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Systems Reference Library

Installation Manual – Physical Planning

IBM Input–Output Components

7000 Series and 1410 Data Processing Systems

This manual contains information necessary for planning the physical installation of Input-Output Components on the IBM 1410 Data Processing System or any IBM 7000 Series System.

In addition to technical information needed for physical installation planning, it contains recommendations and suggestions to be used as a guide only in planning an efficient and pleasant installation. The customer should make such arrangements as he deems necessary for professional consultants' services in planning his installation. It is important that local and national code requirements be adhered to by the customer.

The requirements of the system are subject to modification by engineering developments.

Fifth Edition

This is a reprint of C22-6681-3 incorporating changes released in the following Technical Newsletter:

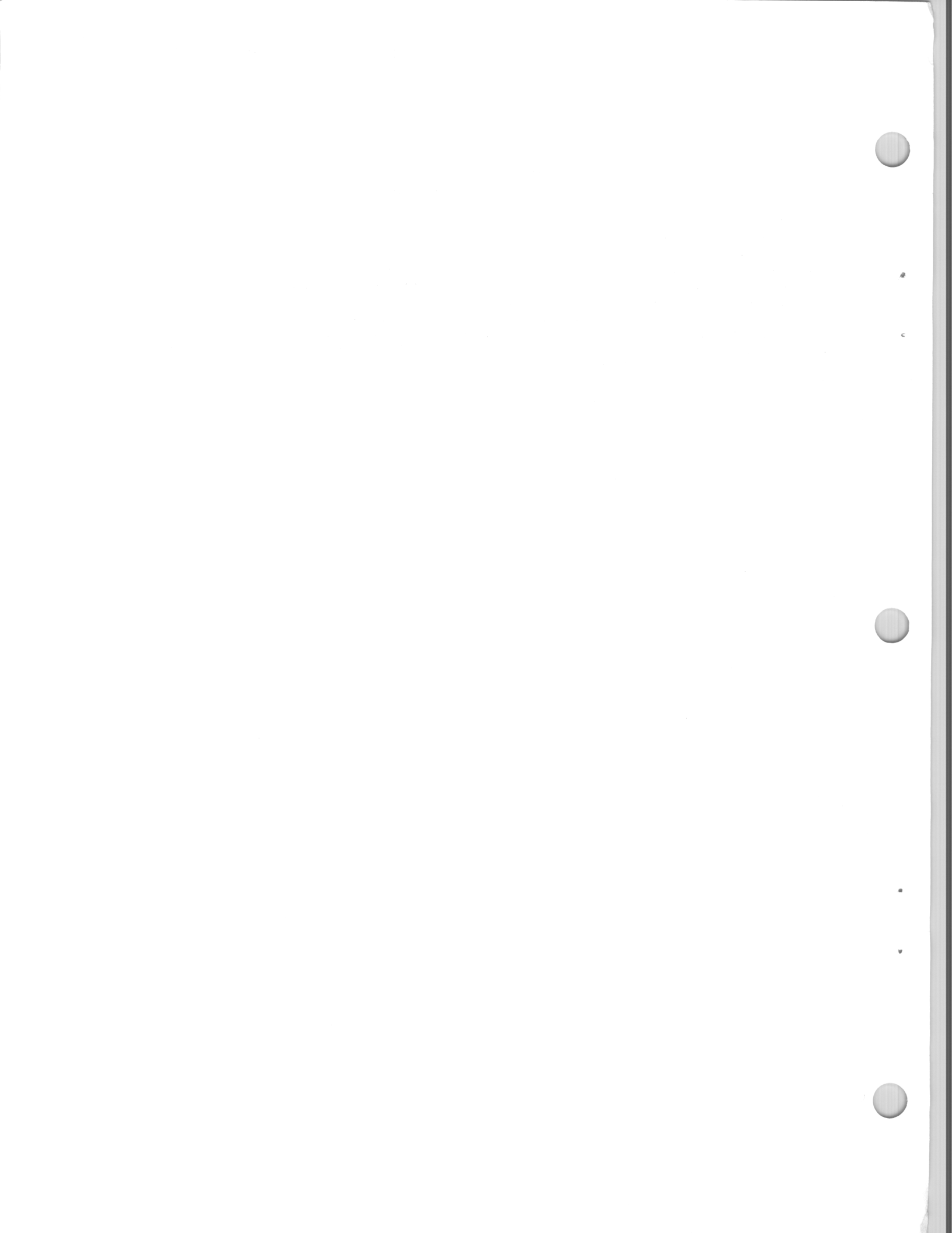
<i>Form Number</i>	<i>Pages Affected</i>	<i>Date</i>
N22-0223-0	39-40	January 12, 1966

Significant changes or additions to the specifications contained in this publication will be reported in subsequent revisions or Technical Newsletters.

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IBM Customer Manuals, Dept. B98, PO Box 390, Poughkeepsie, New York

IBM INPUT-OUTPUT COMPONENTS INSTALLATION MANUAL -
 PHYSICAL PLANNING 5
 Schedule 5
 Twelve Months before Machine Delivery 5
 Six Months before Machine Delivery 5
 Four Months before Machine Delivery 5
 One Month before Machine Delivery 5
 Two Weeks before Machine Delivery 5
 One Week before Machine Delivery 5
 Unit Descriptions 5
 Special Installation Considerations 6
 Customer Engineering Servicing Considerations 6
 Tape Switching Feature for IBM 729 II, IV, V, and VI
 Magnetic Tape Units 7

Examples of Tape Switching 9
 Specification Summary 14
 Cables 16
 1014 Cables 16
 Bending Radius of Cables 16
 Power Requirements 16
 Air Conditioning 16
 Common Carrier Terminal and Cabling Requirements 18
 Cabling Listings and Schematics - Signal 20
 Cabling Listings and Schematics - Power and Control 40
 Cable Connector Illustrations 56
 Machine Illustrations 58



This manual contains the information necessary to install input-output components on IBM 1410 or 7000 series systems. It should be used to supplement the system installation manual.

Where specifications of temperature, humidity, or power for a component and a system conflict, the more critical figures are to be used for the installation.

The specifications contained are summarized by system. In some cases data for the same unit differs for the various systems. Only the data concerning your particular system should be used.

Cables for the components listed will be supplied according to the cable policy stated in the system Physical Installation Planning Manual.

SCHEDULE

Because each data processing machine installation differs in some respects from every other installation, it is not possible to provide a detailed schedule in this manual. However, the following suggested schedule should be adhered to as closely as possible:

Twelve Months before Machine Delivery

1. Determine the machine components desired and review the order.
2. Read this Physical Planning Installation Manual and the system Physical Planning Installation Manual.
3. Determine the prospective location of the system. Make a preliminary layout of the proposed installation.
4. Request a visit by the IBM Installation Planning representative to discuss with the customer's personnel (including the planning staff and consulting group) installation, power, and air conditioning requirements. At this meeting, the proposed room layout will be discussed. Floor construction and the placement of raceways and power receptacles will also be discussed.
5. Advise IBM of security or other restrictions, and advise of any unusual housing requirements as a result of these restrictions.
6. The customer should study local delivery quotations on power and air conditioning equipment to determine when this equipment must be ordered.

Six Months before Machine Delivery

The air conditioning equipment should be reviewed.

Four Months before Machine Delivery

The final layout should be made and approved by the customer, Sales and Field Engineer Representatives,

so that all cables can be ordered. The cable order should be made up at the branch office from the final layout and forwarded by the Branch Manager to the Order Department of the plant of control. When the customer and the branch office require assistance, the IBM Installation Planning representative should be contacted. THIS IS A CRITICAL POINT IN THE SCHEDULE. After these cables are ordered, no changes should be made in the layout that will affect cable lengths.

One Month before Machine Delivery

A survey must be made by local IBM representatives to determine specific requirements for moving the machine components from the delivery platform to the machine room. This information should be forwarded directly to the IBM Traffic Department at Poughkeepsie.

Two Weeks before System Delivery

1. Cables will be delivered to the machine room to be set in place by customer personnel under supervision of IBM Customer Engineers. It is IBM's responsibility to connect the interconnecting cables to any IBM components.
 2. Customer Engineering furniture and equipment will be delivered.
- Components not shipped with the system will have their cables shipped with the individually delivered units.

One Week before Machine Delivery

ALL AIR CONDITIONING EQUIPMENT SHOULD BE INSTALLED, TESTED, AND READY FOR OPERATION. Electrical facilities, lighting, floor ramps, painting, plastering, and decorating should also be completed at this time.

Every effort should be made to balance the air conditioning system as soon as possible after the machine has been delivered.

UNIT DESCRIPTIONS

IBM 7904 Data Channel: A unit containing controls to synchronize the transfer of data from input-output components to the 7040 or 7044 system.

IBM 7907 Data Channel: A unit containing the necessary controls to synchronize the transfer of data from the input-output components to the 7070 or 7074 system.

IBM 7908 Data Channel: A unit containing the necessary controls to synchronize the transfer of data from the input-output components to the 7080 system.

IBM 7909 Data Channel: A unit containing the necessary controls to synchronize the transfer of data from the input-output components to the 7090 system.

IBM 7631 File Control: A unit containing the necessary control circuits for the file units.

IBM 1301 Disk Storage: A high density, large capacity, random access storage unit.

IBM 7155 Switch Control Console: A small unit to permit manual control of tape unit assignment from the system console.

IBM 7640 Hypertape Control: A unit containing the necessary circuits for synchronization and data transfer. Operates in conjunction with the system data channel.

IBM 7340 Hypertape Drive: Magnetic tape input-output unit using one-inch tape and cartridge loading.

IBM 1009 Data Transmission Unit: A unit permitting data transmission over common carrier lines to a computer.

IBM 1011 Paper Tape Reader: A unit that reads punched paper tape for data input to a system.

IBM 1014 Inquiry Unit: A unit that permits inquiry into a computer system from a remote location.

IBM 1414-1, 2, 7 Input-Output Synchronizer: Units which permit the use of 729 or 7330 magnetic tape units.

IBM 1414-3, 8 Input-Output Synchronizer: Units which permit the use of 1402 and 1403 units on a system.

The IBM 1414-4, 5, 6 Input-Output Synchronizer: A unit that permits the attachment of communications and paper tape equipment to a system.

IBM 7320 Rapid Random Access Drum Storage.

IBM 7750 Programmed Transmission Control: A unit to permit a computer system to communicate with remote locations over common carrier lines.

SPECIAL INSTALLATION CONSIDERATIONS

Itemized below by machine type are the various special points to be considered in determining the physical location of the equipment covered by this manual.

IBM 7904 Data Channel: If a raised floor is not used, the 7904 must not be abutted to any other unit or structure.

IBM 7907 Data Channel: The upper half of the front of this unit should be visible from the console. It contains a function display panel which is useful to the operator and Customer Engineer.

IBM 7631 File Control: This unit contains an operator panel which should be visible from the front of the system data channel or channels (7907, 7908, or 7909; any one or a combination of two) and the system console.

IBM 7640/7641 Hypertape Control: These units contain an operator panel which should be visible from

the front of the system data channel or channels (7907, 7908, or 7909) and the system console.

IBM 7340 Hypertape Drive: Space between these units should be 7 inches, 22 inches, 7 inches, 22 inches. The end drive of a group of four requires a source of power.

IBM 1009 Data Transmission Unit: This unit should be located adjacent to the system console. Specify same voltage as for the using System.

IBM 1014 Inquiry Unit: Specify same voltage as for the using system when this unit is installed in the computer room.

IBM 1414-4, 5, 6 Input-Output Synchronizer: To facilitate servicing, locate this unit to permit reasonably good visual access to common carrier line terminals.

The following paragraphs describe additional points to be considered:

The service clearance for any unit should not overlap the service clearance of its control unit or synchronizer.

The 1301, 2302, 7320, 7631, 7641, and 7904 are equipped with radio interference control circuitry and require a good wired earth or building ground. Total resistance of the ground conductor, measured between the receptacle and the building grounding point, may not exceed 3 ohms. All components of the system or systems to which these units are attached must have the same ground reference. Conduit is not a satisfactory grounding means.

IBM 7750 Programmed Transmission Control: Contains an operator panel and two Customer Engineering panels. The operator panel should be visible and physically accessible from the system console.

Allow space in the computer area for the common carrier equipment when communications type equipment is to be installed. This space should be within sight of the using equipment to facilitate servicing. The amount of space required should be determined by the equipment supplier.

If a raised floor is not used, cable must enter and leave any 7631, 7640, 1414 or similarly constructed unit through the end covers. Special end covers are provided to permit this. The total area available for the passage of external cables within these units is limited to 25 square inches (32 square inches on the 7904). The 7904 may not abut any other unit under these conditions.

Customer Engineering Servicing Considerations

The following features are highly desirable in all layouts and should be incorporated if at all possible without sacrificing the system's operating features.

1. There should be visual access between a control unit or synchronizer and one of each type of its attachable units.

2. There should be visual access between a data channel and each of its attached control units or synchronizers.

TAPE SWITCHING FEATURE FOR IBM 729 II, IV, V, AND VI MAGNETIC TAPE UNITS

IBM 729 II, IV, V, and VI Magnetic Tape Units may be modified to permit signal cable switching between two magnetic tape channels under control of the IBM 7155 Switch Control Console (Figure 1). Power to the modified tape units is not switched between channels. It may be supplied from either channel. However, the power cables must be manually changed to obtain this condition.

The modified tape units provide two additional signal cable connectors (Figure 2), the switching relays, the control cable connector for the Switch Control Console, and fifty feet of control cable.

The 7155 Switch Control Console contains the remote control switches and a plug for connecting to the fifty feet of control cable for each tape unit to be controlled.

The console may be placed on the system console or in any other location which can be reached with the fifty feet of control cable.

Any number of tape units may be modified for tape switching. Up to eight modified tape units may be controlled by one control console. The number of tape units per channel and the maximum length of cables (signal and power) specified for a given tape channel are the only limiting factors. The total length of signal and power cable between the tape channel and the last tape unit on line must not exceed the maximum specified for the system. This includes all tape units connected to this tape channel whether the tape units are switched to this tape channel or not.

The installation requirements of a modified tape unit are the same as for a standard 729 II, IV, V, or VI, except for the connecting cables.

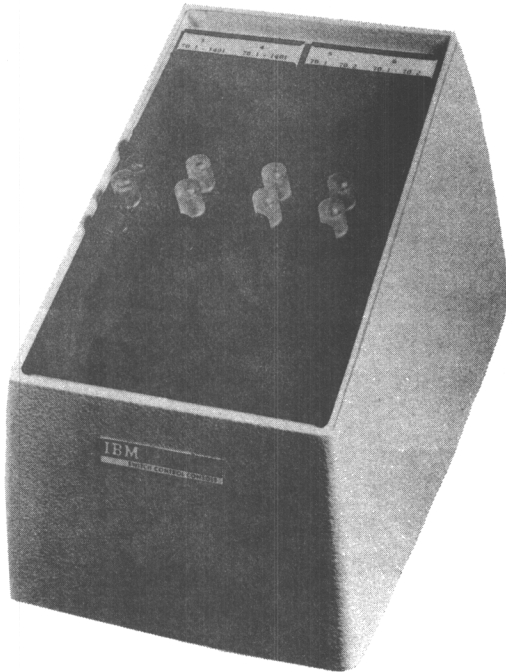


Figure 1. IBM 7155 Switch Control Console

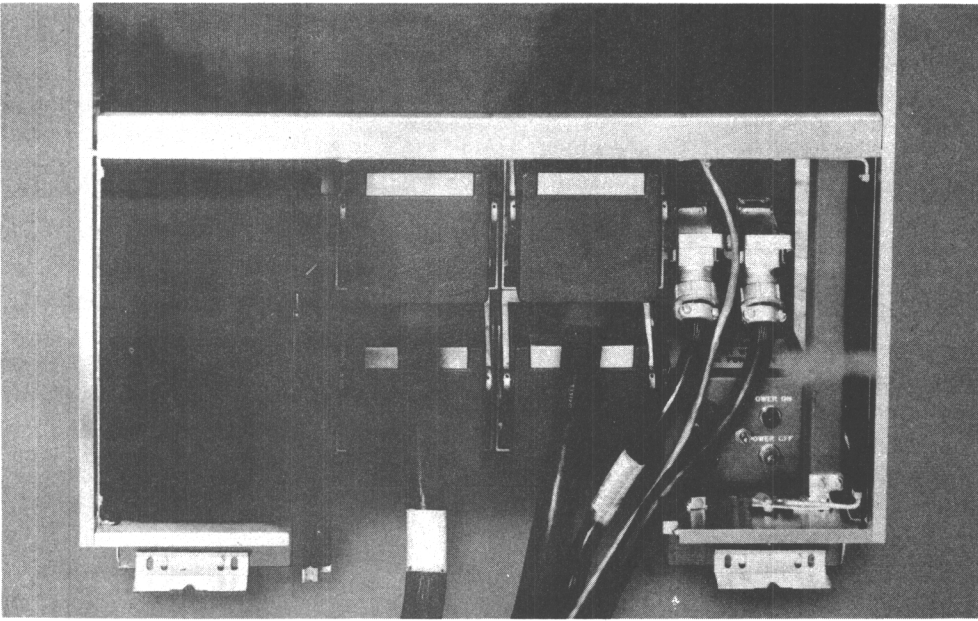


Figure 2. Tape Unit Cables & Connectors

The key number for the signal cables between modified tape units will depend on the systems involved and whether the cables are routed under the floor. The key number for the standard tape-to-tape signal cable, part number 535099, should be used between modified units where the cables are routed under the floor.

A new cable key number 300 for tape-to-tape signal cable, part number 352793, should be used between modified units where the cables are routed on top of the floor. This cable has one connector with a 45-degree cable exit to mate with the lower signal cable receptacle on the modified unit.

If tape units are to be field-modified and the cables are routed on top of the floor, the above cable must be ordered to replace those cables which will require the connectors with the 45-degree angle cable exit. The cables should be ordered on the original order or on an Installation-Alteration-Correction Notice.

The tape-to-tape signal cables between modified units should be written in on the system's cable order form and sent to the plant of control.

The key number for the power cable between modified tape units will depend on the systems involved. However, 18 inches should be added to the X dimension of the power cables between the modified units to take care of the relocation of the power cable connectors as shown in Figure 3.

CAUTION: The total length of power and signal cable between the control unit and the last tape unit on a line must not exceed the maximum cable length as specified in the physical planning installation manual for that system. The tape units with the

signal cable terminators must have power on them for the tape units to operate.

Examples of Tape Switching

The following examples describe the cabling technique when tape switching is employed.

All cable lengths are measured based on running length between units from the point of entry and exit of the units at floor height, with all units installed on a 12-inch raised floor.

All examples are for a 7090 system. The maximum signal cable length, per signal cable group, is 60 feet.

Figure 4 illustrates a two-channel 7090 system with nine tape units per channel. Signal group A is 50 feet, group B 47 feet, group C 42-1/2 feet and group D 45 feet.

Figure 5 is the same physical layout as Figure 4. However, tape switching has been installed on tape unit B1X and C9X. It now becomes possible to switch a tape unit between channels so that one or the other tape channel may have either eight, nine, or ten tape units.

Tape signal cable groups A and D are not affected; therefore, signal cable length remains as before. Signal cable group B has been increased to 57 feet and group C to 52-1/2 feet.

To determine this cable length, the total cable length must be considered, regardless of whether the tape unit is switched on or off the channel. It is the total signal cable footage the Tape Adapter Unit

