RJ21X, RJ22X, RJ23X, RJ24X, RJ2DX, RJ2EX, RJ2FX, RJ2GX, AND RJ2HX IDENTIFICATION AND MAINTENANCE BRIDGED MULTIPLE TIP AND RING ARRANGEMENTS REGISTRATION INTERFACE

1. GENERAL

1.01 This section provides information on the standard wiring arrangements to be provided under the Federal Communications Commission (FCC) Registration Program for registered telephone, ancillary, data equipment, protective circuitry, PBX, and key telephone systems (KTSs). This section covers multiple (more than three lines) connections. For information on 2-line interface connections, see Section 463-400-140. For information on 3-line interface connections, see Section 463-400-142.

> ***Note:*** Registered data equipment connected to the network via the jacks in this section must have a fixed signal power level under −9 dBm. See Section 590-101-103 for connection of other data devices.

1.02 This section is reissued to:

(a) Add connections for interfaces RJ2DX, RJ2EX, RJ2FX, RJ2GX, and RJ2HX

(b) Expand the use of RJ21X as a network interface to include Message Registration (MR), Off-Premises Service (OPS), and Automatic Identification Outward Dialing (AIOD)

(c) Include intermixing of circuits in some jacks.

Revision arrows are used to emphasize the more significant changes. The Equipment Test List (ETL) is not affected.

1.03 A 50-pin miniature ribbon connector (female) is used to provide a bridged tip and ring connection of several telephone lines. The connections are furnished through a connector such as the KS-16690 connector or equivalent, as part of an A25B connector cable. A 66M3-50R connecting block, which is equipped with a connector wired to a 66-type connecting block, can also be used (Fig. 6). Where KTSs are involved, the A and A1 leads may also be supplied. The plug (male) in the registered terminal equipment must be a compatible 50-pin miniature ribbon connector.

1.04 An aid in establishing the position and numbering in the connector is provided in Fig. 1. The lead to pin assignments differs for each arrangement, requiring care be taken that the jacks be wired ▶properly. Connections showing only one type of interface being furnished in the KS-type connector is provided in Fig. 2 through 11.◀ Interfaces RJ22X, RJ23X, and RJ24X are to be wired in this manner with designated lines ***consecutively*** wired into the jack in the ***sequence*** specified by the customer, starting with the first position and not skipping any positions.

1.05 ▶Interface RJ21X, RJ2EX, RJ2FX, RJ2GX, RJ2HX, and RJ2DX, however, can be intermixed in the same connector (Table A) and positions can be skipped as long as the following conditions are met:

(a) Intermixing will only be allowed for lines which the lead structure is clearly defined.

(b) The proper leads can be accommodated in the interface jack.

For example: RJ2GX is structured for leads T, R, T1, R1, E, and M (Fig. 10). Since RJ21X (T, R) or RJ2EX (T, R, E, M) use these leads, they could be intermixed in RJ2GX. Interface RJ2FX (T, R, E, SG, M, SB) could not be intermixed in RJ2GX since RJ2GX is not structured for the SG, SB leads.◀

1.06 ▶When circuits are intermixed in a jack, one other condition must be met. If a circuit as-

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signed a position in a jack has less leads than the structured interface, the unused leads cannot be assigned since the lead structure of the jack would be changed. Again, using RJ2GX as an example, line 1 is assigned pins 26, 1, 27, 2, 28, 3 (Fig. 10). If a RJ2EX is wired to line 1, it would be connected to pins 26, 1, 27, 2. Pins 28, 3 would be left vacant. Whether intermixed or not, the order of appearance of circuits in the jack should be determined by the customer and shown on the service order.◀

1.07 When necessary to access leads in COM KEY® key telephone system installations, wire as follows:

(a) COM KEY 718 telephone system—Tip and ring ahead of the line circuit can be obtained at the incoming CO/PBX line terminations on block 3 using 183B2 adapters. If T, R, A, or A1 are required behind the line circuit, they can be accessed per line at any of the line appearances of the station terminations on blocks 3, 4, or 5. Use 183B2 adapters. For information on COM KEY 718 telephone system, refer to Section 518-450-100.

(b) COM KEY 1434 telephone system—Tip and ring ahead of the line circuit can be accessed at the incoming line terminations on block 7 using 183B2 adapters. T and R behind the line circuit and A and A1 for a particular line can be accessed at any of the line appearances of the station terminations on blocks 6 through 15 using 183B2 adapters. For information on COM KEY 1434 telephone system, refer to Section 518-450-102.

