoot the Power / Ring Board:

- a. Power down the system and wait one minute.
- b. Disconnect the first Cage of the system.
- c. Power up the system and test to see if any difference in performance occurs.
- d. If no difference was observed, power down the system and wait one minute. Reconnect the Cage. If the system has multiple cages, disconnect the next Cage and test as before until a difference in performance is observed. This will help isolate which cage might be causing the problem.
- e. Power down the system and wait for one minute. Remove one board from the offending Cage, reprogram the system and observe the performance. Follow this procedure until the problem board can be identified.

CAUTION

THE SYSTEM MUST BE TURNED OFF FOR AT LEAST ONE MINUTE BEFORE REMOVING ANY BOARD

Green LED cycles but no Dial Tone is observed on Station/Gate Boards

1. Check DC power.
2. Check dial tone on Gate Board J1-33
3. Check Control Board.

Dial, Busy, and Ring Tone test points

1. Check J1-33 (Dial Tone) of Control or Gate Board.
2. Check J1-42 (Ring Tone) of Control or Gate Board.
3. Check J1-83 (Busy Tone) of Control or Gate Board.

Green LED cycles but Dial Tone not observed on some Gate Boards

1. Replace the Station/Gate Board. Contact the factory for a replacement.

Green LED cycles but all relays are busy

1. If the system has more than one Station/Gate Board, make sure they are set to different addresses.
2. Dip switches may stick when new. Turn them on and off several times, and then return to proper setting.

3. If the dial number is different than the relay number, the memory might be corrupted. If possible check memory with TriCom Pro software or a dumb terminal, then reprogram or initialize the unit.

4. Check all DC voltages before contacting the factory.

Green LED cycles but some relays are busy

1. The voice path might be active on another Gate to Stack Card.
2. Maybe that relay is blocked by tenants line in use.
3. If the dial number is different than the relay number, then try the relay number
4. Use UPS for more protection.

41# through 48# Does Not Work

1. Do the station to resident calls work? WITH THE SYSTEM OFF, check the dip switch settings. Move them back and forth several times before returning them to their previous settings. Check setting of the Station/Gate Board addresses.
2. If there is more than one Station/Gate Board in the system, make sure they are set to different addresses.
3. If station to resident calls do not work, check the DC voltages. If voltages are correct, there could be a problem on the Station/Gate Board. Contact the factory.

41# through 48# Does Not Work with some relays

1. Check tenant telephones. Some types of cordless phones may not generate a true DTMF tone.
2. Check 41# through 48# at the RJ71C.
3. Check seating of U6 on the problem Stack Card.
4. Move the problem tenant line to another Stack Board.

Station call does not detect off-hook and cut-in

1. This indicates the Station/Gate Board is not sensitive enough. This can be adjusted by increasing R15 on the Station/Gate Board.

(see Pg. 24)

When a Station calls a Resident, the Resident's phone rings but drops the call before the Resident can answer.

1. This might happen if there are several phones on the phone line, and indicates that the Station/Gate Board is too sensitive. This can be adjusted by decreasing R15 on the Station/Gate Board. (see Pg. 24)

TROUBLESHOOTING GUIDE Cont.

Ring volume on Resident phone

1. Adjust VR5 on the Power / Ring Board. Turn clockwise to desired ring volume.
2. If the adjustment on VR5 did not increase the ring at the resident phone, then check the line resistance by shorting the line either at the RJ71C or at the resident RJ11. Over 100 Ohms is excessive.
3. If the line resistance is excessive and adjusting the VR5 on the Power / Ring Board had no effect, you may have to replace the wiring to that resident.

Low volume on Station phone

- 1 Change the Station telephone.
2. Check the connection and wiring.
3. If there is more than one Station/Gate Board on the system, TURN the SYSTEM OFF. Wait one minute and then switch the Station/Gate Board settings. Make sure the boards are properly seated and repower the system. If this made a difference, the first Station/Gate Board might be malfunctioning.
4. If no difference was observed, adjust VR5 on the Power / Ring Board clockwise (if not done previously).
5. If the problem persists, contact the factory.

No DTMF tone on the Station call back ID

- 1 Check the add-on 2K resistor on the Control board between U11 pin 12 & 13 top or bottom side.
2. Check to make sure the telephone has a ringer equivilance no. 1.0A.

