Installation KI-1728C

Telecenter® Trunk Interface

Rauland-Borg Corporation
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General Information

Revision History

This manual has been reformatted. No substantive changes were made during the reformatting process.

This manual revision includes information on DOC approval.

Description

THE TC4182 TRUNK CARD is an FCC Part 68 approved device for connecting Telecenter® IV, Telecenter V, Telecenter System 21, or Telecenter TCS systems to outside telephone trunks. The module, which works with loop-start trunks, enables the system to detect outside calls, receive such calls, and call via an outside trunk.

THE TC4183 TIE-TRUNK MODULE is a device for connecting Telecenter® IV, Telecenter V, Telecenter System 21, or Telecenter TCS systems to a PBX or EKSU via an E&M tie line. Besides providing an audio path, the module provides separate DC signaling (E and M) leads, which greatly improves call-handling and control between the Telecenter system and an external system. Two wire audio and E&M Types I, II, III, and V signaling are supported.

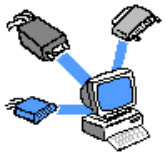
Important:

The Telecenter system and the PBX must be located in the same building.

THE TC4181 REPEATER AMPLIFIER boosts incoming and outgoing audio by 6.5 decibels. This offsets the losses that occur inside the Telecenter system. These losses can cause reduced audio levels on external lines; in some cases, they can cause dialing problems. However, not all systems will exhibit substantial losses; therefore, the Telecenter V and Telecenter System 21 may not require the use of repeater amplifiers.

THE TC4180 CHASSIS holds five TC4182 or TC4183 modules and five TC4181 Repeater Amplifiers. To simplify installation and prevent installation errors, it has pre-wired connectors and two different sizes of card guides. It requires 3–1/2 inches of vertical space in a standard 19-inch rack; all of the required mounting hardware is included.

Additional Equipment



To connect the TC4182 Trunk Module directly to a central-office trunk, use an RJ11 or RJ21X connector installed by the telephone company.

Each TC4182 or TC4183 module requires one Telecenter line. The number of lines needed depends upon the number of outside lines to be installed and the software functions and options.

If the rack's mounting holes are not tapped, obtain four #10 × 1/2″ self-tapping screws (e.g., Rauland WA102); if the holes are not protruded, also obtain four #10 speed nuts (e.g., Rauland AB1889).

The repeater amplifiers require 24–VDC power. The low-cost Rauland Model 6400 Power Supply can accommodate 10 TC4181s. The trunk cards derive their power from the Telecenter system.

For details about wiring, programming, and FCC requirements, refer to the main Telecenter manuals: KI-1582 (*Telecenter IV Interconnect Planning and Installation*), KI-1584 (*Telecenter IV Programming*), KI-1692 (*Telecenter V Programming*), KI-1693 (*Telecenter V Operations*), KI- 1766 (*Telecenter System 21 Operations*), KI-1767 (*Telecenter System 21 Installation and Drawings*), KI-1768 *(Telecenter System 21 Programming*), or to the Telecenter TCS planning and installation manual, KI-1539, and programming manual, KI-1538.

Retrofit in TC4170 Chassis

The card guides and connectors needed by the COA Trunk Card come installed in the TC4180 Expander Chassis. However, if you need to add a Trunk Card to an older, TC4170, Expander Chassis, you will need to order these parts:

Quantity	Part	Part Number
2	Card guides.	QP0761–1
1	Card-edge connectors, 30-pin wire-wrap.	SF0506–30
1	Polarizing key for the connector.	QP0938
2	#4 × 7/16″ hex washer-head thread-forming screws for attaching the connector to the TC4170.	WA216
1	ID strip for the trunk-card connector (already installed).	QP0928

Alerts, Precautions, and Limitations

- ✓ Before installing a TC4182 Trunk Card in a Telecenter IV or Telecenter TCS system, be sure to follow the instructions for modification of the card.
- ✓ Be sure to install the proper Telecenter line adapter or strap the MSM port on the Telecenter System 21 prior to installing the TC4182 or TC4183.
- ✓ Never install a TC4171 COA Module in a Telecenter V or Telecenter System 21 system.

Related Documents

For installation instructions, consult KI-1457, the older TC4171 manual, which also covers the TC4170.

FCC Requirements

The Telecenter system complies with Part 68 of the FCC rules. The telephone company may ask the installer to provide the following information:

- ✓ **Ringer Equivalence Number (REN):** This information is on a label located on the back door of the equipment cabinet.
- ✓ **FCC Registration Number:** This information is also on the label located on the back door of the equipment cabinet.

- ✓ A list of all the registration jack USOCs. Examples are:

  RJ11C (single-line, two-wire, T/R, 6-position).

  RJ11W (single-line, two-wire, T/R, 6-position).

  RJ21X (25-lines, two-wire, T/R, 50-position).

- ✓ **Facility Interface Codes (FIC):** The FIC for loop trunks is 02LS2. The FIC code for ground start trunks is 02GS2.
- ✓ **Service Order Codes:** The service order code is 9.0F.

The REN is used to determine the number of telephone devices (in this case, COAs) that may be connected to a trunk. Never connect more than one COA to a single trunk.

If the Telecenter system causes harm to the telephone network, the telephone company will try to notify the customer before it disconnects its lines. If advance notice is not practical, the telephone company will also notify the customer of the right to file a complaint with the FCC.

If the telephone company changes it's facilities, equipment, operations, or procedures in ways that could affect the operation of the equipment, it will provide advance notice so that the customer can make the necessary modifications in order to maintain uninterrupted service.

No repairs or adjustments to the equipment, other than programming changes, should be made by the customer. Any customer who has trouble with the Telecenter system should contact an authorized Rauland-Borg distributor for repair or warranty information. If the trouble is causing harm to the telephone network, the telephone company may request that the equipment be removed from the network until the problem is resolved.

This Telecenter system can not be used on public coin service provided by the telephone company. Connection to the Party Line Service is subject to state tariffs. (Contact the State Public Utility Commission, Public Service Commission, or the Corporation Commission for information on these two matters.)

The Telecenter System is FCC approved for Hearing Aid Compatibility.

The user-programmable toll-restriction feature in the Telecenter software must be updated to handle newly established Area Codes and Exchange Codes as they are placed in service. Failure to update the premised systems to recognize the new codes as they are established will restrict the customer from gaining access to the network and to these codes. Bell Communications Research (Bellcore) publishes "North American Numbering Plan" (NANP) information in paper, microfiche, and computer tape. An abbreviated summary of the newly established Area Codes and Exchange Codes is also available. Bellcore may be contacted at (201)-829-2592 to obtain the appropriate information so you can keep your customer's equipment updated.

Allowing the Telecenter system to be operated in such a manner as to not provide for proper answer supervision is a violation of part 68 of the FCC's rules.

Proper answer supervision is when:

A. This equipment returns answer supervision to the PSTN when DID calls are:

- ✓ Answered by the called station
- ✓ Answered by the attendant
- ✓ Routed to a recorded announcement that can be administered by the CPE user

B. This equipment returns answer supervision on all DID calls forwarded to the PSTN. Permissible exceptions are:

- ✓ A call is unanswered
- ✓ A busy tone is received
- ✓ A reorder tone is received

FCC and DOC Approval

Important:

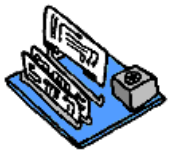
The TC4183 Tie-Trunk Module is designed for interconnecting local systems. It is not intended for use with central-office trunks and, consequently, is not FCC or DOC approved.

A Copy of the Federal Communication Commission's registration for the TC4182 Central-Office Trunk Module is attached. You may wish to consult it for the technical provisions and the Registration Number, which is required on some forms.

For systems in Canada, the DOC Load Number is *7*.