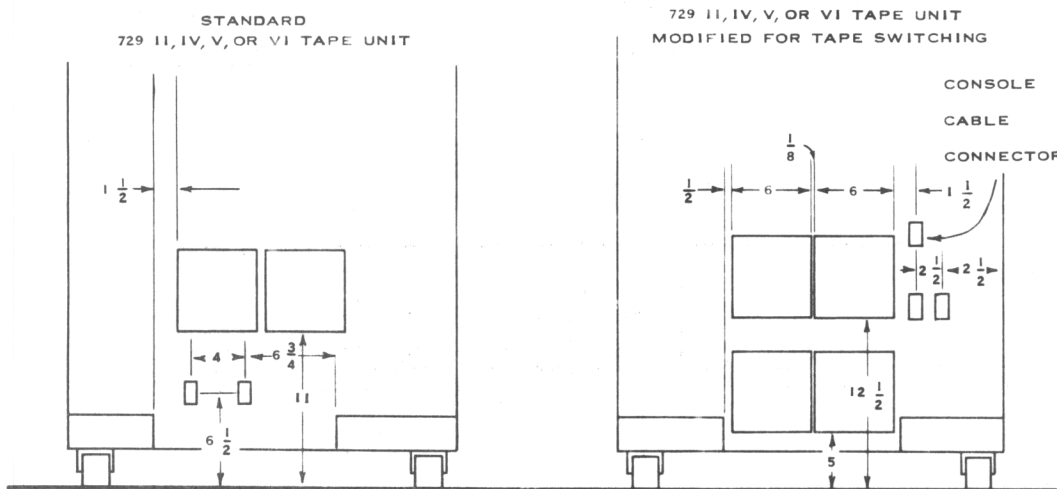


Figure 3. Connector Location Differences

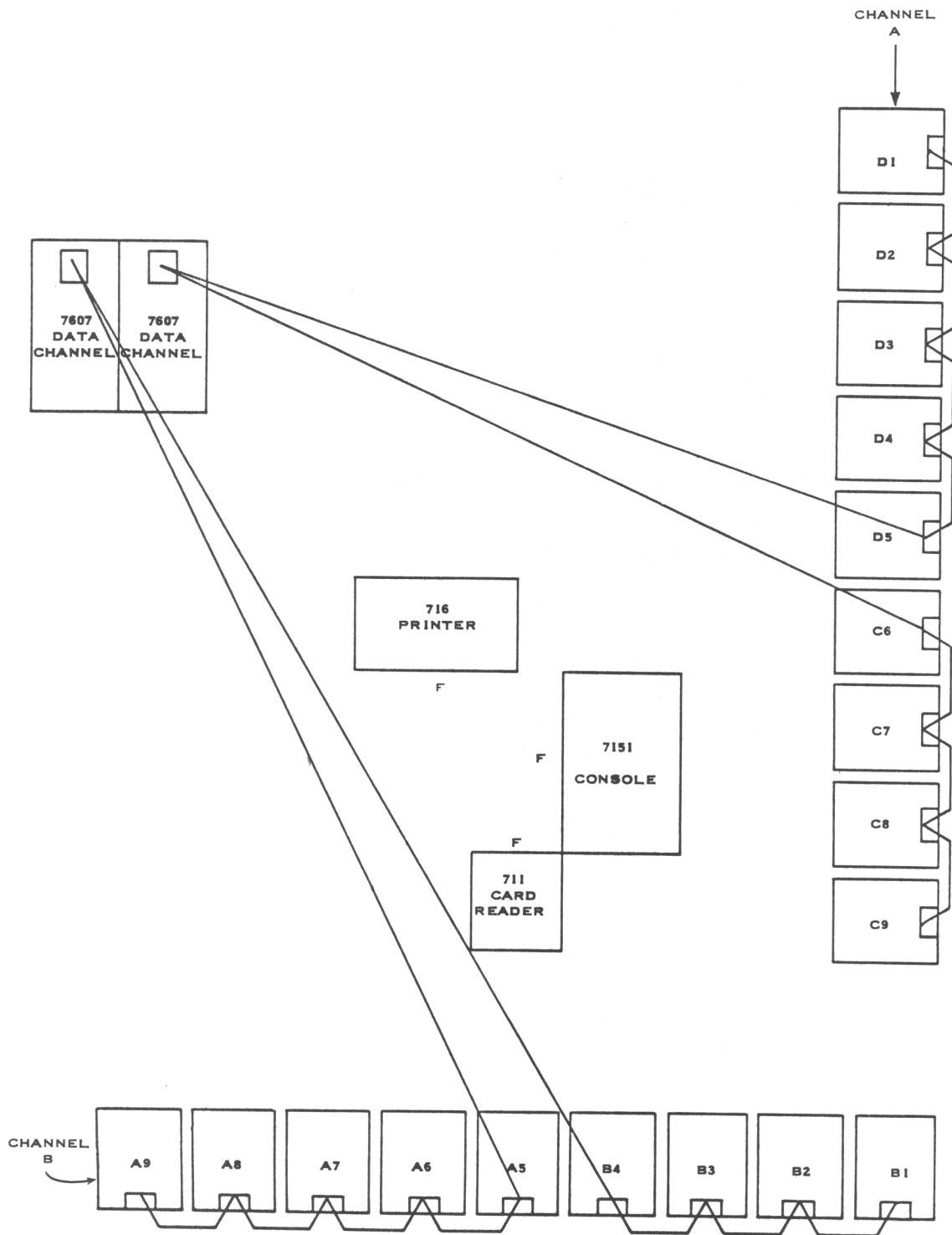


Figure 4. Tape Unit Cabling without Tape Switching

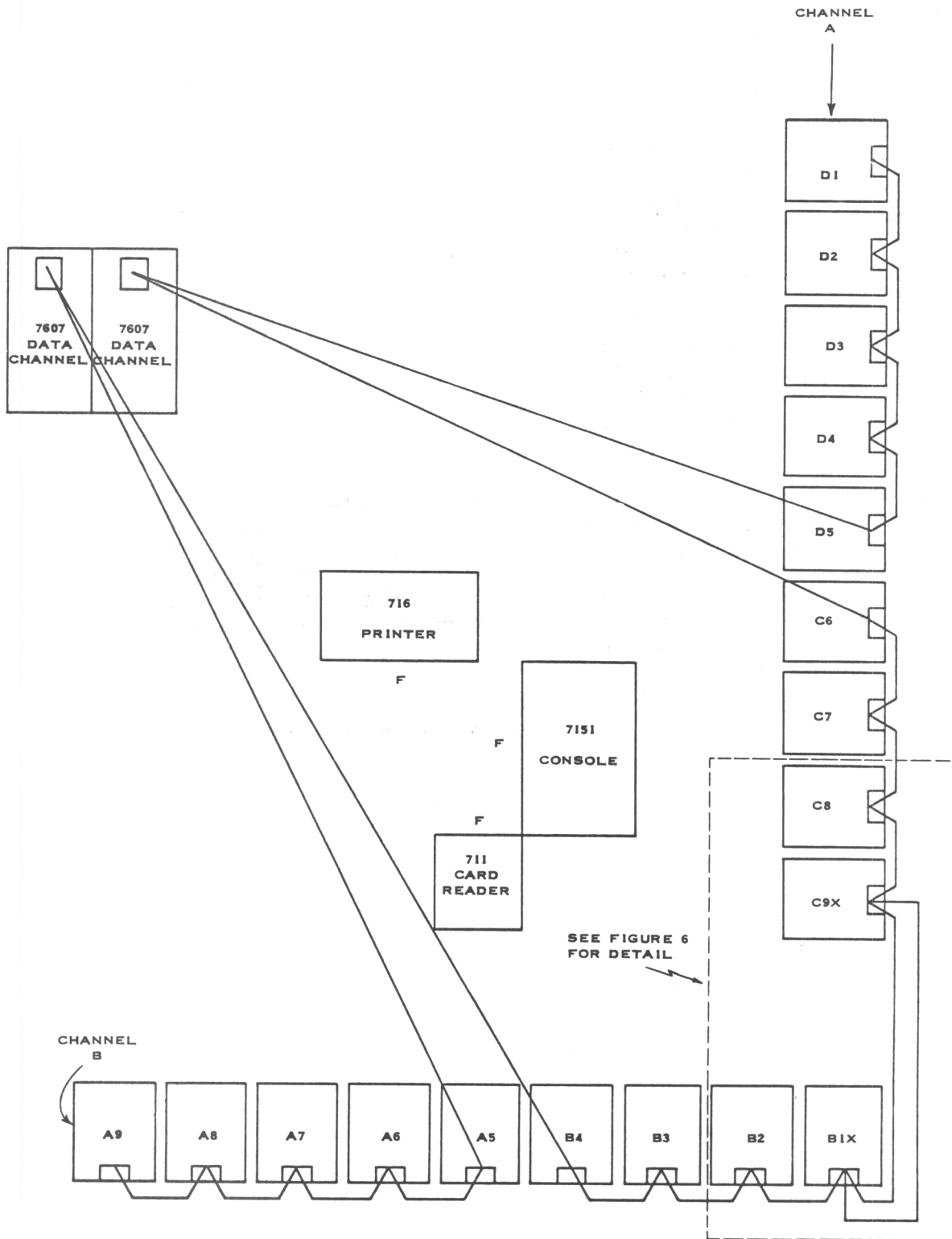


Figure 5. Tape Unit Cabling with Tape Switching

(TAU) must "look at." For group B, the TAU looks at the cable from the 7607 to tapes B4, B3, B2, B1X, and 9X, a total of 57 feet. For group C, the TAU looks at the cable from the 7607 to tapes C6, C7, C8, C9X, and B1X, a total of 52-1/2 feet.

Note that tape unit C9X now becomes the last tape unit in the B signal group, while tape unit B1X becomes the last tape unit in the C signal group. As these units are the last of each signal group, they must have a signal line terminator installed. Figure 6 provides a detail of the actual cabling and termination for these tape units.

Figure 7 is the same physical layout as Figures 4 and 5, but now an IBM 1401 System has been included. By installing the tape switching feature on tape units A9X and D1X, it now becomes possible to switch a tape from either tape channel of the 7090 to the tape channel of the 1401.

Tape signal cable groups A, B, C, and D are not affected and their signal cable lengths remain the same as previously described under Figure 5. Signal cable group E refers to the 1401. The signal cable length for E is: 15-1/2 feet from the 1401 to tape unit D1X, plus 38 feet from tape unit D1X to tape unit A9X, or a total signal cable length of 53-1/2 feet.

In this particular example, tape unit A9X would have two signal terminators installed in the two lower signal cable receptacles, one terminator for signal group A and another for signal group E.

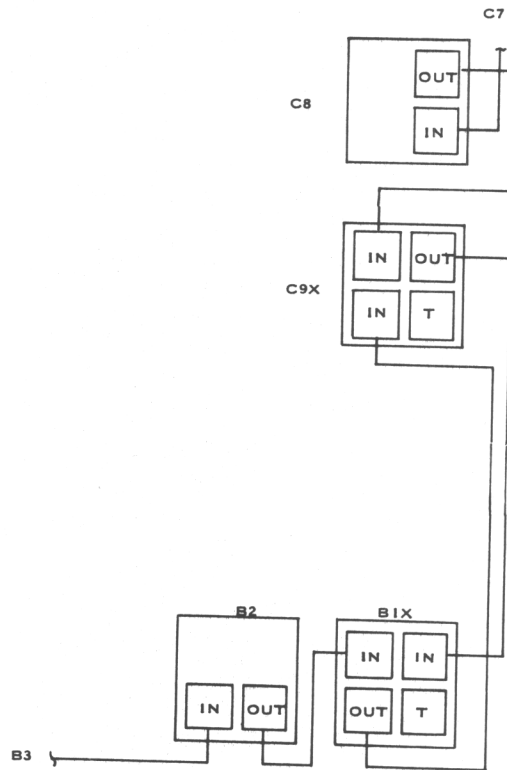


Figure 6. Tape Unit Cable Termination

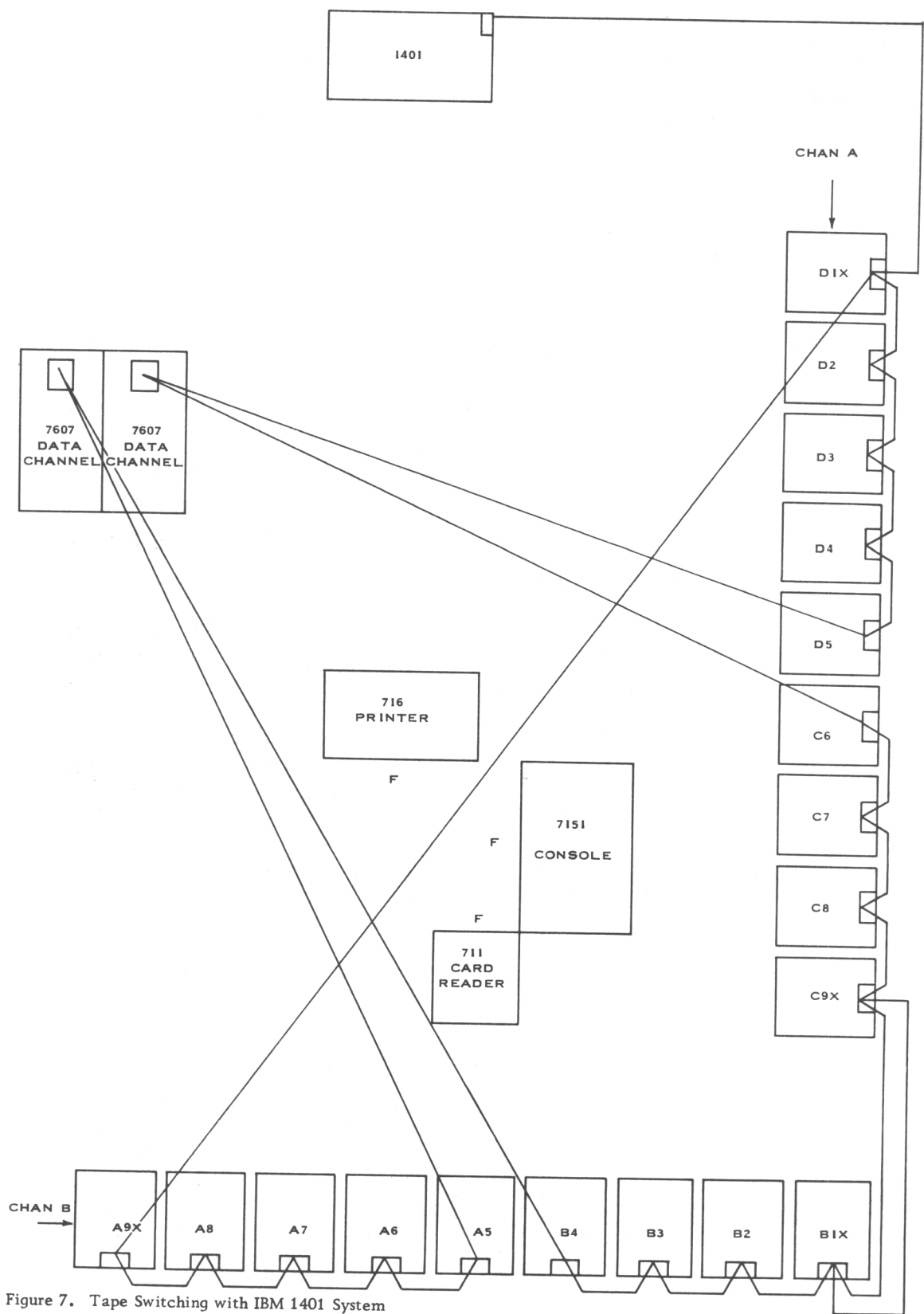


Figure 7. Tape Switching with IBM 1401 System

SPECIFICATION SUMMARY

Type	Description	60 Cycle		400 Cycle		Total BTU/Hr	CFM	Plug Type	Temp (Deg F.)	RH(%)	Wgt (lbs)	Dimensions(inches)			Service Clearances(inches)			Notes	
		KVA	KVA	KVA	KVA							Front	Side	Hgt	Front	Rear	Left		Right
729	Magnetic Tape	1.6	--	--	3900	550	--	60-90	20-80	20-80	1,160	29-1/8	33-7/8	69-1/4	30	30	2	2	3
1009	Data Transmission Unit	0.3	--	--	1000	120	C or D	60-90	20-80	20-80	500	29	30-3/4	39-3/4	42	42	30	30	9
1011	Paper Tape Reader	1.8	--	--	4100	150	C	60-90	20-80	20-80	529	31-3/4	24-1/8	60	30	42	30	30	30
1014	Inquiry Unit	0.35	--	--	1000	0	C or D	60-90	20-95	20-95	175	24	29	35	30	30	0	0	9
1015	Inquiry Display Terminal	0.28	--	--	900	--	D	60-80	10-80	10-80	375	48	29	47	36	6	30	36	9
1301	Disk Storage	9.0	--	--	20000	Note	B	65-90	10-80	3,825	86	33	68-3/4	44	44	40	40	40	2,8,11
2302-1	Disk Storage	9.0	--	--	20000	Note	B	65-90	10-80	4,025	86	33	68-3/4	60	60	60	60	60	2,8,11,17
2302-2	Disk Storage	12.6	--	--	28000	Note	B	65-90	10-80	4,425	86	33	68-3/4	60	60	60	60	60	2,8,11,17
1402	Read/Punch	1.6	--	--	4400	290	--	60-90	20-80	1,400	57-1/2	29	35	36	36	36	36	36	36
1403	Printer	1.0	--	--	3000	310	--	60-90	20-80	750	47-3/4	28-1/2	53-1/4	36	36	30	30	30	30
1414-1, 2, 7	I-O Synchronizer	0.5	--	--	1400	500	--	60-90	20-80	500	37-1/2	31-1/2	70	42	36	30	30	30	1,14
1414-3	I-O Synchronizer	0.8	--	--	2120	500	--	60-90	20-80	500	37-1/2	31-1/2	70	42	36	30	30	30	1,14
1414-4	I-O Synchronizer	1.8	--	--	5000	1000	--	60-90	20-80	1,200	74	32	70	42	36	30	30	30	1,4,14
1414-5	I-O Synchronizer	1.2	--	--	4050	1000	--	60-90	20-80	1,200	74	32	70	42	36	30	30	30	1,4,14
1414-6	I-O Synchronizer	1.2	--	--	4050	1000	C	60-90	20-80	1,200	74	32	70	42	36	30	30	30	1,4
1414-8	I-O Synchronizer	1.9	--	--	6500	500	--	60-90	20-80	750	37-1/2	31-1/2	70	42	36	30	30	30	1,14
7155	Switch Control Console	--	--	--	--	--	--	--	--	--	--	7-1/2	12	8-1/2	--	--	--	--	--
7320	Drum Storage	1.1	--	--	2800	320	E	60-90	10-80	850	30	29	60	40	40	40	42	42	8
7330	Magnetic Tape	1.1	--	--	3415	150	--	60-90	20-80	637	29	30-3/4	60	44	40	40	6	6	6
7340	Hypertape Drive	4.0	--	--	12000	700	B	60-90	20-80	1,500	29	60	48	46	52	--	--	--	6,10,16
7340-2	Hypertape Drive	4.0	--	--	12000	700	B	60-90	20-80	1,500	29	60	48	46	52	--	--	--	6,10,16
7631	File Control	1.5	--	--	3550	500	A	65-90	10-80	500	38	32	70	42	36	30	30	30	1,8
7640	Hypertape Control	1.6	--	--	4100	1000	E	60-90	20-80	1,100	74	32	70	42	36	30	30	30	1,4,8
7641	Hypertape Control	0.6	--	--	2000	450	E	60-90	20-80	600	37-1/2	30-1/2	70	42	36	30	30	30	1,8
7750	Prog. Trans. Control	7.2	--	--	27000	2000	E	60-90	20-80	2,750	181-1/2	32	70	42	36	30	30	30	1,5,8,13
7904-1	Data Channel	0.5	--	--	1690	710	B	60-90	20-80	660	38	32	70	42	36	30	30	30	1,5,8,13
7904-2	Data Channel	0.76	--	--	1870	710	B	60-90	20-80	750	38	32	70	42	36	30	30	30	1,5,8,13
7907	Data Channel	--	2.25	--	7800	600	--	65-90	10-80	1,500	20	68	69	60	30	--	--	--	12,15
7908	Data Channel	0.62	1.14	--	5800	500	--	65-80	10-80	500	38	32	70	42	36	30	30	30	1,7
7909	Data Channel	0.62	0.65	--	4000	500	--	65-90	10-80	700	38	32	70	42	36	30	30	30	1
7404	Graphic Output Unit	--	--	--	3000	200	--	50-90	8-80	800	50	18	81	42	36	30	30	30	30
7634	Graphic Control Unit	2.5	--	--	6000	500	E or F	50-90	8-80	540	37-1/2	31-1/2	69-1/4	42	36	30	30	30	30

Plug	Connector	Receptacle	Rating
A - Russell & Stoll FS3750	FS3933	FS3753	250v, 30 amp, 1 phase, 3 wire
B - Russell & Stoll SC7328	SC7428	SC7324	600v, 60 amp, 3 phase, 4 wire
C - Russell & Stoll FS3720	FS3913	FS3743	250v, 15 amp, 1 phase, 3 wire
D - Pass & Seymour 5267		5262	125v, 15 amp, 1 phase, 3 wire
E - Russell & Stoll FS3760	FS3934	FS3754	250v, 30 amp, 3 phase, 4 wire
F - Russell & Stoll JPS344F	JCS344F	JRS344F	600v, 30 amp, 3 phase, 5 wire

NOTES:

1. A clearance of 30 inches is required on any side not abutted to a similar module. A total of five modules or sections may be abutted.
2. Shipped in two sections, 50-1/8 inches and 35-3/8 inches long. Weight of 50-1/8 inch section can be reduced to 2500 lb. if required for elevator.
3. Suggested minimum clearance between tape units is 2 inches on a side, 30 inches between tape unit and any other unit.
4. Shipped in two equal sections, 37 x 32 x 70 inches each. These dimensions include covers.
5. Should not be abutted to any other unit if a raised floor is not used.
6. Minimum clearance for two 7340 units is 7 inches. Clearances should alternate 7", 22", 7", 22". Clearance between 7340 and any other structure is 30 inches.
7. Powered from 7804.
8. This unit is equipped with radio interference control circuitry and requires a good wired earth or building ground. Total resistance of the ground conductor, measured between the receptacle and the building grounding point, may not exceed 3 ohms. For proper operation, all components of the system or systems to which this unit is attached must have the same ground reference. Conduit is not a satisfactory grounding means.
9. Available 120v, 1 phase, 3 wire for remote installation.
10. One Hypertape Drive out of each four requires power service from a customer-supplied receptacle.
11. See Illustration Page for Airflow.
12. Must abut 7301 on 7070 Systems.
13. 7904 is powered from the 7106/7107. The KVA of the tape units must be added to the data channel KVA for total KVA. A 60 ampere power cord is supplied with the 7904 when a tape channel is attached to the 7904. Maximum of 1 on the 7904-1 and a maximum of 2 on the 7904-2. Each power cord will supply power for a maximum of 10 tape units.
14. Add power requirement to that of the processor to obtain total power.
15. A 12-inch removable appendage is included in the side dimension.
A 30-inch clearance is required on any side not abutted.
16. Add 250 lb to weight and 22 inches to height if autoloader feature is installed.
17. The service for these units is to be run in conduit up to the receptacle or connector.

CABLES

IBM will supply the necessary cables for the initial installation as specified in the installation manual. The cables are custom-made to the lengths required for each installation. Cables are measured and ordered in accordance with the approved layout. The key number and suffix, if any, and part number along with the required cable length must be submitted for each cable in the computer system. All external cables are measured from the base of one machine to the base of the machine it connects. When computing the cable length required between units, measure from the center points of the cable hole locations in question, and add twice the depth of the false floor if any. In the interest of best electrical design, all cable lengths should be kept as short as possible. Orders for cables that exceed the maximum lengths specified for the system must be accompanied by an approved RPQ.

External interconnecting cables should be installed under the false floor. Where a false floor is not used, these cables should be protected from mechanical injury, scuffing, and in a manner that will not present a safety hazard to operating personnel.

Cable orders must be placed with the plant from which the equipment was ordered. This cable order must be in the plant 120 days prior to machine delivery. Improperly placed orders will not be honored by the receiving plant.

1014 Cables

1. The IBM 1014 can be installed either locally in the same room as the IBM Computer System, or can be installed remotely at a maximum distance of eight wire-miles* from the IBM 1414 Model 4, 5, or 6.

2. For local installation, IBM provides a 4-wire signal cable (approximately 3/8 inch diameter, 50 feet maximum length) for connecting the 1014 to the wall-mounted terminal box.

3. For remote installation, the customer provides the necessary wire in excess of 50 feet to connect the IBM 1014 to the wall-mounted terminal box.

4. The wall-mounted terminal box is connected to the 1414 Model 4, 5 or 6 (C frame) by up to 50 feet of cable.

5. Height of terminal boxes on the wall should be included in the X dimension of the 1014 cables.

Bending Radius of Cables

When cables are installed in a confined space, consideration should be given to the minimum bending radius of the cables to be installed: These radii are approximately as follows:

Outside Diameter (inches)	Min Bending Radius (inches)
1.5 - 1.0	7.0
1.0 - 0.75	3.0
0.75 - 0.1	1.5

Power Requirements

Unless otherwise noted, the specifications for voltage and frequency regulation are within the limits specified in the systems Installation Manual -- Physical Planning.

All power cords supplied with equipment listed in this manual will be 14 feet long.

Air Conditioning

The temperature and humidity ranges are provided for each individual unit in the specification summaries. These ranges may vary between units and according to the system to which the unit is to be attached. In all cases, the most stringent specification for the unit or system will be the specification for the installation; and the maximum wet bulb temperature must not exceed 78°F during operating periods (machine power ON), nor 80°F during nonoperating periods (machine power OFF).

* The signal transmitted over these wires will not cause interference with adjacent wires in a cable used for telephone transmission. Wire lines for the 1014 might be procured from a telephone company or common carrier, depending on availability of circuits and local policy on leasing wire facilities. Leased wire facilities can contain a certain number of "bridge taps" along the transmission line. A bridge tap is an additional unused pair of wires across the pair of wires being used for the transmission. When this condition exists, the total length of the transmission line plus the length of the bridge taps may not exceed 10 wire miles.