Excessive HUM on a Station Phone

1. Check grounding.
 - a. Use 12 ga. solid wire for grounding.
 - b. Use true earth ground.
 - c. Do not use telephone company ground.
 - d. Keep grounding connection as short as possible.

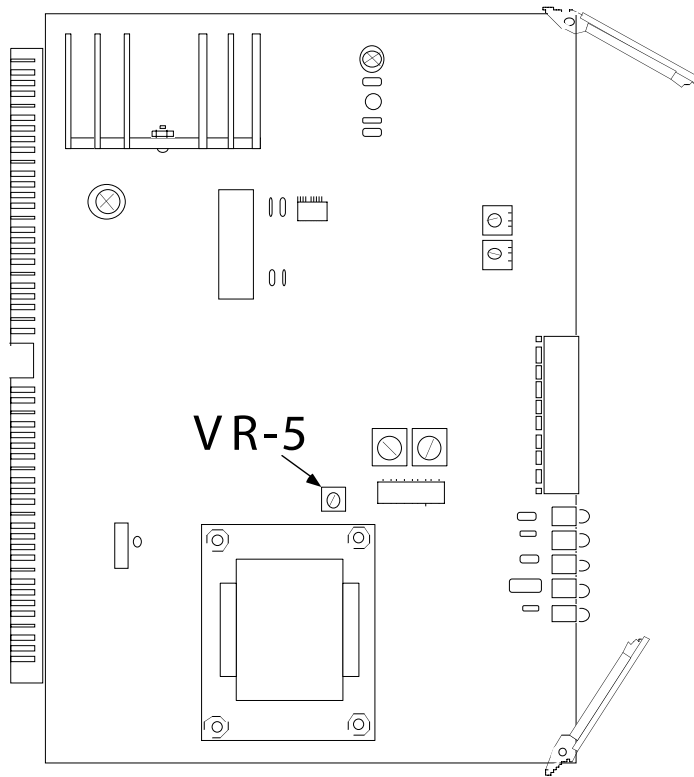
Amphinal Cable

1. Use ONLY standard 15ft long cable.

Station/Gate Boards

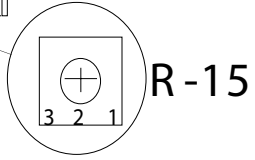
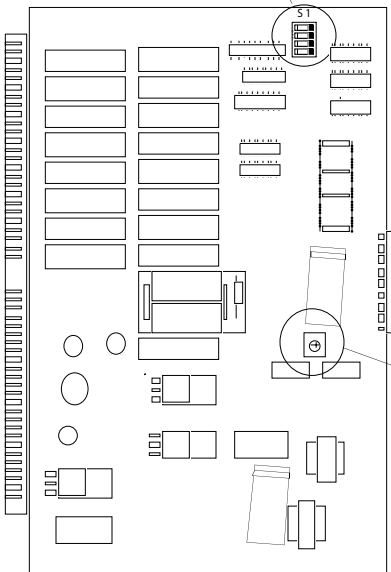
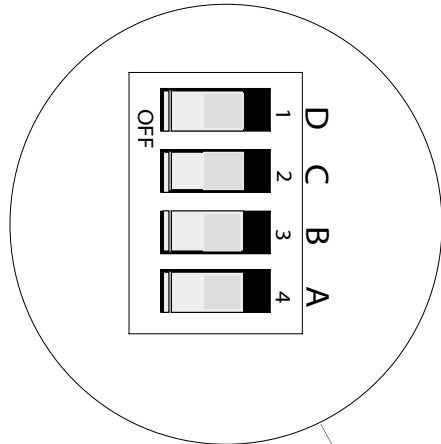
1. They must be set to different addresses.
2. Dip switch settings:

Gate Address	A = 4	B = 3	C = 2	D = 1
Decimal				
0	OFF	OFF	OFF	OFF
1	ON	OFF	OFF	OFF
2	OFF	ON	OFF	OFF
3	ON	ON	OFF	OFF
4	OFF	OFF	ON	OFF
5	ON	OFF	ON	OFF
6	OFF	ON	ON	OFF
7	ON	ON	ON	OFF
8	OFF	OFF	OFF	ON
9	ON	OFF	OFF	ON
10	OFF	ON	OFF	ON
11	ON	ON	OFF	ON
12	OFF	OFF	ON	ON
13	ON	OFF	ON	ON
14	OFF	ON	ON	ON
15	ON	ON	ON	ON



VR-5

Power/Ring PCB



Gate Board