Parts for TC4180 Chassis		
Quantity	**Part**	**Part Number**
4	#10-32 × 1/2″ hex, SEMS, unslotted machine screws, for attaching the chassis to the rack.	WA202
1	Locking bar, for holding the trunk modules and repeater amps in the chassis.	AB3660
2	Thread-forming screws, for attaching the locking bar to the chassis.	WA5
5	ID strips for the trunk-card connectors.	QP0928
Dress Panel and Mounting Hardware		
1	Dress panel.	ANGP1058
2	#6–32 × 3/8″ black pan-head Phillips screws.	WA96
2	#6 flat stainless steel washers.	WJ0074
2	#6–32 “U” nuts.	AB2904

Line Adapters



These are small circuit boards that plug into a socket on a Line Link Module (LLM) PC board of a Telecenter IV or V system. Each line has a standard adapter(s) that must be replaced with one of the enclosed adapter(s) to interface with a trunk card. Each trunk card comes with two adapter(s):

- ✓ VC7330 (for Telecenter IV and TCS systems).
- ✓ VC7463 or TC4157 (for Telecenter V systems).

Telecenter System 21: Set the jumper on the appropriate MSM port to E&M, and the 12 V/ 48 V setting to 12 V.

Drawings, Diagrams, Other Graphics, and Forms

This document includes the following drawings, diagrams, supplemental graphics, and/or forms:

- ✓ Mechanical Installation Drawing (IL0374)
- ✓ Wiring Diagram (KM1065)
- ✓ Wiring Diagram (KM1066)
- ✓ Wiring Diagram (KM1143)
- ✓ Wiring Diagram (KM1171)
- ✓ Wiring Diagram (KM1072)
- ✓ Wiring Diagram (KM1144)
- ✓ Wiring Diagram (KM1078)
- ✓ Wiring Diagram (KM1079)
- ✓ Wiring Diagram (KM1080)
- ✓ Wiring Diagram (KM1081)
- ✓ FCC Registration Form (Form 484)

2

Installation

Initial Mechanical

1. Orient the Expander Chassis horizontally, with the rack-mounting ears to the front. The tabs for the locking bar should be on top, and the leftmost set of card guides should be the larger ones used for the repeater amplifiers (see IL0291).
2. Locate the two vertically centered tabs used for mounting the front panel. Push a #6–32 "U" nut, flat side facing outward, on each tab.

Important:

If the rack's mounting holes are not tapped, obtain the self-tapping screw speed nuts listed earlier under "Additional Equipment."

3. Fasten the chassis to the rack with the four #10 machine screws.
4. Before installing a TC4182 trunk card, make sure that the sleeve jumper is set to match the impedance of the central-office lines (typically 900 ohms) or PBX lines (typically 600 ohms). To change the setting, simply pull off the sleeve and push it onto the center pin and the pin with the desired value ("600" or "900").
5. Working from the front of the chassis, insert a trunk card into the slots with the smaller card guides; the component side should face to the right.
6. Working from the front of the chassis, insert the repeater-amplifier modules into the slots with the larger card guides; the component side should face to the left, and the printing on the face plate should be right-side-up.
7. Complete all wiring, programming, and testing (see the attached wiring diagrams and the appropriate Telecenter manuals). Note that the wiring between the connectors has been done by the factory.

8. Label each module pair with both the central-office or PBX number and the Physical Number of the Telecenter line.
9. Complete the installation by doing the final mechanical assembly.

Repeater-Amplifier Test

Place an outside call from a phone next to the Telecenter system (you can call back into the system and test two trunk interfaces together). The trunk card for the line you are testing will light its LEDs (refer to the following paragraph). While listening to the handset of the phone, plug and unplug the TC4181 Amp. The sound level in the handset should be about 6–dB louder when the amplifier is plugged in.

TC4182 & TC4183 LEDs

The TC4182 and TC4183 LEDs display the status of a phone line. The Telecenter LED ("TC") shows a request from the Telecenter system to the Central Office. The Central Office ("CO") display indicates a request from the Central Office to the Telecenter system (e.g., a ring voltage signaling an incoming call, or a loop current signaling an ongoing or outgoing call).

Final Mechanical

1. Orient the locking bar as shown in IL0291 and secure it with the two #6 × 1/4″ thread-forming screws.
2. Install the dress panel, using the #6 pan-head Phillips screws and flat washers; be careful not to mar the panel.
3. Print FCC Registration (2 pages, enclosed) as unnumbered pages 13-14.

UNITED STATES OF AMERICA
FEDERAL COMMUNICATIONS COMMISSION

PART 68-EQUIPMENT REGISTRATION

WASHINGTON, D.C. 20554

REGISTRATION UNDER PART 68, CONNECTION OF TERMINAL EQUIPMENT TO THE TELEPHONE NETWORK

SUBJECT TO THE PROVISIONS OF PART 68 OF THE COMMISSION'S RULES AND REGULATIONS, REGISTRATION IS HEREBY GRANTED FOR THE EQUIPMENT LISTED HEREIN. ANY CHANGE IN MODEL NUMBER OR TRADE NAME REQUIRES AMENDMENT OF REGISTRATION. EACH PIECE OF EQUIPMENT BEARING THE LISTED TRADE NAME(S) AND MODEL NUMBER(S) SHALL BE LABELED IN ACCORDANCE WITH THE PROVISIONS OF SECTION 68.300.

TELEPHONE EQUIPMENT CONTAINING RADIO-FREQUENCY CIRCUITRY MAY REQUIRE ADDITIONAL EQUIPMENT AUTHORIZATION(S) TO BE ISSUED BY THE COMMISSION PRIOR TO MARKETING SUCH EQUIPMENT IN THE UNITED STATES. FAILURE TO OBTAIN THE REQUIRED EQUIPMENT AUTHORIZATIONS, WHEN REQUIRED, MAY SUBJECT THE REGISTRANT TO FINES AND PENALTIES PROVIDED FOR IN TABLE V, SECTION 501 AND 503 OF THE COMMUNICATIONS ACT OF 1934, AS AMENDED.

FUTURE CORRESPONDENCE CONCERNING THIS GRANT SHOULD REFERENCE THE FILE NUMBER, THE REGISTRATION NUMBER AND DATE OF GRANT.

REGISTRATION NUMBER: EY6USA-73519-PF-T FILE NUMBER: 1498-CX-92 DATE OF GRANT: 05/26/92

REGISTRANT: RAULAND BORG MANUFACTURER: RAULAND BORG

TYPE OF EQUIPMENT: FULLY PROTECTED PBX'S

NATURE OF APPLICATION: ORIGINAL - 500 GENERIC PORT PBX

TRADE NAME(S)	MODEL NUMBER(S)	OTHER REGISTRATION(S) AFFECTED
TELECENTER V	TC4002	

AUX. EQUIPMENT: STANDARD PHONES FROM THIRD PARTY VENDORS

Authorized Network Ports: 02LS2 02GS2

Date Printed: Wed May 27 1992 Time: 15:25:44

ALL PRODUCTS LISTED ABOVE MUST BE LABELED AS SPECIFIED IN 47 C.F.R. Sec. 68.300.

UNITED STATES OF AMERICA
FEDERAL COMMUNICATIONS COMMISSION

PART 68 - EQUIPMENT REGISTRATION

WASHINGTON, D.C. 20554

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FUTURE CORRESPONDENCE CONCERNING THIS GRANT SHOULD REFERENCE THE FILE NUMBER, THE REGISTRATION NUMBER AND DATE OF GRANT.

