



Telecenter® V
Installation Drawings

RAULAND-BORG CORPORATION • 3450 West Oakton Street, Skokie, Illinois 60076-2951 • (847) 679-0900

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System Assembly

The Telecenter V system may be shipped fully assembled or as component shelves. To ensure the stability of the rack and ease in wiring, the relative position of the chassis shelves must be as follows:

- All audio amplifiers must be placed in the bottom of the rack. If there is more than one amplifier, the higher-power unit must be placed at the bottom of the rack.
- The TC4145 LLM chassis is typically placed directly below the TC4002, and the switch banks are typically placed directly above the TC4002. This arrangement minimizes the length of flat-ribbon cable run to these chassis.
- The remaining units may be placed in any position in the rack. Fill the unused rack spaces with blank panels.

Wiring

Refer to the wire routing diagrams in this manual when wiring each unit. Be sure to route and secure all wires as

shown. Specific connections between components are shown in the main wiring diagram, KM1035.

Field wiring includes all cables which exit the Telecenter V rack. Refer to the field-wiring diagrams included in this manual. Route and secure all wires and cables as shown in these diagrams.

In addition to the wiring diagrams, an equipment-mounting diagram (ILO440) is included in this manual. This shows the location of equipment mounted to the left and right inside walls of the rack.

General Precautions

- Never wire a telephone during an electrical storm.
- Never install telephone jacks in wet locations unless the jack is specifically designed for wet locations.
- Use caution when installing or modifying telephone lines.
- Never touch uninsulated telephone wires or terminals unless the telephone line has been disconnected at the network interface.

Installation Notes

The drawings are listed in five groups: Central-System Wiring, Room-Station Wiring, Central-System Accessories Wiring, Cabling and Assignment Charts, and Wire Routing Diagrams.

Central System

The Central-System Wiring group includes the factory-wiring recommendations, which should be followed whenever possible.

Room Stations

This group of drawings details the field wiring for virtually all station interfaces common to the educational and institutional industry. Each diagram is complete with cabling information, including two types of cable.

Central-System Accessories

This group of drawings shows accessories installation to the TC4002 main switch. These drawings represent the most commonly or requested applications using external devices.

Cable Plans and Assignments

The Uniform Cabling plan provides a method of cross-connecting equipment wiring to field (or room) wiring that allows easy access to all terminations, thus simplifying cable identification and troubleshooting.

Some installers may prefer using three sets of punch-down blocks (equipment blocks, field blocks, and cross-connection blocks). The main drawbacks to this method are that it requires three times the space and the extra expense of the additional blocks.

Whichever method you use, *number and label the blocks clearly* and use of both sides of split blocks. Remember that equipment wiring should be terminated on the left side, and field wiring on the right side (enter from the left and exit on the right).

Following the Uniform Cabling Plan are Cable-Assignment Charts for both the TC4155 Line Link Modules (LLMs) and the TC4110 (SC25) and TC4120 (SCC25) relay boards (terminated with a CAM25 male cable assembly).

Wire Routing Diagrams

This group of diagrams shows the proper wiring for each unit, including the recommended location of cable ties.

Maintenance for the CPU3 battery

The battery in the CPU circuit card (part of the TC4002) must be replaced every five years. Use the following procedure when changing the battery:

Step 1. Shut off the system using the switch on the back of the TC4002.

Step 2. Remove the front panel cover of the TC4002 and the retaining bracket.

Step 3. Remove the ribbon cable connected to the CPU assembly. This assembly is 6 inches wide and is located on the right side of the rack (as viewed from the front). It is labeled *CPU3*.

Step 4. Put a personal grounding strap around your wrist and attach it to the unit.

Step 5. Now remove the CPU from the rack:

Step 6. Remove the coin-shaped battery from the holder and replace it with a 3-VDC, 24mm in diameter, 250 mAHr capacity coin cell battery, positive side up. We recommend the use of Sanyo CR2430 or Duracell DL2430.

Step 7. Replace the CPU board, retaining bracket, flat-ribbon cable, and the front panel cover of the TC4002.

Step 8. Turn the system on.

Model List

The following is a list of all Telecenter V units and accessories:

2524	Master Clock
2490	Master Clock
6400	24-VDC Power Supply
DAX60	Audio Amplifiers
DAX120	Audio Amplifiers
FAX60	Audio Amplifiers
FAX120	Audio Amplifiers
FAX250	Audio Amplifiers
MCB300	Program Control Panel
MCC300	Intercom Control Panel
MCT300	Telephone Control Panel
MCX300	Radio/Cassette Player
MCZ300	Master Control Panel
MR100	Media Retrieval
MR200	Media Retrieval Chassis
PSX300	28-VDC Power Supply
RAC900	AC Power Strip or Equivalent
RP1100	Cabinet
RP1101	Cabinet
RP1102	Cabinet
RP1103	Cabinet

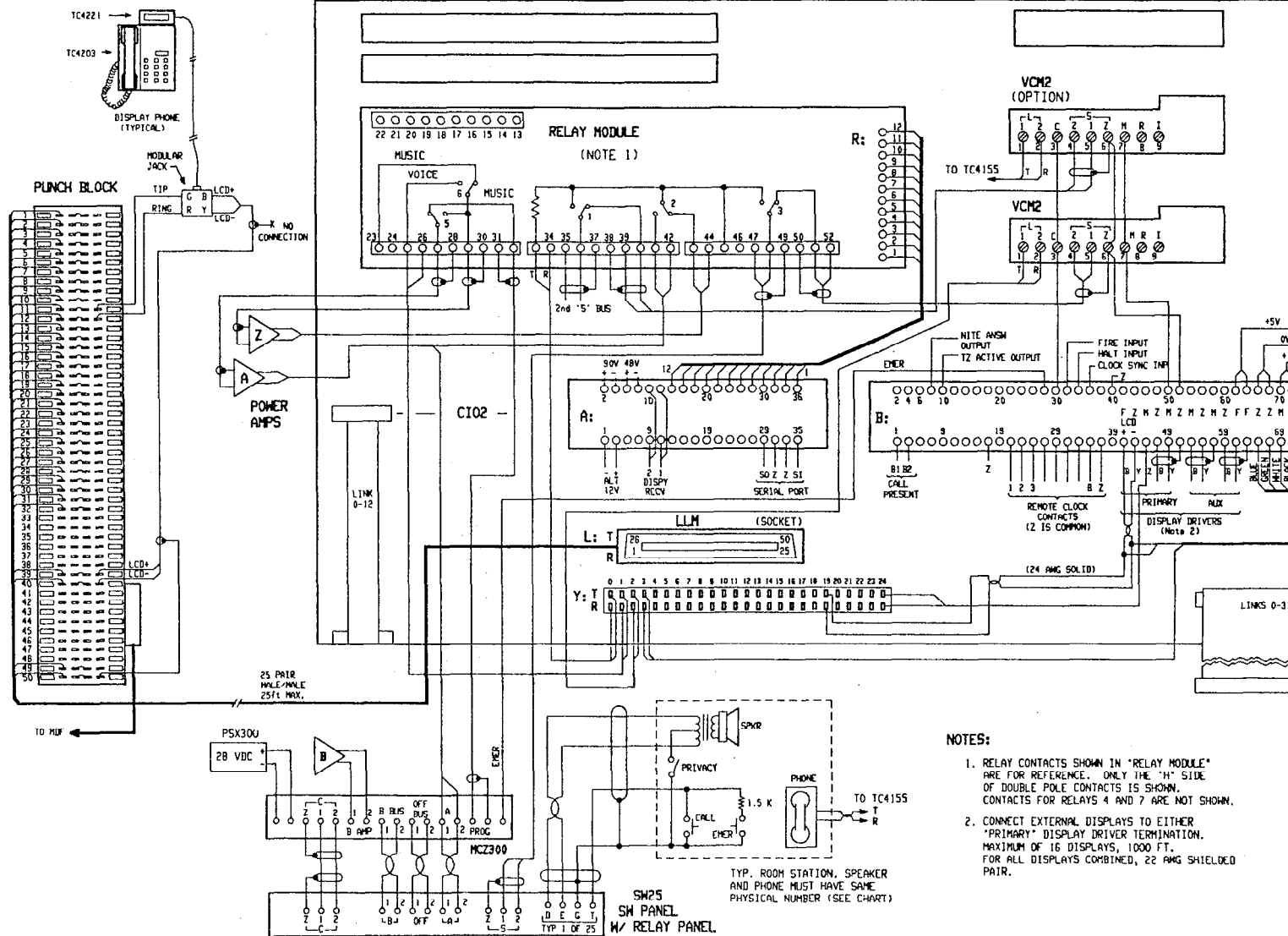
Telecenter[®] V Installation Drawings

S662CF	Connector Block	TC4160	VCM
SW25	Switch Banks	TC4180	COA Expansion Chassis
SWT425	Switch Banks	TC4181	Line Amp
TC4002	Main Chassis	TC4182	COA2
TC4110	Switch Bank	TC4183	E & M Tie Line Interface
TC4120	Switch Bank	TC4190	DTMF Module
TC4130	Switch Bank	TC4221	LCD Display
TC4131	Switch Bank	TCS4530	Remote Transmitter
TC4145	LLM32 Expansion Chassis	TCS4560	Area Page Expander Chassis
TC4155	LLM32	VC7463	E & M Line Module
TC4156	48 V Line Hybrids		

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

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la classe A prescrites dans le Règlement sur le brouillage radioélectrique édicté par le ministère des Communications du Canada.

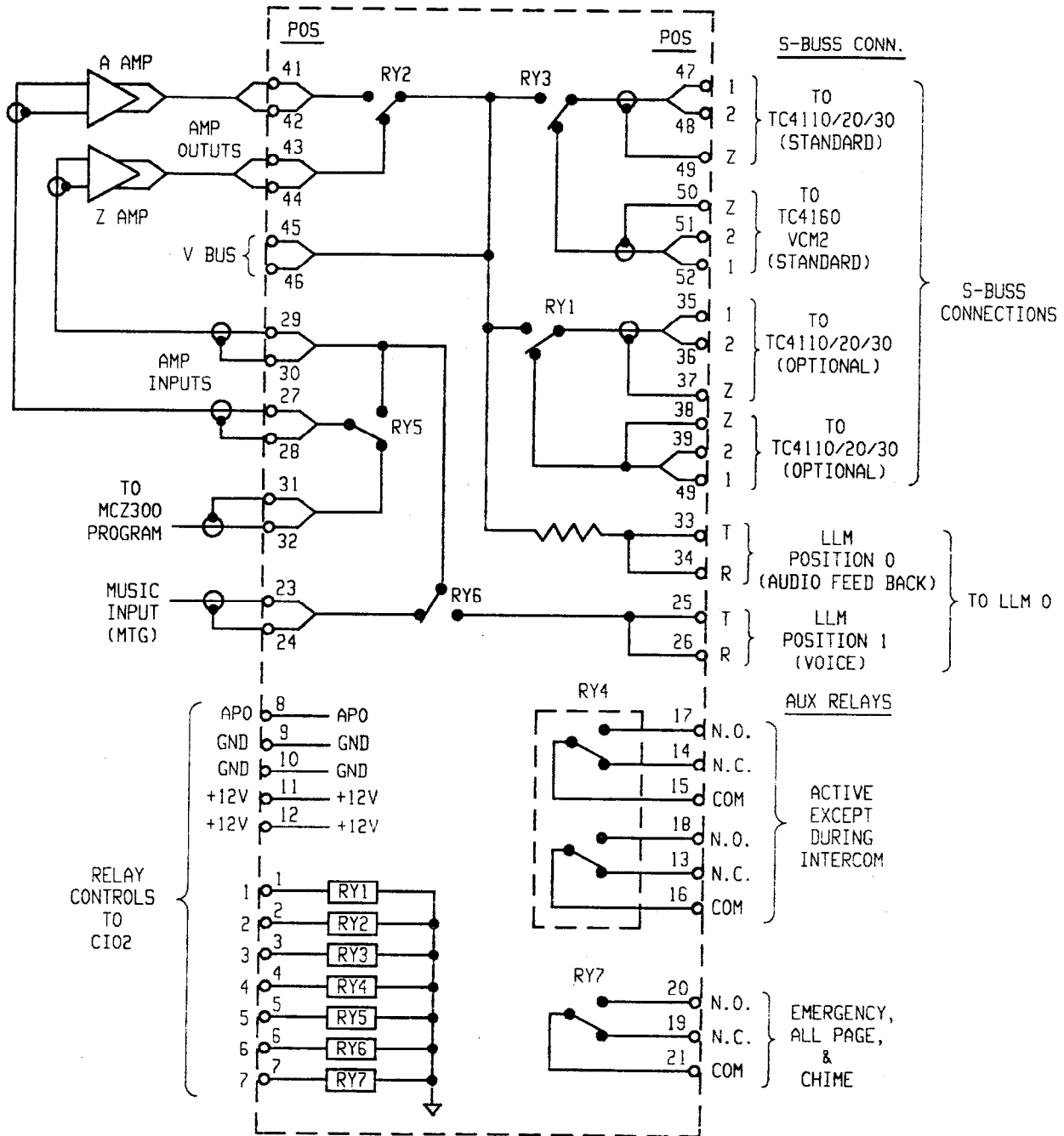
TC4002 (REAR VIEW)



NOTES:

1. RELAY CONTACTS SHOWN IN "RELAY MODULE" ARE FOR REFERENCE. ONLY THE "H" SIDE OF DOUBLE POLE CONTACTS IS SHOWN. CONTACTS FOR RELAYS 4 AND 7 ARE NOT SHOWN.
2. CONNECT EXTERNAL DISPLAYS TO EITHER "PRIMARY" DISPLAY DRIVER TERMINATION. MAXIMUM OF 16 DISPLAYS, 1000 FT. FOR ALL DISPLAYS COMBINED, 22 AWG SHIELDED PAIR.