(c) COM KEY 2152 telephone system—Because of insufficient clearance between the connecting blocks and the closed gate, 183B2 adapters cannot be used on the connecting units of COM KEY 2152 telephone system. To access T and R ahead of the line circuit, route the incoming CO/PBX line to an external 66-type connecting block, then to block 3 of the 100A1 or 101A1 connecting block. The 66-type connecting block is then used to provide a multiple of the line. To access T and R behind the line circuit, use an idle station code termination which must be sacrificed for system use. If no idle station terminations are available, use any station code by running a jumper cable to external 66-type connecting blocks and transferring the station cable to these blocks. The blocks are then used to provide the line appearance multiple. For information on COM KEY 2152 telephone system, refer to Section 518-450-110.

2. IDENTIFICATION

2.01 ***Uniform Service Order Code (USOC) RJ21X:*** This arrangement provides a bridged connection of the tip and ring of a multiple number of CO or PBX trunks ▶and MR, OPS, and AIOD services to the registered terminal equipment.◀ The connection is furnished through a female ribbon connector, such as the KS-16690 connector or equivalent, as part of an A25B connector cable. Up to 25 trunks or lines can be furnished (Fig. 2 and 6). Bridging to the tip and ring may be at various locations. Typical usage for RJ21X would be for connection of registered traffic data recording equipment ▶or a PBX installation.◀

2.02 ***USOC RJ22X:*** Provides up to 12 CO/PBX circuits to the registered terminal equipment where the tip and ring must be bridged ahead of the line circuit and A lead control is required. Leads furnished to the registered terminal equipment on a per line basis are T, R, A, and A1 using a KS-16690 connector or equivalent (Fig. 3 and 6). Access to leads will probably be at the KTS to permit connecting tip and ring ahead of the line circuit and A and A1 behind line circuit. Primary use of arrangement will be to provide for connection of multiple units of registered devices, requiring A lead control.

2.03 ***USOC RJ23X:*** This arrangement is similar to RJ22X except the tip and ring, as well as A and A1, are connected behind the line circuit. Up to 12 circuits are connected using the KS-16690 connector or equivalent (Fig. 4 and 6).

2.04 ***USOC RJ24X:*** Provides the same T, R, and A appearances plus A1 as a standard 5-line key telephone set to the registered terminal equipment (Fig. 5 and 6). The L and LG appearances must be omitted to be in conformance with tariffs. Connection to the registered terminal equipment is through a KS-16690 connector or equivalent. All connections are bridged behind the line circuit.

Note: Some multibutton key sets are terminated in other than the standard wiring arrangement. When accessing the leads for this arrangement, care must be taken that the desired leads will appear on the connector as required.

2.05 ***USOC RJ2DX:*** This arrangement provides up to 12 bridged 4-wire exchange wires (T/R

and T1/R1). This arrangement is typically used with registered terminal equipment and systems requiring 4-wire exchange access.

2.06 ***USOC RJ2EX:*** Provides multiple 2-wire tie trunks with E and M, type I signaling. This arrangement provides up to 12 bridged tie trunks and is basically used with registered PBXs, channel derivation devices, and similar systems.

2.07 ***USOC RJ2FX:*** This arrangement has multiple 2-wire tie trunks with E and M, type II signaling. The RJ2FX provides up to 8 bridged tie trunks and is typically used with registered PBXs, channel derivation devices, and similar systems.

2.08 ***USOC RJ2GX:*** This arrangement provides up to 8 bridged 4-wire trunks (T/R and T1/R1) and E and M, type I signaling. The typical usage for this arrangement is with registered PBXs, channel derivation devices, and similar systems.

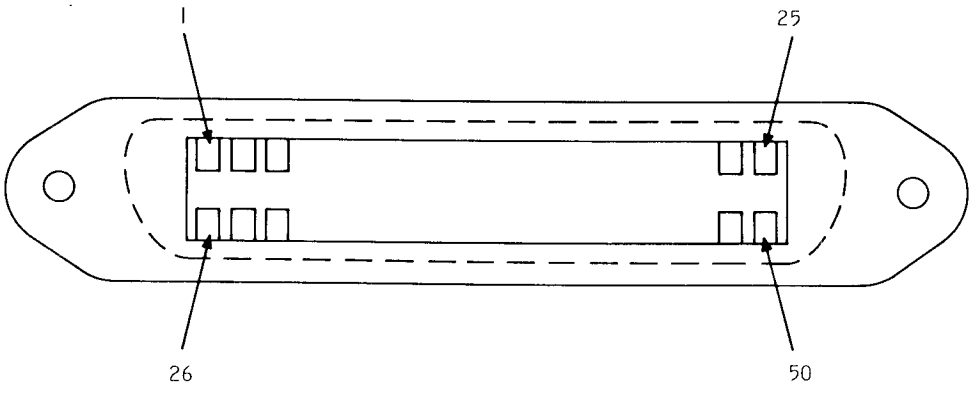
2.09 ***USOC RJ2HX:*** Provides up to 6 bridged 4-wire tie trunks (T/R and T1/R1) and E and M, type II signaling. The typical usage for this arrangement is with registered PBXs, channel derivation devices, and similar systems.