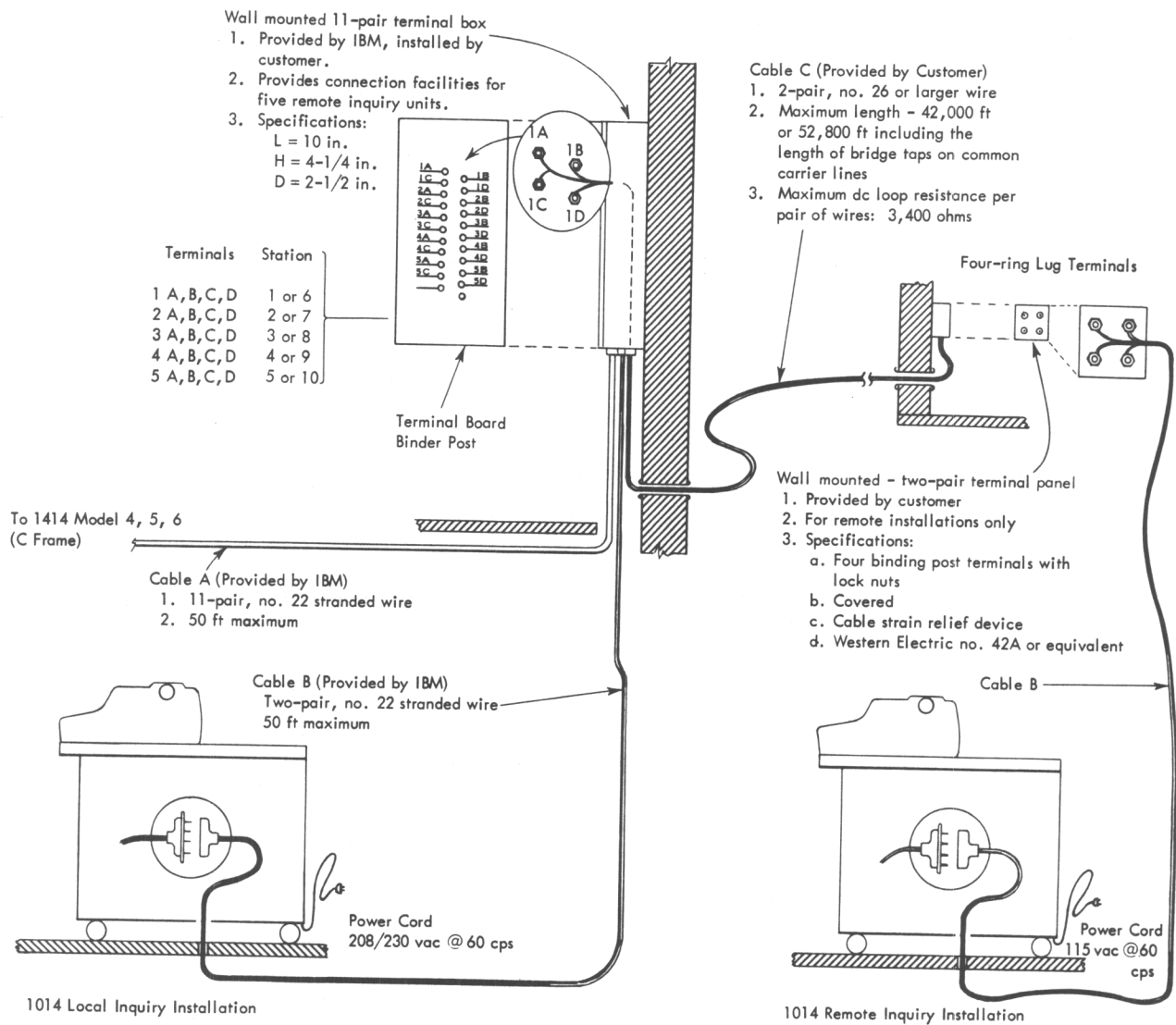


Figure 8. IBM 1014 Remote Inquiry Station Cable

COMMON CARRIER TERMINAL AND CABLING REQUIREMENTS

<u>Line</u>	<u>Plug (By IBM)</u>	<u>Receptacle (By Carrier)</u>	<u>Notes</u>
<u>7750</u>			
Low Speed (Electromech.)	WE 347A	WE 303A	I & IV
Low Speed (Electronic)	DB-19604-432 Cannon or Cinch	DB-19604-433	III & IV
High Speed	DB-19604-432 Cannon or Cinch	DB-19604-433	II & IV
<u>1414 - 4, 5, 6</u>			
Teletype	Amphenol MS3106-28-21PW	Amphenol MS3100-28-21S	IV
1009	DB-19604-432 Cannon or Cinch	DB-19604-433	

Notes:

- I. Carrier lines must terminate at a panel which is accessible and as near to the using unit as possible. Each jack will be identified with the telegraph line number. The terminal must be polarized to have the most positive line at the tip of the jack.

All terminals for a particular cable must be located within a 3-foot radius of the point of measurement of the cable from the 7750. Consideration should be given to making provision for monitoring at the terminal through the use of a read-only unit. This will provide continuous monitoring of all messages on a line.
- II. Termination must be wired to the interface described below and connected to ATT 202A Data Set or equivalent. Data sets will not be more than 36 inches apart (between connectors).
- III. Termination must meet the interface specifications described below and should connect to ATT 103A or 103B Data Set or equivalent. Data set connections will be located within a 3-foot radius of the point from which the cable from the 7750 was measured.
- IV. It is required that all interface connections be pluggable in the manner specified. This will facilitate customer testing at the interface to differentiate between IBM and common carrier faults. It also permits isolation when required by safety.

7750 Carrier Interface Specifications

High Speed or Low Speed Electronic -- Bipolar

Terminating: Input impedance--3,000 ohms or greater
Logic 1 or space--plus 3v to plus 25v
Logic 0 or mark--minus 3v to minus 25v

Driving: Output load--3,000 ohms or greater
Logic 1 or space--plus 3.2v to plus 4.5v
Logic 0 or mark--minus 8.0v to minus 12.5v

Low Speed Electronic -- Unipolar

Terminating: Input impedance--3,000 ohms or greater
Logic 1 or space--minus 0.5v to plus 0.8v
Logic 0 or mark--minus 6.8v to minus 12.5v

Driving: Output load--3,000 ohms or greater
Logic 1 or space--minus 0.2v or 0.0v
Logic 0 or mark--minus 6.0v to minus 12.5v

Low Speed Electromechanical

Current mode operation
Current requirement 62.5 ma \pm 10%
Variations in excess of the percentage stated
will cause unreliable operation.

1414 Carrier Interface Specifications

Transistor Interface

Input Impedance--6,000 ohms or less
Logic 1--plus 1v to minus 1v
Logic 0--minus 10v to minus 20v

Any noise or interference which causes a logic 1 to go below minus 3v and the logic 0 to go above minus 8v will cause unreliable operation.

Electromechanical Interface

Any noise or interface which causes a logic 1 to go below minus 1.5v or a logic 0 above minus 12v will cause unreliable operation.

Low-Speed Electromechanical

Wire Assignment	Receive	Wire Assignment	Send
A	Station Select	W	
B	Teletype Check	X	
C	DP Ready	Z*	Ground (Frame)
D	Read Pulse	a	Bid
E		b	Teletype Check
F	5 Bit	c	Ready
G	4 Bit	d	Cycle Timing
H	3 Bit	e	Start
J	2 Bit	f	5 Bit
K	1 Bit	g	4 Bit
L*	Plug Interlock	h	3 Bit
M*		j	2 Bit
N	Text	k	1 Bit
P	DP Ready Common	m*	Plug Interlock
R*	Ground (Sig)	n*	
S*	Ground (Frame)	p	Start Common
T	Receive Data Common	r	Send Data Common
U		s*	Ground (Sig)
V			

*For duplex operation the following lines can be tied together:
L-m, R-s, S-Z, M-n.

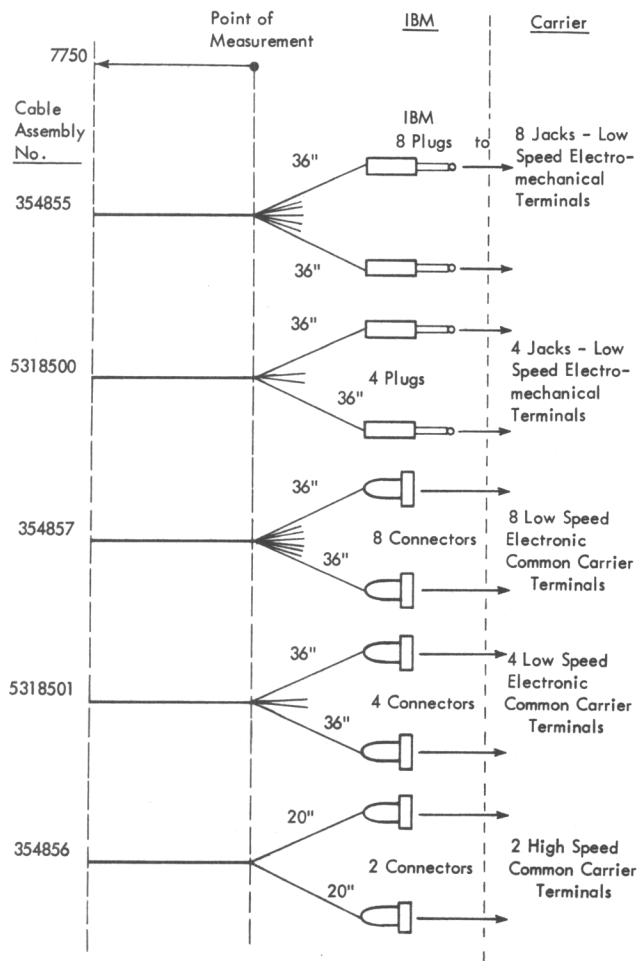


Figure 9. Common Carrier Terminal Cables

I-O Components Cable Listing - Signal

1410 Cable Listing - Signal

Key No.	P/N	From	Ch	To	Max Length		O. D. (in)	Notes	Key No.	P/N	From	Ch	To	Max Length		O. D. (in)	Notes	
					Ch	(ft)								Ch	(ft)			
35	535099	MTU		MTU														
36	761354	1414D		729			1.500	IV	24	761367	1411C	1	1414D	1	40	1.125		
37	761354	1414D		7330			1.500	IV, VI	26	761368	1411D	2	1414D	2	40	1.125		
55	352464	MTU		MTU			1.500	IV, V	80	350880	1411D		1414D		40			
400	5317772	7631		Stor Unit			150	I, VII	410	553343	7631		1411D		50	.930		
401	5317773	7631		Stor Unit				VIII	483	587330	7641		1411E		50	.930		
411	5317772	Stor Unit		Stor Unit				II	484	587330	7641		1411E		50	.930		
412	5317772	Stor Unit		Stor Unit				II	500a	761363	1414A	1	1411C	1	45	.688		
413	5317772	Stor Unit		Stor Unit				II	500b	761364	1414A	1	1411D	1	45	.688		
460	5311760	7340	A	7340	A		1.190	III	500c, e	761365	1414A	1	1411D	1	45	.500		
461	5312097	7340	A	7340	A		.405	III	500d	760368	1414A	1	1411C	1	45	.500	II	
462	5311332	7640	A	7340	A		1.190	III	500f	761370	1414A	1	1411D	1	45	.688	III	
463	5312097	7640	A	7340	A		.405	III	501a	761363	1414A	2	1411E	2	45	.688		
470	5311760	7340	B	7340	B		1.190	III	501b	761364	1414A	2	1411E	2	45	.688		
471	5312097	7340	B	7340	B		.405	III	501c, e	761365	1414A	2	1411E	2	45	.500		
472	5311332	7640	B	7340	B		1.190	III	501d	760368	1414A	2	1411E	2	45	.500	II	
473	5312097	7640	B	7340	B		.405	III	501f	761370	1414A	2	1411E	2	45	.688	III	
480	5312892	7340		7641				III	509a	761363	1414B	1	1411C	1	45	.688		
499	5311865	7340	A	7340	B		1.190	III	509b	761364	1414B	1	1411D	1	45	.688		
506a	760672	1414A		1402		25	1.250		509c	761365	1414B	1	1411D	1	45	.500		
506b	760671	1414A		1402		25	1.250		509d	760368	1414B	1	1411C	1	45	.500		
508a	760674	1414A		1403		25	.500		509e	761370	1414B	1	1411D	1	45	.688		
508b	760673	1414A		1403		25	1.500		510a	761363	1414B	2	1411E	2	45	.688	IV	
530	762735	1414C		TTY S/R-1		250			510b	761364	1414B	2	1411E	2	45	.688	IV	
531	762735	1414C		TTY S/R-2		250			510c, e	761365	1414B	2	1411E	2	45	.500	IV	
532	762733	1414C		TTY Send		250			510d	760368	1414B	2	1411E	2	45	.500	IV	
533	762732	1414C		TTY Rec		250			517a	761363	1414B		1442		45	.688	V	
534	760683	1414C		1011		80			517b	761364	1414B		1442		45	.688	V	
535	763345	1414C		1009		50			517c	760368	1414B		1442		45	.688	II, V	
536	761289	1414C		1014T, B		50			518a	761363	1414A		1442		45	.688	VI	
537	761289	1414C		1014T, B		50			518b	761364	1414A		1442		45	.688	VI	
538	761290	1014		1014 Panel		50			518c	760368	1414A		1442		45	.688	II, VI	
539	761290	1014		1014 Panel		50			559a	587330	7750B		1411E		50	.930		
540	5369965	Modem		1414C		40			559b	587330	7750B		1411E		50	.930		
541	5369965	Modem		1414C		40												
542	5369966	Data Set		1414C		40												
543	5369966	Data Set		1414C		40												
551	354855	Low Speed		7750D		40												
		or Line																
	5318500																	
552	354857	Elect.		7750D		40												
		or L. S. Line																
	5318501																	
553	354856	H. S. Line		7750D		40												
601	5331722	7404		7634		25												
603	535099	729		7634			1.500	IX										
605	535099	7634		729			1.500	IX										
610	761354	7634		1414			1.500	IX										
611	5392834	729		7634		25	1.500	X										

NOTES:

- I. Required only when system includes 800 CPI.
- II. Required only when system includes priority feature.
- III. Required only when system includes 1414 Model 4.
- IV. Required only when system includes 1414 Model 5.
- V. Order in place of Key No. 509 or 510 (a, b, d) when 1414 Model 5 is on same channel. Remainder of cables are routed as before.
- VI. Order in place of Key No. 500 or 501 (a, b, d) when 1414 Model 8 is on same channel. Remainder of cables are routed as before.

NOTES:

- I, II. The sum of the lengths of the cable bearing Notes I and II shall not exceed 150 feet; i.e., Key No. 400 plus 411 plus 411a plus 411b plus 411c is equal to or less than 150 feet, or Key No. 400 plus 412 plus 412a plus 412b plus 412c is equal to or less than 150 feet.
- III. The total length of signal or control cables on any one tape channel shall not exceed 130 feet for ten Hypertape units (70 feet on 7641).
- IV. Total length of tape signal cable should not exceed 100 feet per channel for 729's, 80 feet per channel for 7330's. The maximum number of tapes per channel is ten.
- V. This cable provided to interconnect tape units between channels and/or systems. (It differs from a normal tape signal cable in that the same connector face is required at each end.) One such cable is provided for every tape channel in excess of one. Care should be exercised to prevent exceeding the maximum number of tape drives or cable limitations for any channel or system.

NOTES continued in opposite column.

(I-O Components Cabling Listing - Signal) Notes continued

NOTES:

- VI. With Intermix Feature, both Key No. 36 and 37 are required. The length limitations of Note IV apply to the individual legs of tape drives.
- VII. The maximum length of cable Key No. 400 as used on 7631's under Serial No. 12000, cannot exceed 60 feet. The total length of Key Nos. 400 plus 411, 412, or 413 remains at 150 feet. Specifications on 7631's above Serial No. 12000 are as stated in Note I.
- VIII. The maximum length is 150 feet for 1301, 7320 and 100 feet for 2302.
- IX. The maximum length for on-line operation may not exceed the lengths specified for 729 tape legs in the system.
- X. The maximum length for off-line operation is 25 feet.

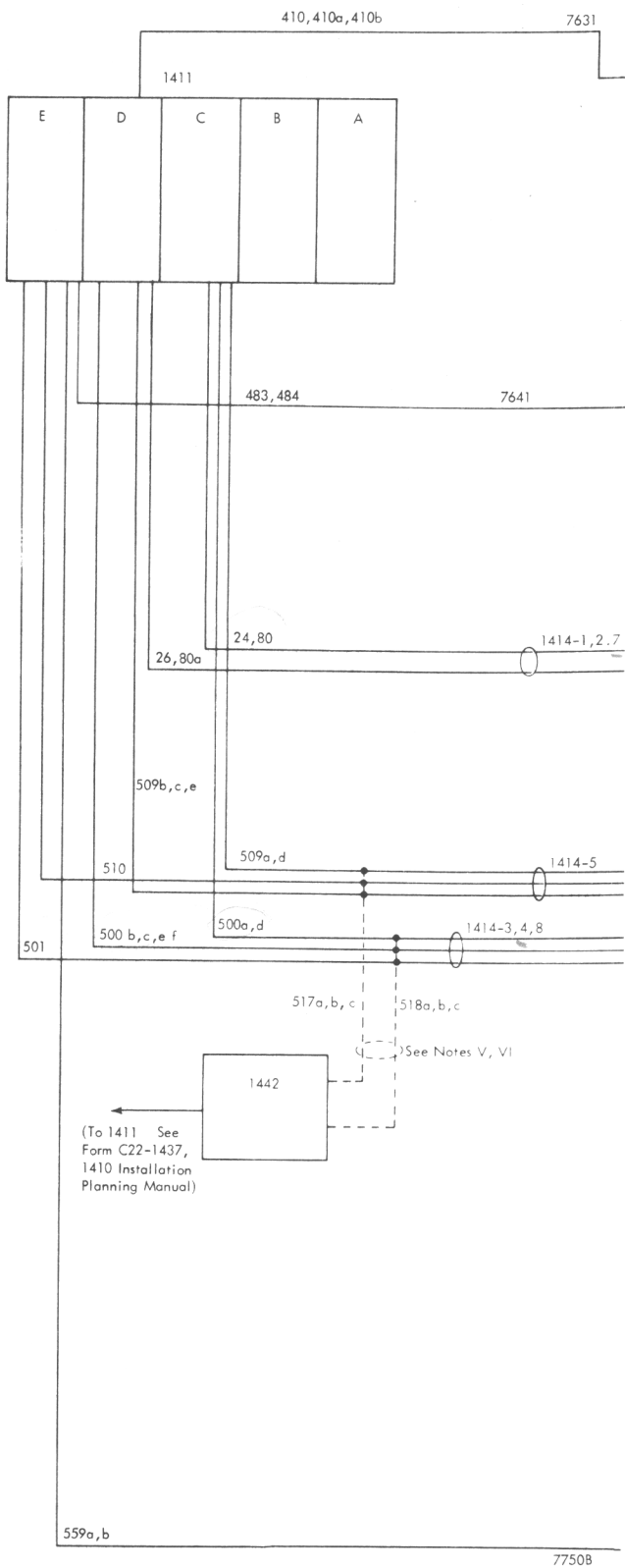


Figure 10-1. 1410 Cabling Schematic

1410-7770 Cable List - Signal

Key No.	P/N	From	Ch	To	Ch	Max Length (ft)	O. D. (in)	Notes
97	5703844	7770		1411D	1		.688	I
97a	5703844	7770		1411D	1		.688	I
97b	5703844	7770		1411D	1		.688	I
98	5703844	7770		1411C	2		.688	I
98a	5703844	7770		1411C	2		.688	I
98b	5703844	7770		1411C	2		.688	I
98c	5703844	7770		1411C	2		.688	I
100-YY5703840		Data Set		7770		40		
101	5235682	1442		7770				I
101a	5235682	1442		7770				I
102	5703844	7770		1411C			.688	I
500d	760368	1414A		1411C	1	45	.500	
501d	760368	1414A		1411E	2	45	.500	
509d	760368	1414B		1411C	1	45	.500	
510d	760368	1414B		1411E	2	45	.500	
544	761363	1414A		7770			.688	I
544a	761364	1414A		7770			.688	I
544b	761365	1414A		7770			.500	I
544c	761370	1414A		7770			.688	I
545	761363	1414B		7770			.688	I
545a	761364	1414B		7770			.688	I
545b	761365	1414B		7770			.500	I
545c	761370	1414B		7770			.688	I

NOTES:

- I. Sum of cable length from 1411 through 7770 to 1414 or 1442 not to exceed 50 feet.

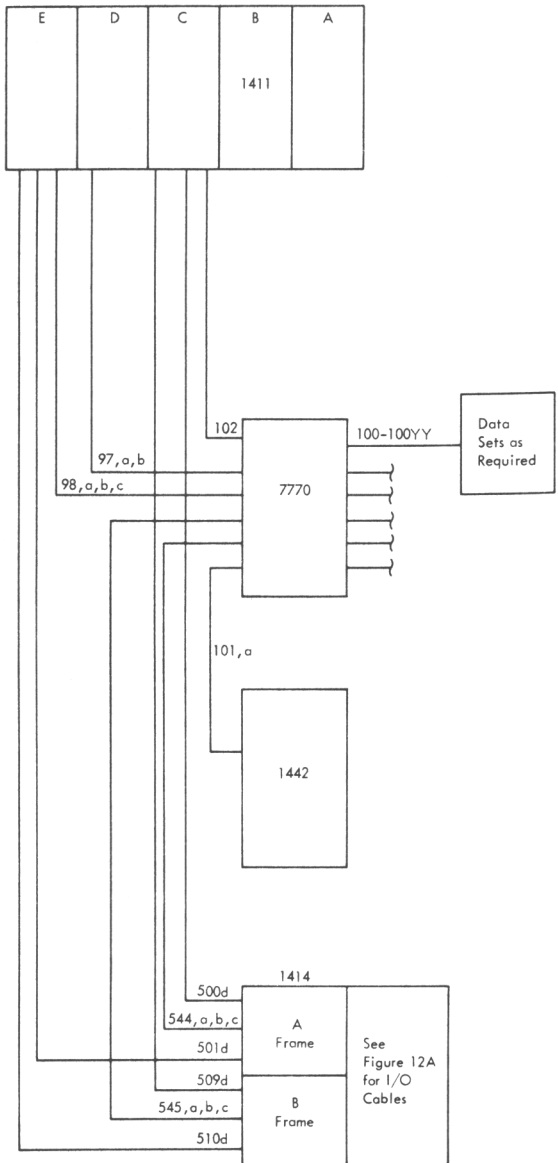


Figure 10.2. 1410-7770 Cabling Schematic

7010 Cable Listing - Signal

Key No.	P/N	From	Ch	To	Ch	Max Length (ft)	O. D. (in)	Notes
391	761368	1414D		7114F	3	40	1.125	
391a	350880	1414D		7114F	3	40	1.125	I
391b	761368	1414D		7114F	4	40	1.125	
391c	350880	1414D		7114F	4	40	1.125	I
393	761367	7114E		1414D		40	1.125	
393a	350880	7114E		1414D		40		I
410	553343	7631		7114E		50	.930	
420	553343	7631		7114F		50	.930	
500a	761363	1414A	1	7114E	1	45	.688	
500b	761364	1414A	1	7114E	1	45	.688	
500c, e	761365	1414A	1	7114E	1	45	.500	
500d	760368	1414A	1	7114E	1	45	.500	
500f	761370	1414A	1	7114E	1	45	.688	III
501a	761363	1414A	2	7114E	2	45	.688	
501b	761364	1414A	2	7114E	2	45	.688	
501c, e	761365	1414A	2	7114E	2	45	.500	
501d	760368	1414A	2	7114E	2	45	.500	
501f	761370	1414A	2	7114E	2	45	.688	III
509a	761363	1414B	1	7114E	1	45	.688	
509b	761364	1414B	1	7114E	1	45	.688	
509c	761365	1414B	1	7114E	1	45	.500	
509d	760368	1414B	1	7114E	1	45	.500	
509e	761370	1414B	1	7114E	1	45	.688	
510a	761363	1414B	2	7114E	2	45	.688	IV
510b	761364	1414B	2	7114E	2	45	.688	IV
510c, e	761365	1414B	2	7114E	2	45	.500	IV
510d	760368	1414B	2	7114E	2	45	.550	IV
517a	761363	1414B		1442		45	.688	V
517b	761364	1414B		1442		45	.688	V
517c	760368	1414B		1442		45	.688	V
518a	761363	1414A		1442		45	.688	VI
518b	761364	1414A		1442		45	.688	VI
518c	760368	1414A		1442		45	.688	VI
559a	587330	7750B		7114E		50	.930	
559b	587330	7750B		7114E		50	.930	

NOTES:

- I. Required only when system includes 800 CPI.
- III. Required only when system includes 1414 Model 4.
- IV. Required only when system includes 1414 Model 5.
- V. Order in place of Key No. 509 or 510 (a, b, d) when 1414 Model 5 is on same channel. Remainder of cables are routed as before.
- VI. Order in place of Key No. 500 or 501 (a, b, d) when 1414 Model 8 is on same channel. Remainder of cables are routed as before.