REGISTRATION NUMBER: EY6USA-73519-PF-T FILE NUMBER: 1005-CX-94 DATE OF GRANT: 03/15/94

REGISTRANT: RAULAND BORG MANUFACTURER: RAULAND BORG

TYPE OF EQUIPMENT: FULLY PROTECTED PBX'S

NATURE OF APPLICATION: NOTICE - ADD SMALLER CAPACITY MODEL

TRADE NAME(S)	MODEL NUMBER(S)	OTHER REGISTRATION(S) AFFECTED
TELECENTER SYSTEM 21	HAC TC2100	

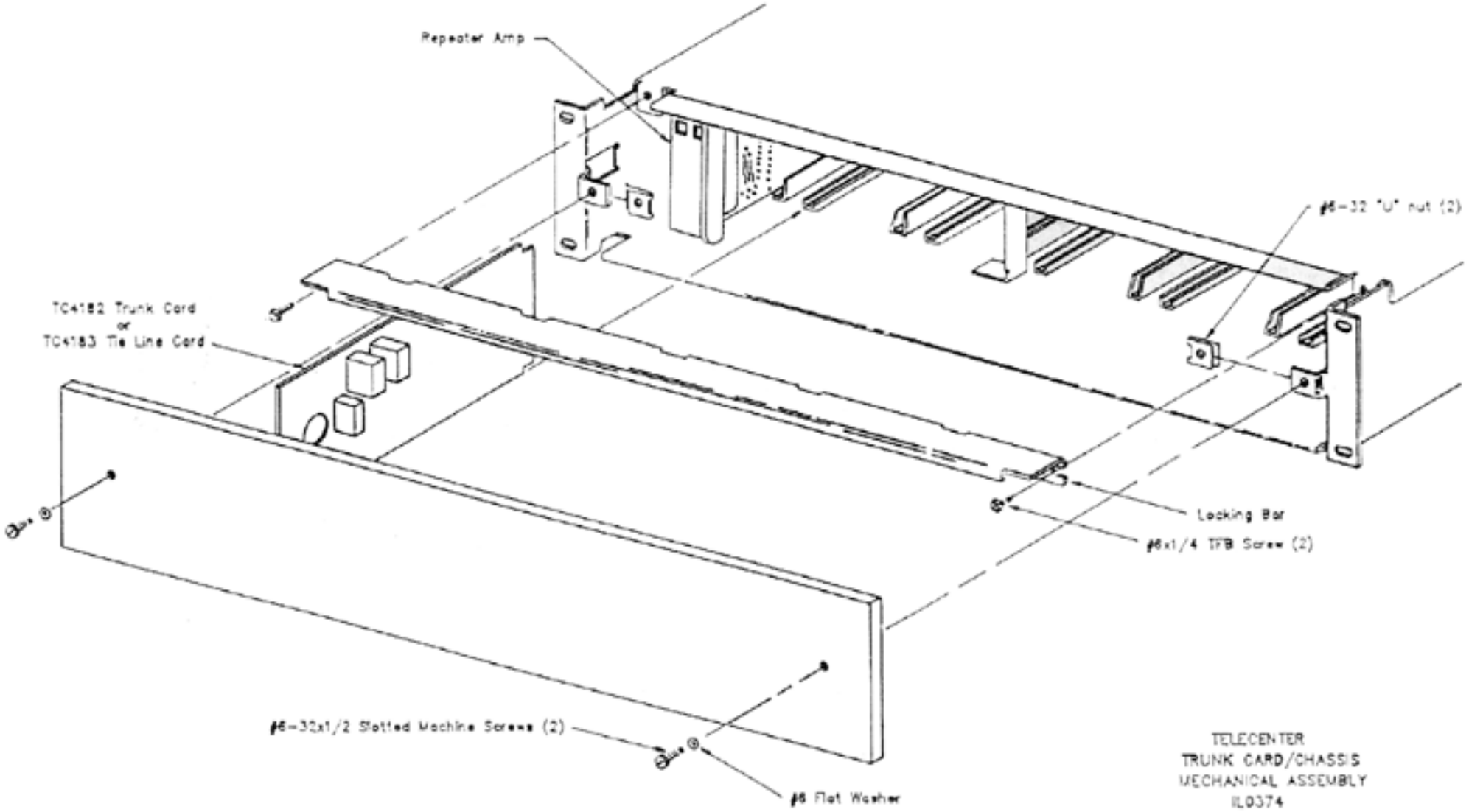
CONTINUING COMPLIANCE DATE: 1/18/94; SEE FILE 1611CX90 FOR ADDITIONAL INFORMATION; TELEPHONES: TC4204,TC4300, TC4301,TC4312; DISPLAYS: TC4221,TC4221; ALARM PANEL: RX1027 POWER SUPPLIES: TC2106,PSX300,6400

Authorized Network Ports: 02LS2

Date Printed: Wed Apr 6 1994 Time: 09:36:29

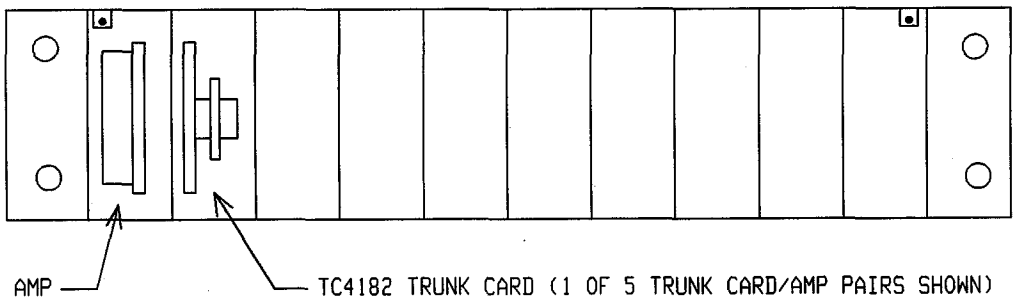
ALL PRODUCTS LISTED ABOVE MUST BE LABELED AS SPECIFIED IN 47 C.F.R. Sec. 68.300.

FCC Form 484

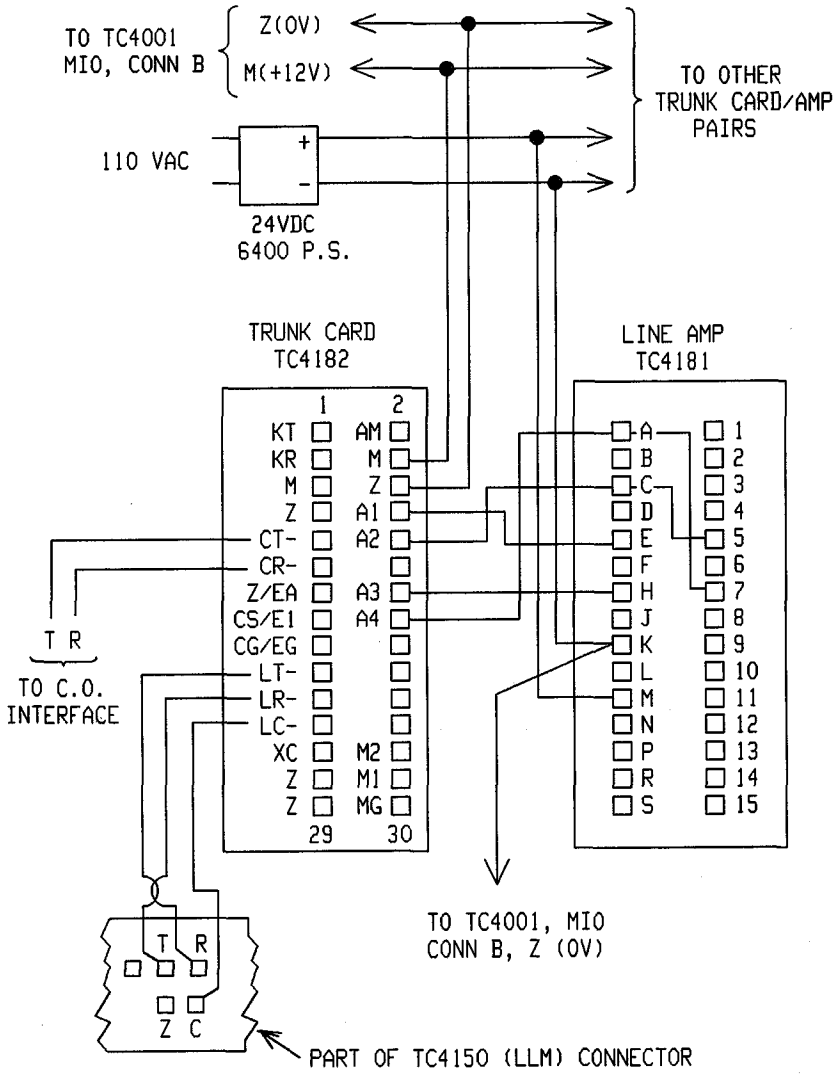


TELECENTER
TRUNK CARD/CHASSIS
MECHANICAL ASSEMBLY
IL0374

LAYOUT (FRONT VIEW)