3. MAINTENANCE

3.01 Maintenance of the wiring arrangements covered in this section is limited to verification of the telephone company wiring and equipment and assurance that the required leads are supplied in the interface used for registered terminal equipment connection.

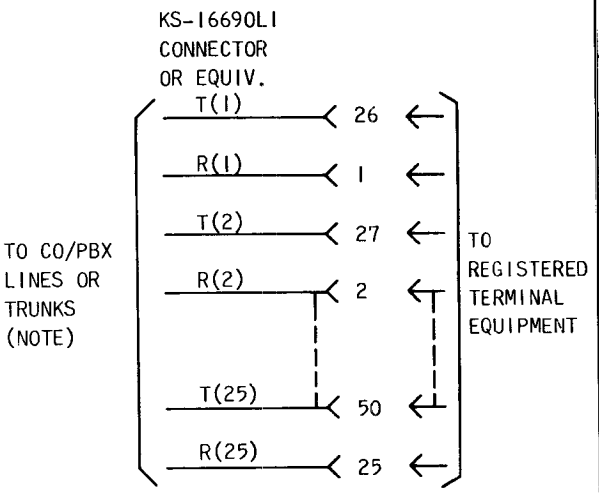
No attempt should be made to test, modify, or repair customer-owned and maintained equipment.

3.02 When in the judgment of repair personnel the trouble is located in or caused by the customer-provided equipment (CPE), the Repair Service Bureau should be notified so proper Maintenance of Service Charge Billing can be initiated as required and as outlined in Section 660-101-312 — Maintenance of Service Charge on Services With Customer-Provided Equipment (CPE) and Section 660-101-318 — Tariff and Registration Violation Notice Procedures.



NOTE:
CONNECTOR VIEWED FROM WIRING SIDE

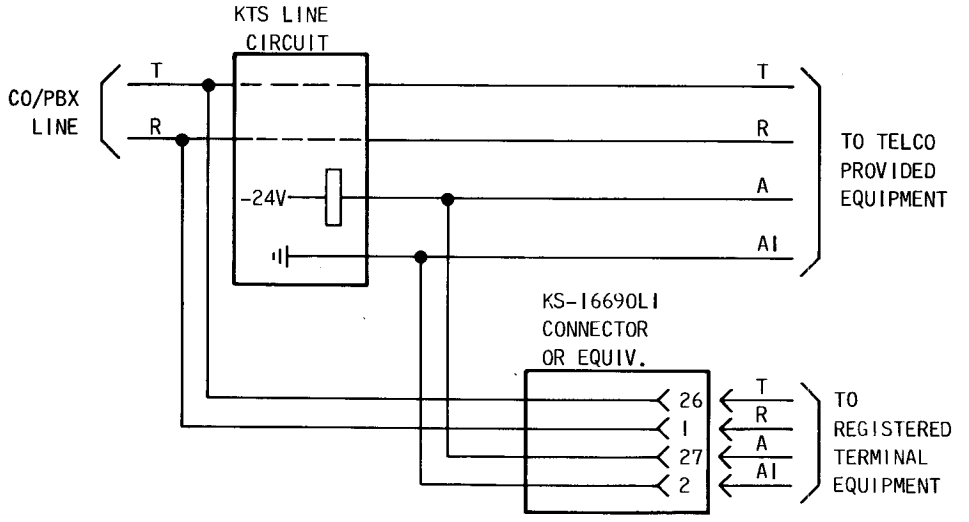
Fig. 1—Location of Contacts in KS-16690 Connector



NOTE:
CONNECT CIRCUITS
AS REQUIRED

CKT	LEAD	PIN	CKT	LEAD	PIN
1	T R	26 1	14	T R	39 14
2	T R	27 2	15	T R	40 15
3	T R	28 3	16	T R	41 16
4	T R	29 4	17	T R	42 17
5	T R	30 5	18	T R	43 18
6	T R	31 6	19	T R	44 19
7	T R	32 7	20	T R	45 20
8	T R	33 8	21	T R	46 21
9	T R	34 9	22	T R	47 22
10	T R	35 10	23	T R	48 23
11	T R	36 11	24	T R	49 24
12	T R	37 12	25	T R	50 25
13	T R	38 13			