TC4196 RELAY MODULE



RELAY ACTIVATION CHART

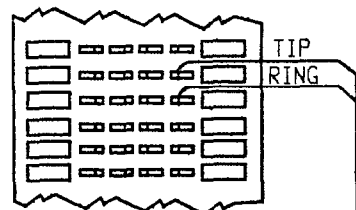
DESCRIPTION	RY1	RY2	RY3	RY4	RY5	RY6	RY7
EMERGENCY CHIME	0	0	0	0	0	0	0

1 = RELAY ACTIVE
0 = RELAY IDLE

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SKOKIE, ILL, USA
KM1098 - 0

ADMINISTRATIVE TELEPHONE

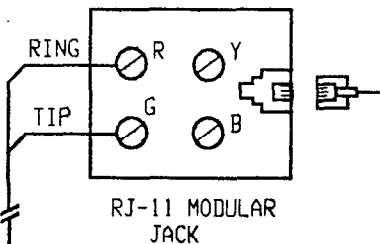
FROM TC4155(LLM)
P/O MDF PUNCH BLOCK



CABLING TO ADMINISTRATIVE PHONES:
- TWISTED PAIRS

MAXIMUM CABLE LENGTHS IN FEET

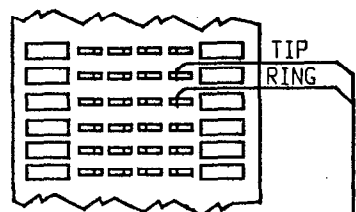
950	24 AWG
1500	22 AWG
2400	20 AWG



← TWISTED PAIR

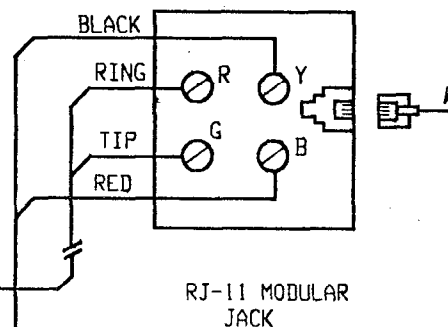
ADMINISTRATIVE TELEPHONE WITH DISPLAY

FROM TC4155(LLM)
P/O MDF PUNCH BLOCK



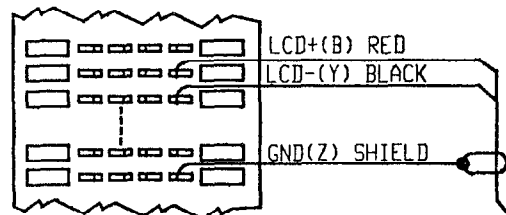
CABLING TO ADMINISTRATIVE PHONE
WITH DISPLAY

- TWISTED PAIR (AS ABOVE)
- SHIELDED PAIR (22 AWG)
MAXIMUM LENGTH 1000 FT



← TWISTED PAIR

FROM CIO
P/O MDF PUNCH BLOCK



EXAMPLE:

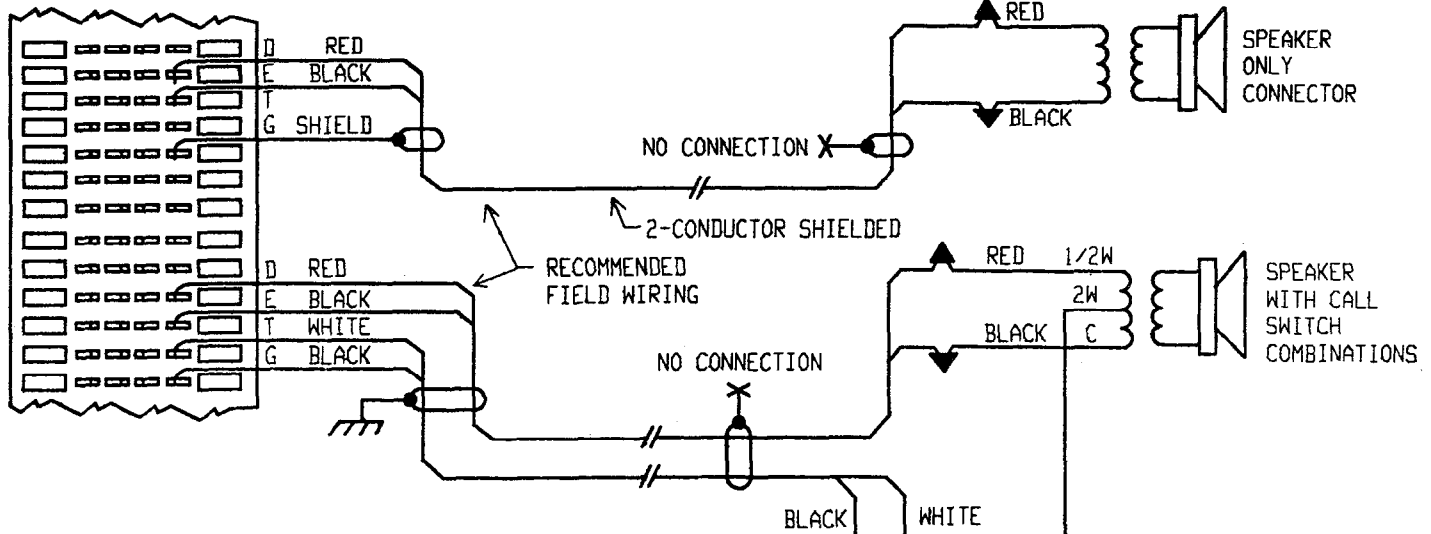
PHONE 1	- 400 FT
PHONE 2	- 350 FT
PHONE 3	- 250 FT
	<u>1000 FT</u>

X NO CONNECTION

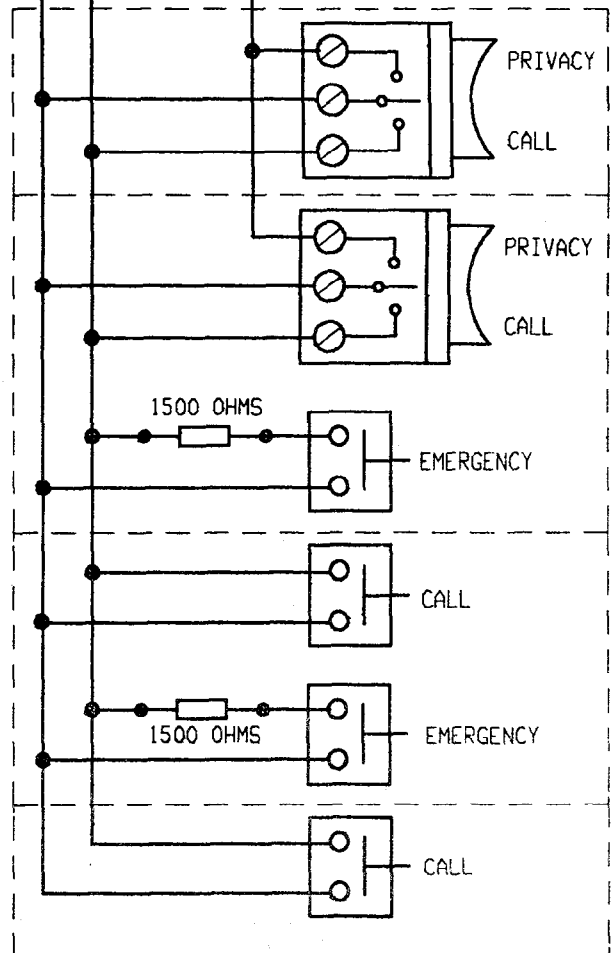
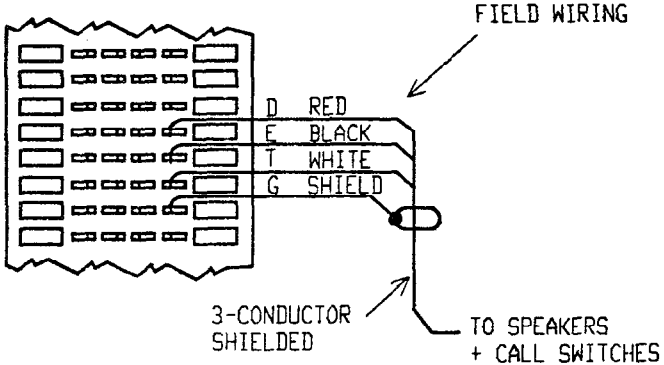
ADMIN:
RA
S
|

SPEAKER AND CALL SWITCHES

FROM TC4110(SC25)/
TC4120(SCC25)
P/O MDF PUNCH BLOCK



FROM TC4110(SC25)/
TC4120(SCC25)
P/O MDF PUNCH BLOCK



CABLING TO SPEAKER/SWITCH STATION

RECOMMENDED: 2-PAIRS SHIELDED (SPEAKER AND CALL SWITCHES)

ALTERNATE: 3-CONDUCTOR SHIELDED CABLE
-1 TWISTED PAIR
-1 SINGLE CONDUCTOR

MAXIMUM CABLE LENGTH IN FEET

950	24 AWG
1500	22 AWG
2400	20 AWG

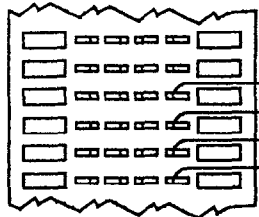
TELECENTER
SPEAKERS WITH CALL SWITCHES

RAULAND-BORG CORP.
SKOKIE, ILL, USA

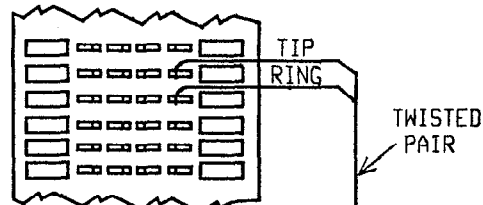
KM1062 - 0

FROM TC4110(SC25)/
TC4120(SCC25)
P/O MDF PUNCH BLOCK

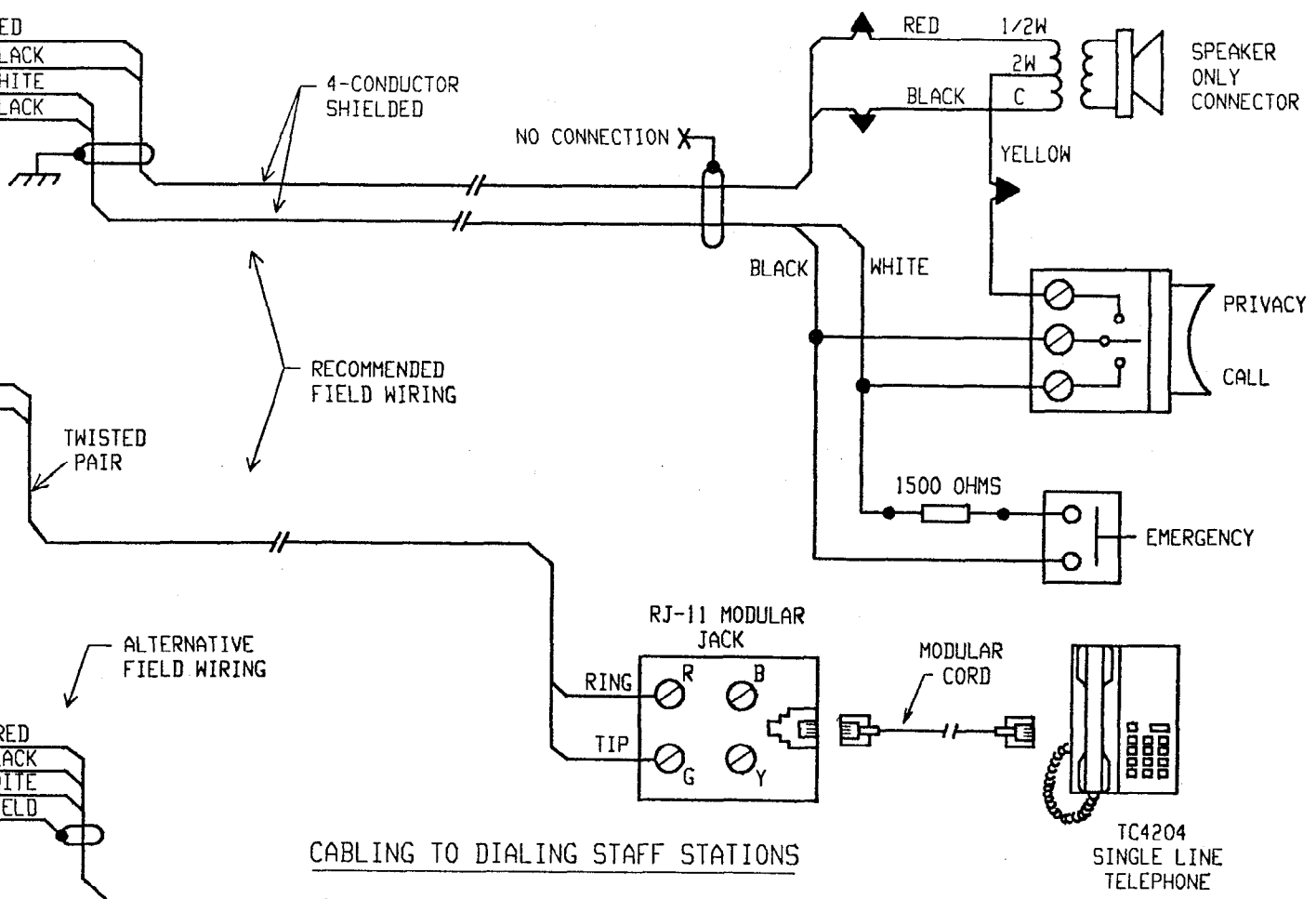
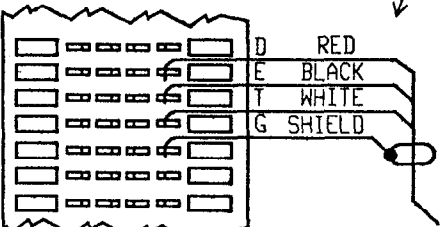
DIALING STAFF STATIONS



FROM TC4155(LLM)
P/O MDF PUNCH BLOCK



FROM TC4110(SC25)
TC4120(SCC25)
P/O MDF PUNCH BLOCK



CABLING TO DIALING STAFF STATIONS

- 1 TWISTED PAIR (SPEAKER)
- 1 SINGLE CONDUCTOR (T=TRIGGER)
- (B) TWISTED PAIR (TELEPHONE)

MAXIMUM CABLE LENGTH:	24 AWG	950 FT
	22 AWG	1500 FT
	20 AWG	2400 FT

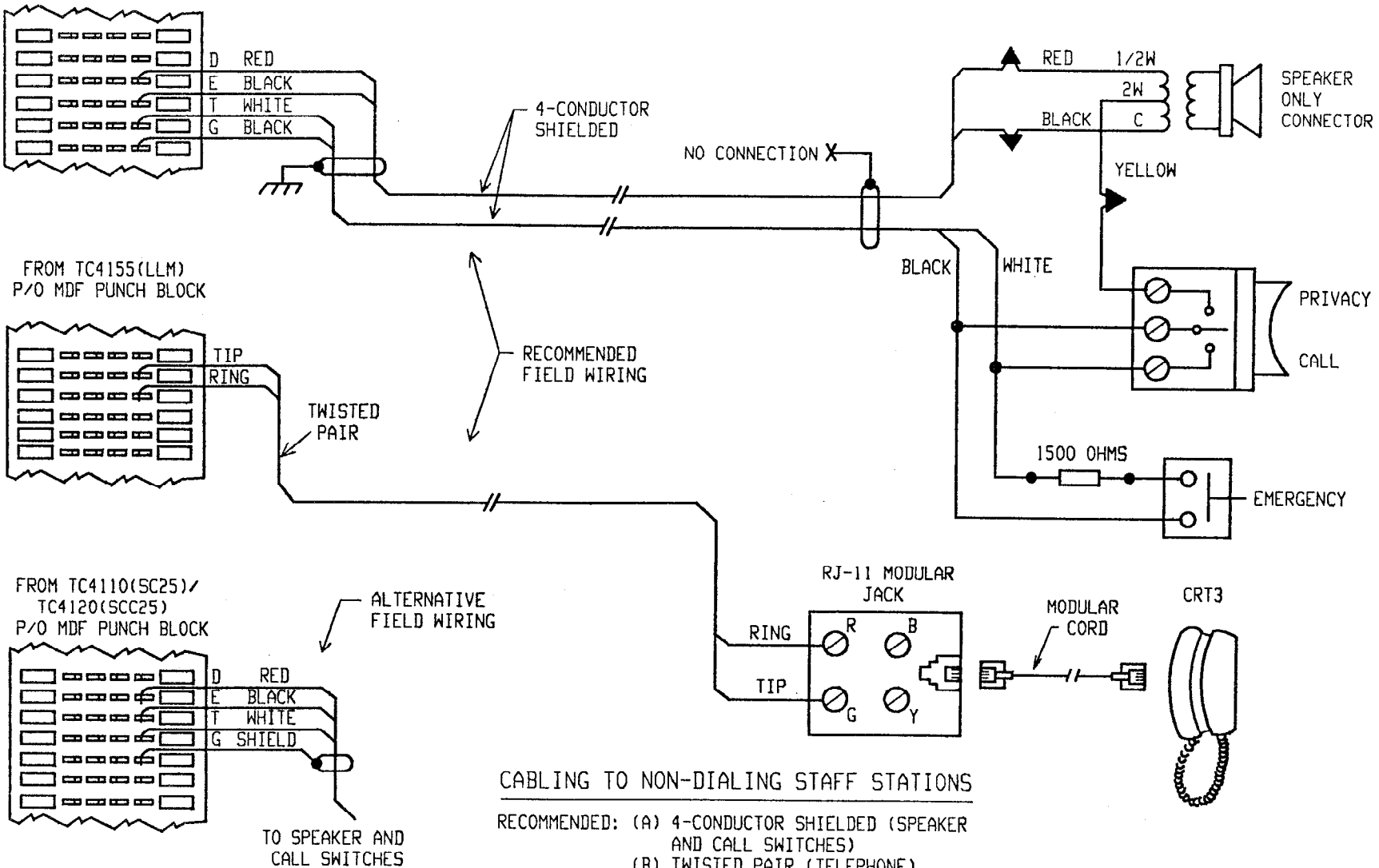
DIALING STAFF TELEPHONE WITH CALL SWITCHES