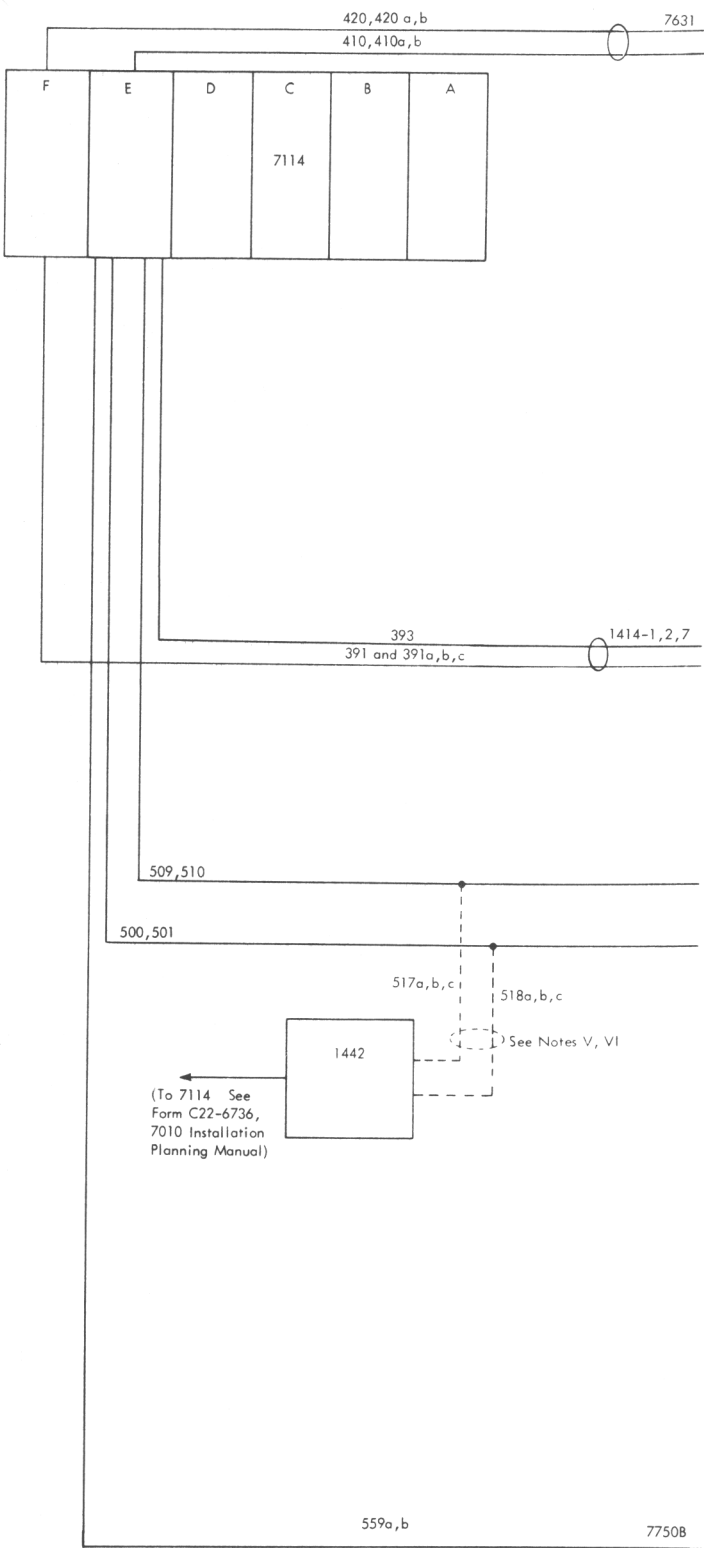


Figure 10-3. 7010 Cabling Schematic - Signal

7010-7770 Cable List - Signal

<u>Key</u> <u>No.</u>	<u>P/N</u>	<u>From</u>	<u>Ch</u>	<u>To</u>	<u>Ch</u>	<u>Max</u> <u>Length</u> <u>(ft)</u>	<u>O.D.</u> <u>(in)</u>	<u>Notes</u>
94	5703844	7770		7114E	1		.688	I
94a	5703844	7770		7114E	1		.688	I
94b	5703844	7770		7114E	1		.688	I
94c	5703844	7770		7114E	1		.688	I
96	5703844	7770		7114E	2		.688	I
96a	5703844	7770		7114E	2		.688	I
96b	5703844	7770		7114E	2		.688	I
96c	5703844	7770		7114E	2		.688	I
100-YY	5703840	Data Set		7770		40		
101	5235682	1442		7770				I
101a	5235682	1442		7770				I
500d	760368	1414A		7114E	1	45	.500	
501d	760368	1414A		7114E	2	45	.500	
509d	760368	1414B		7114E	1	45	.500	
510d	760368	1414B		7114E	2	45	.500	
544	761363	1414A		7770			.688	I
544a	761364	1414A		7770			.688	I
544b	761365	1414A		7770			.500	I
544c	761370	1414A		7770			.688	I
545	761363	1414B		7770			.688	I
545a	761364	1414B		7770			.688	I
545b	761365	1414B		7770			.500	I
545c	761370	1414B		7770			.688	I

NOTES:

- I. Sum of cable length from 7114 through 7770 to 1414 or 1442 not to exceed 50 feet.

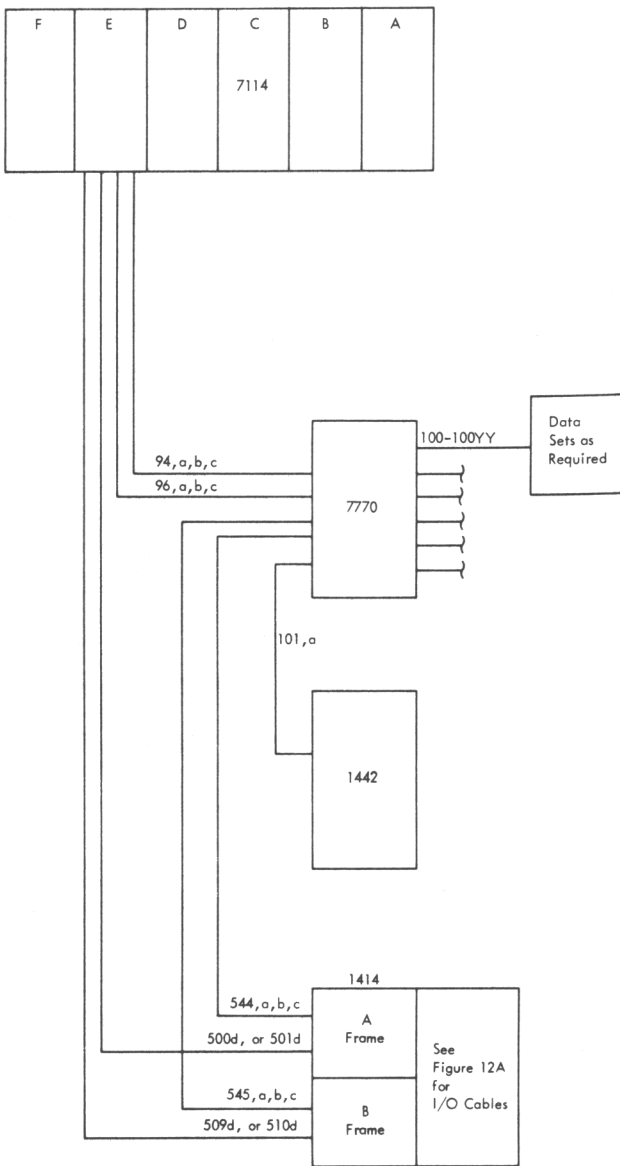


Figure 10-4. 7010-7770 Cabling Schematic

7040/7044 Cable Listing - Signal

Key No.	P/N	From	Ch	To	Max		Notes
					Length Ch (ft)	O. D. (in)	
102,a,b	5235334	7106/07D		7904	B		I
103-							
103f	5235334	7106/07C		7904	B		I
103g	5235334	7106/07C		7904	C		I
104	5235334	7904	C	7904	D		I
105	5235334	7106/07D		7904	D 100		
106-							
106c	5235334	7106/07C		7904	D 100	.876	VII
106d	5235334	7106/07C		7904	E 100	.876	VII
110	5235334	Direct Data		7904		.876	V,VI
397	5325682	1414D		7904	C&E 50		
398	5325682	1414D		7904	B&D 50		
399	5325682	1414D		7106/07E		50	
414	587330	7631		7904		.930	
502a-d	5325682	1414A		7106/07E		45	
502e	5325682	1414A		7106/07E		45	II
511a-d	5235682	1414B		7106/07E		45	III
513	587330	1414B		7904		.930	IV
555	587330	7750B		7904		.930	

NOTES:

- I. Sum of 103 and 104 \leq 100 feet
Sum of 102 and 104 \leq 100 feet
102-102b and 103-103g must not have a difference in length greater than 10 feet.
104-104d must not have a difference in length greater than 10 feet.
- II. Required only when system includes 1414 M4.
- III. Required only when system includes 1414 M5.
- IV. Required only when system includes 1414 M6.
- V. Required only for direct data feature.
- VI. Additional length available on Special Order (to 1000 feet).
- VII. 106-106d must not have a difference in length greater than 10 feet.

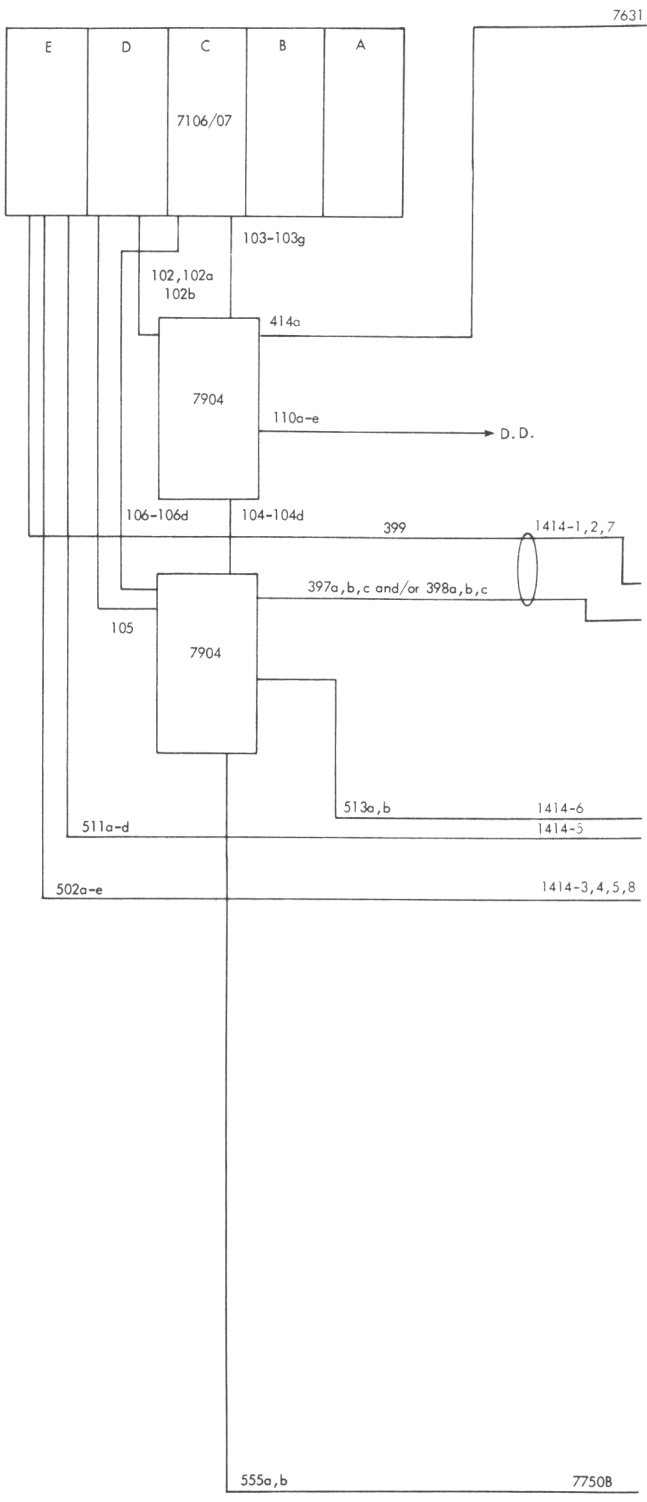


Figure 10-5. 7040/7044 Cabling Schematic - Signal

Cable Listing - Signal
 Direct Couple 7040/44 to 7090/94

<u>Key</u> <u>No.</u>	<u>P/N</u>	<u>From</u>	<u>Ch</u>	<u>To</u>	<u>Ch</u>	<u>Max</u> <u>Length</u> <u>(ft)</u>	<u>O. D.</u> <u>(in)</u>	<u>Notes</u>
A62-								
A62h	587314	7606		7106/07C			.932	I, II
A63	531641	7606		7106/07C			.932	I, II
A66	587314	7606		7106/07C			.932	I, II
A67-								
A67h	587314	7607		7106/07C			.932	I
A68	531641	7607		7106/07C			.932	I
A69-								
A69h	587314	7106/07D		7607			.932	I
A70	531641	7106/07D		7607			.932	I
A71-								
A71h	587314	7106/07D		7909			.932	I
A72	531641	7106/07D		7909			.932	I
A73-								
A73h	587314	7909		7106/07C			.932	I
A74	587314	7109		7106/07C			.932	I
A75	531641	7909		7106/07C			.932	I

NOTES:

- I. Cable requirements are identical to the requirements for a 7607 and/or 7909.
- II. Terminators will be required if the direct couple is connected to a previously unused multiplexor signal leg. Specify terminators required on cable order.

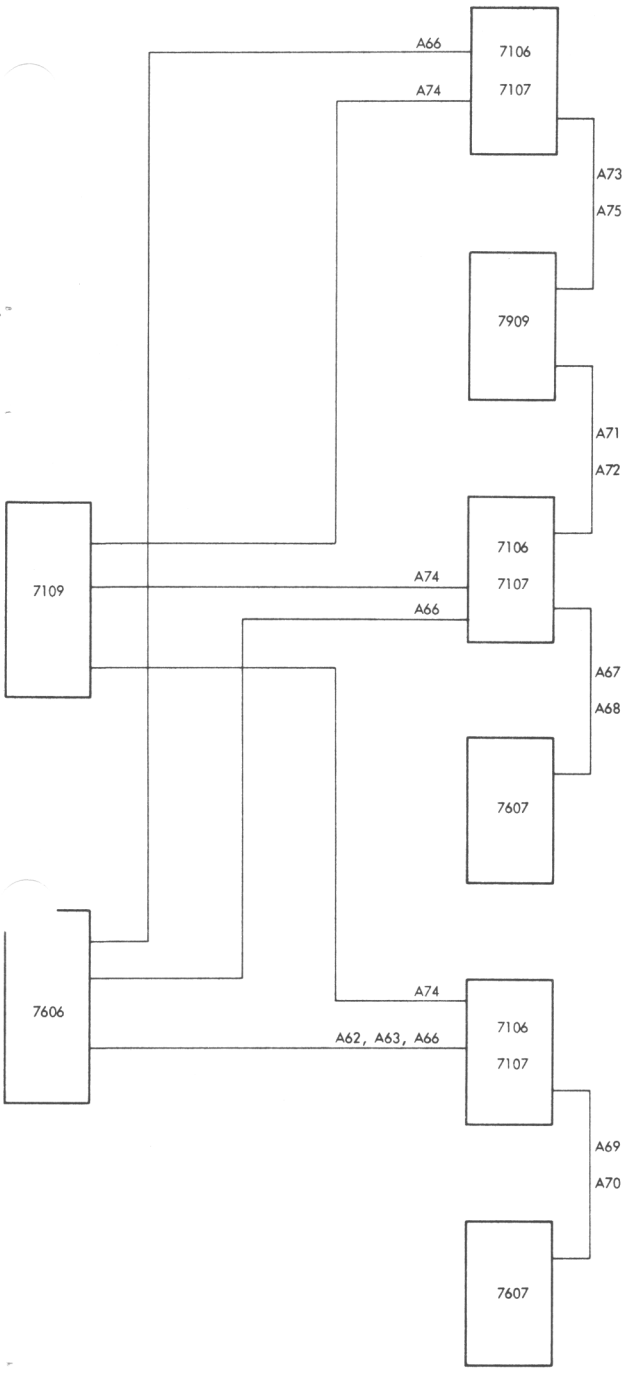


Figure 10-6. 7040/7044 to 7090/7094 Direct Couple Cabling Schematic - Signal

7070 Cable Listing - Signal

<u>Key</u> <u>No.</u>	<u>P/N</u>	<u>From</u>	<u>Ch</u>	<u>To</u>	<u>Ch</u>	<u>Max</u> <u>Length</u> <u>(ft)</u>	<u>O. D.</u> <u>(in)</u>	<u>Notes</u>
407	587330	7631		7907		55	.930	
514	587330	1414B		7907		55	.930	
556	587330	7750B		7907		55	.930	

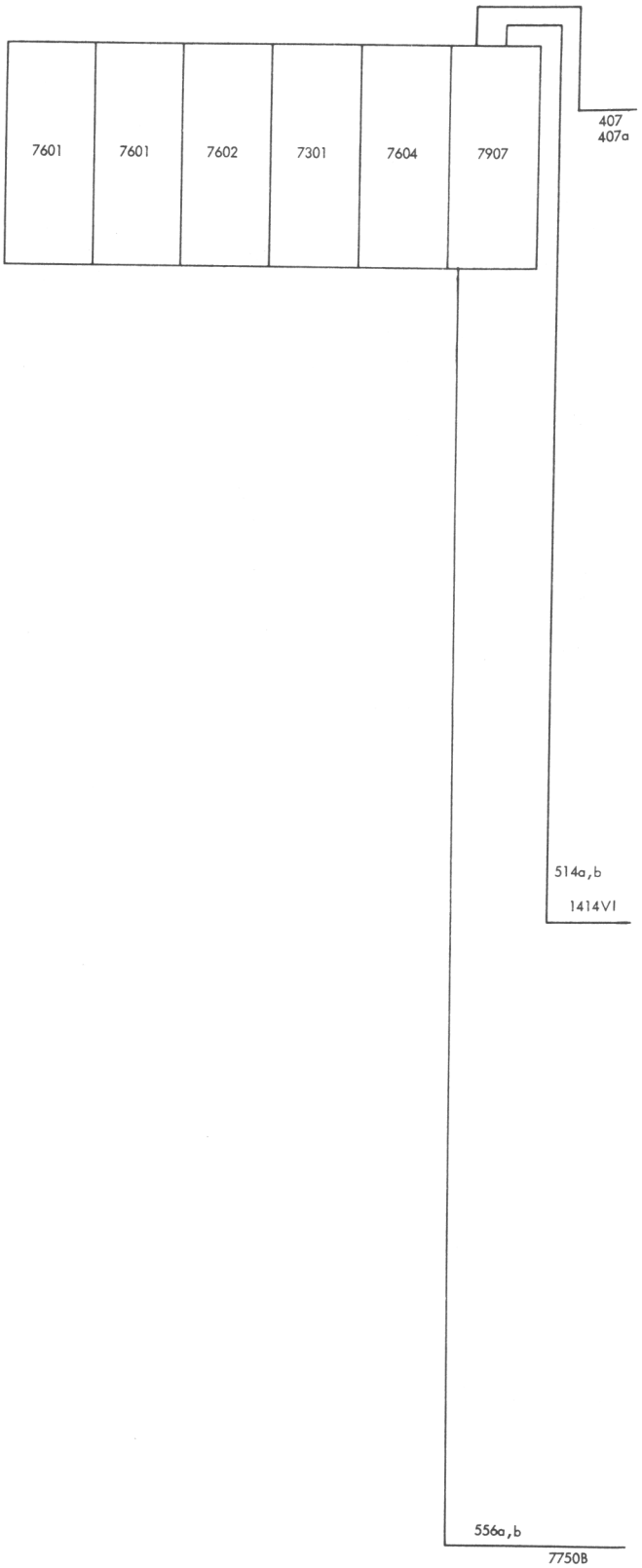


Figure 10-7. 7070 Cabling Schematic - Signal

7074 Cable Listing - Signal

<u>Key</u> <u>No.</u>	<u>P/N</u>	<u>From</u>	<u>Ch</u>	<u>To</u>	<u>Ch</u>	<u>Max</u> <u>Length</u> <u>(ft)</u>	<u>O. D.</u> <u>(in)</u>	<u>Notes</u>
252	587323	7104		7907		55	.830	
253	587323	7104		7907		55	.830	
254	587323	7104		7907		55	.830	
255	587323	7104		7907		55	.830	
256	587323	7104		7907		55	.830	
257	592265	7301-1		7907		35	.932	
258	592265	7301-1		7907		35	.932	
259	592265	7301-1		7907		35	.932	
260	586877	7301-1		7907		35	.830	
276	592265	7301-2		7907		35	.932	
277	592265	7301-2		7907		35	.932	
278	592265	7301-2		7907		35	.932	
279	592265	7301-3		7907		35	.932	
280	592265	7301-3		7907		35	.932	
281	592265	7301-3		7907		35	.932	
407	587330	7631		7907		55	.930	
464	587330	7640	A	7907		55	.930	
474	587330	7640	B	7907		55	.930	
514	587330	1414B		7907		55	.930	
556	587330	7750B		7907		55	.930	

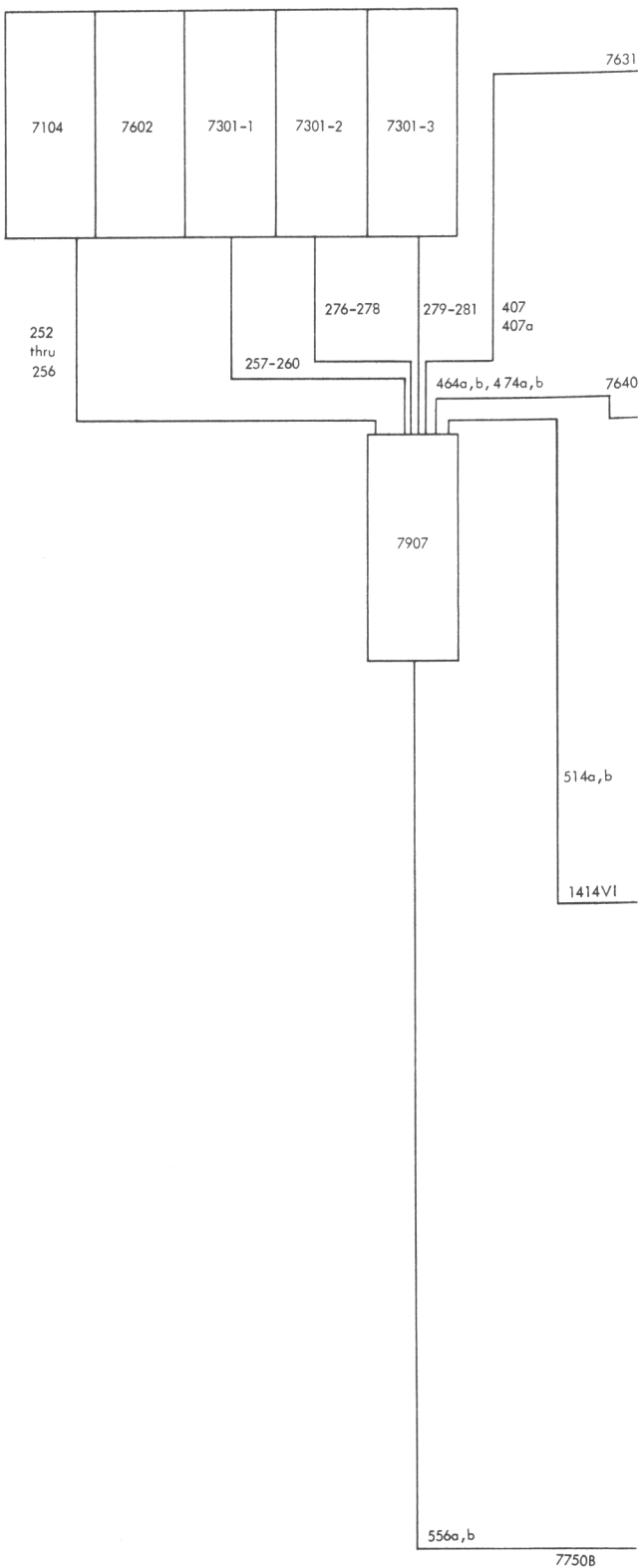


Figure 10-8. 7074 Cabling Schematic - Signal

7080 Cable Listing - Signal

Key No.	P/N	From	Ch	To	Ch	Max		Notes
						Length (ft)	O. D. (in)	
40	587387	7908		7102-1		35	.80	I
41	587387	7908		7102-2		35	.80	
42	587387	7908		7305		35	.80	
43	5305168	7908		7102-1		35	.80	
408	587330	7631		7908		50	.93	
466	587330	7640	A	7908		50	.93	
476	587330	7640	B	7908		50	.93	
515	587330	1414B		7908		50	.93	
557	587330	7750B		7908		50	.93	

NOTES:

- I. 7908 M5-9 only.