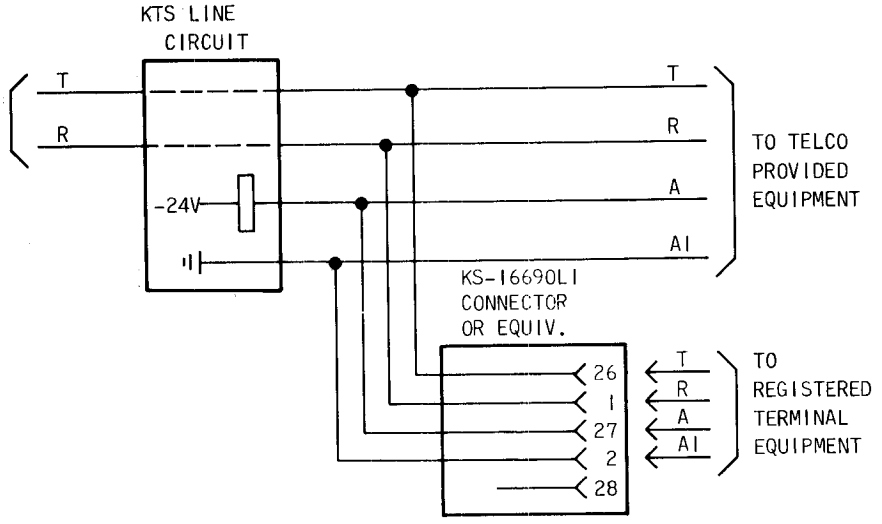
Fig. 2—Connections for USOC RJ21X—Multiple Bridged Tip and Ring



CKT	LEAD	PIN
1	T	26
	R	1
	A	27
	AI	2
2	T	28
	R	3
	A	29
	AI	4
3	T	30
	R	5
	A	31
	AI	6
4	T	32
	R	7
	A	33
	AI	8
5	T	34
	R	9
	A	35
	AI	10
6	T	36
	R	11
	A	37
	AI	12
7	T	38
	R	13
7	A	39
	AI	14
8	T	40
	R	15
	A	41
	AI	16
9	T	42
	R	17
	A	43
	AI	18
10	T	44
	R	19
	A	45
	AI	20
11	T	46
	R	21
	A	47
	AI	22
12	T	48
	R	23
	A	49
	AI	24
		50
		25

NOTE:
CONNECT
CIRCUITS AS
REQUIRED. ONLY
IST CIRCUIT SHOWN
CONNECTED

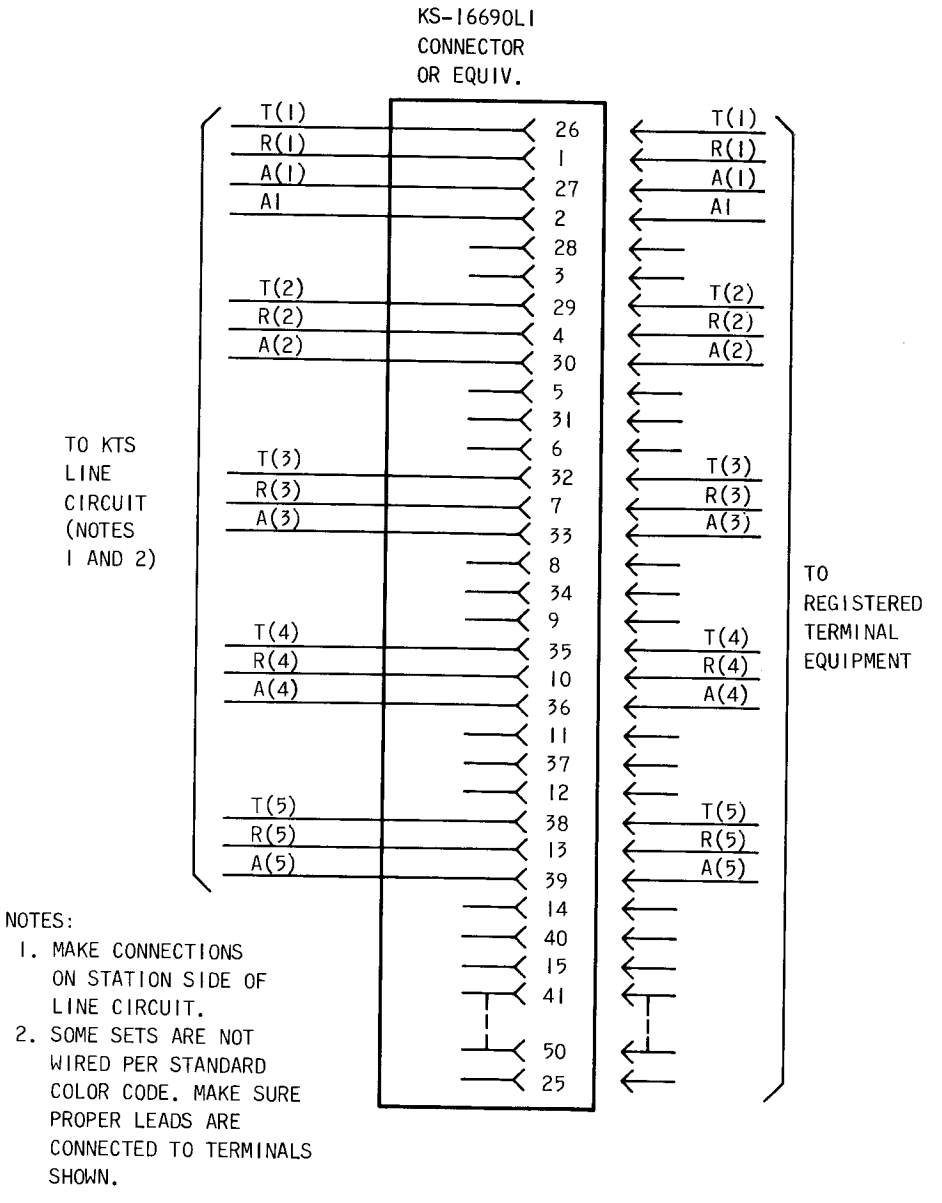
Fig. 3—Connections for USOC RJ22X—Multiple Bridged Tip and Ring Ahead of Line Circuit With A Lead Control