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SKOKIE, ILL., USA

KM1063 - 0

FROM TC4110(SC25)/
TC4120(SCC25)
P/O MDF PUNCH BLOCK

NON-DIALING STAFF STATIONS



CABLING TO NON-DIALING STAFF STATIONS

RECOMMENDED: (A) 4-CONDUCTOR SHIELDED (SPEAKER AND CALL SWITCHES)
(B) TWISTED PAIR (TELEPHONE)

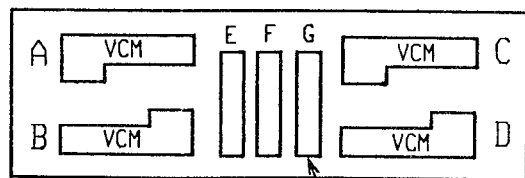
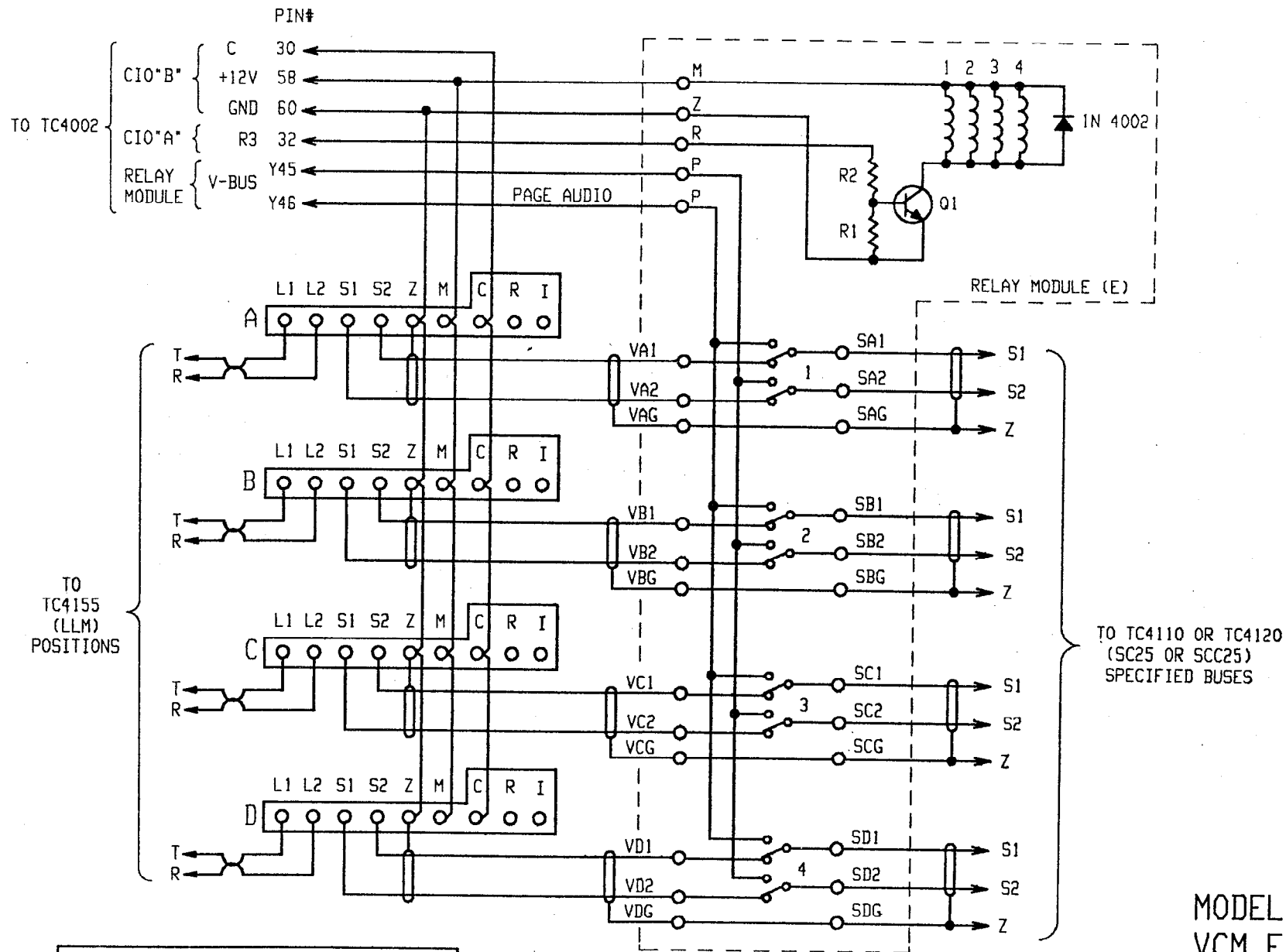
ALTERNATE: (A) 3-CONDUCTOR SHIELDED
- 1 TWISTED PAIR (SPEAKER)
- 1 SINGLE CONDUCTOR (T=TRIGGER)
(B) TWISTED PAIR (TELEPHONE)

MAXIMUM CABLE LENGTH: 24 AWG 950 FT
22 AWG 1500 FT
20 AWG 2400 FT

TELECENTER
NON-DIALING STAFF TELEPHONE
WITH CALL SWITCHES

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SKOKIE, ILL, USA

KM1064 - 0



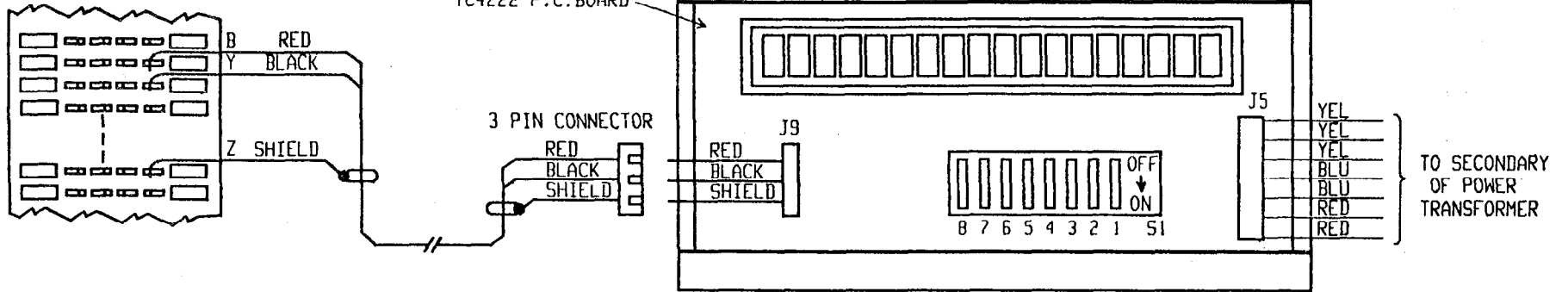
TC4165, REAR VIEW
HOLDS 4 TC4160's (VCM)

NOTE : REMOVE LINE ADAPTOR FOR EACH TC4155(LLM)
POSITION ASSOCIATED WITH VCM CARDS.

MODEL TC4165
VCM EXPANDER
TO TELECENTER V
RAULAND-BORG CORP.
SKOKIE, IL
MADE IN U.S.A
KM1053 - 0

VACUUM FLUORESCENT DISPLAY WIRING

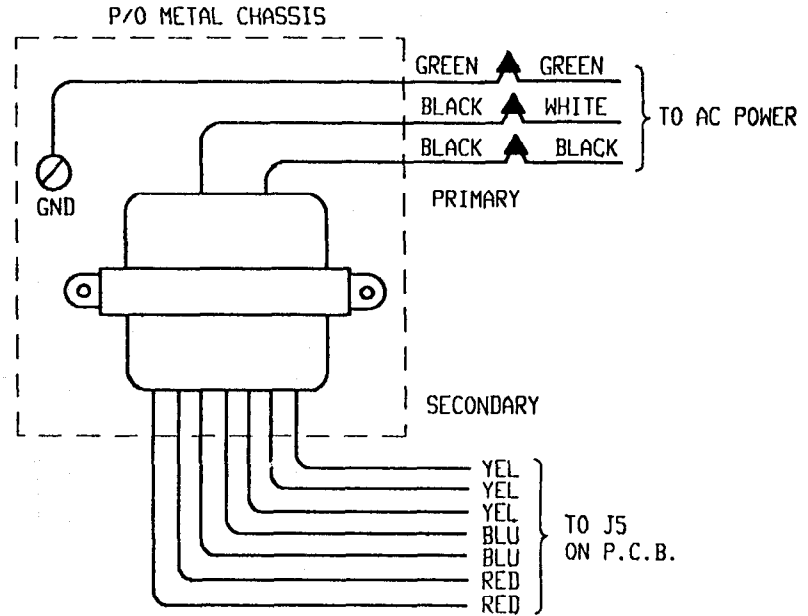
FROM CIO "B"
P/O MDF PUNCH BLOCK



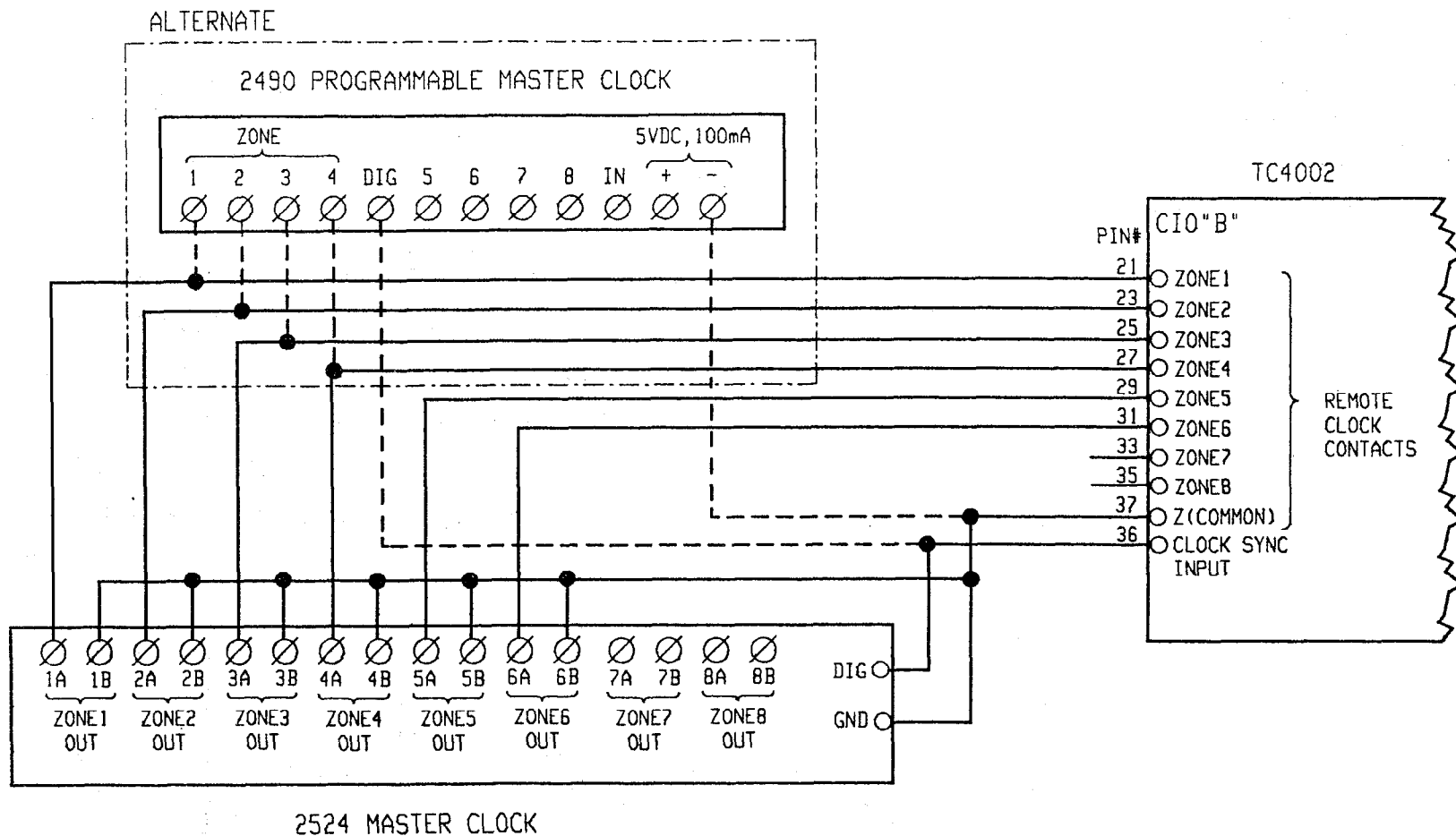
NOTES:

1. TC4222 SHOWN IN TCV APPLICATION WITH FACE PLATE REMOVED.
2. SEE KI1683 TC4222 VACUUM FLUORESCENT DISPLAY MANUAL FOR S1 SWITCH SETTING.
3. MAXIMUM CABLE LENGTH 1000 FT.
4. FOR MOUNTING IN RACK WITH SYSTEM, CONNECT VFD AS FOLLOWS:



SYSTEM CONNECTION	J9 TERMINALS		
	RED	BLACK	SHIELD
TCIV LCD1 MIO "B" PINS	27 OR 29	31 OR 33	25 OR 35
LCD2 MIO "B" PINS	39 OR 41	43 OR 45	37 OR 47
TCV PRIMARY CIO "B" PINS	41 OR 47	43 OR 49	45 OR 51



TELECENTER
TC4222 VFD WIRING
RAULAND-BORG CORP.
SKOKIE, ILL; USA
KM1054 - 0



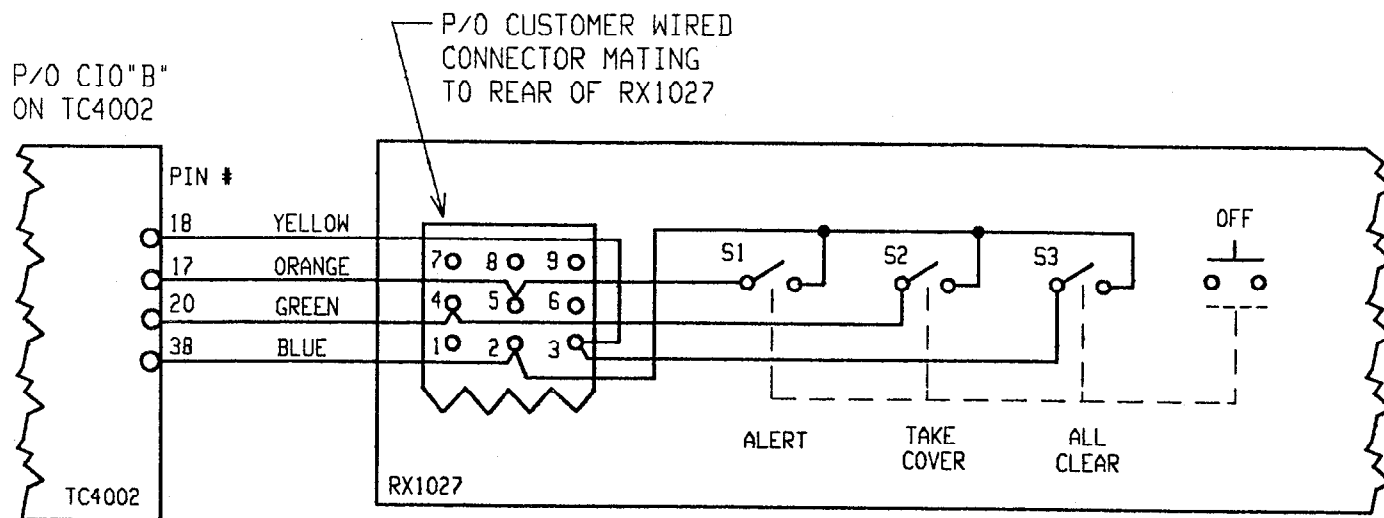
NOTES:

1. TCV SHOWN WITH TWO POPULAR MASTER CLOCKS, ONLY ONE SUPPORTED PER SYSTEM.
2.  INDICATES SCREW TERMINALS
 INDICATES WIRE WRAP PINS
3. FACTORY PROGRAMMING ON 2490 IS FOR 4-ZONE OPERATION AS SHOWN.
4. FACTORY PROGRAMMING ON 2524 IS FOR 6-ZONE OPERATION AS SHOWN.
5. CLOCK SYNCHRONIZATION OCCURS EVERY 24 HOURS AT 12:00:57 AM.
6. BOTH MASTER CLOCKS ZONES MAY BE EXTENDED TO 8-ZONES IF NO CLOCK CORRECTION IS REQUIRED. (CONSULT CLOCK MANUAL FOR INSTRUCTION).