WIRING (REAR VIEW)



TRUNK CARD INSTALLATION IN A TCIV SYSTEM

PROCEDURE:

1. SELECT AND PROGRAM LLM LINES BY PHYSICAL NUMBERS BASED ON INTERCONNECT PLANNING REQUIREMENTS (SEE PROGRAMMING MANUAL).
2. TURN SYSTEM POWER OFF.
3. CUT AND REMOVE RESISTOR R19 FROM EACH TRUNK CARD USED WITH TCIV.
4. FOR THE PHYSICAL NUMBERS SELECTED, REPLACE THE U1 HYBRIDS ON THE TC4150 (LLM) WITH VC7330. DO NOT USE THE TCV LINE ADAPTOR VC7463 OR TC4157 THAT IS PACKAGED WITH THE TC4182.
5. RECORD DIRECTORY NUMBER AND TCIV PHYSICAL NUMBER BY MARKING IN FRONT OF EACH TRUNK CARD/AMP MODULE PAIR.
6. WIRE EACH TRUNK OR C.O. LINE AS SHOWN IN THE WIRING DIAGRAM. LINE AMP TERMINALS ARE MARKED ON THE SIDE OF THE EDGE CARD CONNECTOR.
7. FOR GROUND START TRUNKS ONLY CONNECT TRUNK CARD TERMINAL "CG" TO GROUND "Z".
8. INSURE THAT ALL C.O. OR OTHER LINES EXTENDING OUTSIDE OF THE BUILDING (MUST) HAVE LIGHTNING PROTECTION NEAR POINT OF ENTRY TO BUILDING.
9. TURN ON POWER, CHECK FOR PROPER OPERATION.

CAUTION:

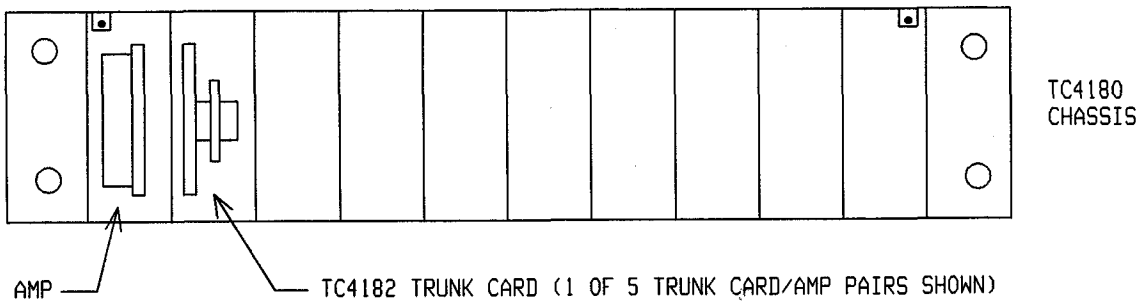
TC4182 AND TC4171 MODULES ARE NOT INTER-CHANGEABLE DUE TO DIFFERENT LINE MODULE REQUIREMENTS IN THE LLM. DO NOT SWAP THEM AT ANY TIME WITHOUT ALSO CHANGING THE LINE ADAPTORS AS SHOWN ABOVE.

TC4182 WITH TELECENTER IV SYSTEM
WIRING DIAGRAM

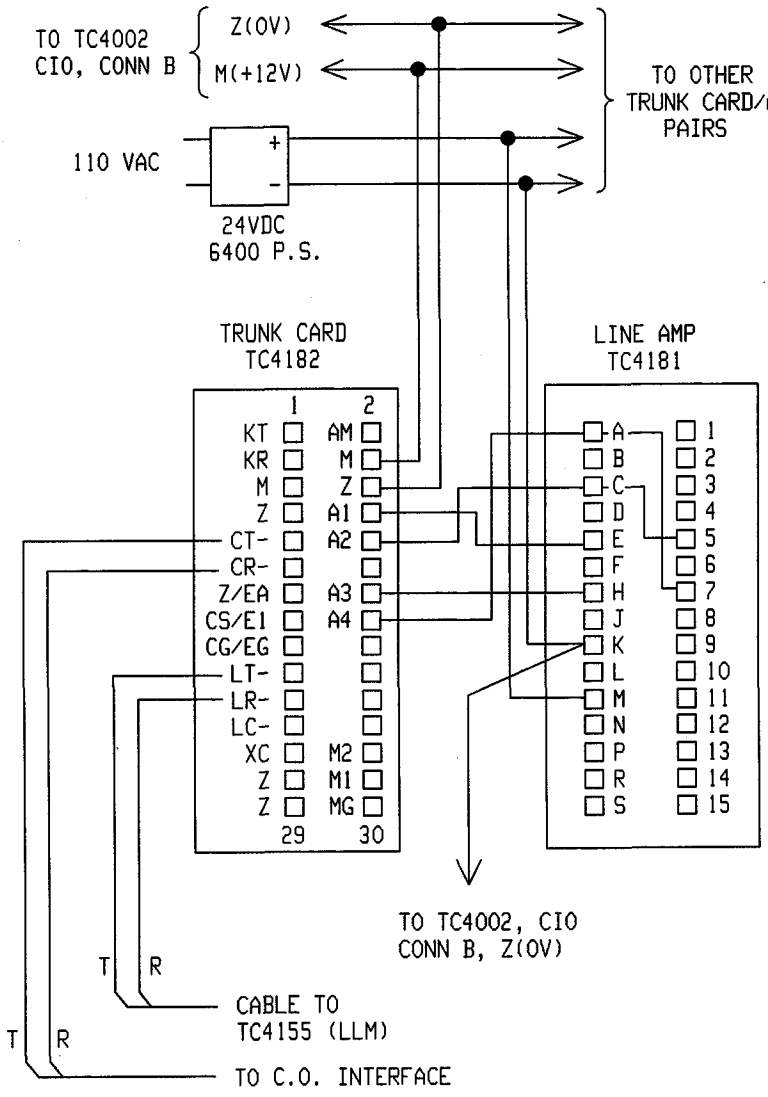
RAULAND-BORG CORP.
SKOKIE, ILL, USA

KM1065 - A

LAYOUT (FRONT VIEW)



WIRING (REAR VIEW)



TRUNK CARD INSTALLATION IN A TCV SYSTEM

PROCEDURE:

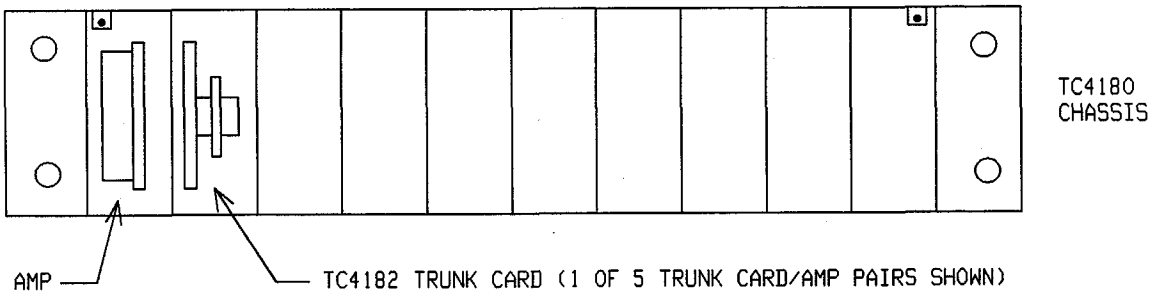
1. SELECT AND PROGRAM LLM LINES BY PHYSICAL NUMBERS BASED ON INTERCONNECT PLANNING REQUIREMENTS (SEE PROGRAMMING MANUAL).
2. TURN SYSTEM POWER OFF.
3. FOR THE PHYSICAL NUMBERS SELECTED, REPLACE THE U1 HYBRIDS ON THE TC4155 (LLM) WITH VC7463 OR TC4157.
4. RECORD DIRECTORY NUMBER AND TCV PHYSICAL NUMBER BY MARKING IN FRONT OF EACH TRUNK CARD/AMP MODULE PAIR.
5. WIRE EACH TRUNK OR C.O. LINE AS SHOWN IN THE WIRING DIAGRAM. LINE AMP TERMINALS ARE MARKED ON THE SIDE OF THE EDGE CARD CONNECTOR.
6. FOR GROUND START TRUNKS ONLY CONNECT TRUNK CARD TERMINAL "CG" TO GROUND "Z".
7. INSURE THAT ALL C.O. OR OTHER LINES EXTENDING OUTSIDE OF THE BUILDING (MUST) HAVE LIGHTNING PROTECTION NEAR POINT OF ENTRY TO BUILDING.
8. TURN ON POWER, CHECK FOR PROPER OPERATION.