CKT	LEAD	PIN	CKT	LEAD	PIN
1	T	26	7	A	39
	R	1		AI	14
	A	27			
	AI	2			
2	T	28	8	T	40
	R	3		R	15
	A	29		A	41
	AI	4		AI	16
3	T	30	9	T	42
	R	5		R	17
	A	31		A	43
	AI	6		AI	18
4	T	32	10	T	44
	R	7		R	19
	A	33		A	45
	AI	8		AI	20
5	T	34	11	T	46
	R	9		R	21
	A	35		A	47
	AI	10		AI	22
6	T	36	12	T	48
	R	11		R	23
	A	37		A	49
	AI	12		AI	24
7	T	38			50
	R	13			25

NOTE:
CONNECT CIRCUITS AS REQUIRED. ONLY 1ST CIRCUIT SHOWN CONNECTED.

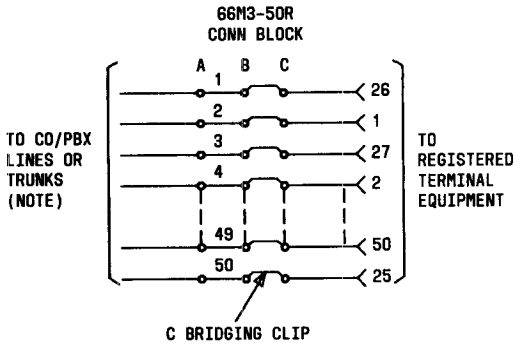
Fig. 4—Connections for USOC RJ23X—Multiple Bridged Tip and Ring Behind Line Circuit With A Lead Control



NOTES:

1. MAKE CONNECTIONS ON STATION SIDE OF LINE CIRCUIT.
2. SOME SETS ARE NOT WIRED PER STANDARD COLOR CODE. MAKE SURE PROPER LEADS ARE CONNECTED TO TERMINALS SHOWN.

Fig. 5—Connections for USOC RJ24X—Multiple Bridged Tip and Ring With A Lead Control, Standard Appearance



66M3-50R CONN. BLOCK		RJ21X		RJ22X		RJ23X		RJ24X	
CLIP	CONN. TERM.	CIR-CUIT	LEAD DESIG	CIR-CUIT	LEAD DESIG	CIR-CUIT	LEAD DESIG	CIR-CUIT	LEAD DESIG
1	26	1	T	1	T	1	T	1	T
2	1		R		R		R		R
3	27	2	T		A		A		A
4	2		R		A1		A1		A1
5	28	3	T	2	T	2	T		
6	3		R		R		R		
7	29	4	T		A		A	2	T
8	4		R		A1		A1		R
9	30	5	T	3	T	3	T		A
10	5		R		R		R		
11	31	6	T		A		A		
12	6		R		A1		A1		
13	32	7	T	4	T	4	T	3	T
14	7		R		R		R		R
15	33	8	T		A		A		A
16	8		R		A1		A1		
17	34	9	T	5	T	5	T		
18	9		R		R		R		
19	35	10	T		A		A	4	T
20	10		R		A1		A1		R
21	36	11	T	6	T	6	T		A
22	11		R		R		R		
23	37	12	T		A		A		
24	12		R		A1		A1		