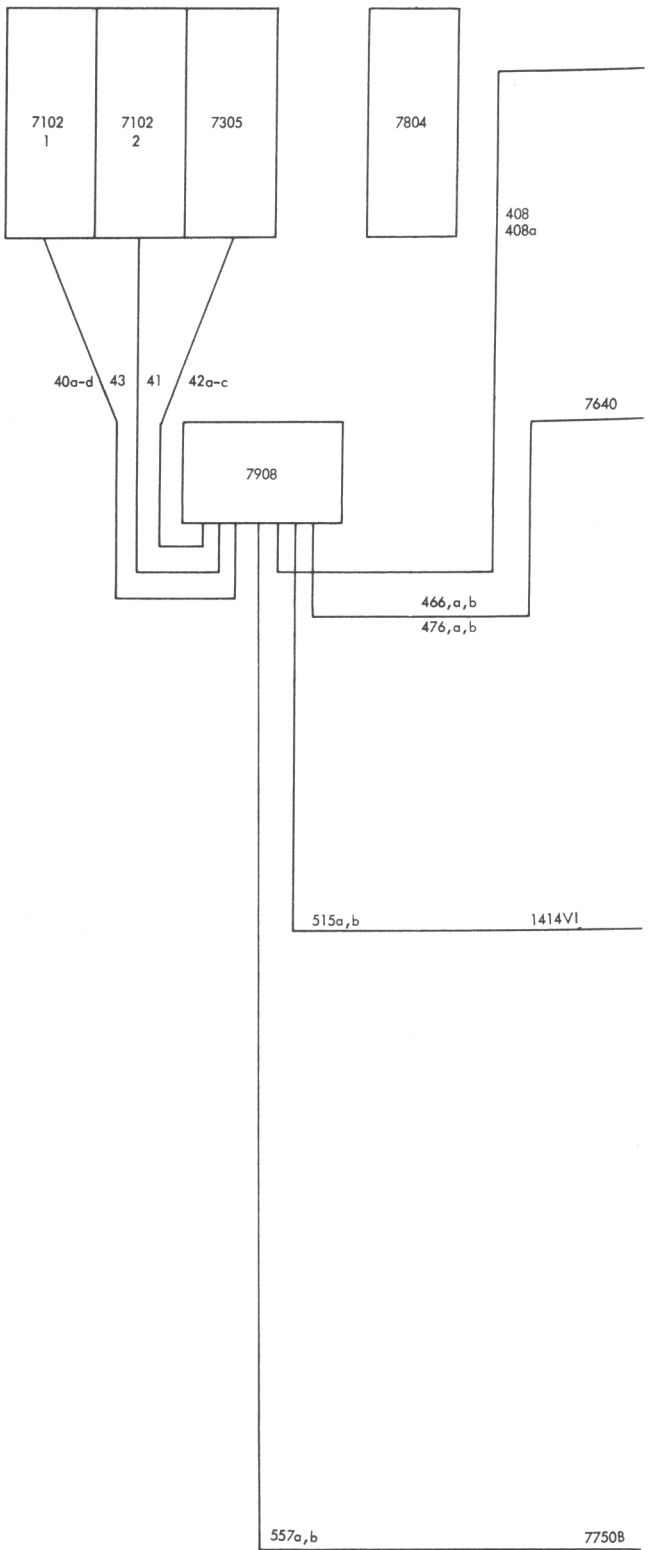


Figure 10-9. 7080 Cabling Schematic - Signal

7090/7094 Cable Listing - Signal

<u>Key No.</u>	<u>P/N</u>	<u>From</u>	<u>Ch</u>	<u>To</u>	<u>Ch</u>	<u>Max Length (ft)</u>	<u>O. D. (in)</u>	<u>Notes</u>
62	587314	7606		7909			.932	I
63	531641	7606		7909			.932	I, II
66	587314	7606		7909			.932	
67	587314	7607		7909			.932	I
68	531641	7607		7909			.932	I, II
69	587314	7909		7607			.932	I
70	531641	7909		7607			.932	I, II
71	587314	7909		7909			.932	I
72	531641	7909		7909			.932	I, II
409	587330	7631		7909		50	.930	
468	587330	7640	1	7909	1	50	.930	
478	587330	7640	2	7909	2	50	.930	
516	587330	1414B		7909		50	.930	
558	587330	7750B		7909		50	.930	
607	532121	7634		7607			1.45	III

NOTES:

- I. Total cable on any signal leg shall not exceed 100 feet. An additional cable, Key No. 15b, 68, 70, or 72, is required to join the outer ends of the signal legs. This cable may be up to 140 feet in length. A total of 340 feet of cable is available to install two 7607 or 7909 channels (one per signal leg) on a system. For each additional channel, decrease the total available cable by 40 feet.
- II. Use as required. This cable should connect the end channels of each signal leg. Not required if there is only one signal leg. To obtain maximum system efficiency, channels should be numbered in order of descending character rate and cabled in numeric sequence. Where several units have the same character rate, the application should determine the sequence number.
- III. The maximum length for on-line operation 607 + 603 or 35 may not exceed total cable length specified for 729 legs in the system.

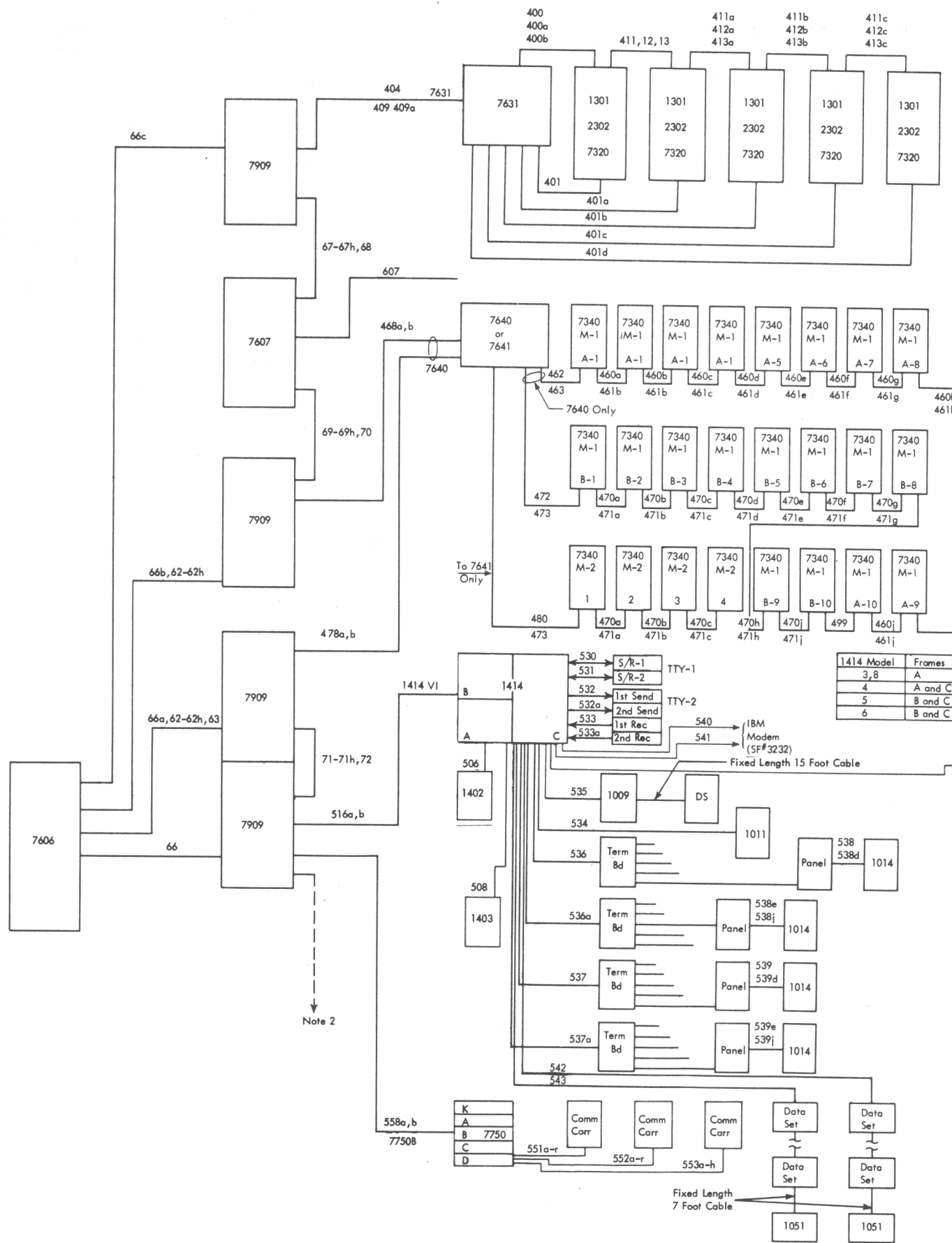
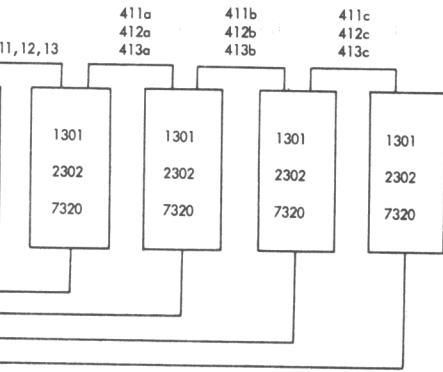


Figure 11. 7090/7094 Cabling Schematic - Signal

Figure 12A. I/O Components Cabling Schematic - Signal

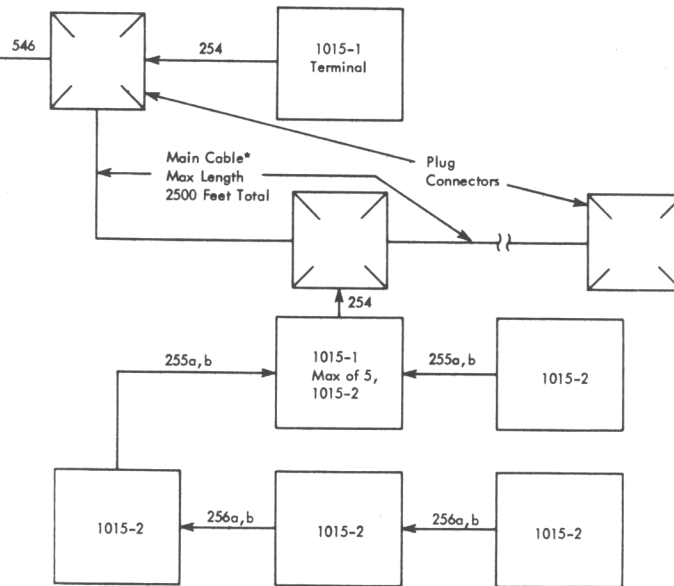
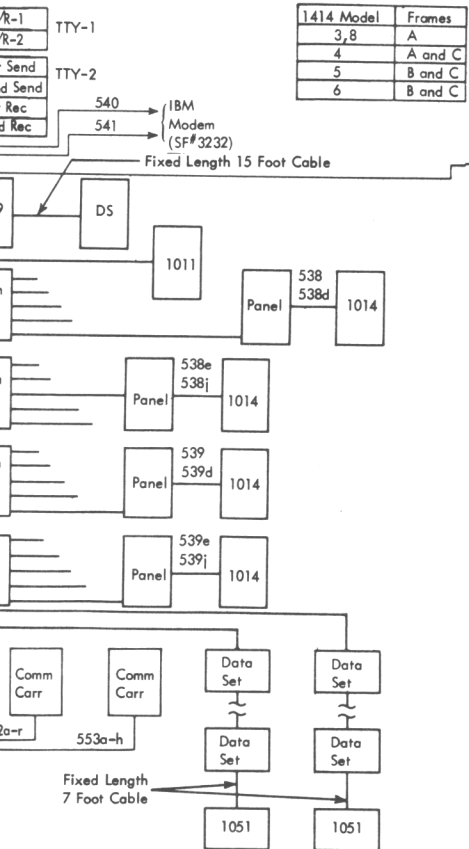
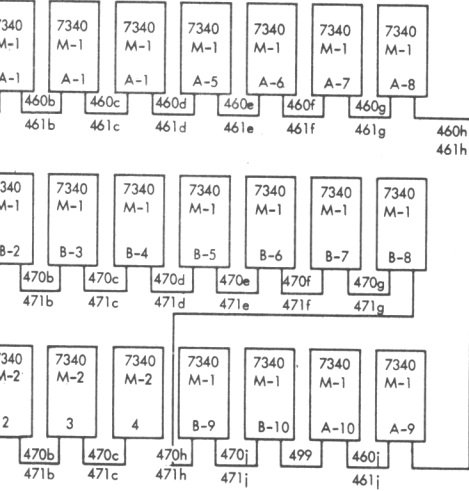


1015 Cable Listing and Cable Schematic

Key No.	P/N	From	Ch	To	Ch	Max	O. D.	Notes
						Length		
254	742878	1015-1		Connector		20		
255a	742756	1015-2		1015-1		50		I
255b	5707285	1015-2		1015-1		50		I
256a	742756	1015-2		1015-2				I
256b	5707285	1015-2		1015-2				I
546	5397916	1414 C		Wall Connector		40		

NOTES:

- Sum of Key Nos. 255 and 256 not to exceed 50 feet.



*Main cable and connectors are customer installed and maintained

I/O Components Cable Listing - Power and Control

1410 Cable Listing - Power and Control

Key No.	P/N	From	Ch	To	Ch	Max Length (ft)	O. D. (in)	Notes
2	535098	MTU		MTU			.85	II
419	5342370	7631		Stor			.500	V
419a-d	5342370	1301		Stor			.500	V
450	5312035	MTU		Receptacle		14(fixed)	.745	III
451	5312036	7340	A	7340	A		.745	I
452	5312035	MTU		Receptacle		14(fixed)	.745	III
453	5312036	7340	B	7340	B		.745	I
454	5312035	MTU		Receptacle		14(fixed)	.745	III
455	5312036	7340	A	7340	A		.745	I
456	5312035	MTU		Receptacle		14(fixed)	.745	III
457	5312036	7340	B	7340	B		.745	I
458	5312035	MTU		Receptacle		14(fixed)	.745	III
459	5312036	7340	A&B	7340	A&B		.745	I
505a	760737	1414A		1402		28	1.125	
505b	5369968	1414A		1402		28	1.188	VIII
507	5369971	1414A		1403		25	0.750	VIII
600	535098	7404		7634		25	.85	
602	535098	729		7634			.85	VI, VII
604	535098	7634		729			.85	VII

NOTES:

- I. The total length of cable for any one Key No. bearing this note shall not exceed 86 feet (60 feet for 7641).
- II. Total length of power cable not to exceed 80 feet per leg. There are two power legs per channel, a maximum of five tapes per leg.
- III. Power input cable. One required for each group of four Hypertape units.
- IV. The total length of signal or control cables on any one tape channel shall not exceed 130 feet for ten Hypertape units (70 feet for 7641).
- V. Total length of all Key No. 419 cable may not exceed 150 feet.
- VI. The maximum length for off-line operation is 25 feet.
- VII. The maximum length for on-line operation may not exceed the lengths specified for 729 tape legs in the system.
- VIII. These cables were made pluggable on systems manufactured after March 5, 1965. Field modification of the 1402 and 1414 will be required if units manufactured prior to March 5, 1965 are being installed.

Key No.	P/N	From	Ch	To	Ch	Max Length (ft)	O. D. (in)	Notes
1	535098	1411A	1	MTU	1		.85	II
3	535098	1411A	1	MTU	1		.85	II
4	535098	1411A	2	MTU	2		.85	II
6	535098	1411A	2	MTU	2		.85	II
8	760739	1411A	1	1414D	1	50	1.125	
9	760739	1411A	2	1414D	2	50	1.125	
99	352303	1411A		7770		50	.500	
101b	352303	7770		1442		50	.500	
405	352303	7631		1411A		100	.500	
485	352303	7641		1411A		50	.550	
500g	760736	1414A	1	1411A	1	50	1.125	III
501g	760736	1414A	2	1411A	2	50	1.125	III
504a	760736	1402	1	1411A	1	50	1.125	
504b	760736	1402	2	1411A	2	50	1.125	
509f	763337	1414B	1	1411A	1	45		I
510f	763337	1414B	2	1411A	2	45		I
562	352303	7750K		1411A		50	.500	

NOTES:

- I. Required only when system includes 1414 M5.
- II. Total length of power cable not to exceed 80 feet per leg. There are two power legs per channel. Maximum of 5 tape drivers per leg.
- III. Required only for 1414 M8.

I/O Components Cable Listing - Power and Control

Key No.	P/N	From	Ch	To	Ch	Max Length (ft)	O.D. (in)	Notes
2	535098	MTU		MTU			0.85	II
419	5342370	7631		Stor			.500	V
419a-d	5342370	1301		Stor			.500	V
450	5312035	MTU		Receptacle		14(fixed)	.745	III
451	5312036	7340	A	7340	A		.745	I
452	5312035	MTU		Receptacle		14(fixed)	.745	III
453	5312036	7340	B	7340	B		.745	I
454	5312035	MTU		Receptacle		14(fixed)	.745	III
455	5312036	7340	A	7340	A		.745	I
456	5312035	MTU		Receptacle		14(fixed)	.745	III
457	5312036	7340	B	7340	B		.745	I
458	5312035	MTU		Receptacle		14(fixed)	.745	III
459	5312036	7340	A&B	7340	A&B		.745	I
505a	760737	1414A		1402		28	1.125	
505b	5369968	1414A		1402		28	1.188	VIII
507	5369971	1414A		1403		25	0.750	VIII
600	535098	7404		7634		25	.85	
602	535098	729		7634			.85	VI, VII
604	535098	7634		729			.85	VII

NOTES:

- I. The total length of cable for any one Key No. bearing this note shall not exceed 86 feet (60 feet for 7641).
- II. Total length of power cable not to exceed 80 feet per leg. There are two power legs per channel, a maximum of five tapes per leg.
- III. Power input cable. One required for each group of four Hypertape units.
- IV. The total length of signal or control cables on any one tape channel shall not exceed 130 feet for ten Hypertape units (70 feet for 7641).
- V. Total length of all Key No. 419 cable may not exceed 150 feet.
- VI. The maximum length for off-line operation is 25 feet.
- VII. The maximum length for on-line operation may not exceed the lengths specified for 729 tape legs in the system.
- VIII. These cables were made pluggable on systems manufactured after March 5, 1965. Field modification of the 1402 and 1414 will be required if units manufactured prior to March 5, 1965 are being installed.

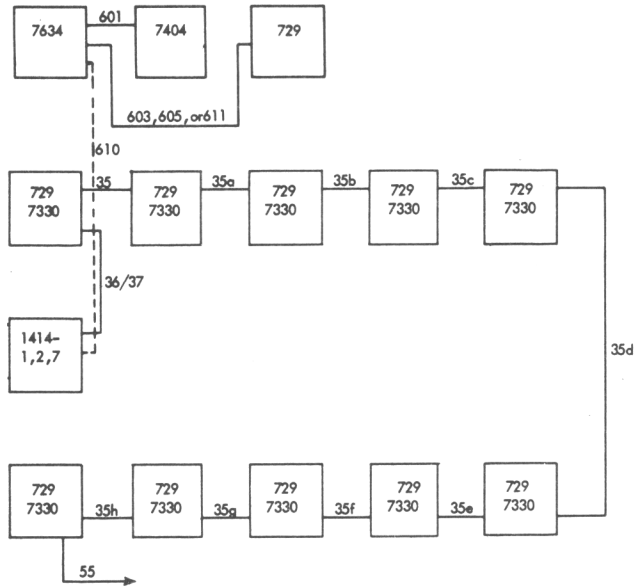


Figure 12B. I/O Components Cabling Schematic - Signal

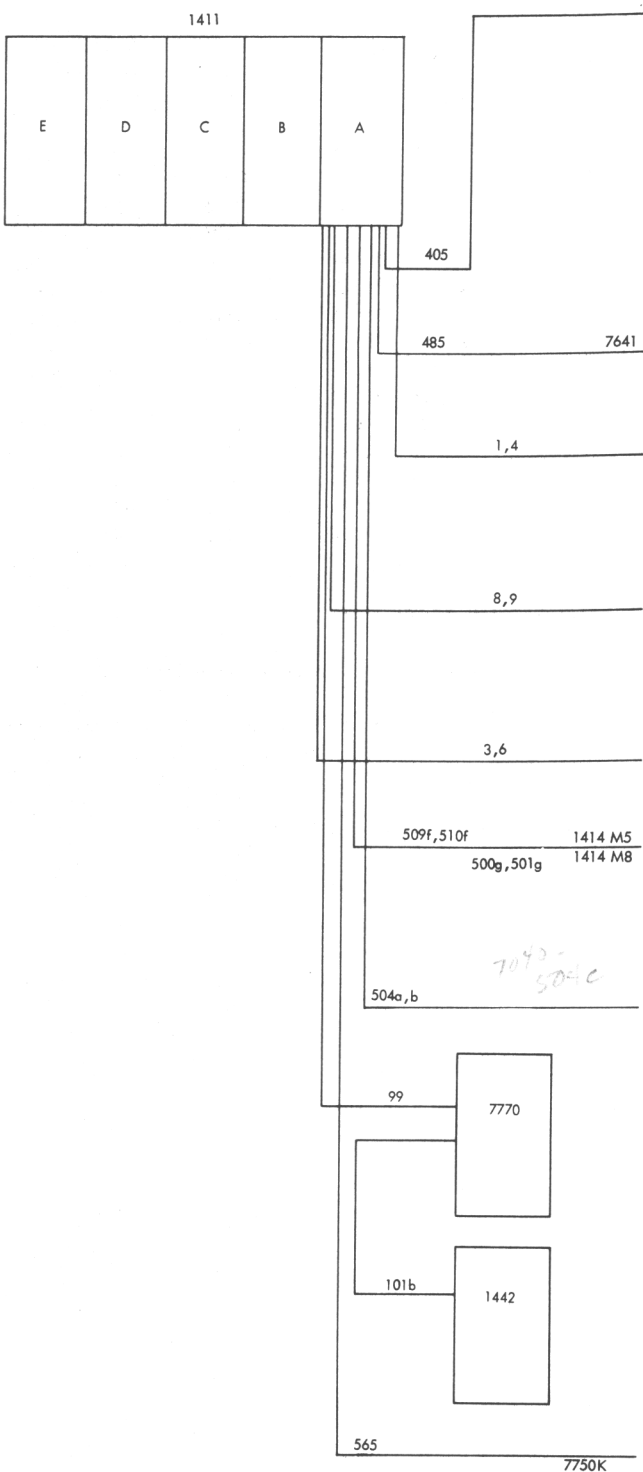


Figure 13-1. 1410 Cabling Schematic - Power and Control

7010 Cable Listing - Power and Control

Key No.	P/N	From	Ch	To	Ch	Max Length (ft)	O. D. (in)	Notes
95	352303	7114B		7770		50	.500	
101b	352303	7770		1442		50	.500	
389, a	760739	1414D		7114F		50	1.125	
390, a, b, c	5235359	729		7114F			1.125	II
392	760739	7114B		1414D		50	1.125	
394	535098	7114B		MTU			.85	II
394a	535098	7114B		MTU			.85	II
417	352303	7631		7114B		100	.500	
500g	760736	1414A	1	7114B	1	50	1.125	III
501g	760736	1414A	2	7114B	2	50	1.125	III
504a	760736	1402	1	7114B	1	50	1.125	
504b	760736	1402	2	7114B	2	50	1.125	
509f	763337	1414B	1	7114B	1	45		I
510f	763337	1414B	2	7114B	2	45		I
562	352303	7750K		7114B		50	.500	

NOTES:

- I. Required only when system includes 1414 M5.
- II. Total length of power cable not to exceed 80 feet per leg.
There are two power legs per channel. Maximum of 5 tape drivers per leg.
- III. Required only for 1414 M8.