TELECENTER V
CLOCK WIRING
RAULAND-BORG CORP.
SKOKIE, IL. USA

KM1055 - 0

EXTERNAL TONE ACTIVATION



NOTES:

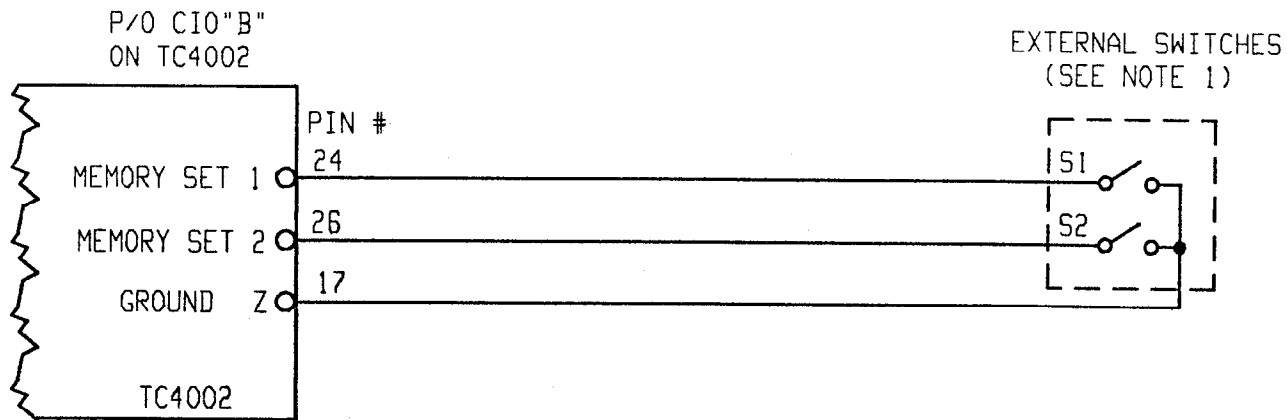
1. CONNECTOR SHOWN ON RX1027 IS A 9-PIN MALE CONNECTOR.
2. TONE BUTTONS LATCH. OFF RELEASES SELECTION.
3. SIGNAL AT CIO "B" PINS 18 AND 20 ARE NORMALLY LOW.
4. ASSIGNMENT OF TONE OUTPUTS FROM LOCATION CODES AS FOLLOWS:

LOCATION CODE	SIGNAL
000	CIO CEM 000 COUNTRIES CTO CEM 000

1. CHIME
2. WESTMINSTER
3. EUROPEAN SIREN
4. PULSING TONE

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SKOKIE, IL. USA

KM1056 - 0



NOTES:

1. S1 AND S2 ARE EXTERNAL SWITCHES OR UNUSED ZONE RELAYS SUPPLYING DRY CONTACTS FROM A MASTER CLOCK i.e. RAULAND PART NUMBER 2524 OR 2490.
2. GROUNDING OR CLOSING SWITCHES (OV) S1 AND S2 SELECT MEMORY BLOCK 1 THROUGH 4 PER THE FOLLOWING TABLE:

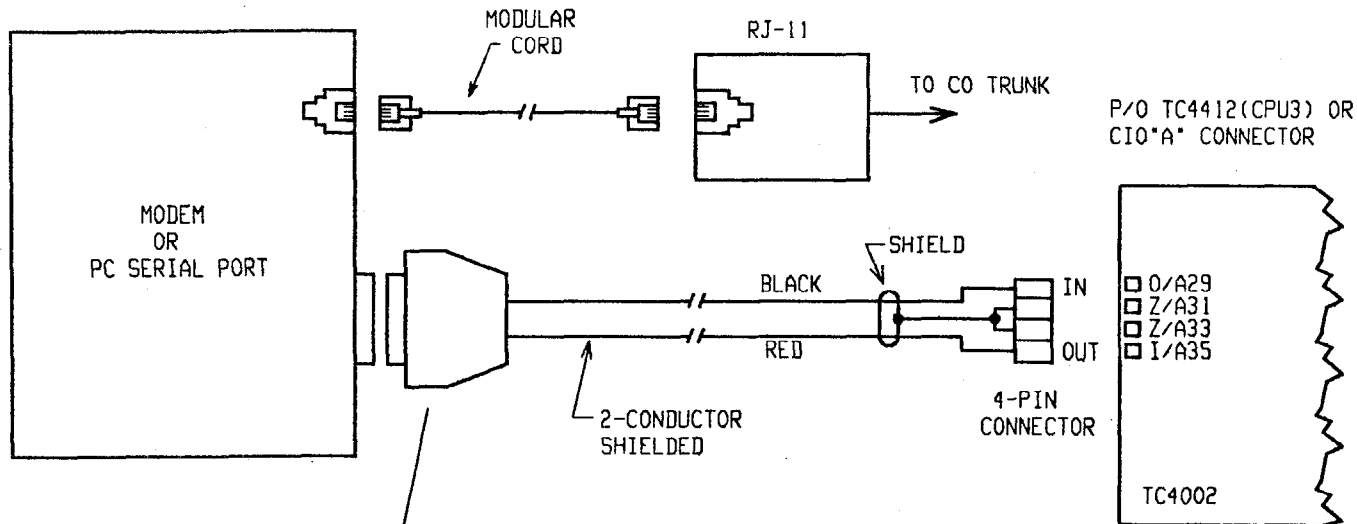
BLOCK SELECTION	S2	S1
MEMORY BLOCK 1	OPEN	OPEN
MEMORY BLOCK 2	OPEN	CLOSED
MEMORY BLOCK 3	CLOSED	OPEN
MEMORY BLOCK 4	CLOSED	CLOSED

MANUAL MEMORY BLOCK SWITCH
TELECENTER V

RAULAND-BORG CORP.
SKOKIE, IL. USA

KM1057 - 0

TELECENTER V CONNECTED TO MODEM/COMPUTER



SERIAL CABLE PINOUT:

CONNECTOR TYPE	IN	OUT*	SHIELD
25 PIN, MALE	PIN 2	PIN 3	PIN 7
25 PIN, FEMALE	3	2	7
9 PIN, MALE	3	2	5
9 PIN, FEMALE	2	3	5

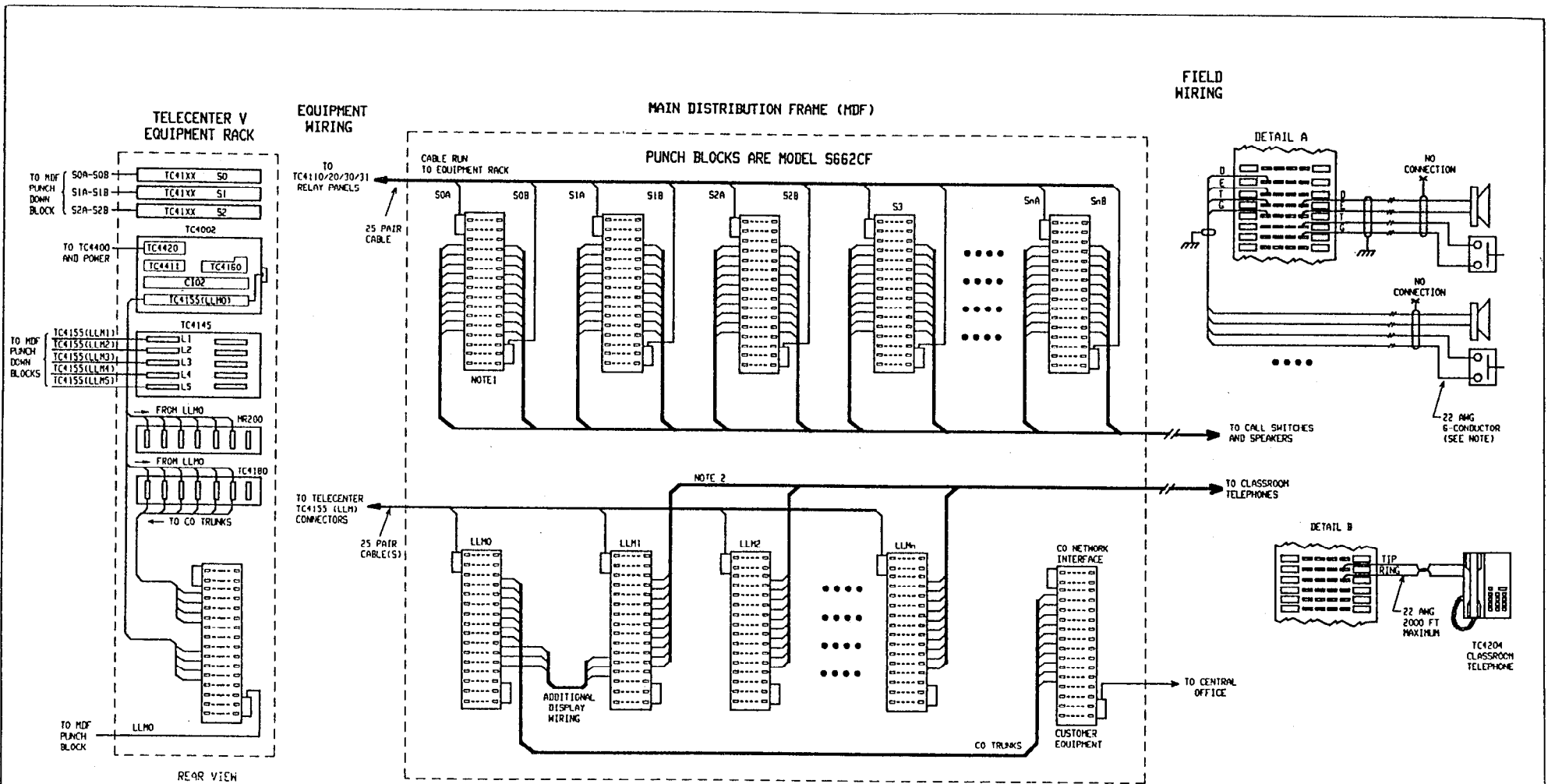
NOTES:

1. 4-PIN CONNECTOR SAME AS USED ON TC4110(SC25)/TC4120(SCC25) PANELS (SQUARE PINS WITH .156 CENTERS).
- *2. TO VERIFY OUTPUT PIN NUMBER (2 OR 3). VOLTMETER MEASURES 10 TO 15 VDC BETWEEN OUT AND GND.
3. MODEM SHOULD BE SET UP AS FOLLOWS:
 - A. AUTO ANSWER ENABLED
 - B. NO INTERNAL HANDSHAKING
 - C. NO ON SCREEN RESPONSES (ECHO)
4. TEST MODEM BY CALLING FROM ANOTHER PHONE. MODEM SHOULD ANSWER AND RESPOND WITH 1 KHz TONE.
5. SEE TD5 DIAGNOSTIC PROGRAM MANUAL FOR MORE DETAILS ON SERIAL PORT APPLICATIONS.

TELECENTER V
TO MODEM OR PERSONAL COMPUTER

RAULAND-BORG CORP.
SKOKIE, ILL., USA

KM1058 - 0



NOTES:

1. FIELD SPEAKER/CALL-IN SWITCH WIRING ROUTES

4. NOT SHOWN IN EQUIPMENT RACK ARE ALL ACCESSORY ITEMS WITH

DIRECTLY TO RIGHT SIDE OF THE PUNCH DOWN BLOCK OR TO AN INTERMEDIATE PUNCH DOWN BLOCK PRIOR TO CROSS CONNECTION TO LLM BLOCKS.

3. INSTALL BRIDGING CLIPS ON ALL LLM BLOCKS AS NEEDED.

6. 25 PAIR CABLES SHOULD BE LABELED AS SHOWN.

7. CABLE WIRING ON MDF SHOWN FOR LAYOUT PURPOSES ONLY.

8. REFER TO CABLE ASSIGNMENT CHART.

TELECENTER V
UNIFORM CABLING PLAN

RAULAND-BORG CORP.
SKOKIE, IL. USA

KM1047 - 0

Telecenter® V

PHYSICAL NUMBER LAYOUT PLANNING WORKSHEET

KM 1102

Sw #	SC25 #48			SC25 #0			SC25 #1			SC25 #2			SC25 #3			
	Phys.	Arch.	LLM	Pos.	Phys.	Arch.	LLM	Pos.	Phys.	Arch.	LLM	Pos.	Phys.	Arch.	LLM	Pos.
1	0	----	0	0	16		1	0	41		2	9	66		4	2
2	1	----	0	1	17		1	1	42		2	10	67		4	3
3	2	----	0	2	18		1	2	43		2	11	68		4	4
4	3		0	3	19		1	3	44		2	12	69		4	5
5	4		0	4	20		1	4	45		2	13	70		4	6
6	5		0	5	21		1	5	46		2	14	71		4	7
7	6		0	6	22		1	6	47		2	15	72		4	8
8	7		0	7	23		1	7	48		3	0	73		4	9
9	8		0	8	24		1	8	49		3	1	74		4	10
10	9		0	9	25		1	9	50		3	2	75		4	11
11	10		0	10	26		1	10	51		3	3	76		4	12
12	11		0	11	27		1	11	52		3	4	77		4	13
13	12		0	12	28		1	12	53		3	5	78		4	14
14	13		0	13	29		1	13	54		3	6	79		4	15
15	14		0	14	30		1	14	55		3	7	80		5	0
16	15		0	15	31		1	15	56		3	8	81		5	1
17	n/a	n/a	n/a	n/a	32		2	0	57		3	9	82		5	2
18	n/a	n/a	n/a	n/a	33		2	1	58		3	10	83		5	3
19	These SC terminals do not have physical numbers and cannot be used by the system				34		2	2	59		3	11	84		5	4
20					35		2	3	60		3	12	85		5	5
21					36		2	4	61		3	13	86		5	6
22					37		2	5	62		3	14	87		5	7
23	n/a	n/a	n/a	n/a	38		2	6	63		3	15	88		5	8
24	n/a	n/a	n/a	n/a	39		2	7	64		4	0	89		5	9
25	n/a	n/a	n/a	n/a	40		2	8	65		4	1	90		5	10

LEGEND

Arch. = Architectural Number LLM = Line Link Module (TC4155) SC25 # = Speaker Control Board (TC4110/20/30)
 Phys. = Physical number Pos. = Position number of LLM SW.# = Switch position of a SC25

Telecenter® V

PHYSICAL NUMBER LAYOUT PLANNING WORKSHEET

KM 1102

Sw #	SC25 #4				SC25 #5				SC25 #6				SC25 #7			
	Phys.	Arch.	LLM	Pos.	Phys.	Arch.	LLM	Pos.	Phys.	Arch.	LLM	Pos.	Phys.	Arch.	LLM	Pos.
1	116		7	4	141		8	13	166		10	6	191		11	15
2	117		7	5	142		8	14	167		10	7	192		12	0
3	118		7	6	143		8	15	168		10	8	193		12	1
4	119		7	7	144		9	0	169		10	9	194		12	2
5	120		7	8	145		9	1	170		10	10	195		12	3
6	121		7	9	146		9	2	171		10	11	196		12	4
7	122		7	10	147		9	3	172		10	12	197		12	5
8	123		7	11	148		9	4	173		10	13	198		12	6
9	124		7	12	149		9	5	174		10	14	199		12	7
10	125		7	13	150		9	6	175		10	15	200		12	8
11	126		7	14	151		9	7	176		11	0	201		12	9
12	127		7	15	152		9	8	177		11	1	202		12	10
13	128		8	0	153		9	9	178		11	2	203		12	11
14	129		8	1	154		9	10	179		11	3	204		12	12
15	130		8	2	155		9	11	180		11	4	205		12	13
16	131		8	3	156		9	12	181		11	5	206		12	14
17	132		8	4	157		9	13	182		11	6	207		12	15
18	133		8	5	158		9	14	183		11	7	208		13	0
19	134		8	6	159		9	15	184		11	8	209		13	1
20	135		8	7	160		10	0	185		11	9	210		13	2
21	136		8	8	161		10	1	186		11	10	211		13	3
22	137		8	9	162		10	2	187		11	11	212		13	4
23	138		8	10	163		10	3	188		11	12	213		13	5
24	139		8	11	164		10	4	189		11	13	214		13	6
25	140		8	12	165		10	5	190		11	14	215		13	7