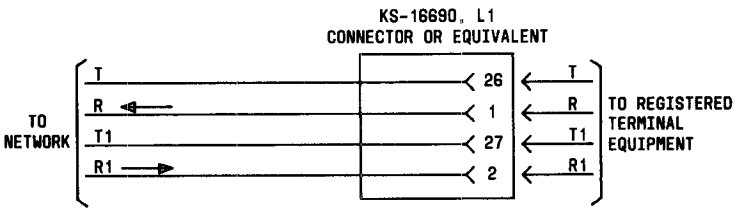
Fig. 6— Connections for RJ21X, RJ22X, RJ23X, and RJ24X Using 66M3-50R Connecting Block (Sheet 1 of 2)

66M3-50R CONN. BLOCK		RJ21X		RJ22X		RJ23X		RJ24X	
CLIP	CONN. TERM.	CIR-CUIT	LEAD DESIG	CIR-CUIT	LEAD DESIG	CIR-CUIT	LEAD DESIG	CIR-CUIT	LEAD DESIG
25	38	13	T	7	T	7	T	5	T
26	13		R		R		R		R
27	39	14	T		A		A		A
28	14		R		A1		A1		
29	40	15	T	8	T	8	T		
30	15		R		R		R		
31	41	16	T		A		A		
32	16		R		A1		A1		
33	42	17	T	9	T	9	T		
34	17		R		R		R		
35	43	18	T		A		A		
36	18		R		A1		A1		
37	44	19	T	10	T	10	T		
38	19		R		R		R		
39	45	20	T		A		A		
40	20		R		A1		A1		
41	46	21	T	11	T	11	T		
42	21		R		R		R		
43	47	22	T		A		A		
44	22		R		A1		A1		
45	48	23	T	12	T	12	T		
46	23		R		R		R		
47	49	24	T		A		A		
48	24		R		A1		A1		
49	50	25	T						
50	25		R						

NOTE:

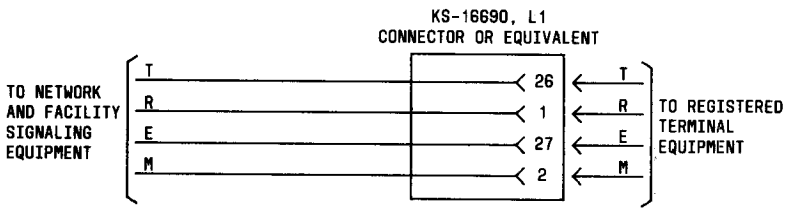
CONNECT CIRCUITS AS REQUIRED

Fig. 6— Connections for RJ21X, RJ22X, RJ23X, and RJ24X Using 66M3-50R Connecting Block (Sheet 2 of 2)



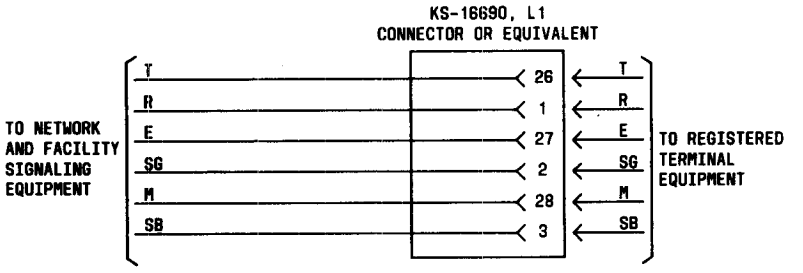
LINE	LEAD	PIN	LINE	LEAD	PIN
1	T	26	7	T	38
	R	1		R	13
	T1	27		T1	39
	R1	2		R1	14
2	T	28	8	T	40
	R	3		R	15
	T1	29		T1	41
	R1	4		R1	16
3	T	30	9	T	42
	R	5		R	17
	T1	31		T1	43
	R1	6		R1	18
4	T	32	10	T	44
	R	7		R	19
	T1	33		T1	45
	R1	8		R1	20
5	T	34	11	T	46
	R	9		R	21
	T1	35		T1	47
	R1	10		R1	22
6	T	36	12	T	48
	R	11		R	23
	T1	37		T1	49
	R1	12		R1	24