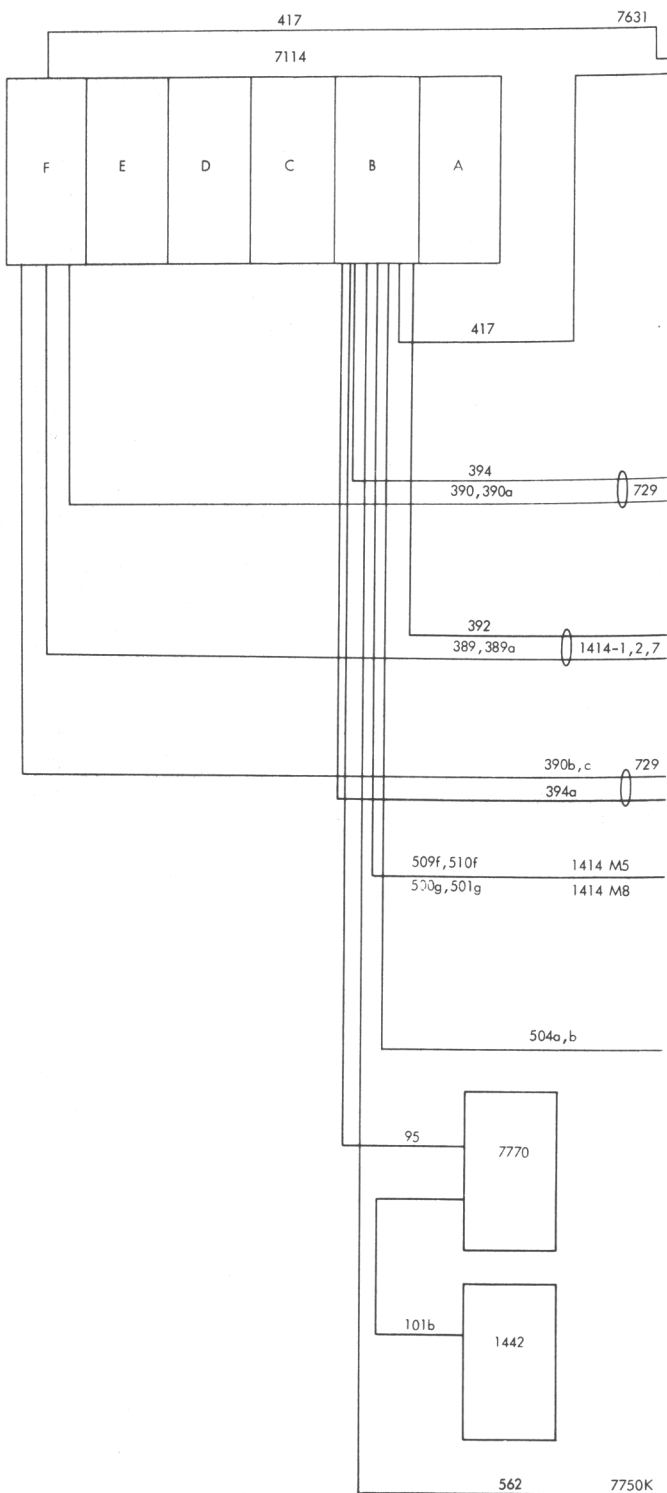


Figure 13-2. 7010 Cabling Schematic - Power and Control

7040/7044 Cable Listing - Power and Control

<u>Key</u> <u>No.</u>	<u>P/N</u>	<u>From</u>	<u>Ch</u>	<u>To</u>	<u>Ch</u>	<u>Max</u> <u>Length</u> <u>(ft)</u>	<u>O.D.</u> <u>(in)</u>	<u>Notes</u>
108	5235357	7106/07A		7904	B	60	.675	
108a	5235357	7106/07A		7904	D	60	.675	
108b	5235358	7106/07A		7904	B	60	.918	
108c	5235358	7106/07A		7904	D	60	.918	
395	760739	7106/07A		1414D		50	1.125	
396	5235369	7904		MTU		50		II
396h, j	5235369	7106/07A		MTU	A			II
415	352303	7631		7106/07A		60	.500	
504c	760736	1402		7106/07A		50	1.125	
511f	763337	1414B		7106/07A		45		I
519	352303	1414B		7106/07A		60	.500	III
560	352303	7750K		7106A		60	.500	
561	352303	7750K		7107A		60	.500	
608	5235359	7634		7106A			1.500	II
609	5235359	7634		7904			1.500	II
613	352303	7634		7106/07		100	.500	

NOTES:

- I. Required only when system includes 1414 M5.
- II. Total length of power cable not to exceed 80 feet per leg. There are two power legs per channel, maximum of 5 tape drives per leg. 7634 looks like 729 Tape Drive to system.
- III. Required only for 1414 M8.

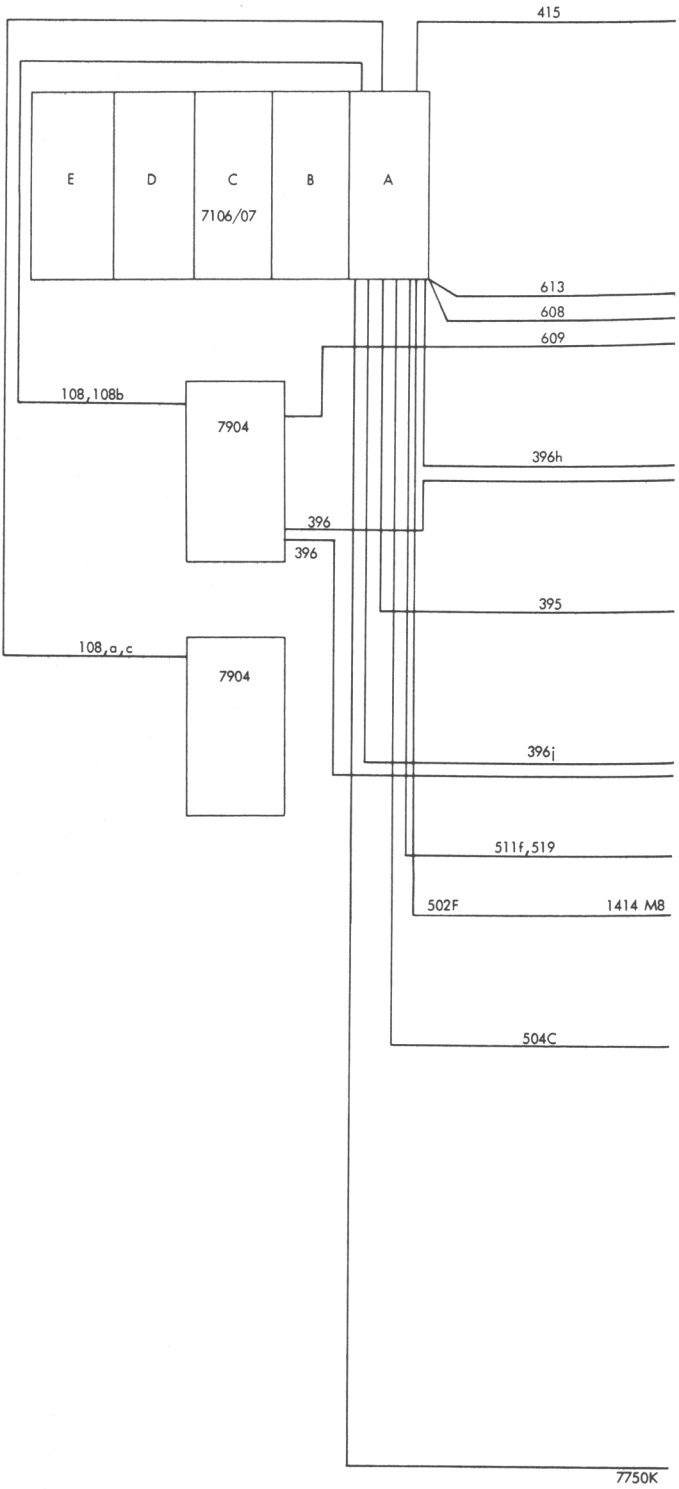


Figure 13-3. 7040/7044 Cabling Schematic - Power and Control

Cable Listing - Power
Direct Couple 7040/44 to 7090/94

<u>Key</u> <u>No.</u>	<u>P/N</u>	<u>From</u>	<u>Ch</u>	<u>To</u>	<u>Ch</u>	<u>Max</u> <u>Length</u> <u>(ft)</u>	<u>O. D.</u> <u>(in)</u>	<u>Notes</u>
A76	381492	7106/07A		7618		75		

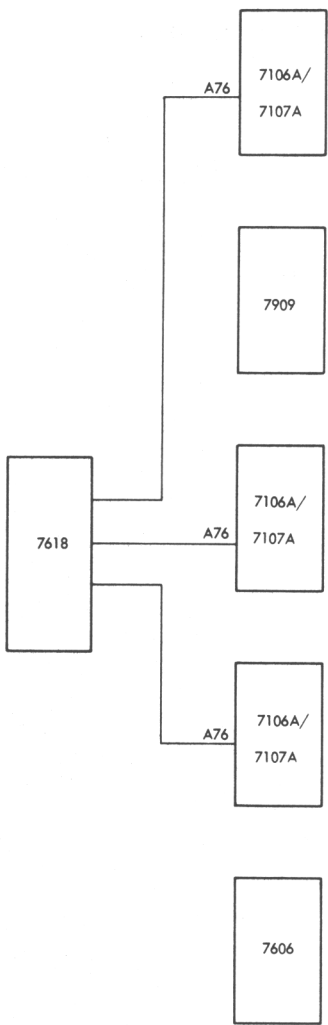


Figure 13-4. 7040/7044 to 7090/7094 Direct Couple Cabling Schematic - Power and Control

7070 Cable Listing - Power and Control

<u>Key</u> <u>No.</u>	<u>P/N</u>	<u>From</u>	<u>Ch</u>	<u>To</u>	<u>Ch</u>	<u>Max</u> <u>Length</u> <u>(ft)</u>	<u>O. D.</u> <u>(in)</u>	<u>Notes</u>
402	352303	7631		7602		100	.500	
520	352303	1414B		7602		100	.500	
563	352303	7750K		7602		100	.500	

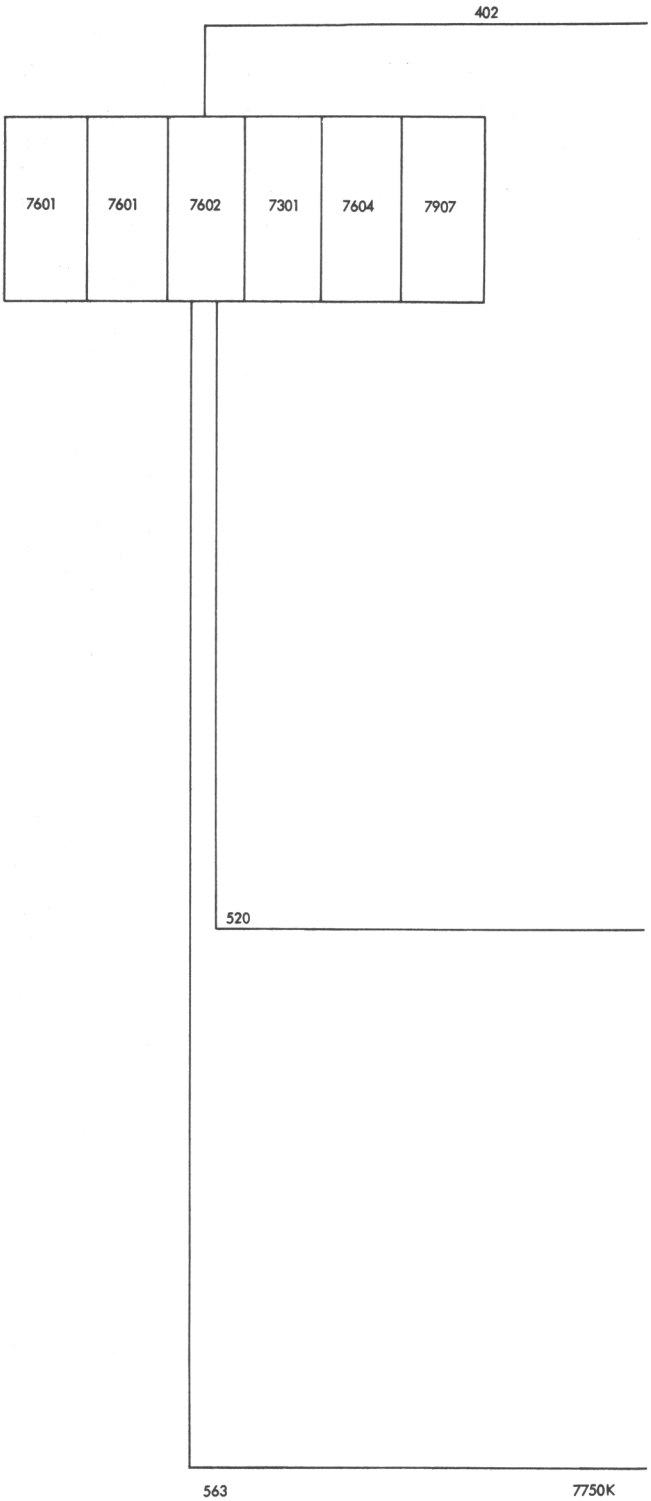


Figure 13-5. 7070 Cabling Schematic - Power and Control

7074 Cable Listing - Power and Control

<u>Key</u> <u>No.</u>	<u>P/N</u>	<u>From</u>	<u>Ch</u>	<u>To</u>	<u>Ch</u>	<u>Max</u> <u>Length</u> <u>(ft)</u>	<u>O.D.</u> <u>(in)</u>	<u>Notes</u>
222	539433	7602		7907		55	.800	
402	352303	7631		7602		100	.500	
465	352303	7640		7602		100	.500	
520	352303	1414B		7602		100	.500	
563	352303	7750K		7602		100	.500	

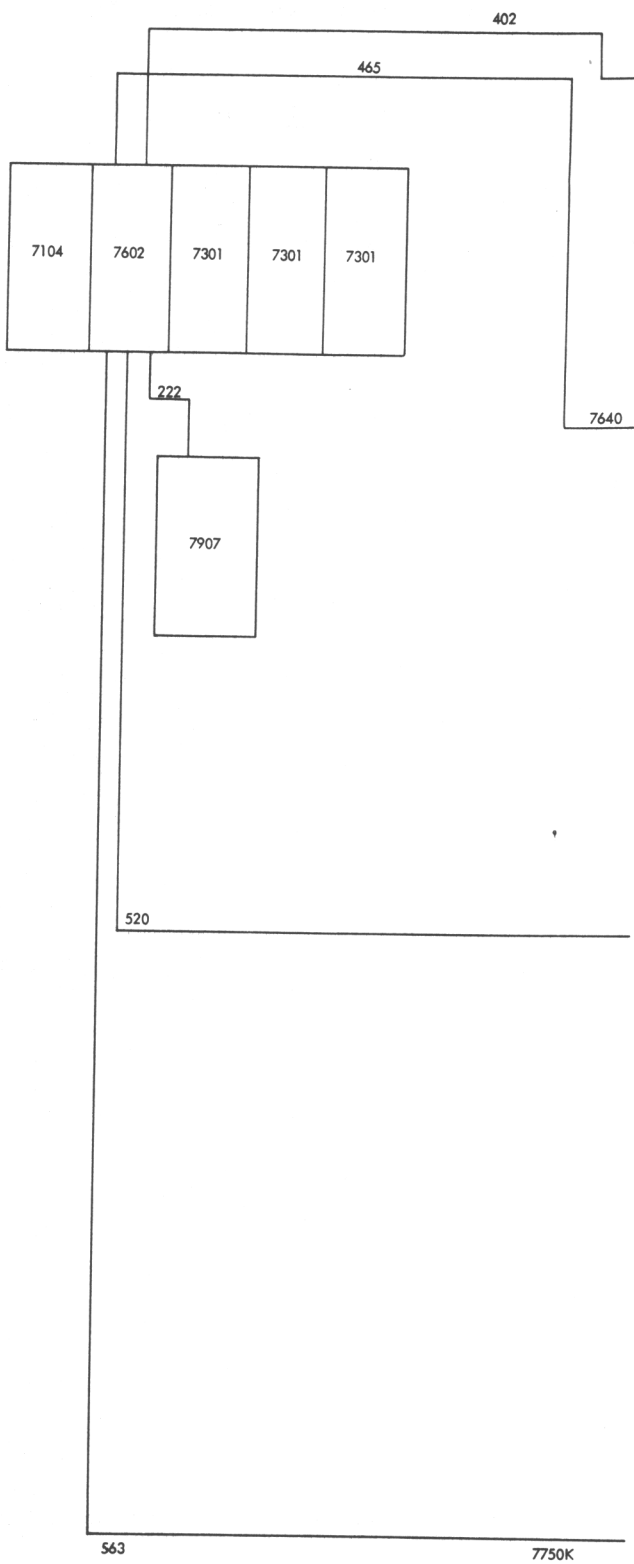


Figure 13-6. 7074 Cabling Schematic - Power and Control

7080 Cable Listing - Power and Control

<u>Key</u>						Max	O. D.	
<u>No</u>	<u>P/N</u>	<u>From</u>	<u>Ch</u>	<u>To</u>	<u>Ch</u>	<u>Length</u>	<u>(in)</u>	<u>N.</u>
						<u>(ft)</u>		
39	352294	7908		7804		75	1.04	
403	352303	7631		7804		100	.50	
467	352303	7640		7804		100	.50	
521	352303	1414B		7804		100	.50	
565	352303	7750K		7804		100	.50	

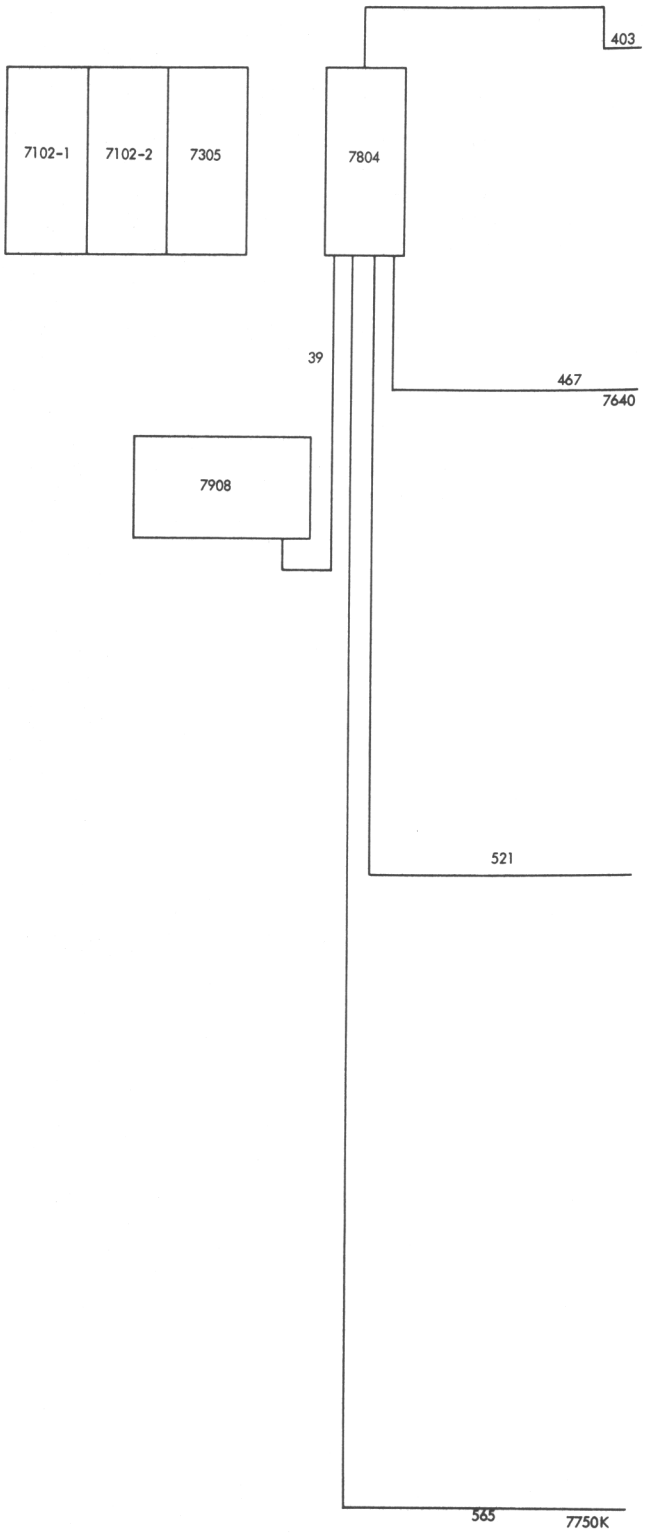


Figure 13-7. 7080 Cabling Schematic - Power and Control

7090/7094 Cable Listing - Power and Control

<u>Key</u> <u>No.</u>	<u>P/N</u>	<u>From</u>	<u>Ch</u>	<u>To</u>	<u>Ch</u>	<u>Max</u> <u>Length</u> <u>(ft)</u>	<u>O.D.</u> <u>(in)</u>	<u>Note</u>
60	532542	7909		7618		100	.700	
61	532973	7909		7618		100	.800	
404	352303	7631		7909		100	.500	
469	352303	7640		7909		100	.500	
522	352303	1414B		7909		100	.500	
564	352303	7750K		7909		100	.500	
606	532536	7634		7607			.85	I
612	381492	7634		7618		100	.500	

NOTES:

- I. The maximum length of on-line cable may not exceed the lengths specified for 729 tape legs in the system.