LEGEND

Arch. = Architectural Number
Phys. = Physical number

LLM = Line Link Module (TC4155)
Pos. = Position number of LLM

SC25 # = Speaker Control Board (TC4110/20/30)
SW.# = Switch position of a SC25

Telecenter® V

PHYSICAL NUMBER LAYOUT PLANNING WORKSHEET

KM 1102

Sw #	SC25 #8				SC25 #9				SC25 #10				SC25 #11			
	Phys.	Arch.	LLM	Pos.	Phys.	Arch.	LLM	Pos.	Phys.	Arch.	LLM	Pos.	Phys.	Arch.	LLM	Pos.
1	216		13	8	241		15	1	266		16	10	291		18	3
2	217		13	9	242		15	2	267		16	11	292		18	4
3	218		13	10	243		15	3	268		16	12	293		18	5
4	219		13	11	244		15	4	269		16	13	294		18	6
5	220		13	12	245		15	5	270		16	14	295		18	7
6	221		13	13	246		15	6	271		16	15	296		18	8
7	222		13	14	247		15	7	272		17	0	297		18	9
8	223		13	15	248		15	8	273		17	1	298		18	10
9	224		14	0	249		15	9	274		17	2	299		18	11
10	225		14	1	250		15	10	275		17	3	300		18	12
11	226		14	2	251		15	11	276		17	4	301		18	13
12	227		14	3	252		15	12	277		17	5	302		18	14
13	228		14	4	253		15	13	278		17	6	303		18	15
14	229		14	5	254		15	14	279		17	7	304		19	0
15	230		14	6	255		15	15	280		17	8	305		19	1
16	231		14	7	256		16	0	281		17	9	306		19	2
17	232		14	8	257		16	1	282		17	10	307		19	3
18	233		14	9	258		16	2	283		17	11	308		19	4
19	234		14	10	259		16	3	284		17	12	309		19	5
20	235		14	11	260		16	4	285		17	13	310		19	6
21	236		14	12	261		16	5	286		17	14	311		19	7
22	237		14	13	262		16	6	287		17	15	312		19	8
23	238		14	14	263		16	7	288		18	0	313		19	9
24	239		14	15	264		16	8	289		18	1	314		19	10
25	240		15	0	265		16	9	290		18	2	315		19	11

LEGEND

Arch. = Architectural Number
Phys. = Physical number

LLM = Line Link Module (TC4155)
Pos. = Position number of LLM

SC25 # = Speaker Control Board (TC4110/20/30)
SW.# = Switch position of a SC25

Telecenter® V

PHYSICAL NUMBER LAYOUT PLANNING WORKSHEET

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SC25 #12					SC25 #13				SC25 #14				SC25 #15			
Sw #	Phys.	Arch.	LLM	Pos.	Phys.	Arch.	LLM	Pos.	Phys.	Arch.	LLM	Pos.	Phys.	Arch.	LLM	Pos.
1	316		19	12	341		21	5	366		22	14	391		24	7
2	317		19	13	342		21	6	367		22	15	392		24	8
3	318		19	14	343		21	7	368		23	0	393		24	9
4	319		19	15	344		21	8	369		23	1	394		24	10
5	320		20	0	345		21	9	370		23	2	395		24	11
6	321		20	1	346		21	10	371		23	3	396		24	12
7	322		20	2	347		21	11	372		23	4	397		24	13
8	323		20	3	348		21	12	373		23	5	398		24	14
9	324		20	4	349		21	13	374		23	6	399		24	15
10	325		20	5	350		21	14	375		23	7	400		25	0
11	326		20	6	351		21	15	376		23	8	401		25	1
12	327		20	7	352		22	0	377		23	9	402		25	2
13	328		20	8	353		22	1	378		23	10	403		25	3
14	329		20	9	354		22	2	379		23	11	404		25	4
15	330		20	10	355		22	3	380		23	12	405		25	5
16	331		20	11	356		22	4	381		23	13	406		25	6
17	332		20	12	357		22	5	382		23	14	407		25	7

21	336		21	0	361		22	9	386		24	2	411		25	11
22	337		21	1	362		22	10	387		24	3	412		25	12
23	338		21	2	363		22	11	388		24	4	413		25	13
24	339		21	3	364		22	12	389		24	5	414		25	14
25	340		21	4	365		22	13	390		24	6	415		25	15

LEGEND

Arch. = Architectural Number
Phys. = Physical number

LLM = Line Link Module (TC4155)
Pos. = Position number of LLM

SC25 # = Speaker Control Board (TC4110/20/30)
SW.# = Switch position of a SC25

Telecenter® V

PHYSICAL NUMBER LAYOUT PLANNING WORKSHEET

KM 1102

Sw #	SC25 #16				SC25 #17				SC25 #18				SC25 #19			
	Phys.	Arch.	LLM	Pos.	Phys.	Arch.	LLM	Pos.	Phys.	Arch.	LLM	Pos.	Phys.	Arch.	LLM	Pos.
1	416		26	0	441		27	9	466		29	2	491		30	11
2	417		26	1	442		27	10	467		29	3	492		30	12
3	418		26	2	443		27	11	468		29	4	493		30	13
4	419		26	3	444		27	12	469		29	5	494		30	14
5	420		26	4	445		27	13	470		29	6	495		30	15
6	421		26	5	446		27	14	471		29	7	496		31	0
7	422		26	6	447		27	15	472		29	8	497		31	1
8	423		26	7	448		28	0	473		29	9	498		31	2
9	424		26	8	449		28	1	474		29	10	499		31	3
10	425		26	9	450		28	2	475		29	11	500		31	4
11	426		26	10	451		28	3	476		29	12	501		31	5
12	427		26	11	452		28	4	477		29	13	502		31	6
13	428		26	12	453		28	5	478		29	14	503		31	7
14	429		26	13	454		28	6	479		29	15	504		31	8
15	430		26	14	455		28	7	480		30	0	505		31	9
16	431		26	15	456		28	8	481		30	1	506		31	10
17	432		27	0	457		28	9	482		30	2	507		31	11
18	433		27	1	458		28	10	483		30	3	508		31	12
19	434		27	2	459		28	11	484		30	4	509		31	13
20	435		27	3	460		28	12	485		30	5	510		31	14
21	436		27	4	461		28	13	486		30	6	511		31	15
22	437		27	5	462		28	14	487		30	7	These SC terminals do not have physical numbers and cannot be used by the system			
23	438		27	6	463		28	15	488		30	8				
24	439		27	7	464		29	0	489		30	9				
25	440		27	8	465		29	1	490		30	10				

LEGEND

Arch. = Architectural Number
Phys. = Physical number

LLM = Line Link Module (TC4155)
Pos. = Position number of LLM

SC25 # = Speaker Control Board (TC4110/20/30)
SW.# = Switch position of a SC25

TC4155 CABLE ASSIGNMENT CHART (LLM0)

Distributor:

Job Name:

Date:

RT 4002-_____

BLOCK	CABLE		TC4155 ---- LINE LINK MODULE #0				
CLIP #	CONN. #	COLOR	DESIG.	POS.#	PHYS #	ARCH #	NOTES
1	26	W/BL	T	0	0		SYSTEM AUDIO FEEDBACK
2	1	BL/W	R				NOT AVAILABLE
3	27	W/O	T	1	1		PAGING AMPLIFIER AUDIO FEED
4	2	O/W	R				NOT AVAILABLE
5	28	W/G	T	2	2		VCM AUDIO FEEDBACK
6	3	G/W	R				NOT AVAILABLE
7	29	W/BR	T	3	3	403	TEST PHONE WIRED TO RJ-11
8	4	BR/W	R				NOT AVAILABLE
9	30	W/S	T	4	4	404	
10	5	S/W	R				
11	31	R/BL	T	5	5	405	
12	6	BL/R	R				
13	32	R/O	T	6	6	406	
14	7	O/R	R				
15	33	R/G	T	7	7	407	
16	8	G/R	R				
17	34	R/BR	T	8	8	408	
18	9	BR/R	R				
19	35	R/S	T	9	9	409	
20	10	S/R	R				
21	36	BK/BL	T	10	10	410	
22	11	BL/BK	R				
23	37	BK/O	T	11	11	411	
24	12	O/BK	R				
25	38	BK/G	T	12	12	412	
26	13	G/BK	R				
27	39	BK/BR	T	13	13	413	
28	14	BR/BK	R				
29	40	BK/S	T	14	14	414	
30	15	S/BK	R				
31	41	Y/BL	T	15	15	415	
32	16	BL/Y	R				
33	42	Y/O	SPARE	SPARE	SPARE	SPARE	
34	17	O/Y					
35	43	Y/G					
36	18	G/Y					
37	44	Y/BR					
38	19	BR/Y	SPARE	SPARE	SPARE	SPARE	
39	45	Y/S	B	---	---	---	DISPLAY LEADS B = LCD+; Y = LCD- INTSALLER TO FAN OUT LEADS FOR
40	20	S/Y	Y				
41	46	V/BL	SPARE	SPARE	SPARE	SPARE	ADDITIONAL CONNECTIONS
42	21	BL/V					
43	47	V/O					
44	22	O/V					
45	48	V/G					
46	23	G/V					
47	49	V/BR					
48	24	BR/V	SPARE	SPARE	SPARE	SPARE	
49	50	V/S	Z	---	---	---	SYSTEM GROUND LEADS
50	25	S/V	Z				

TC4155 CABLE ASSIGNMENT CHART AND WORK SHEET (LLM #)

Distributor: _____ Job Name: _____ Date: _____ RT 4002-_____

BLOCK	CABLE		TC4155 ----- LINE LINK MODULE # _____				
CLIP #	CONN. #	COLOR	DESIG.	POS.#	PHYS #	ARCH #	NOTES
1	26	W/BL	T	0			
2	1	BL/W	R				
3	27	W/O	T	1			
4	2	O/W	R				
5	28	W/G	T	2			
6	3	G/W	R				
7	29	W/BR	T	3			
8	4	BR/W	R				
9	30	W/S	T	4			
10	5	S/W	R				
11	31	R/BL	T	5			
12	6	BL/R	R				
13	32	R/O	T	6			
14	7	O/R	R				
15	33	R/G	T	7			
16	8	G/R	R				
17	34	R/BR	T	8			
18	9	BR/R	R				
19	35	R/S	T	9			
20	10	S/R	R				
21	36	BK/BL	T	10			
22	11	BL/BK	R				
23	37	BK/O	T	11			
24	12	O/BK	R				
25	38	BK/G	T	12			
26	13	G/BK	R				
27	39	BK/BR	T	13			
28	14	BR/BK	R				
29	40	BK/S	T	14			
30	15	S/BK	R				
31	41	Y/BL	T	15			
32	16	BL/Y	R				
33	42	Y/O	SPARE	SPARE	SPARE	SPARE	
34	17	O/Y					
35	43	Y/G					
36	18	G/Y					
37	44	Y/BR					
38	19	BR/Y					
39	45	Y/S					
40	20	S/Y					
41	46	V/BL					
42	21	BL/V					
43	47	V/O					
44	22	O/V					
45	48	V/G					
46	23	G/V					
47	49	V/BR					
48	24	BR/V					
49	50	V/S					
50	25	S/V	SPARE	SPARE	SPARE	SPARE	

Telecenter V

KM 1103

TC41XX / CAM25 BLOCK ASSIGNMENT CHART

			LEFT SIDE					RIGHT SIDE						
			SC25	0	1	2	3	4	SC25	0	1	2	3	4
CABLE/CONN.				J1	J3	J5	J7	J9		J2	J4	J6	J8	J10
CLIP	PIN	COLOR	DESIG.	POS #	POS #	POS #	POS #	POS #	DESIG.	POS #	POS #	POS #	POS #	POS #
1	26	W/BL	D	16	41	66	91	116	D	40	65	90	115	140
2	1	BL/W	E						E					
3	27	W/O	G						G					
4	2	O/W	T						T					
5	28	W/G	D	17	42	67	92	117	D	39	64	89	114	139
6	3	G/W	E						E					
7	29	W/BR	G						G					
8	4	BR/W	T						T					
9	30	W/S	D	18	43	68	93	118	D	38	63	88	113	138
10	5	S/W	E						E					
11	31	R/BL	G						G					
12	6	BL/R	T						T					
13	32	R/O	D	19	44	69	94	119	D	37	62	87	112	137
14	7	O/R	E						E					
15	33	R/G	G						G					
16	8	G/R	T						T					
17	34	R/BR	D	20	45	70	95	120	D	36	61	86	111	136
18	9	BR/R	E						E					
19	35	R/S	G						G					
20	10	S/R	T						T					
21	36	BK/BL	D	21	46	71	96	121	D	35	60	85	110	135
22	11	BL/BK	E						E					
23	37	BK/O	G						G					
24	12	O/BK	T						T					
25	38	BK/G	D	22	47	72	97	122	D	34	59	84	109	134
26	13	G/BK	E						E					
27	39	BK/BR	G						G					
28	14	BR/BK	T						T					
29	40	BK/S	D	23	48	73	98	123	D	33	58	83	108	133
30	15	S/BK	E						E					
31	41	Y/BL	G						G					
32	16	BL/Y	T						T					
33	42	Y/O	D	24	49	74	99	124	D	32	57	82	107	132
34	17	O/Y	E						E					
35	43	Y/G	G						G					
36	18	G/Y	T						T					
37	44	Y/BR	D	25	50	75	100	125	D	31	56	81	106	131
38	19	BR/Y	E						E					
39	45	Y/S	G						G					
40	20	S/Y	T						T					
41	46	V/BL	D	26	51	76	101	126	D	30	55	80	105	130
42	21	BL/V	E						E					
43	47	V/O	G						G					
44	22	O/V	T						T					
45	48	V/G	D	27	52	77	102	127	D	29	54	79	104	129
46	23	G/V	E						E					
47	49	V/BR	G						G					
48	24	BR/V	T						T					
49	50	V/S	D	28	53	78	103	128	G	28	53	78	103	128
50	25	S/V	E						T					

Telecenter V

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TC41XX / CAM25 BLOCK ASSIGNMENT CHART

			LEFT SIDE							RIGHT SIDE				
			SC25	5	6	7	8	9	SC25	5	6	7	8	9
CABLE/CONN.				J11	J13	J15	J17	J19		J12	J14	J16	J18	J20
CLIP	PIN	COLOR	DESIG.	POS #	POS #	POS #	POS #	POS #	DESIG.	POS #	POS #	POS #	POS #	POS #
1	26	W/BL	D	141	166	191	216	241	D	165	190	215	240	265
2	1	BL/W	E						E					
3	27	W/O	G						G					
4	2	O/W	T						T					
5	28	W/G	D	142	167	192	217	242	D	164	189	214	239	264
6	3	G/W	E						E					
7	29	W/BR	G						G					
8	4	BR/W	T						T					
9	30	W/S	D	143	168	193	218	243	D	163	188	213	238	263
10	5	S/W	E						E					
11	31	R/BL	G						G					
12	6	BL/R	T						T					
13	32	R/O	D	144	169	194	219	244	D	162	187	212	237	262
14	7	O/R	E						E					
15	33	R/G	G						G					
16	8	G/R	T						T					
17	34	R/BR	D	145	170	195	220	245	D	161	186	211	236	261
18	9	BR/R	E						E					
19	35	R/S	G						G					
20	10	S/R	T						T					
21	36	BK/BL	D	146	171	196	221	246	D	160	185	210	235	260
22	11	BL/BK	E						E					
23	37	BK/O	G						G					
24	12	O/BK	T						T					
25	38	BK/G	D	147	172	197	222	247	D	159	184	209	234	259
26	13	G/BK	E						E					
27	39	BK/BR	G						G					
28	14	BR/BK	T						T					
29	40	BK/S	D	148	173	198	223	248	D	158	183	208	233	258
30	15	S/BK	E						E					
31	41	Y/BL	G						G					
32	16	BL/Y	T						T					
33	42	Y/O	D	149	174	199	224	249	D	157	182	207	232	257
34	17	O/Y	E						E					
35	43	Y/G	G						G					
36	18	G/Y	T						T					
37	44	Y/BR	D	150	175	200	225	250	D	156	181	206	231	256
38	19	BR/Y	E						E					
39	45	Y/S	G						G					
40	20	S/Y	T						T					
41	46	V/BL	D	151	176	201	226	251	D	155	180	205	230	255
42	21	BL/V	E						E					
43	47	V/O	G						G					
44	22	O/V	T						T					
45	48	V/G	D	152	177	202	227	252	D	154	179	204	229	254
46	23	G/V	E						E					
47	49	V/BR	G						G					
48	24	BR/V	T						T					
49	50	V/S	D	153	178	203	228	253	G	153	178	203	228	253
50	25	S/V	E						T					