TC4182 WITH TELECENTER V SYSTEM
WIRING DIAGRAM

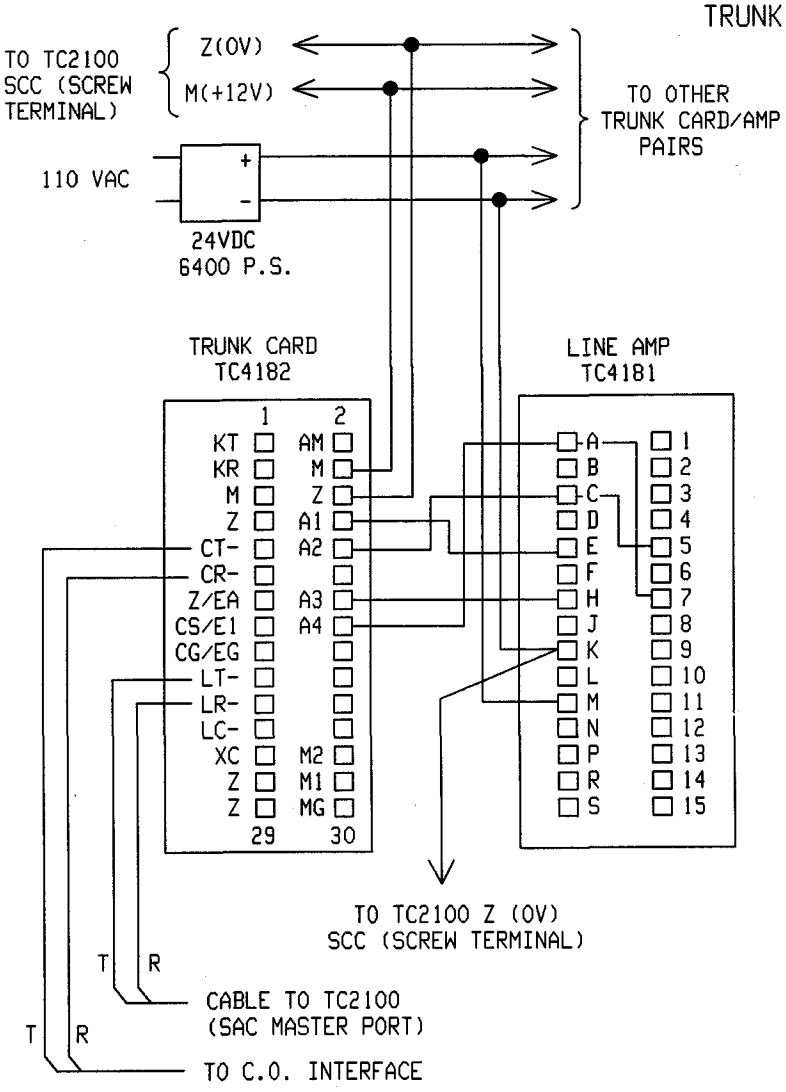
RAULAND-BORG CORP.
SKOKIE, ILL, USA

KM1066 - A

LAYOUT (FRONT VIEW)



WIRING (REAR VIEW)



TRUNK CARD INSTALLATION IN A TC2100 SYSTEM

PROCEDURE:

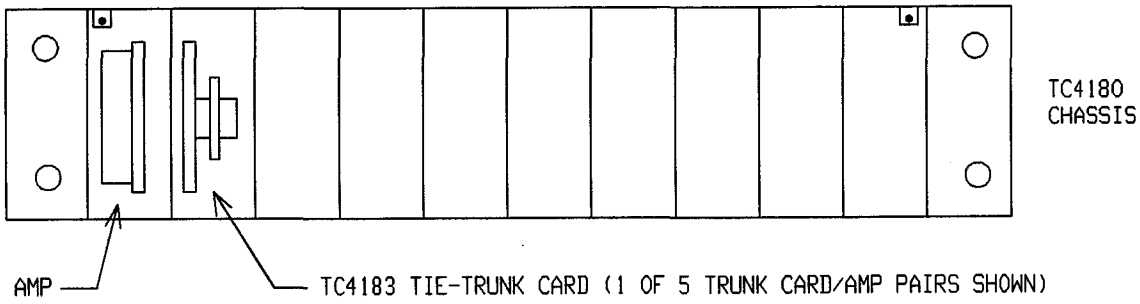
1. SELECT AND PROGRAM MASTER PORTS BY PHYSICAL NUMBERS (M1-M12) BASED ON INTERCONNECT PLANNING REQUIREMENTS (SEE PROGRAMMING MANUAL).
2. TURN SYSTEM POWER OFF.
3. FOR THE MASTER PORTS SELECTED, SET PH/EM JUMPER ON MSM TO EM AND 12/48 JUMPER TO 12.
4. RECORD DIRECTORY NUMBER AND MASTER PORT PHYSICAL NUMBER BY MARKING IN FRONT OF EACH TRUNK CARD/AMP MODULE PAIR.
5. WIRE EACH TRUNK OR C.O. LINE AS SHOWN IN THE WIRING DIAGRAM. LINE AMP TERMINALS ARE MARKED ON THE SIDE OF THE EDGE CARD CONNECTOR.
6. FOR GROUND START TRUNKS ONLY, CONNECT TRUNK CARD TERMINAL "CG" TO GROUND "Z".
7. INSURE THAT ALL C.O. OR OTHER LINES EXTENDING OUTSIDE OF THE BUILDING (MUST) HAVE LIGHTNING PROTECTION NEAR POINT OF ENTRY TO BUILDING.
8. TURN ON POWER, CHECK FOR PROPER OPERATION.