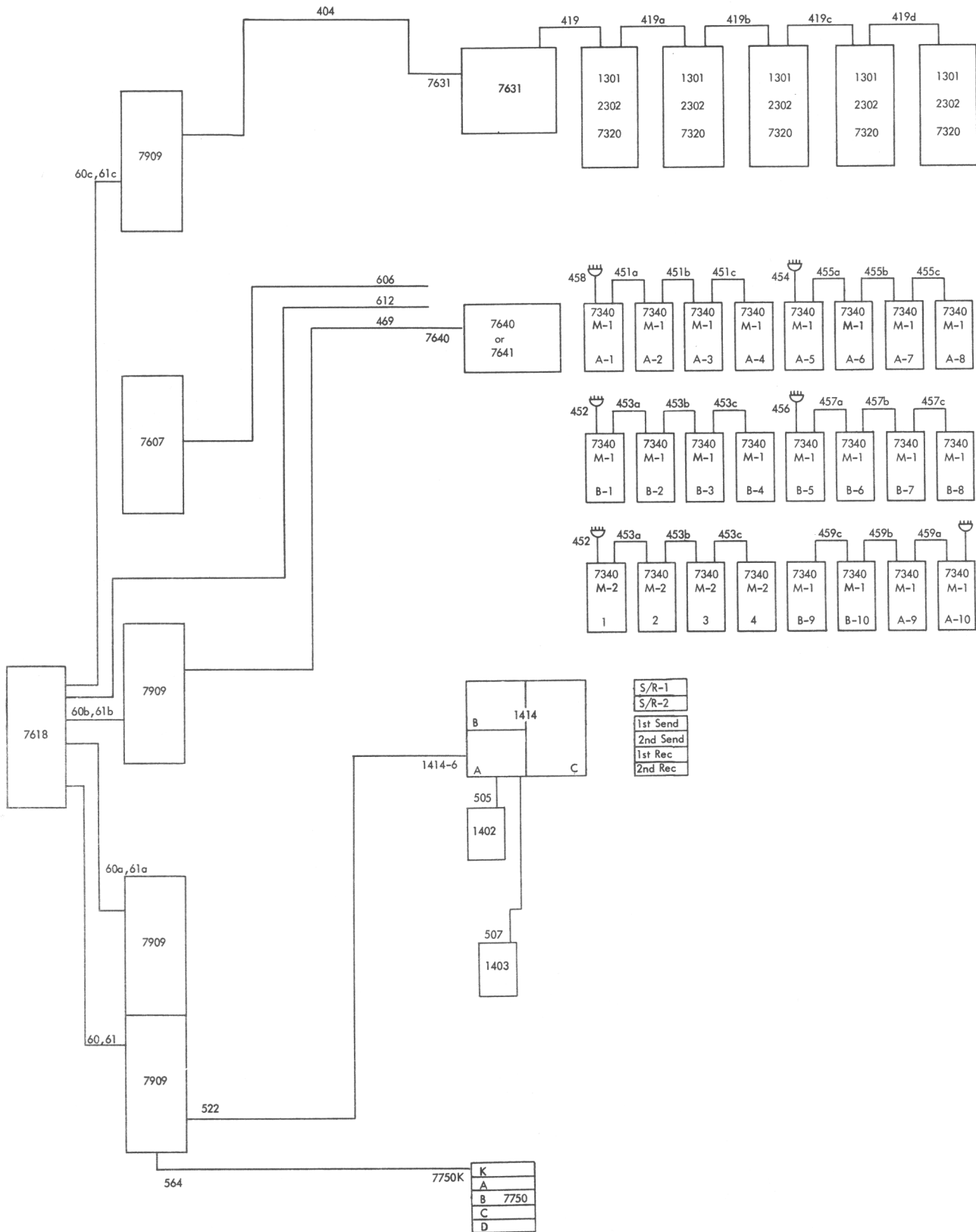


Figure 14. 7090/7094 Cabling Schematic - Power and Control

Figure 15A. I/O Components Cabling Schematic - Power and Control

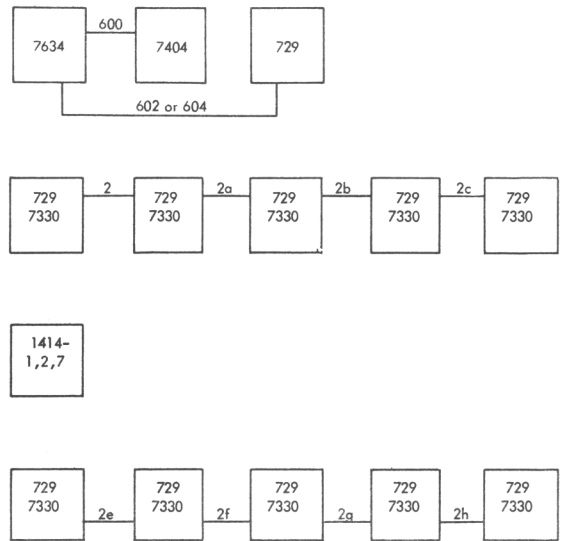
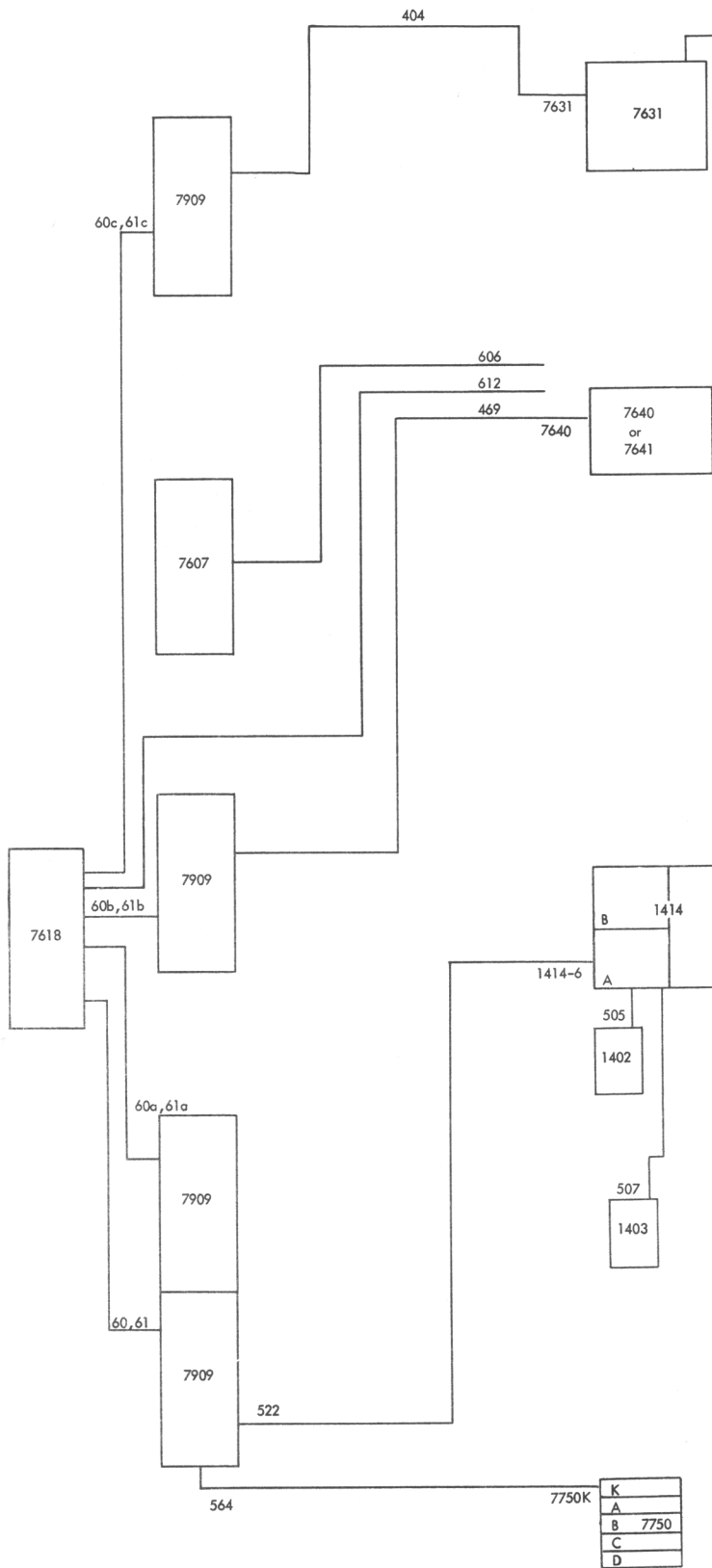


Figure 14. 7090/7094 Cabling Schematic - Power and Control Figure 15A.

Figure 15B. I-O Components Cabling Schematic - Power and Control

ILLUSTRATIONS

Figures 16 through 24 are representative of cable connectors used in the computer systems. The dimensions given for the connectors are maximum over-all measurements and may be used in calculations concerning sub-floor clearances.

Figures 16 through 19 are input-output cables.

Figures 20 through 22 are interframe cables.

Figures 23 and 24 are power cables.

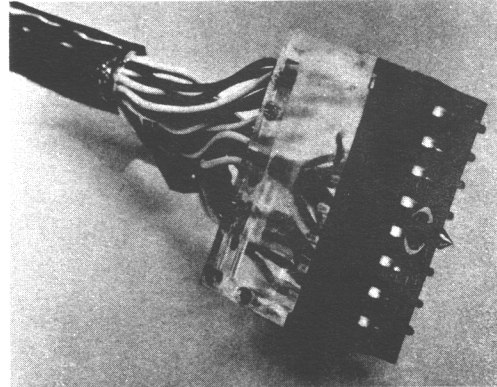


Figure 16. Disk Signal Cable Connector (2-3/4" high, 2-1/2" deep, 1" wide)

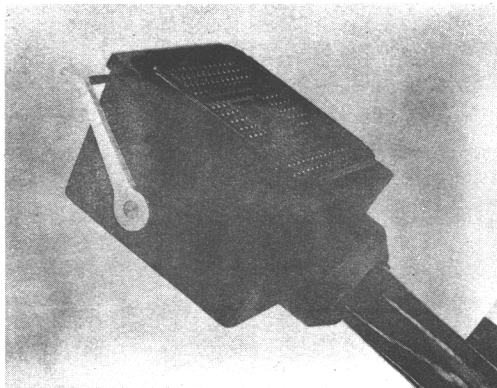


Figure 17. Input-Output Signal Cable Connector (7-11/16" high, 3-1/2" deep, 5-15/16" wide)

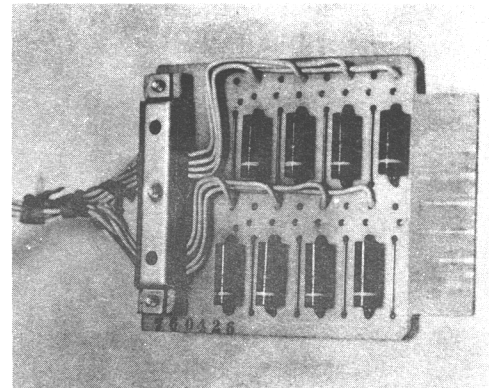


Figure 18. Paddle Connector (2-1/2" high, 4-1/2" deep, 1/2" wide)

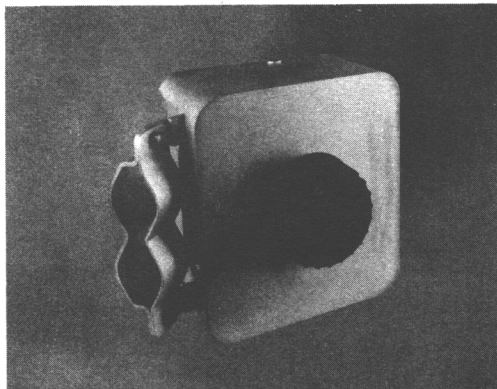


Figure 19. Hypertape Signal Connector (7-11/16" high, 4-1/8" deep, 5-15/16" wide)

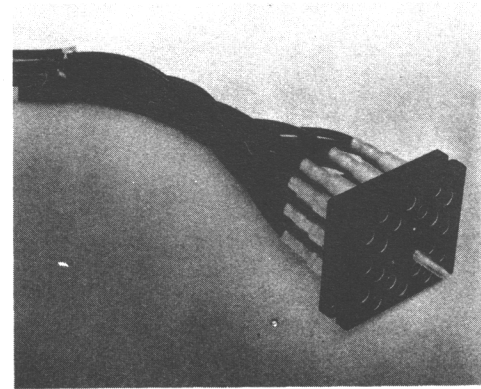


Figure 20. Twenty-Position Connector (2" high, 2-13/16" deep, 2-3/8" wide)

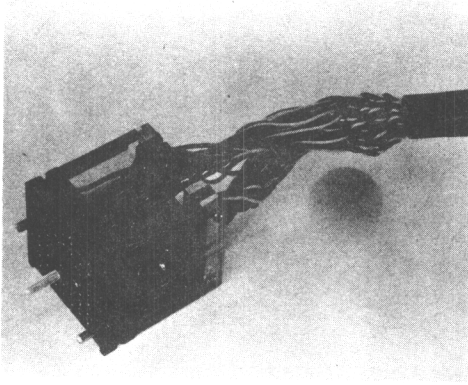


Figure 21. Forty-Position Connector (2" high, 2-1/2" deep, 2-3/8" wide)

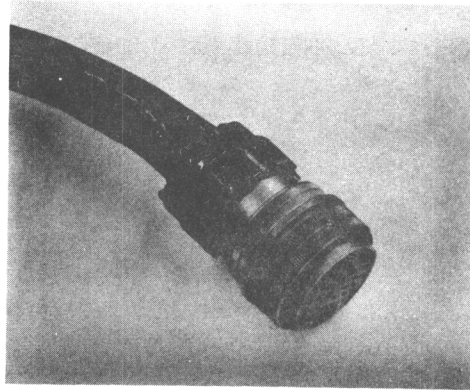


Figure 22. Power Distribution Cable Connector (O.D. 2-1/2", 3-1/8" long)

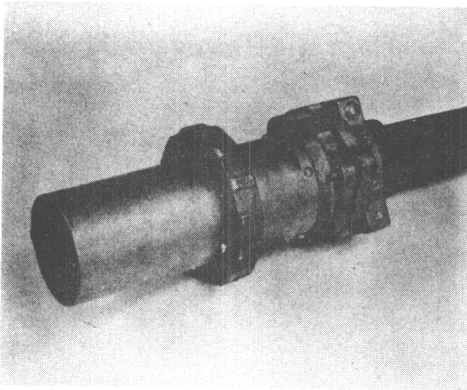


Figure 23. Power Cord Connector (3 Φ , 60 amp, 4 wire; O.D. 3-3/4", 9" long)

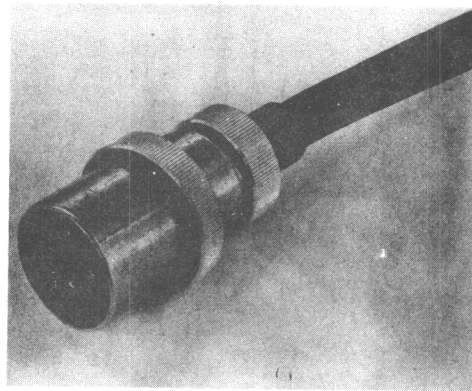


Figure 24. Power Cord Connector (3 Φ , 30 amp, 4 wire; O.D. 2-1/4", 4-1/2" long)

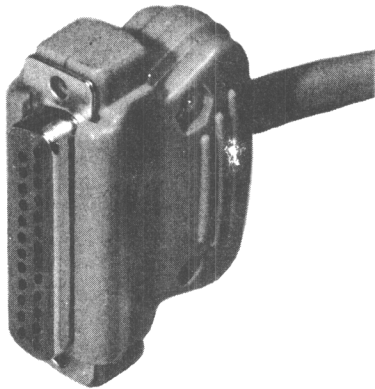


Figure 25. Common Carrier to Data Set - 7750 (2-3/16" wide, 3/4" high, 1-5/8" deep)

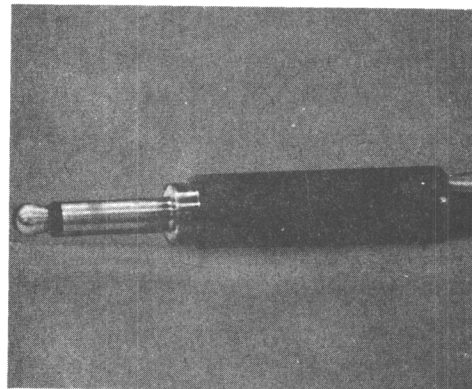
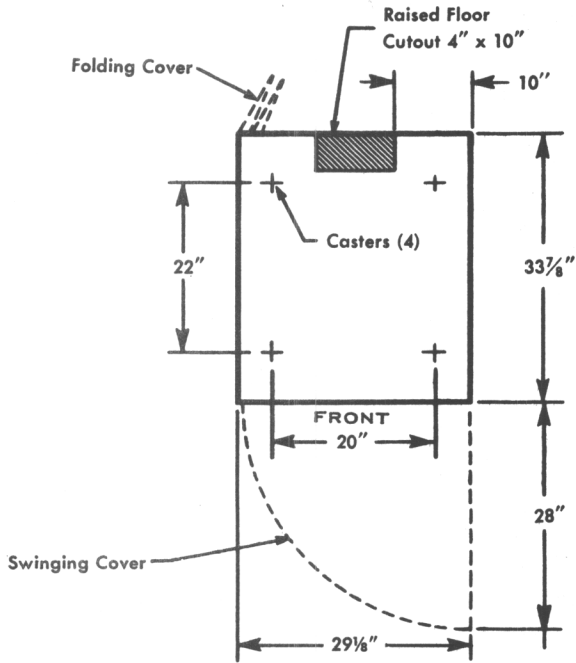


Figure 26. Common Carrier to Telegraph - 7750 (3-3/8" long, 9/16" O. D.)

729 II, IV, V, AND VI MAGNETIC TAPE UNIT

Plan View

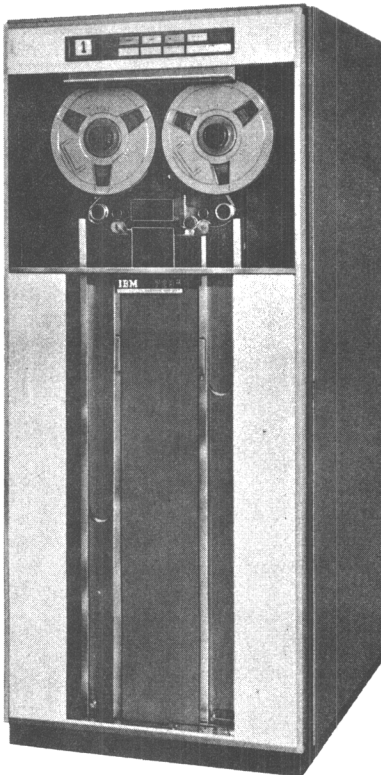


Notes

Height: 69"

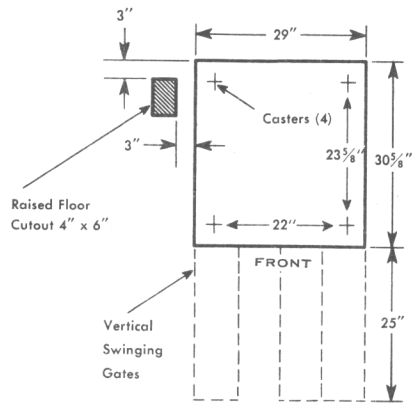
Service Clearances: Front 30" Rear 30"

Minimum clearance between tape units of 2" on the sides, otherwise 30" between a tape unit and any other unit.



1009 DATA TRANSMISSION UNIT

Plan View



Notes

Height: 39-5/8"

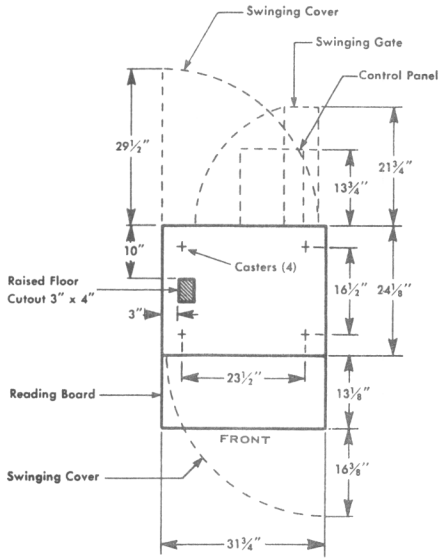
Service Clearances: Front Rear Sides
42" 42" 30"

Should be located near system console.



1011 PAPER TAPE READER

Plan View

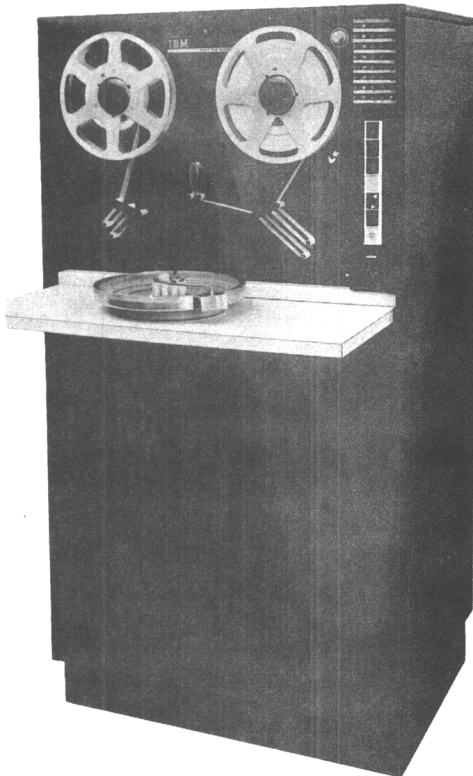


Notes

Height: 60"

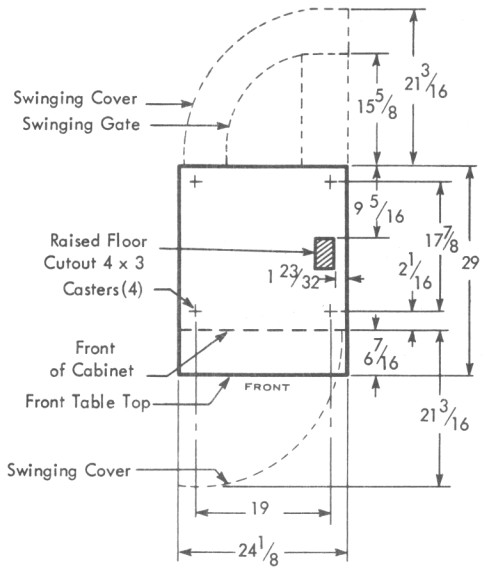
Service Clearances: Front Rear Sides
30" 42" 30"

Front clearance is measured from front of reading board.



1014 REMOTE INQUIRY STATION

Plan View



Notes

Height: 35"

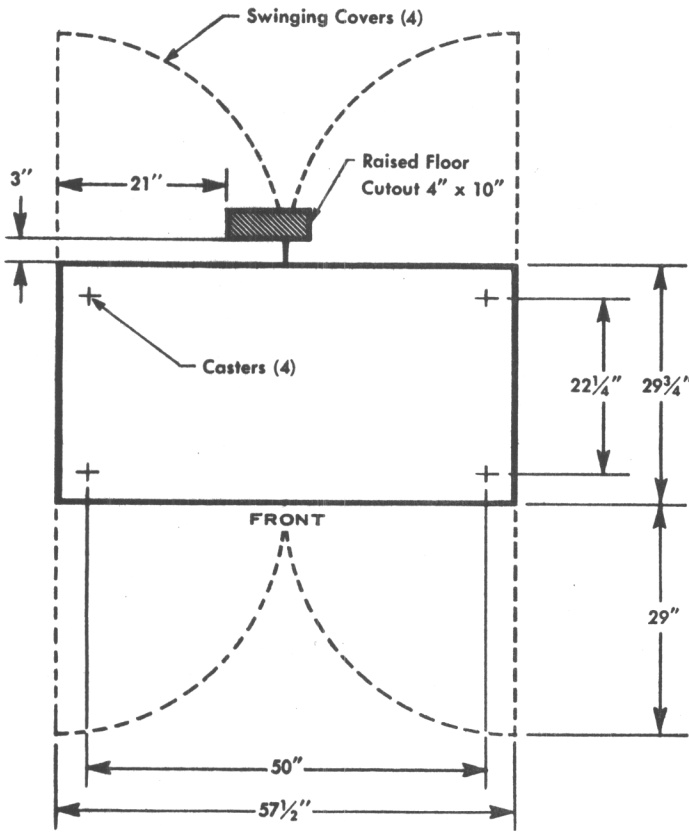
Service Clearances: Front Rear
30" 30"

None required for sides.