TC41XX / CAM25 BLOCK ASSIGNMENT CHART

				LEFT SIDE					RIGHT SIDE						
				SC25	10	11	12	13	14	SC25	10	11	12	13	14
CABLE/CONN.				J21	J23	J25	J27	J29	J22	J24	J26	J28	J30		
CLIP	PIN	COLOR	DESIG.	POS #	POS #	POS #	POS #	POS #	DESIG.	POS #	POS #	POS #	POS #	POS #	
1	26	W/BL	D	266	291	316	341	366	D	290	315	340	365	390	
2	1	BL/W	E						E						
3	27	W/O	G						G						
4	2	O/W	T						T						
5	28	W/G	D	267	292	317	342	367	D	289	314	339	364	389	
6	3	G/W	E						E						
7	29	W/BR	G						G						
8	4	BR/W	T						T						
9	30	W/S	D	268	293	318	343	368	D	288	313	338	363	388	
10	5	S/W	E						E						
11	31	R/BL	G						G						
12	6	BL/R	T						T						
13	32	R/O	D	269	294	319	344	369	D	287	312	337	362	387	
14	7	O/R	E						E						
15	33	R/G	G						G						
16	8	G/R	T						T						
17	34	R/BR	D	270	295	320	345	370	D	286	311	336	361	386	
18	9	BR/R	E						E						
19	35	R/S	G						G						
20	10	S/R	T						T						
21	36	BK/BL	D	271	296	321	346	371	D	285	310	335	360	385	
22	11	BL/BK	E						E						
23	37	BK/O	G						G						
24	12	O/BK	T						T						
25	38	BK/G	D	272	297	322	347	372	D	284	309	334	359	384	
26	13	G/BK	E						E						
27	39	BK/BR	G						G						
28	14	BR/BK	T						T						
29	40	BK/S	D	273	298	323	348	373	D	283	308	333	358	383	
30	15	S/BK	E						E						
31	41	Y/BL	G						G						
32	16	BL/Y	T						T						
33	42	Y/O	D	274	299	324	349	374	D	282	307	332	357	382	
34	17	O/Y	E						E						
35	43	Y/G	G						G						
36	18	G/Y	T						T						
37	44	Y/BR	D	275	300	325	350	375	D	281	306	331	356	381	
38	19	BR/Y	E						E						
39	45	Y/S	G						G						
40	20	S/Y	T						T						
41	46	V/BL	D	276	301	326	351	376	D	280	305	330	355	380	
42	21	BL/V	E						E						
43	47	V/O	G						G						
44	22	O/V	T						T						
45	48	V/G	D	277	302	327	352	377	D	279	304	329	354	379	
46	23	G/V	E						E						
47	49	V/BR	G						G						
48	24	BR/V	T						T						
49	50	V/S	D	278	303	328	353	378	G	278	303	328	353	378	
50	25	S/V	E						T						

Telecenter V

KM 1103

TC41XX / CAM25 BLOCK ASSIGNMENT CHART

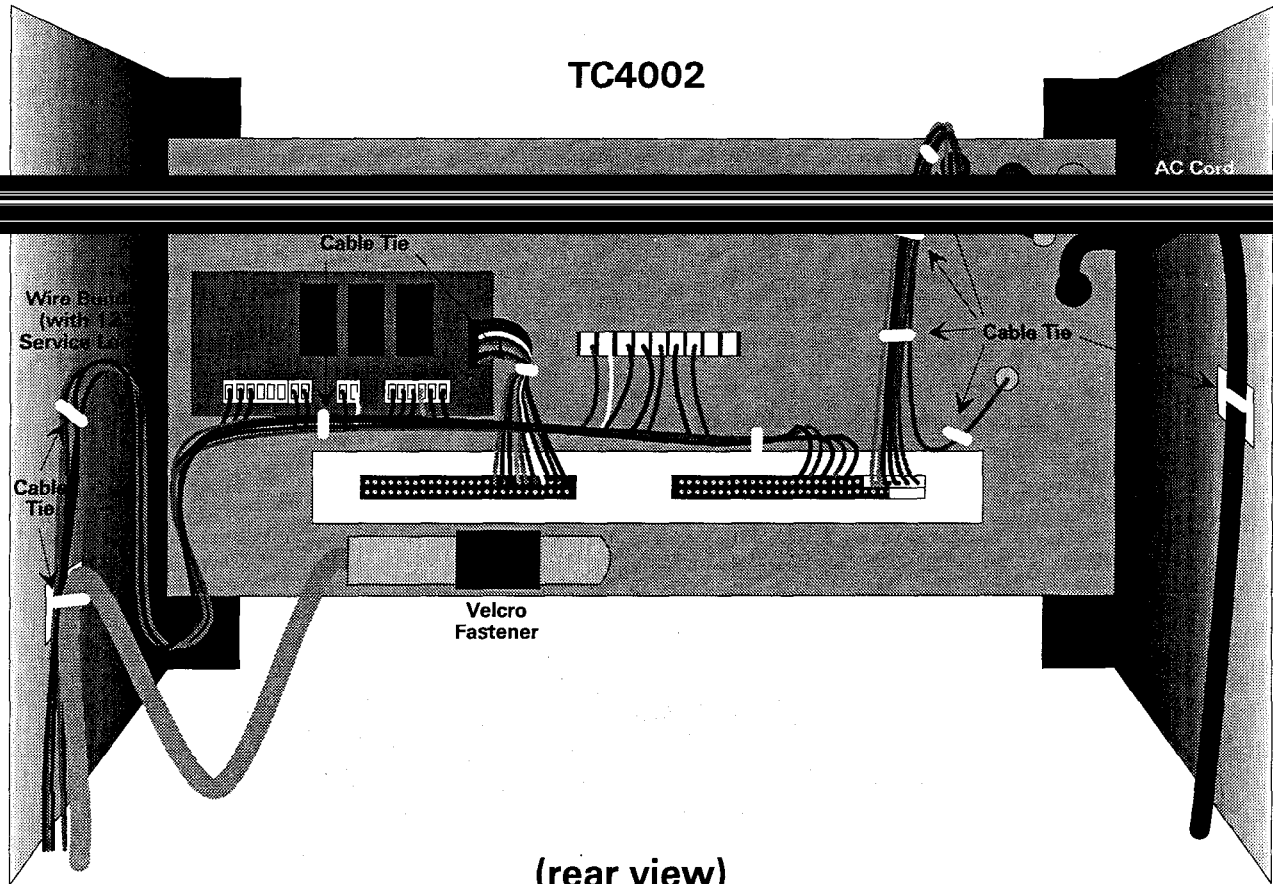
				LEFT SIDE					RIGHT SIDE						
				SC25	15	16	17	18	19	SC25	15	16	17	18	19
CABLE/CONN.				J31	J33	J35	J37	J39		J32	J34	J36	J38	J40	
CLIP	PIN	COLOR	DESIG	POS #	POS #	POS #	POS #	POS #	DESIG	POS #	POS #	POS #	POS #	POS #	
1	26	W/BL	D	391	416	441	466	491	D	415	440	465	490	N/A	
2	1	BL/W	E						E						
3	27	W/O	G						G						
4	2	O/W	T						T						
5	28	W/G	D	392	417	442	467	492	D	414	439	464	489	N/A	
6	3	G/W	E						E						
7	29	W/BR	G						G						
8	4	BR/W	T						T						
9	30	W/S	D	393	418	443	468	493	D	413	438	463	488	N/A	
10	5	S/W	E						E						
11	31	R/BL	G						G						
12	6	BL/R	T						T						
13	32	R/O	D	394	419	444	469	494	D	412	437	462	487	N/A	
14	7	O/R	E						E						
15	33	R/G	G						G						
16	8	G/R	T						T						
17	34	R/BR	D	395	420	445	470	495	D	411	436	461	486	511	
18	9	BR/R	E						E						
19	35	R/S	G						G						
20	10	S/R	T						T						
21	36	BK/BL	D	396	421	446	471	496	D	410	435	460	485	510	
22	11	BL/BK	E						E						
23	37	BK/O	G						G						
24	12	O/BK	T						T						
25	38	BK/G	D	397	422	447	472	497	D	409	434	459	484	509	
26	13	G/BK	E						E						
27	39	BK/BR	G						G						
28	14	BR/BK	T						T						
29	40	BK/S	D	398	423	448	473	498	D	408	433	458	483	508	
30	15	S/BK	E						E						
31	41	Y/BL	G						G						
32	16	BL/Y	T						T						
33	42	Y/O	D	399	424	449	474	499	D	407	432	457	482	507	
34	17	O/Y	E						E						
35	43	Y/G	G						G						
36	18	G/Y	T						T						
37	44	Y/BR	D	400	425	450	475	500	D	406	431	456	481	506	
38	19	BR/Y	E						E						
39	45	Y/S	G						G						
40	20	S/Y	T						T						
41	46	V/BL	D	401	426	451	476	501	D	405	430	455	480	505	
42	21	BL/V	E						E						
43	47	V/O	G						G						
44	22	O/V	T						T						
45	48	V/G	D	402	427	452	477	502	D	404	429	454	479	504	
46	23	G/V	E						E						
47	49	V/BR	G						G						
48	24	BR/V	T						T						
49	50	V/S	D	403	428	453	478	503	G	403	428	453	478	503	
50	25	S/V	E						T						

TC41XX / CAM25 CABLE ASSIGNMENT CHART AND WORK SHEET (SC25 #)

Distributor: Job Name: Date: RT4002-

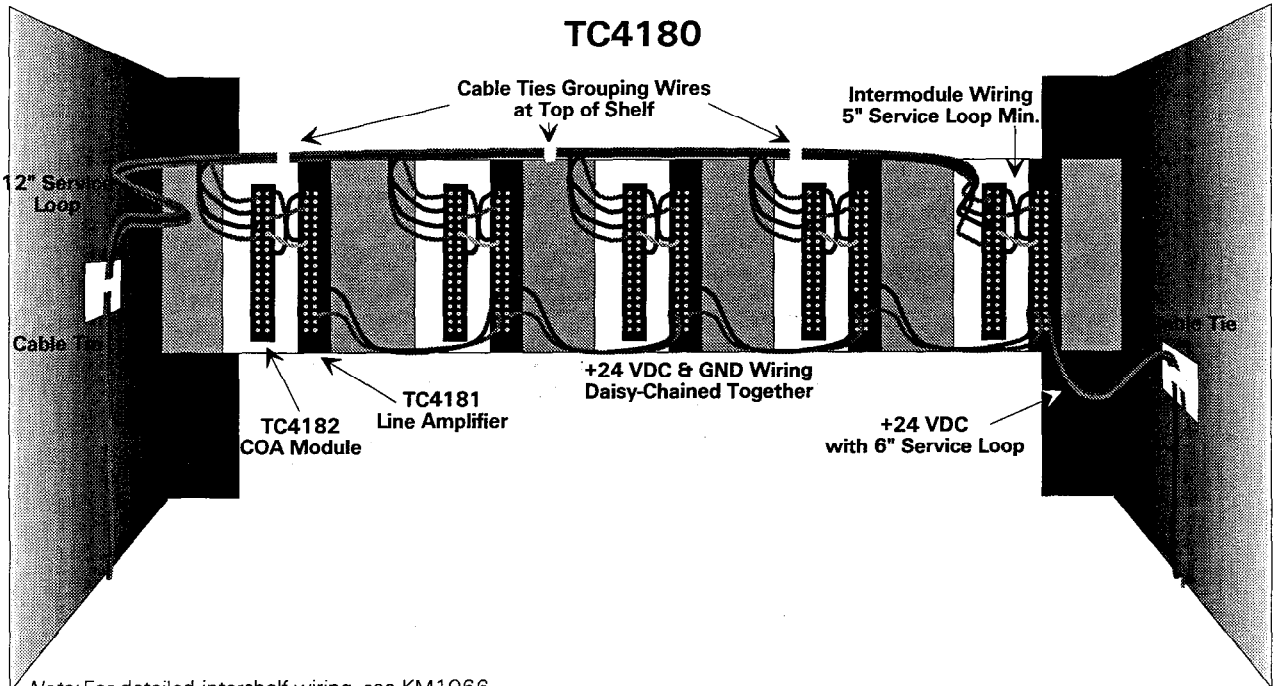
CABLE				LEFT SIDE OF BLOCK - CABLE #1				RIGHT SIDE OF BLOCK - CABLE #2				
CLIP	PIN	COLOR	DESIG.	POS #	PHYS #	ARCH #	NOTES	DESIG.	POS #	PHYS #	ARCH #	NOTES
1	26	W/BL	D	1				D	25			
2	1	BL/W	E					E				
3	27	W/O	G					G				
4	2	O/W	T					T				
5	28	W/G	D	2				D	24			
6	3	G/W	E					E				
7	29	W/BR	G					G				
8	4	BR/W	T					T				
9	30	W/S	D	3				D	23			
10	5	S/W	E					E				
11	31	R/BL	G					G				
12	6	BL/R	T					T				
13	32	R/O	D	4				D	22			
14	7	O/R	E					E				
15	33	R/G	G					G				
16	8	G/R	T					T				
17	34	R/BR	D	5				D	21			
18	9	BR/R	E					E				
19	35	R/S	G					G				
20	10	S/R	T					T				
21	36	BK/BL	D	6				D	20			
22	11	BL/BK	E					E				
23	37	BK/O	G					G				
24	12	O/BK	T					T				
25	38	BK/G	D	7				D	19			
26	13	G/BK	E					E				
27	39	BK/BR	G					G				
28	14	BR/BK	T					T				
29	40	BK/S	D	8				D	18			
30	15	S/BK	E					E				
31	41	Y/BL	G					G				
32	16	BL/Y	T					T				
33	42	Y/O	D	9				D	17			
34	17	O/Y	E					E				
35	43	Y/G	G					G				
36	18	G/Y	T					T				
37	44	Y/BR	D	10				D	16			
38	19	BR/Y	E					E				
39	45	Y/S	G					G				
40	20	S/Y	T					T				
41	46	V/BL	D	11				D	15			
42	21	BL/V	E					E				
43	47	V/O	G					G				
44	22	O/V	T					T				
45	48	V/G	D	12				D	14			
46	23	G/V	E					E				
47	49	V/BR	G					G				
48	24	BR/V	T					T				
49	50	V/S	D	13				G	13			
50	25	S/V	E					T				

TC4002



(rear view)