TC4182 WITH TELECENTER SYSTEM 21
WIRING DIAGRAM

RAULAND-BORG CORP.
SKOKIE, ILL, USA

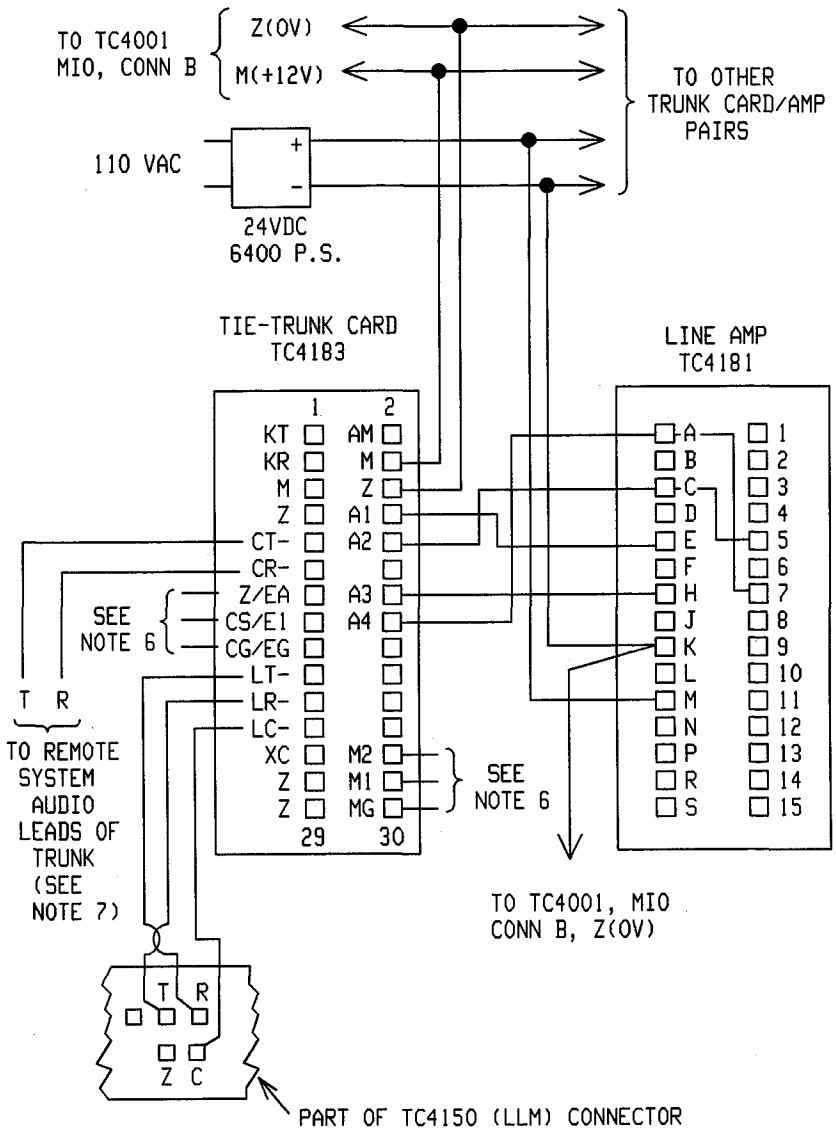
KM1143 - 0

LAYOUT (FRONT VIEW)



TIE-TRUNK CARD INSTALLATION IN A TCIV SYSTEM

WIRING (REAR VIEW)



PROCEDURE:

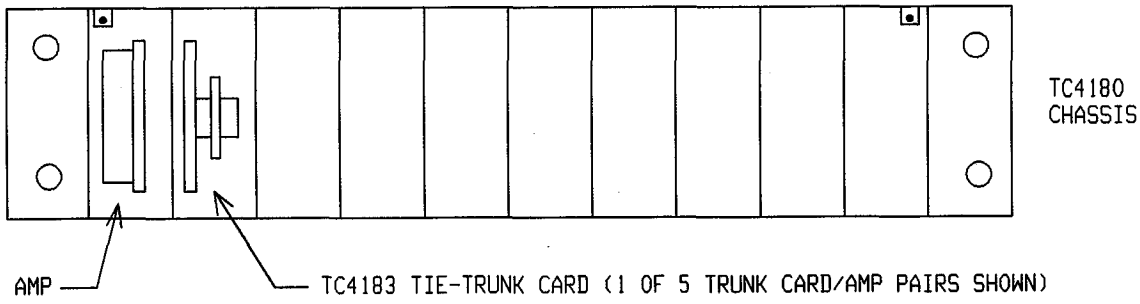
1. SELECT AND PROGRAM LLM LINES BY PHYSICAL NUMBERS BASED ON INTERCONNECT PLANNING REQUIREMENTS (SEE PROGRAMMING MANUAL).
2. TURN SYSTEM POWER OFF.
3. FOR THE PHYSICAL NUMBERS SELECTED, REPLACE THE U1 LINE ADAPTORS ON THE TC4150 (LLM) WITH VC7330. DO NOT USE THE VC7463 OR TC4157 LINE ADAPTOR THAT IS PACKAGED WITH THE TC4183.
4. RECORD DIRECTORY NUMBER AND TCIV PHYSICAL NUMBER BY MARKING IN FRONT OF EACH TRUNK CARD/AMP MODULE PAIR.
5. WIRE EACH E & M TIE TRUNK AS SHOWN IN THE WIRING DIAGRAM. LINE AMP TERMINALS ARE MARKED ON THE SIDE OF THE EDGE CARD CONNECTOR.
6. SEE DRAWINGS KM1078 THROUGH KM1081 FOR E & M TYPES OF SIGNALLING CONFIGURATION AND WIRING.
7. 4 WIRE TO 2 WIRE AUDIO CONVERTER REQUIRED IF REMOTE SYSTEM USES 4 WIRE AUDIO (i.e. T,R,T1,R1).
8. TURN ON POWER, CHECK FOR PROPER OPERATION.

TC4183 WITH TELECENTER IV SYSTEM
WIRING DIAGRAM

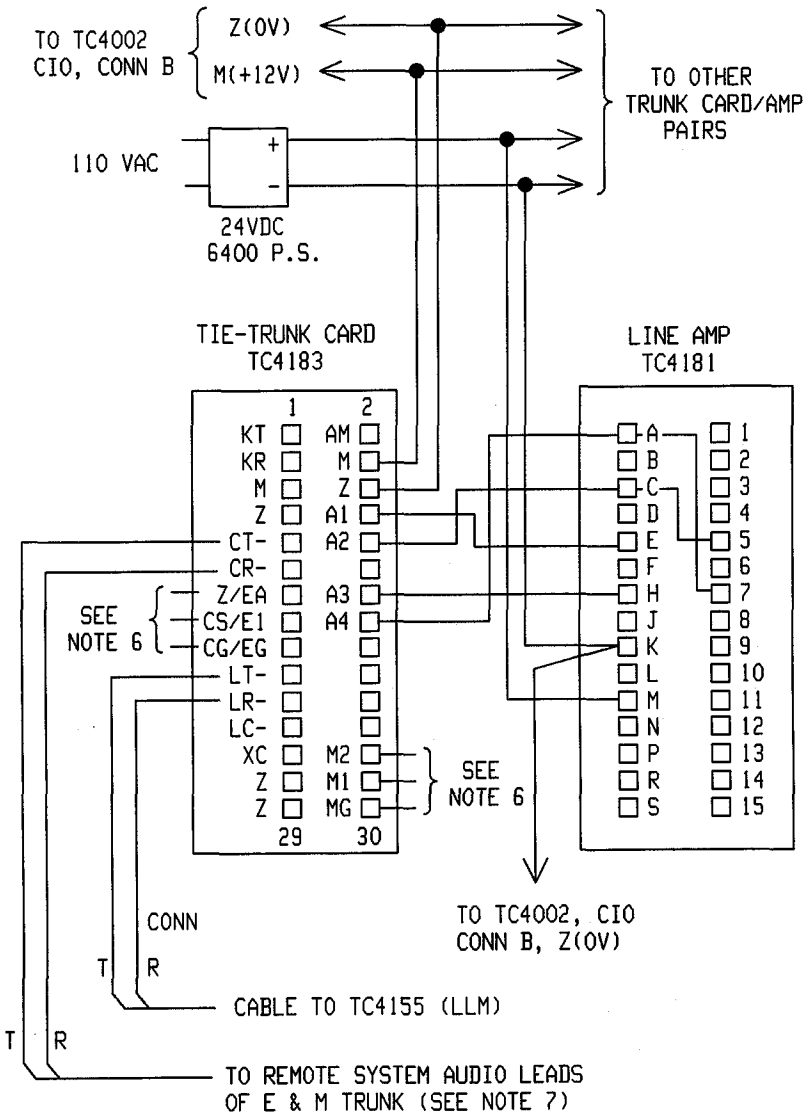
RAULAND-BORG CORP.
SKOKIE, ILL, USA

KM1071 - A

LAYOUT (FRONT VIEW)



WIRING (REAR VIEW)



TIE-TRUNK CARD INSTALLATION IN A TCV SYSTEM

PROCEDURE:

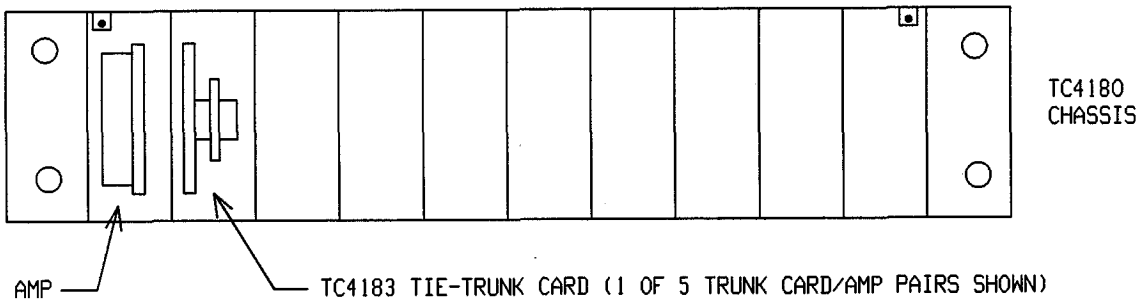
1. SELECT AND PROGRAM LLM LINES BY PHYSICAL NUMBERS BASED ON INTERCONNECT PLANNING REQUIREMENTS (SEE PROGRAMMING MANUAL).
2. TURN SYSTEM POWER OFF.
3. FOR THE PHYSICAL NUMBERS SELECTED, REPLACE THE U1 LINE ADAPTORS ON THE TC4155 (LLM) WITH VC7463 OR TC4157.
4. RECORD DIRECTORY NUMBER AND TCV PHYSICAL NUMBER BY MARKING IN FRONT OF EACH TRUNK CARD/AMP MODULE PAIR.
5. WIRE EACH E & M TIE TRUNK AS SHOWN IN THE WIRING DIAGRAM. LINE AMP TERMINALS ARE MARKED ON THE SIDE OF THE EDGE CARD CONNECTOR.
6. SEE DRAWINGS KM1078 THROUGH KM1081 FOR E & M TYPES OF SIGNALLING CONFIGURATIONS AND WIRING.
7. 4 WIRE TO 2 WIRE AUDIO CONVERTER REQUIRED IF REMOTE SYSTEM USES FOUR WIRE AUDIO (i.e. T,R,T1,R1).
8. TURN ON POWER, CHECK FOR PROPER OPERATION.

TC4183 WITH TELECENTER V SYSTEM
WIRING DIAGRAM

RAULAND-BORG CORP.
SKOKIE, ILL, USA

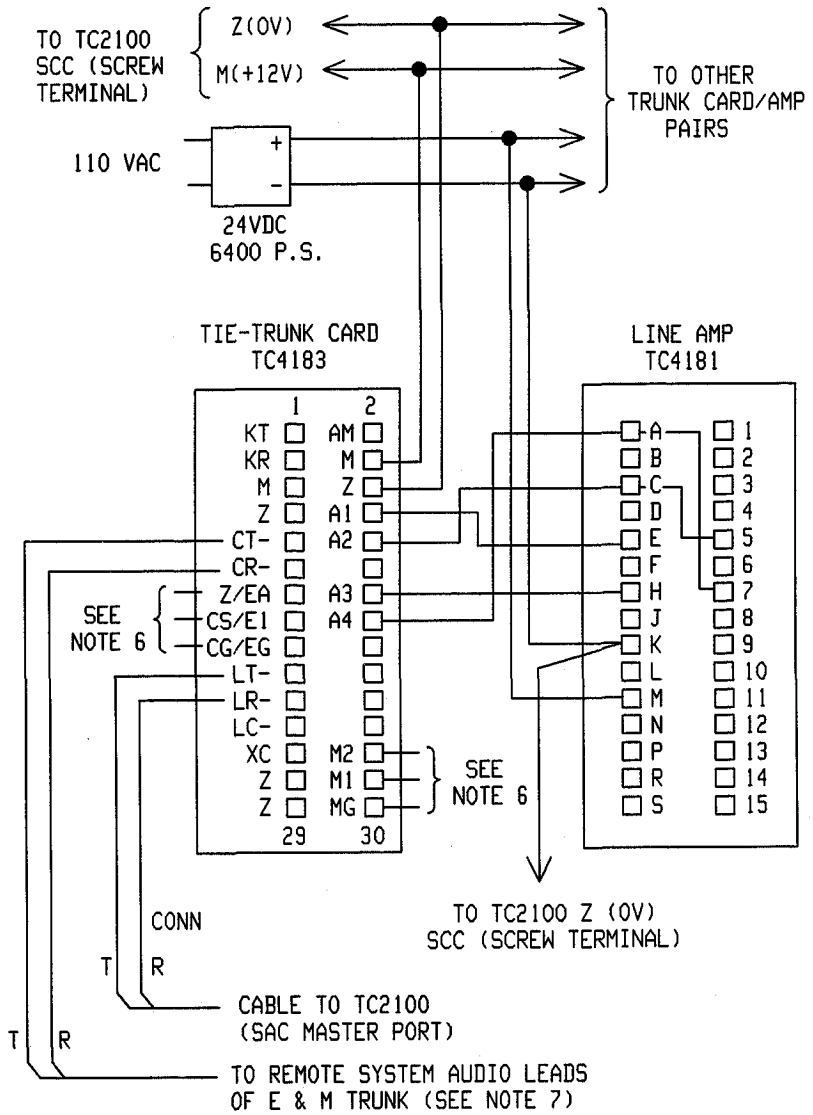
KM1072 - A

LAYOUT (FRONT VIEW)



TIE-TRUNK CARD INSTALLATION IN A TC2100 SYSTEM

WIRING (REAR VIEW)



PROCEDURE:

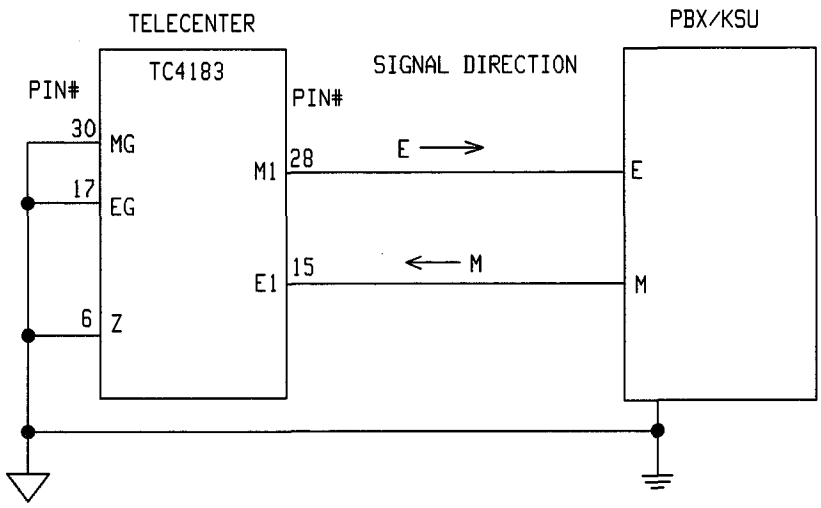
1. SELECT AND PROGRAM MASTER PORTS BY PHYSICAL NUMBERS BASED ON INTERCONNECT PLANNING REQUIREMENTS (SEE PROGRAMMING MANUAL).
2. TURN SYSTEM POWER OFF.
3. FOR THE MASTER PORTS SELECTED, SET PH/EM JUMPER ON MSM TO EM AND 12/48 JUMPER TO 12.
4. RECORD DIRECTORY NUMBER AND MASTER PORT PHYSICAL NUMBER BY MARKING IN FRONT OF EACH TRUNK CARD/AMP MODULE PAIR.
5. WIRE EACH E & M TIE TRUNK AS SHOWN IN THE WIRING DIAGRAM. LINE AMP TERMINALS ARE MARKED ON THE SIDE OF THE EDGE CARD CONNECTOR.
6. SEE DRAWINGS KM1078 THROUGH KM1081 FOR E & M TYPES OF SIGNALLING CONFIGURATIONS AND WIRING.
7. 4 WIRE TO 2 WIRE AUDIO CONVERTER REQUIRED IF REMOTE SYSTEM USES FOUR WIRE AUDIO (i.e. T,R,T1,R1).
8. TURN ON POWER, CHECK FOR PROPER OPERATION.

TC4183 WITH TELECENTER SYSTEM 21
WIRING DIAGRAM

RAULAND-BORG CORP.
SKOKIE, ILL, USA

KM1144 - 0

TYPE I E & M SIGNALLING INTERFACE



TELECENTER SIDE "A" SIDE (PBX)

TC4183 E & M TIE TRUNK MODULE INTERFACED WITH PBX/KSU ("A" SIDE).