Fig. 7—Connections for USOC RJ2DX—Multiple Line Bridged 4-Wire T/R and T1/R1



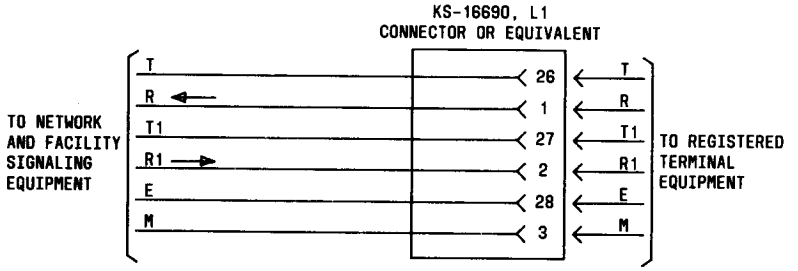
LINE	LEAD	PIN	LINE	LEAD	PIN
1	T	26	7	T	38
	R	1		R	13
	E	27		E	39
	M	2		M	14
2	T	28	8	T	40
	R	3		R	15
	E	29		E	41
	M	4		M	16
3	T	30	9	T	42
	R	5		R	17
	E	31		E	43
	M	6		M	18
4	T	32	10	T	44
	R	7		R	19
	E	33		E	45
	M	8		M	20
5	T	34	11	T	46
	R	9		R	21
	E	35		E	47
	M	10		M	22
6	T	36	12	T	48
	R	11		R	23
	E	37		E	49
	M	12		M	24

Fig. 8—Connections for USOC RJ2EX—Multiple 2-Wire Tie Trunks With E and M, Type I Signaling



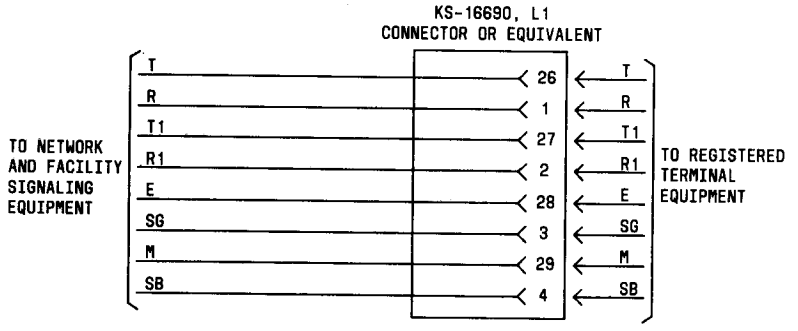
LINE	LEAD	PIN	LINE	LEAD	PIN
1	T	26	5	T	38
	R	1		R	13
	E	27		E	39
	SG	2		SG	14
	M	28		M	40
	SB	3		SB	15
2	T	29	6	T	41
	R	4		R	16
	E	30		E	42
	SG	5		SG	17
	M	31		M	43
	SB	6		SB	18
3	T	32	7	T	44
	R	7		R	19
	E	33		E	45
	SG	8		SG	20
	M	34		M	46
	SB	9		SB	21
4	T	35	8	T	47
	R	10		R	22
	E	36		E	48
	SG	11		SG	23
	M	37		M	49
	SB	12		SB	24

Fig. 9—Connections for USOC RJ2FX—Multiple 2-Wire Tie Trunks With E and M, Type II Signaling



LINE	LEAD	PIN	LINE	LEAD	PIN
1	T	26	5	T	38
	R	1		R	13
	T1	27		T1	39
	R1	2		R1	14
	E	28		E	40
	M	3		M	15
2	T	29	6	T	41
	R	4		R	16
	T1	30		T1	42
	R1	5		R1	17
	E	31		E	43
	M	6		M	18
3	T	32	7	T	44
	R	7		R	19
	T1	33		T1	45
	R1	8		R1	20
	E	34		E	46
	M	9		M	21
4	T	35	8	T	47
	R	10		R	22
	T1	36		T1	48
	R1	11		R1	23
	E	37		E	49
	M	12		M	24

Fig. 10—Connections for USOC RJ2GX—Multiple 4-Wire Tie Trunks With E and M, Type I Signaling



LINE	LEAD	PIN	LINE	LEAD	PIN
1	T	26	4	T	38
	R	1		R	13
	T1	27		T1	39
	R1	2		R1	14
	E	28		E	40
	SG	3		SG	15
	M	29		M	41
	SB	4		SB	16
2	T	30	5	T	42
	R	5		R	17
	T1	31		T1	43
	R1	6		R1	18
	E	32		E	44
	SG	7		SG	19
	M	33		M	45
	SB	8		SB	20
3	T	34	6	T	46
	R	9		R	21
	T1	35		T1	47
	R1	10		R1	22
	E	36		E	48
	SG	11		SG	23
	M	37		M	49
	SB	12		SB	24

Fig. 11—Connections for USOC RJ2HX—Multiple 4-Wire Tie Trunks With E and M, Type II Signaling