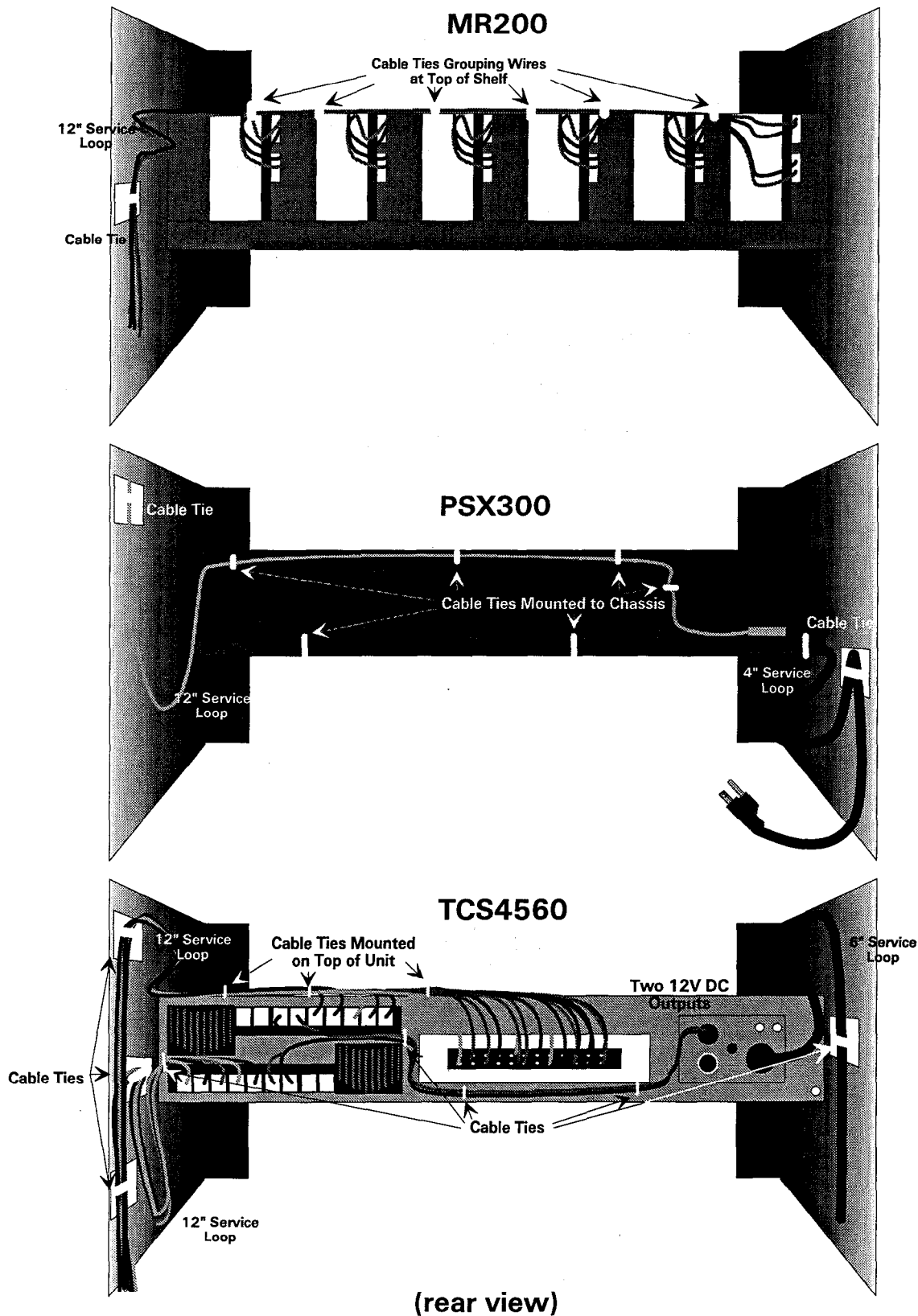
TC4180



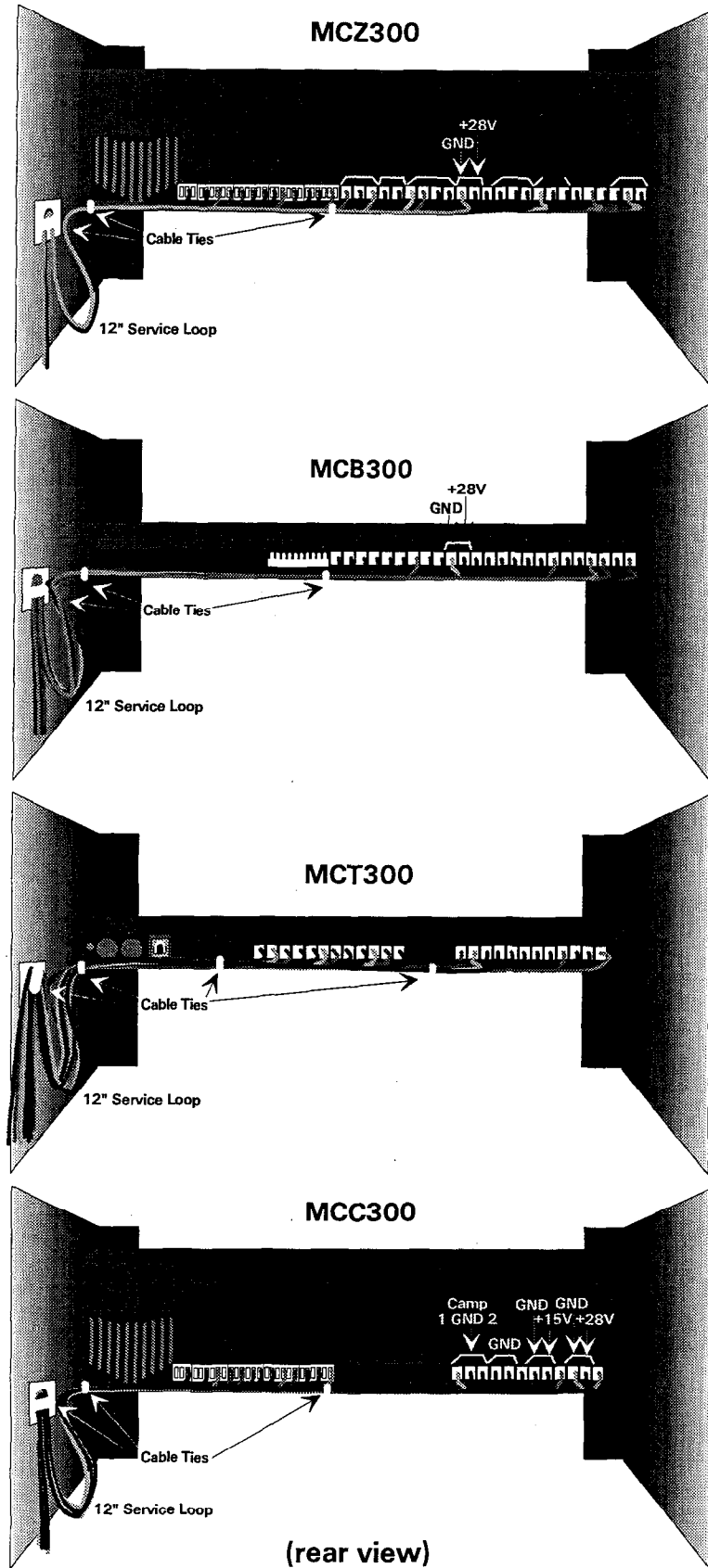
Note: For detailed intershelf wiring, see KM1066.

Wire Routing Diagram for the Telecenter[®] TC4002 & TC4180

IL0432
Rauland-Borg Corp.
Skokie, IL USA
8/93

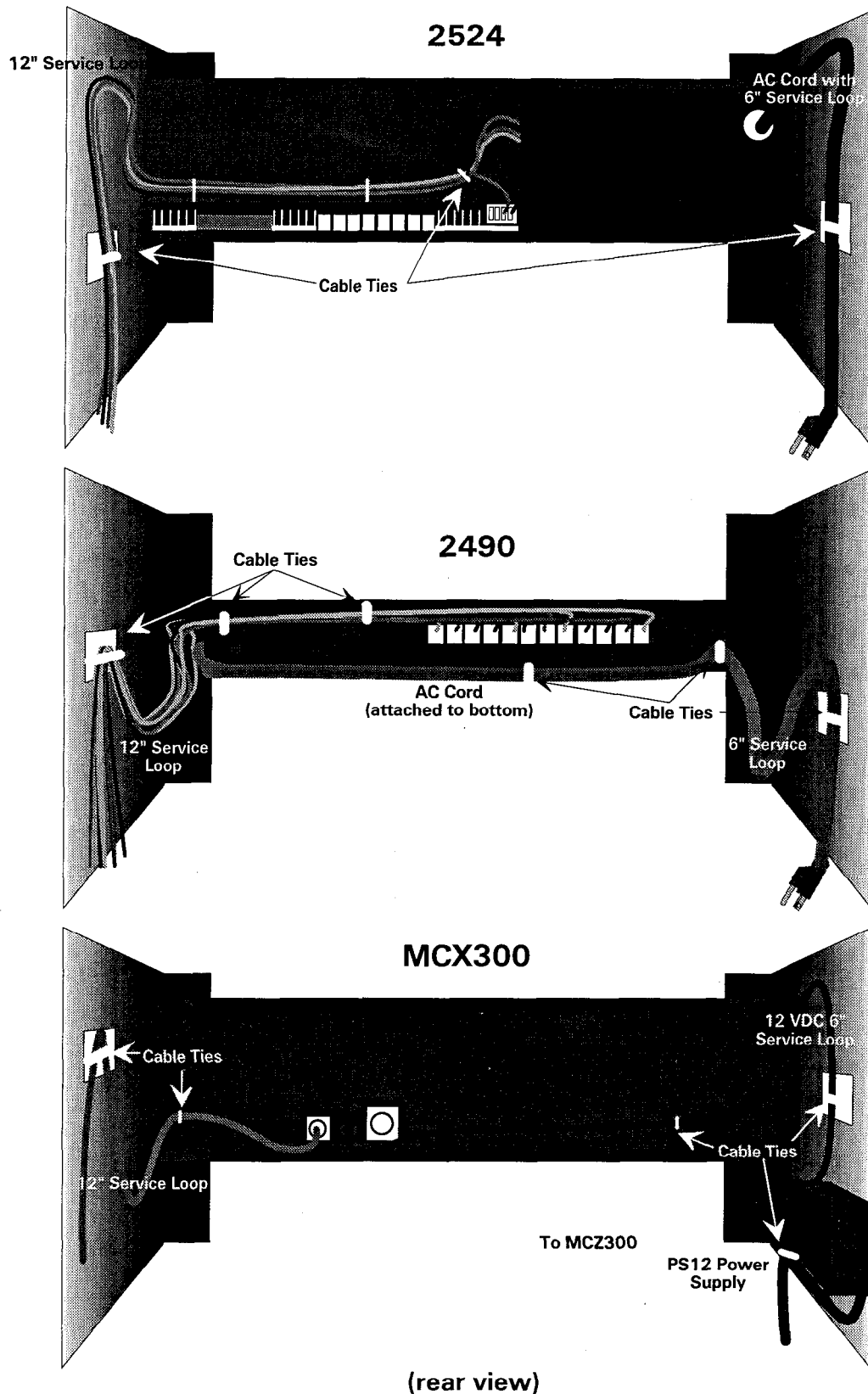


**Wire Routing Diagram for the
MR200 Media Retrieval, PSX300 DC Power Supply,
and TCS4560 Area Page Expander Chassis,
in a Telecenter® system**



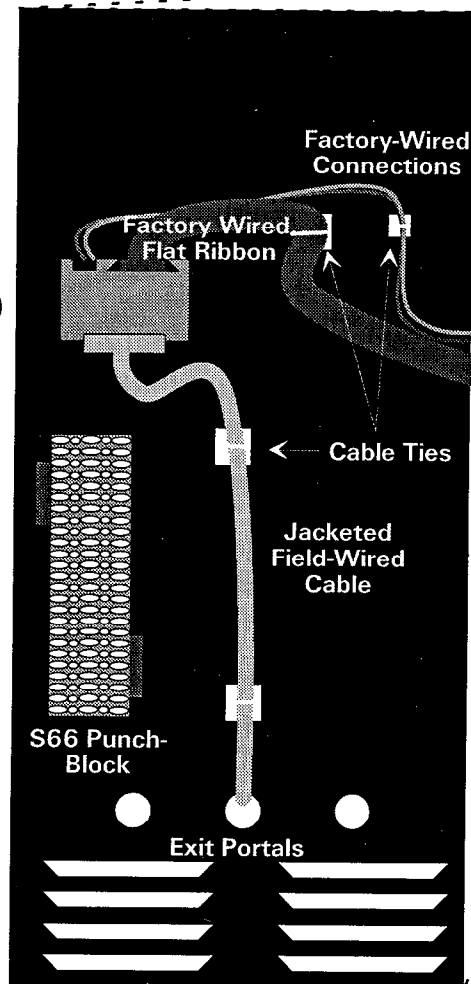
IL0434
 Rauland-Borg Corp.
 Skokie, IL USA
 8/93

Wire Routing Diagram
MCZ300 Master Control Panel, MCB300 Channel "B" Program Control Panel, MCT300 Telephone Control Panel, and MCC300 Intercom Control Panel in a Telecenter® System

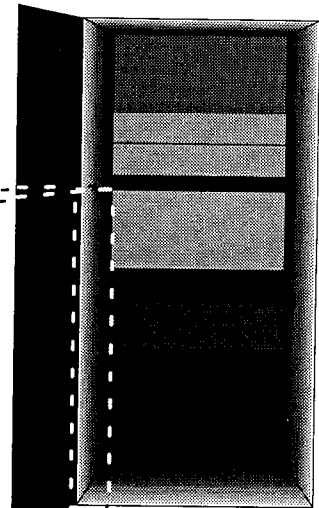


**Wire Routing Diagram for the
2524 and 2490 Master Clock, and the
MCX300 AM/FM Tuner and Cassette Player
in a Telecenter[®] system**

TCS4530



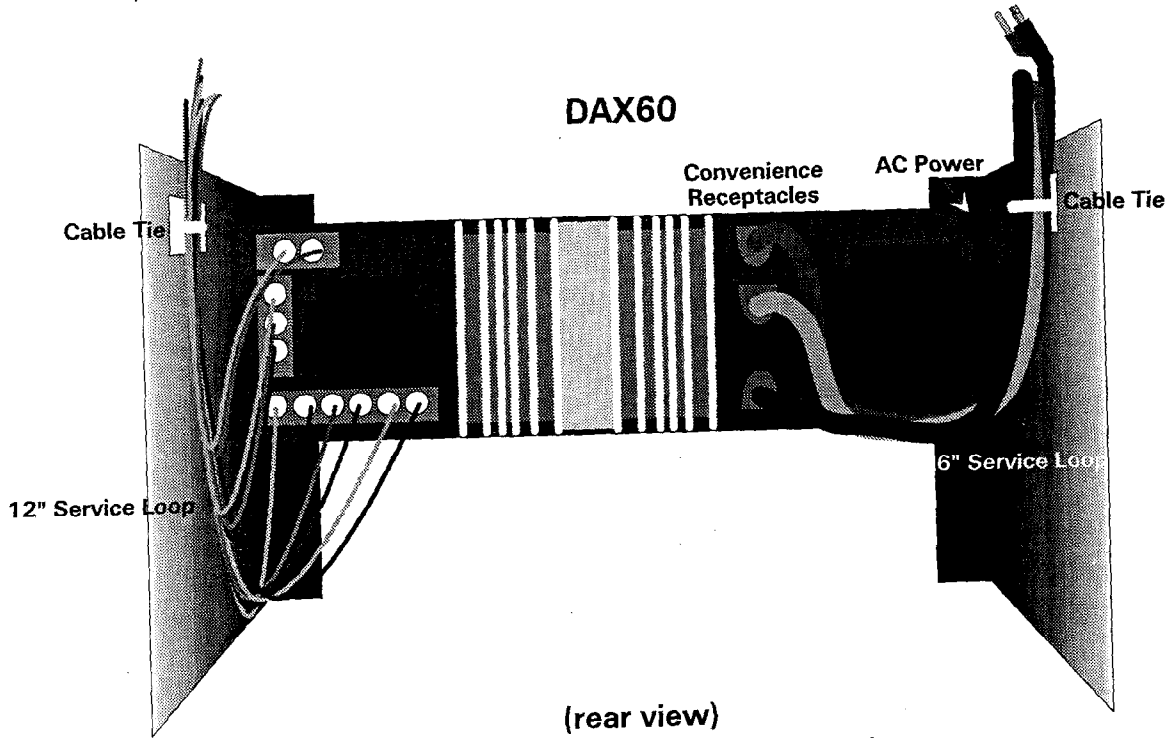
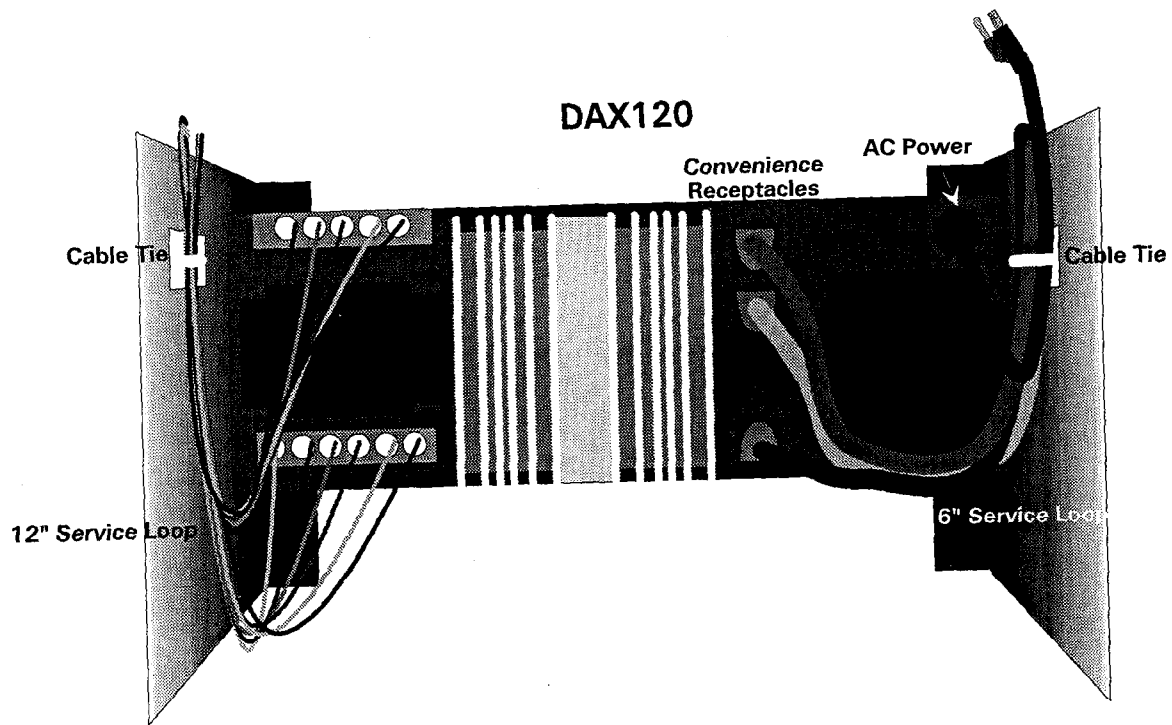
Left Inside Wall of Rack