NOTES:

1. "A" SIDE SIGNALLING SYSTEM ORGINATES M-LEAD FOR SERVICE REQUESTS AND RESPONSES TO E-LEAD SERVICE REQUEST FROM THE REMOTE SYSTEM.

2. SYSTEM GROUNDS MUST BE TIED TOGETHER.

3. TROUBLESHOOTING VOLTAGES, TC4183

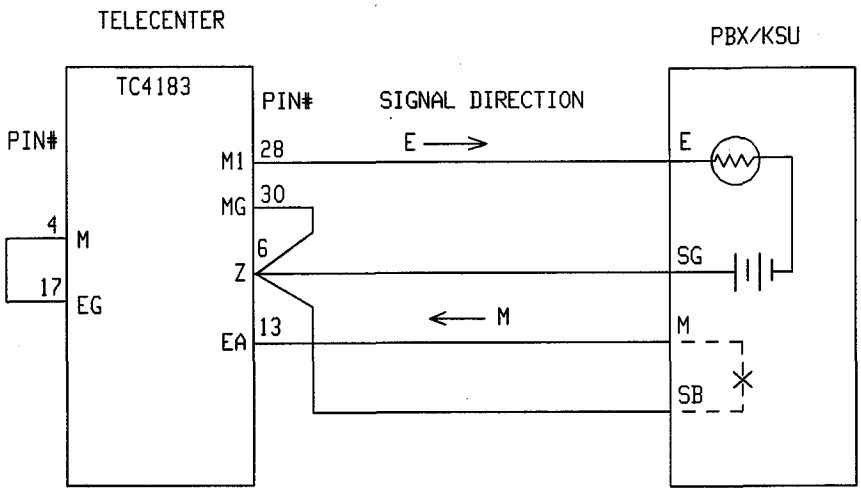
TERMINAL	IDLE	REQUEST
E1 (to TC)	0	-48V
M1 (to PBX)	-48	0V

TYPE I E & M INTERFACE

RAULAND-BORG CORP.
SKOKIE, ILL, USA

KM1078 - A

TYPE II E & M SIGNALLING INTERFACE



TELECENTER SIDE "A" SIDE (PBX)

TC4183 E & M TIE TRUNK MODULE INTERFACED WITH PBX/KSU ("A" SIDE).

NOTES:

1. "A" SIDE SIGNALLING SYSTEM ORIGINATES M-LEAD FOR SERVICE REQUESTS THROUGH A CONTACT CLOSURE. IT ALSO RECOGNIZES SERVICE REQUESTS THROUGH VOLTAGE LEVELS APPLIED TO IT'S E-LEAD.

2. ✳ DENOTES NORMALLY OPEN RELAY CONTACTS.

   ┼ DENOTES NORMALLY CLOSED RELAY CONTACTS.

3. TROUBLESHOOTING VOLTAGES, TC4183

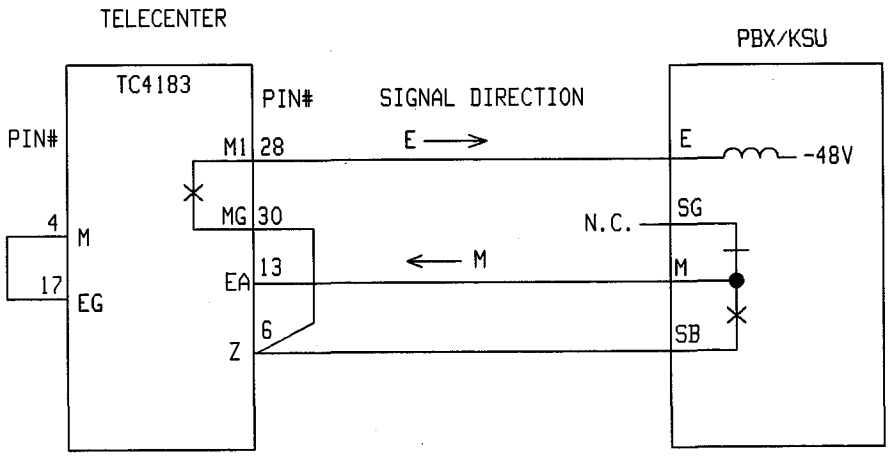
TERMINAL	IDLE	REQUEST
EA (to TC)	+12	0V
M1 (to PBX)	-48	0V

TYPE II E & M INTERFACE

RAULAND-BORG CORP.
SKOKIE, ILL, USA

KM1079 - A

TYPE III E & M SIGNALLING INTERFACE



TELECENTER SIDE "A" SIDE (PBX)

TC4183 E & M TIE TRUNK MODULE INTERFACED WITH PBX ("A" SIDE).

NOTES:

1. "A" SIDE SIGNALLING SYSTEM ORGINATES M-LEAD FOR SERVICE REQUESTS BY CHANGING STATE OF M RELAY. IT ALSO RECOGNIZES SERVICE REQUESTS THROUGH VOLTAGE LEVELS APPLIED TO IT'S E-LEAD.

2. ✳ DENOTES NORMALLY OPEN RELAY CONTACTS.

   ┼ DENOTES NORMALLY CLOSED RELAY CONTACTS.

3. TROUBLESHOOTING VOLTAGES, TC4183

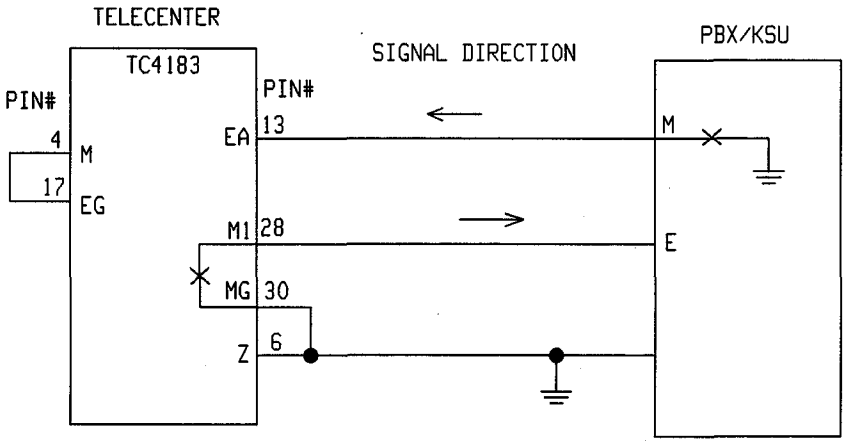
TERMINAL	IDLE	REQUEST
EA (to TC)	+12	0V
M1 (to PBX)	-48	0V

TYPE III E & M INTERFACE

RAULAND-BORG CORP.
SKOKIE, ILL, USA

KM1080 - A

TYPE V E & M SIGNALLING INTERFACE



TELECENTER SIDE "A" SIDE (PBX)

TC4183 E & M TIE TRUNK MODULE INTERFACED WITH PBX/KSU ("A" SIDE)

NOTES:

1. TYPE V SIGNALING USES GROUND AND OPEN FOR BOTH E AND M SIGNALLING LEADS. FOR "A" SIDE SIGNALLING THE SYSTEM ORIGINATES SERVICE REQUEST ON ITS M LEAD AND RECEIVES REQUEST FROM THE REMOTE EQUIPMENT ON ITS E LEAD.
2. SINCE BOTH ENDS OF THIS CIRCUIT USE GROUND AND OPENS FOR E AND M SIGNALLING STATES, IT IS POSSIBLE TO CONNECT TWO "A" SIDE OR "B" SIDE DEVICES TOGETHER BY CONNECTING E TO M AND M TO E.
3. ✳ DENOTES NORMALLY OPEN RELAY CONTACTS.
4. TROUBLESHOOTING VOLTAGES, TC4183

TERMINAL	IDLE	REQUEST
EA (to TC)	+12	0V
M1 (to PBX)	-48	0V

TYPE V E & M INTERFACE

RAULAND-BORG CORP.
SKOKIE, ILL, USA

KM1081 - A