66M3-50R CONN. BLOCK SEE NOTE		RJ2DX		RJ2EX		RJ2FX		RJ2GX		RJ2HX	
CLIP	CONN TERM.	CIRCUIT	LEAD DESIG	CIRCUIT	LEAD DESIG	CIRCUIT	LEAD DESIG	CIRCUIT	LEAD DESIG	CIRCUIT	LEAD DESIG
1	26	1	T	1	T	1	T	1	T	1	T
2	1		R		R		R		R		R
3	27		T1		E		E		T1		T1
4	2		R1		M		SG		R1		R1
5	28	2	T	2	T		M		E		E
6	3		R		R		SB		M		SG
7	29		T1		E	2	T	2	T		M
8	4		R1		M		R		R		SB
9	30	3	T	3	T		E		T1	2	T
10	5		R		R		SG		R1		R
11	31		T1		E		M		E		T1
12	6		R1		M		SB		M		R1
13	32	4	T	4	T	3	T	3	T		E
14	7		R		R		R		R		SG
15	33		T1		E		E		T1		M
16	8		R1		M		SG		R1		SB
17	34	5	T	5	T		M		E	3	T
18	9		R		R		SB		M		R
19	35		T1		E	4	T	4	T		T1
20	10		R1		M		R		R		R1
21	36	6	T	6	T		E		T1		E
22	11		R		R		SG		R1		SG
23	37		T1		E		M		E		M
24	12		R1		M		SB		M		SB
25	38	7	T	7	T	5	T	5	T	4	T
26	13		R		R		R		R		R
27	39		T1		E		E		T1		T1
28	14		R1		M		SG		R1		R1

Fig. 12—Connections for RJ2DX, RJ2EX, RJ2FX, RJ2GX, and RJ2HX Using 66M3-50R Connecting Block (Sheet 1 of 2)

66M3-50R CONN. BLOCK SEE NOTE		RJ2DX		RJ2EX		RJ2FX		RJ2GX		RJ2HX	
CLIP	CONN TERM.	CIRCUIT	LEAD DESIG	CIRCUIT	LEAD DESIG	CIRCUIT	LEAD DESIG	CIRCUIT	LEAD DESIG	CIRCUIT	LEAD DESIG
29	40	8	T	8	T	5	M	5	E	4	E
30	15		R		R		SB		M		SG
31	41		T1		E	6	T	6	T		M
32	16		R1		M		R		R		SB
33	42	9	T	9	T		E		T1	5	T
34	17		R		R		SG		R1		R
35	43		T1		E		M		E		T1
36	18		R1		M		SB		M		R1
37	44	10	T	10	T	7	T	7	T		E
38	19		R		R		R		R		SG
39	45		T1		E		E		T1		M
40	20		R1		M		SG		R1		SB
41	46	11	T	11	T		M		E	6	T
42	21		R		R		SB		M		R
43	47		T1		E	8	T	8	T		T1
44	22		R1		M		R		R		R1
45	48	12	T	12	T		E		T1		E
46	23		R		R		SG		R1		SG
47	49		T1		E		M		E		M
48	24		R1		M		SB		M		SB
49	50										
50	25										

NOTE: CONNECTIONS SHOW ONLY ONE TYPE OF INTERFACE IN EACH JACK. FOR INFORMATION ON INTERMIXING OF INTERFACES, REFER TO PARAGRAPH 1.04 THROUGH 1.06 AND TABLE A.

Fig. 12—Connections for RJ2DX, RJ2EX, RJ2FX, RJ2GX, and RJ2HX Using 66M3-50R Connecting Block (Sheet 2 of 2)

TABLE A

INTERMIXABLE SERVICES AND JACKS

SERVICE	JACK (NOTES 1 AND 2)								
	RJ11C	RJ14C	RJ25C	RJ21X	RJ2EX	RJ2FX	RJ2GX	RJ2HX	RJ2DX
2-Wire Private Line Services*	•	•	•	•	•	•	•	•	•
Message Registration	•	•	•	•	•	•	•	•	•
Automatic Identification Outward Dialing	•	•	•	•	•	•	•	•	•
Off-Premises Service	•	•	•	•	•	•	•	•	•
Tie Trunk T, R, E, M Leads					•	•	•	•	
Tie Trunk T, R, E, SG, M, SB Leads						•		•	
Tie Trunk T, R, T1, R1, E, M Leads							•	•	
Tie Trunk T, R, T1, R1, E, SG, M, SB Leads								•	
4-Wire Private Line Services†							•	•	•

Note 1: For additional information, refer to paragraphs 1.04 through 1.08.

Note 2: Refer to the following sections for jacks not covered in this section:

RJ11C 463-400-120
RJ14C 463-400-140
RJ25C 463-400-142

* Includes Foreign Message Toll Telephone Service (MTS), Wide Area Telephone Service (WATS), Foreign Exchange (FX), and Common Control Switching Arrangement (CCSA).

† Includes MTS, WATS, FX, and Foreign Central Office (FCO).