(rear view)

**Wire Routing Diagram for the
TCS4530 Remote Transmitter
in a Telecenter® System**

IL0436
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Skokie, IL USA
8/93



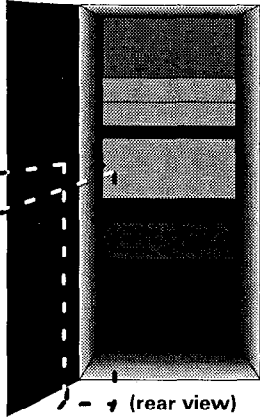
(rear view)

Note: Both units mount upside down in the rack.

Wire Routing Diagram for the DAX120 and DAX60 Amplifiers in a Telecenter[®] System

IL0437
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S662CF



(rear view)

S66 Punch-Block

Wire Bundle

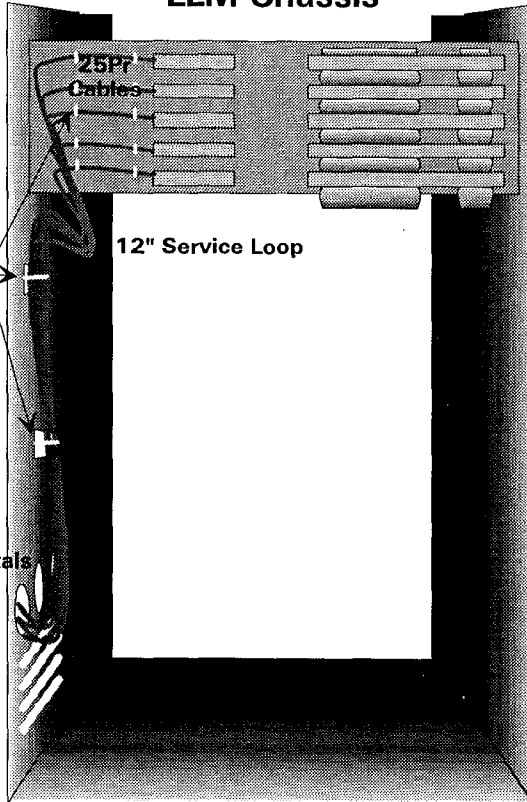
Cable Tie

25Pr Cable

Exit Portals

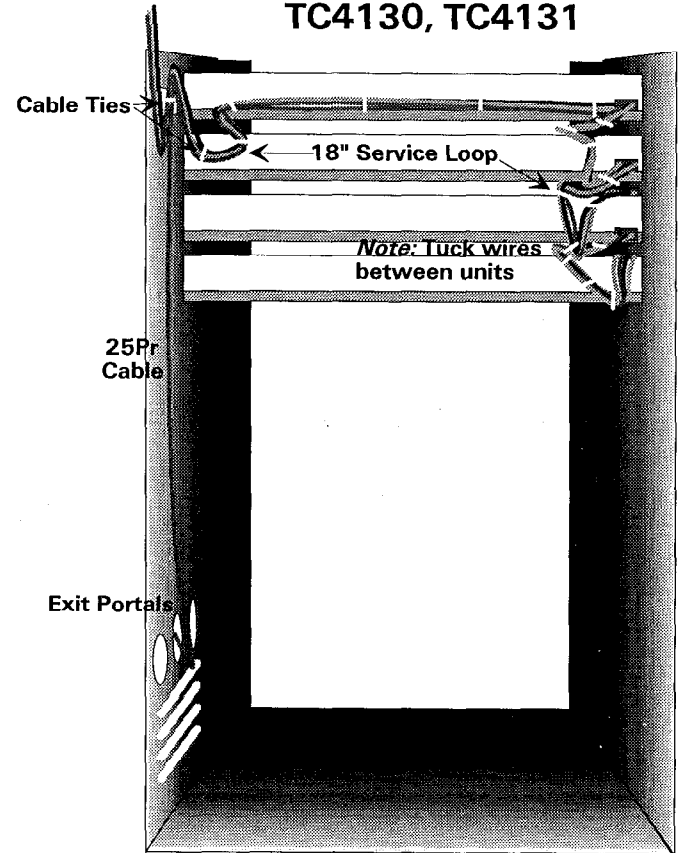
Left Inside Wall of Rack

TC4145
LLM Chassis



(rear view)

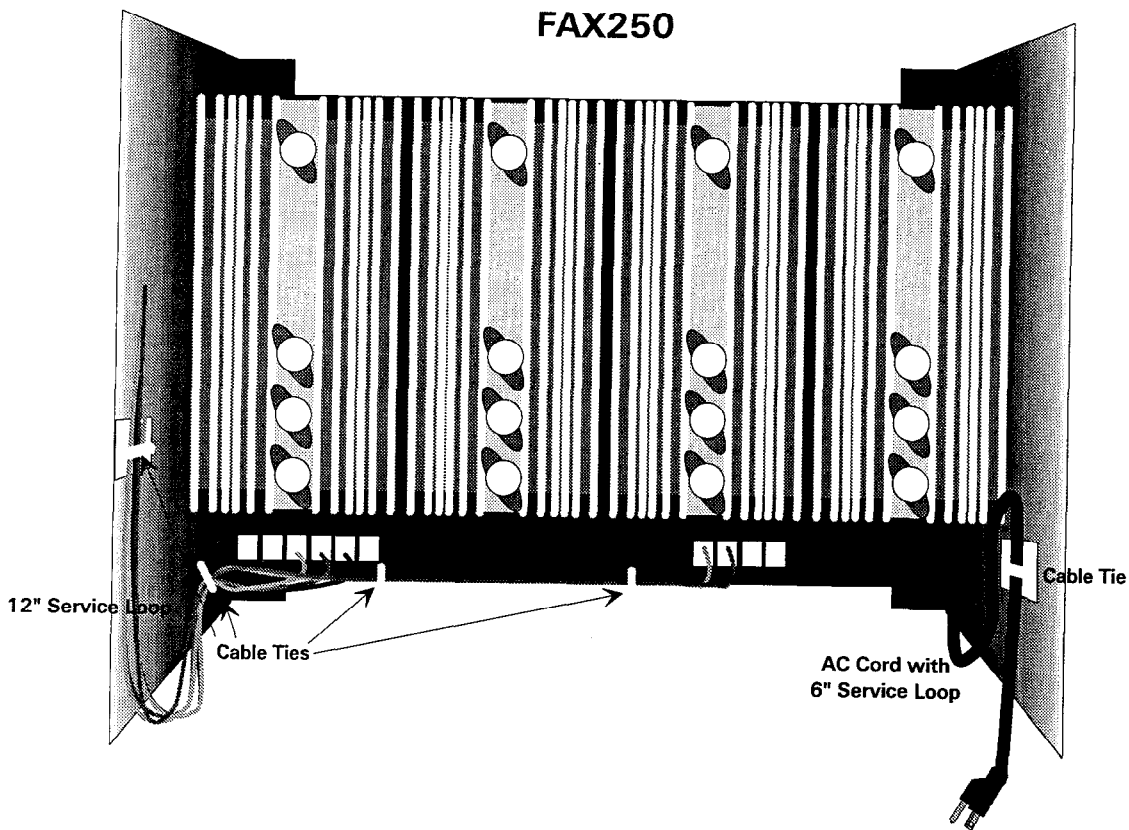
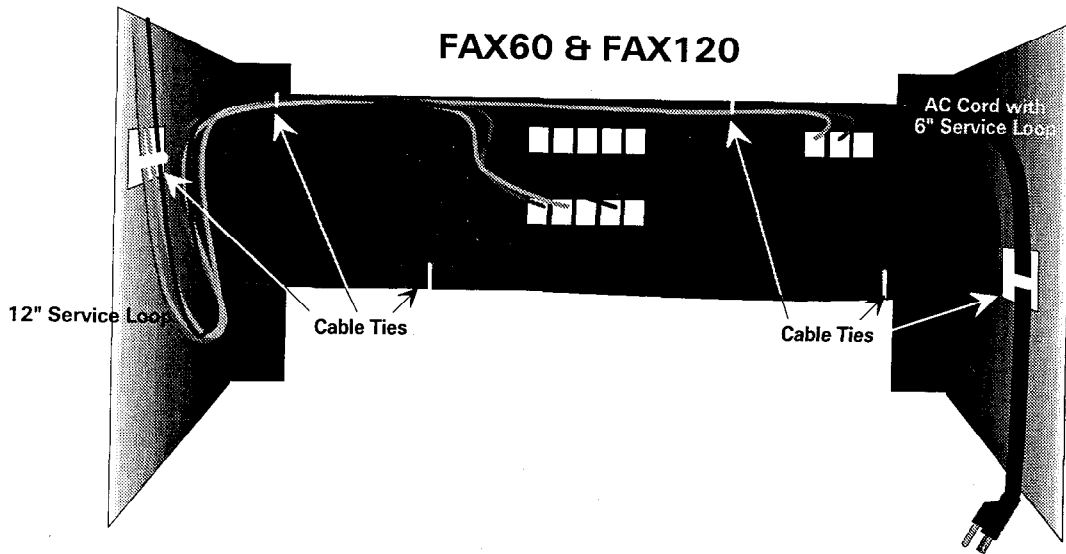
TC4110, TC4120,
TC4130, TC4131



(rear view)

Telecenter® V Field-Wired Components

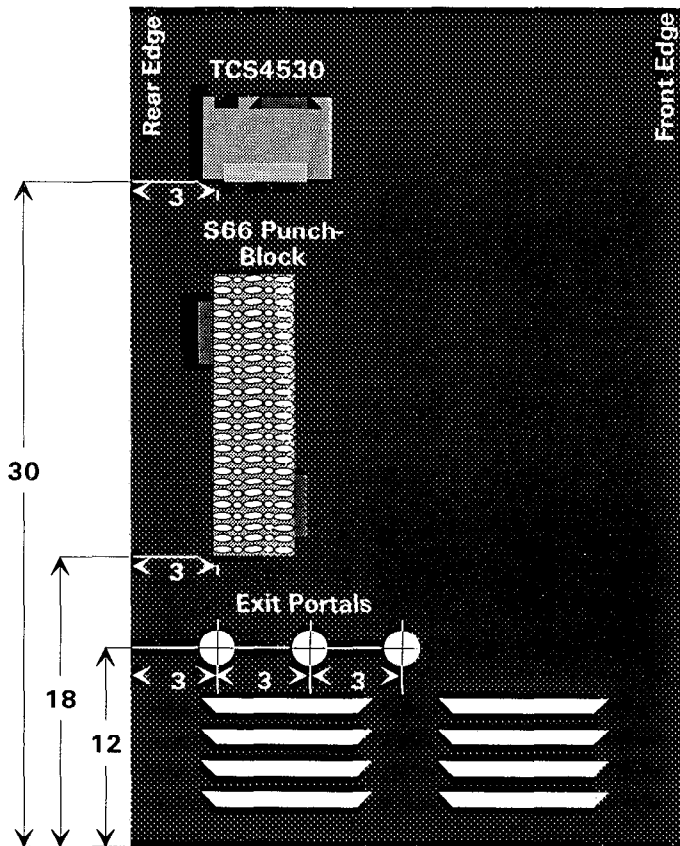
IL0438
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Skokie, IL USA
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(rear view)

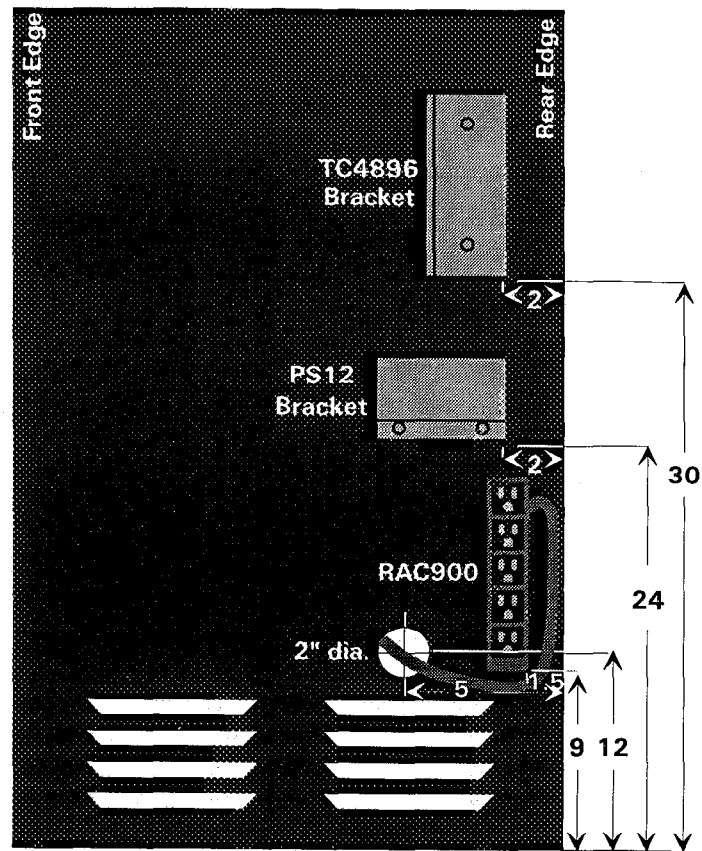
**Wire Routing Diagram for the FirePlex[®]
FAX60, FAX120, and FAX 250
Fire-Alarm Amplifiers in a
Telecenter[®] System**

IL0439
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Left Inside Wall

All Dimensions +/- .5"



Right Inside Wall

Location of Equipment Mounted on the Inside Walls of a Telecenter[®] System Rack

IL0440
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Skokie, IL USA
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