1402 CARD READ-PUNCH

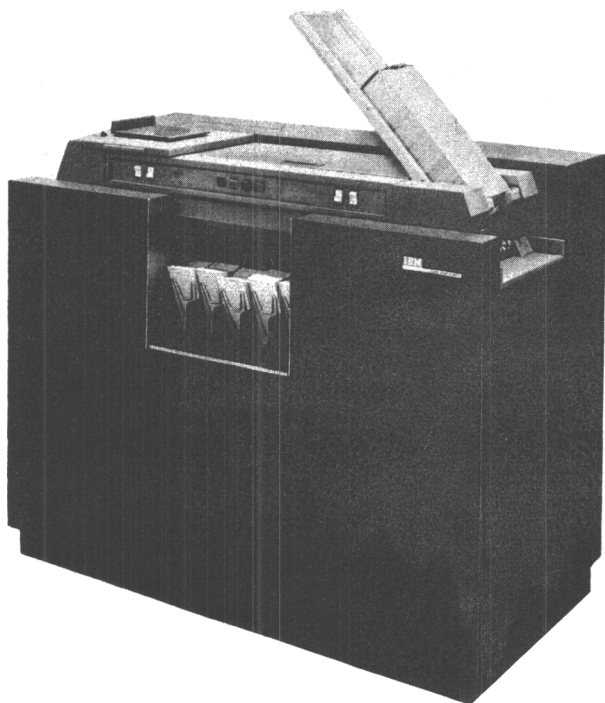
Plan View



Notes

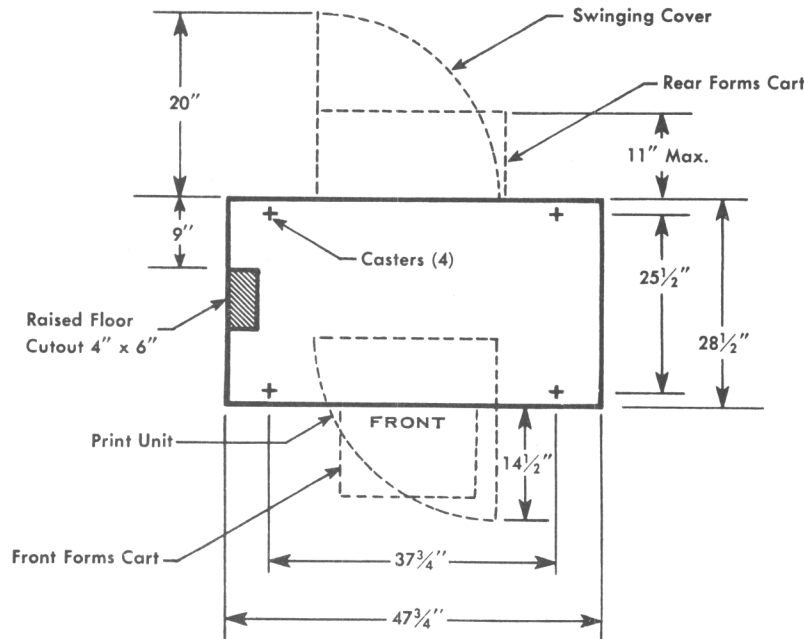
Height: 45-1/4" (plus Read File
Feed 14-5/8")

Service Clearance: 36" all sides



1403 PRINTER, MODELS 1 AND 2

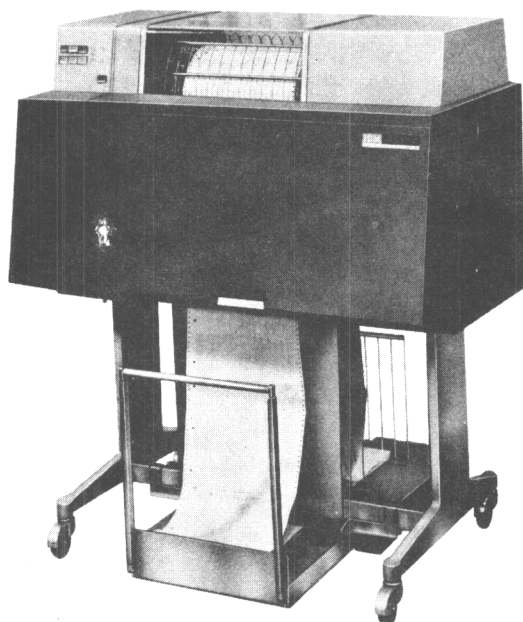
Plan View



Notes

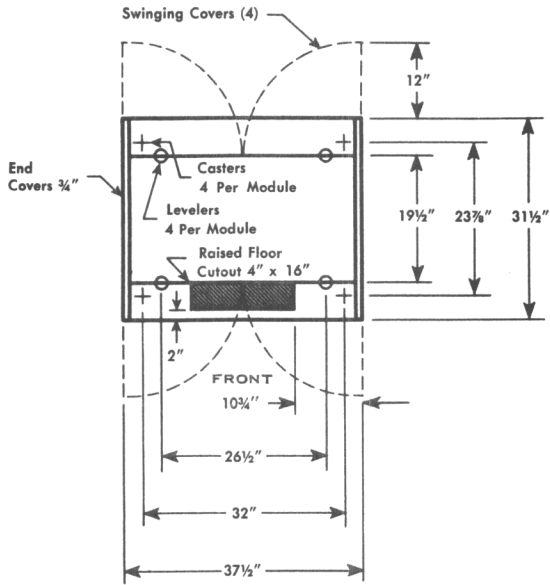
Height: 53-1/2"

Service Clearances: Front Rear Sides
36" 36" 30"



1414 INPUT-OUTPUT SYNCHRONIZER, MODELS 1, 2, 3, and 7
7904, 7908, 7909 DATA CHANNELS

Plan View

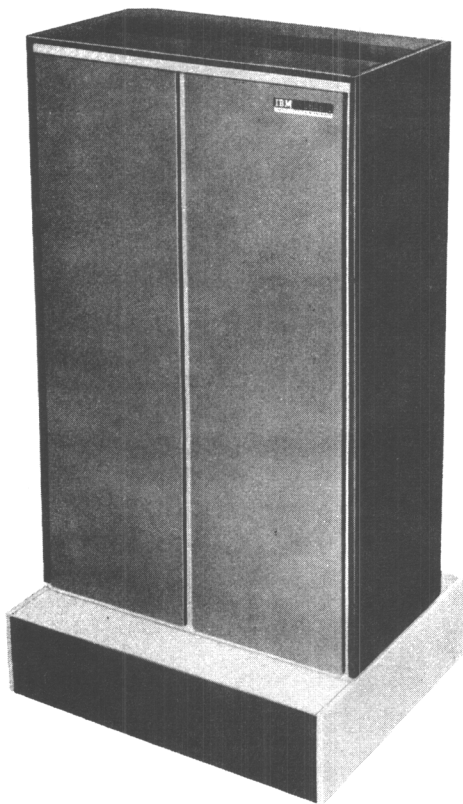


Notes

Height: 70"

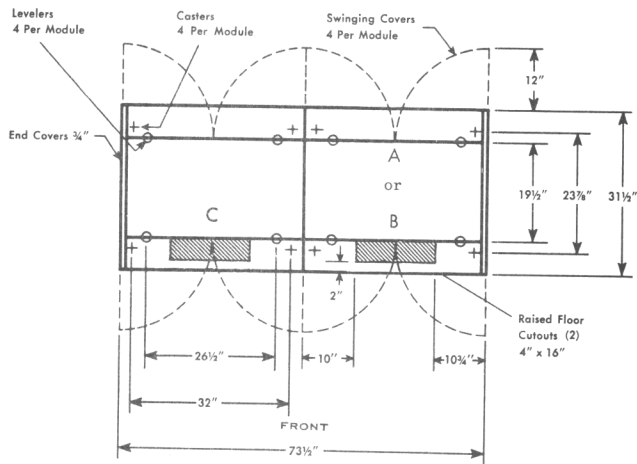
Service Clearances: Front Rear Sides
42" 36" 30"

Units may be placed in a line to form assemblies of up to 5 modules.



1414 INPUT-OUTPUT SYNCHRONIZER, MODEL 4, 5, and 6

Plan View

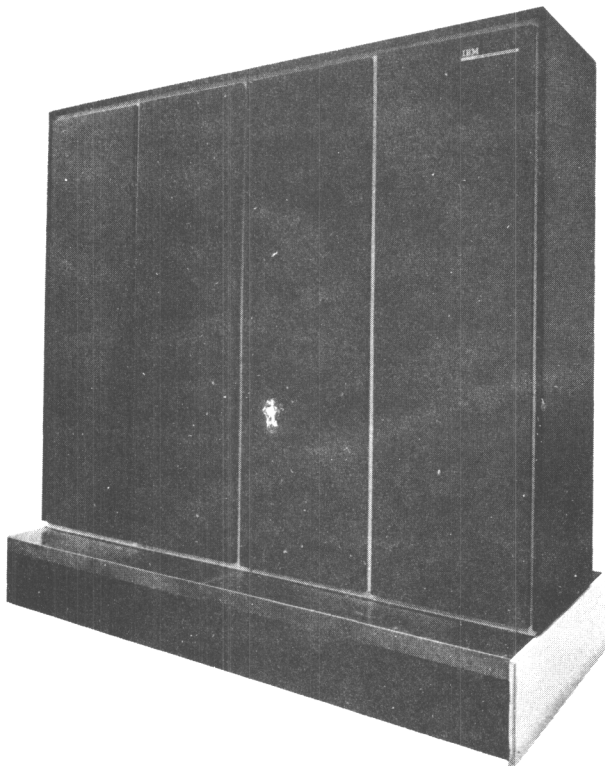


Notes

Height: 70"

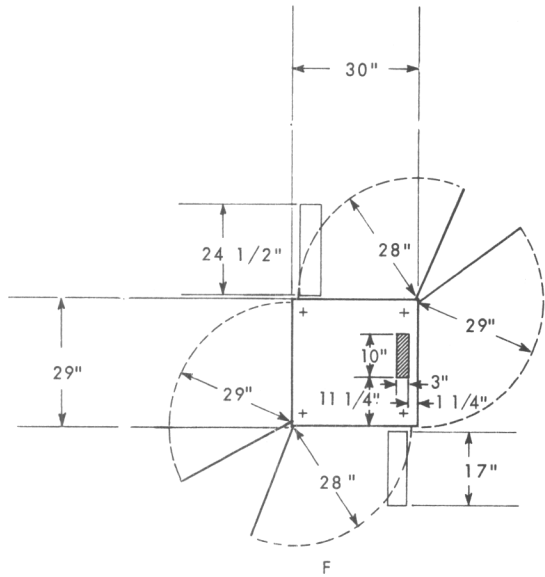
Service Clearances: Front Rear Sides
42" 36" 30"

Units may be placed in a line to form assemblies of up to 5 modules.



7320 DRUM STORAGE

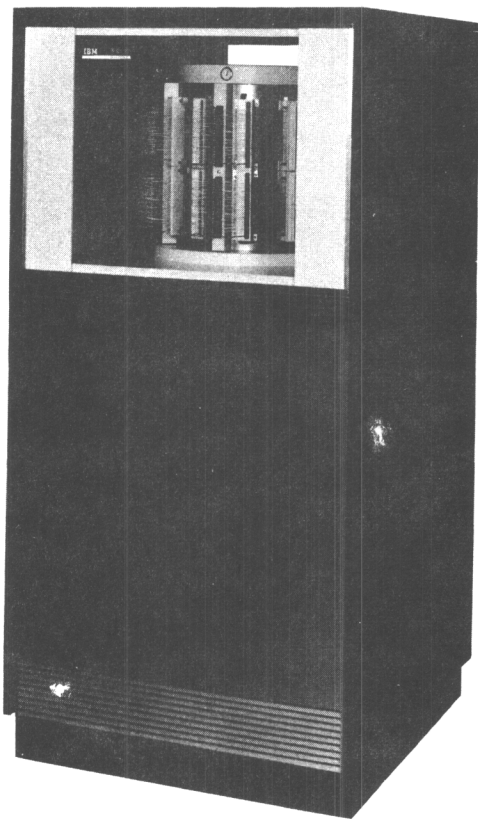
Plan View



Notes

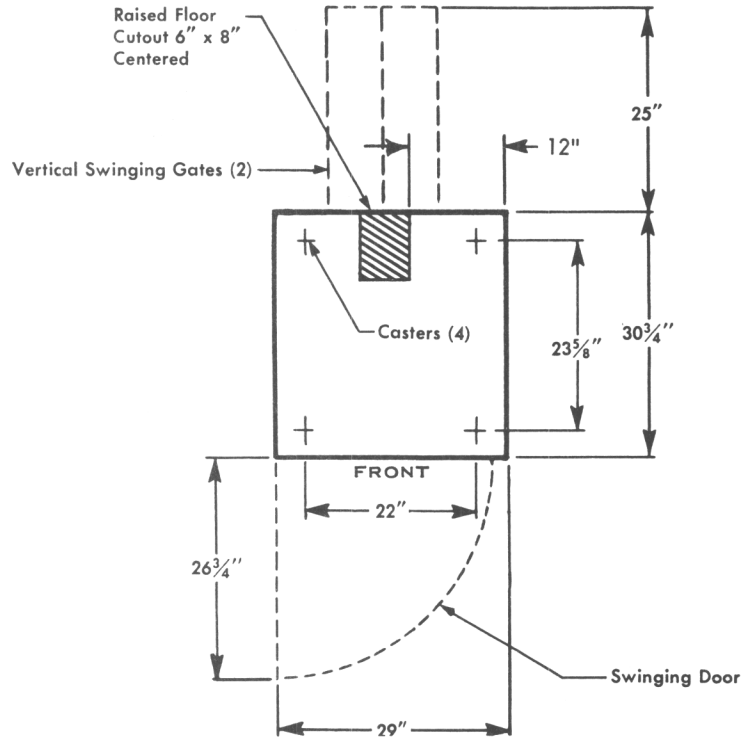
Height: 60"

Service Clearances:
40" Front and Rear
42" Sides



7330 MAGNETIC TAPE UNIT

Plan View



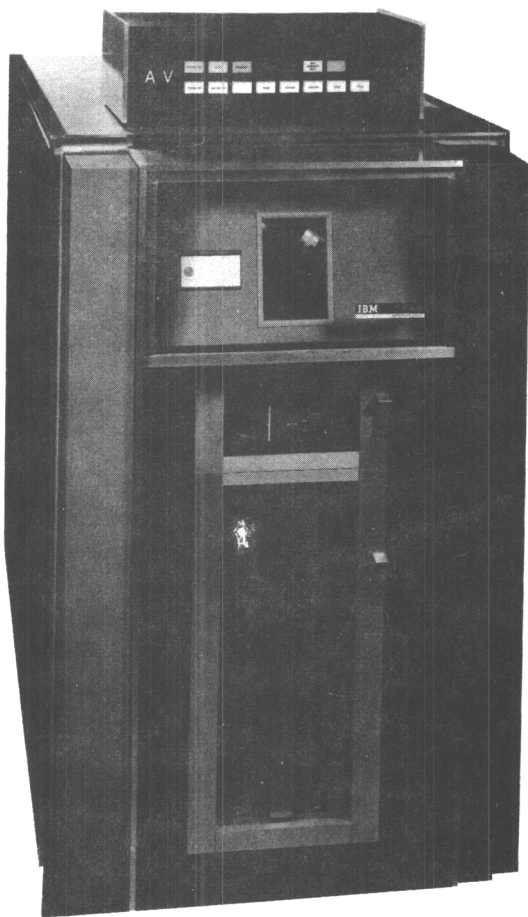
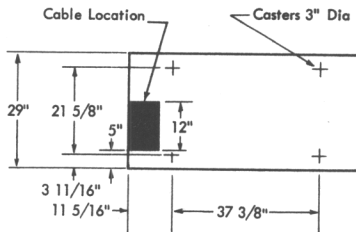
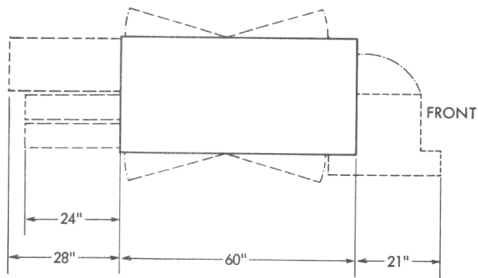
Notes

Height: 60"

Service Clearances: Front Rear Sides
44" 40" 6"

7340 HYPERTAPE DRIVE

Plan View



Notes

Height: 48"

Service Clearances:

Sides 7" One Side

22" Other Side

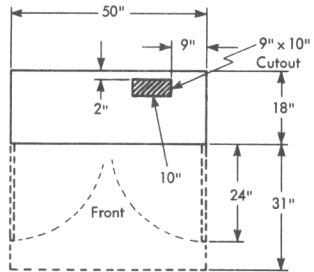
Front 46"

Rear 52"

Air intakes and exhaust on sides.

7404 GRAPHIC OUTPUT UNIT

Plan View



Notes:

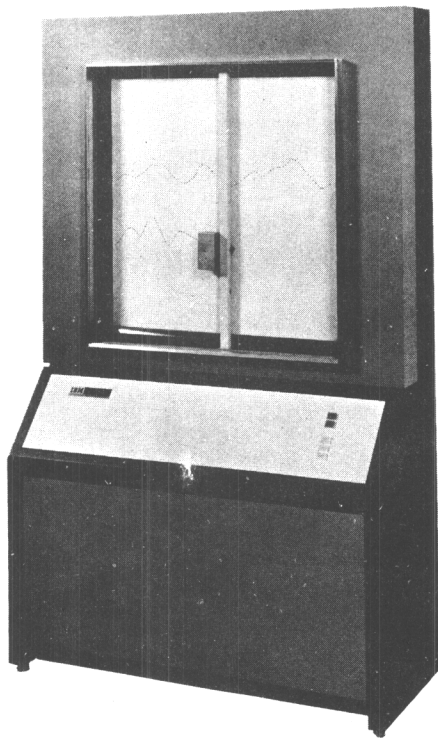
Height: 81"

Service Clearance:

42" Front

36" Rear

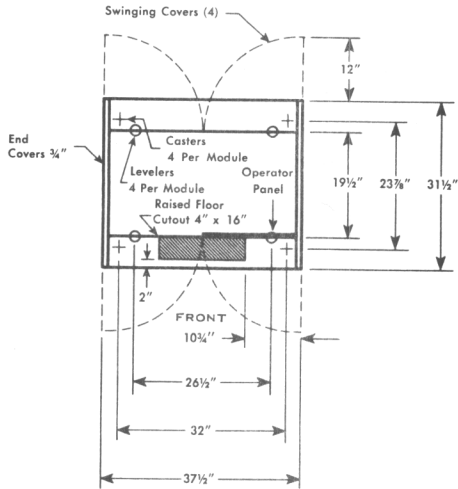
30" Sides



7631 FILE CONTROL ALL MODELS

7641 HYPERTAPE CONTROL

Plan View

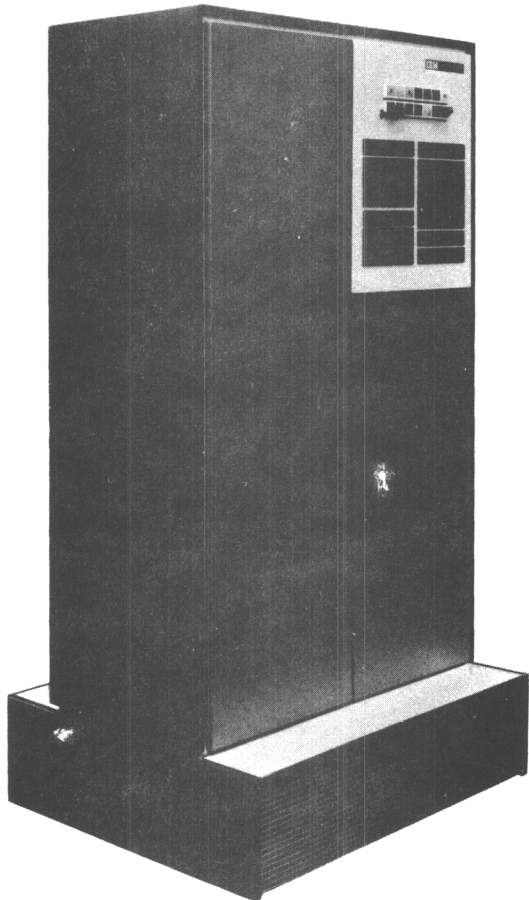


Notes

Height: 70"

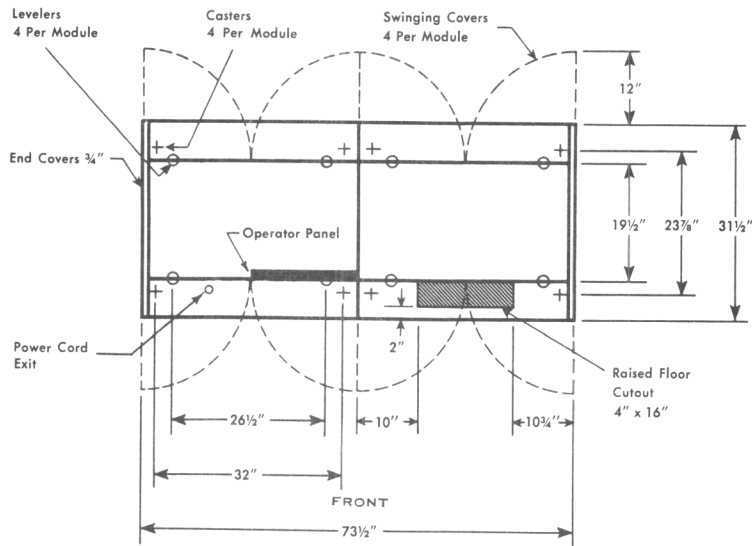
Service Clearances: 30" each side
42" front
36" rear

Similar units may be abutted.
Limit assemblies of units to 5 modules.



7640 HYPERTAPE CONTROL

Plan View

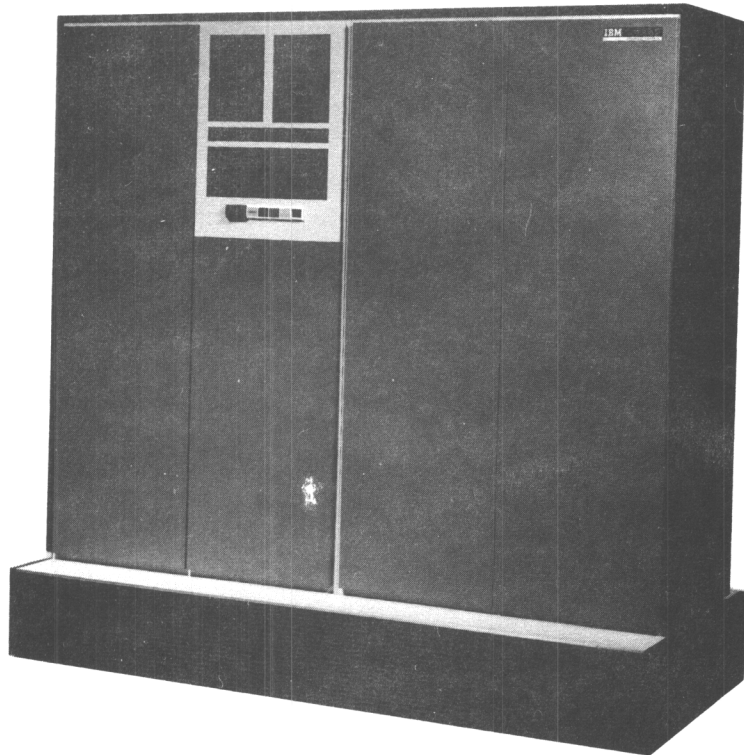


Notes

Height: 70"

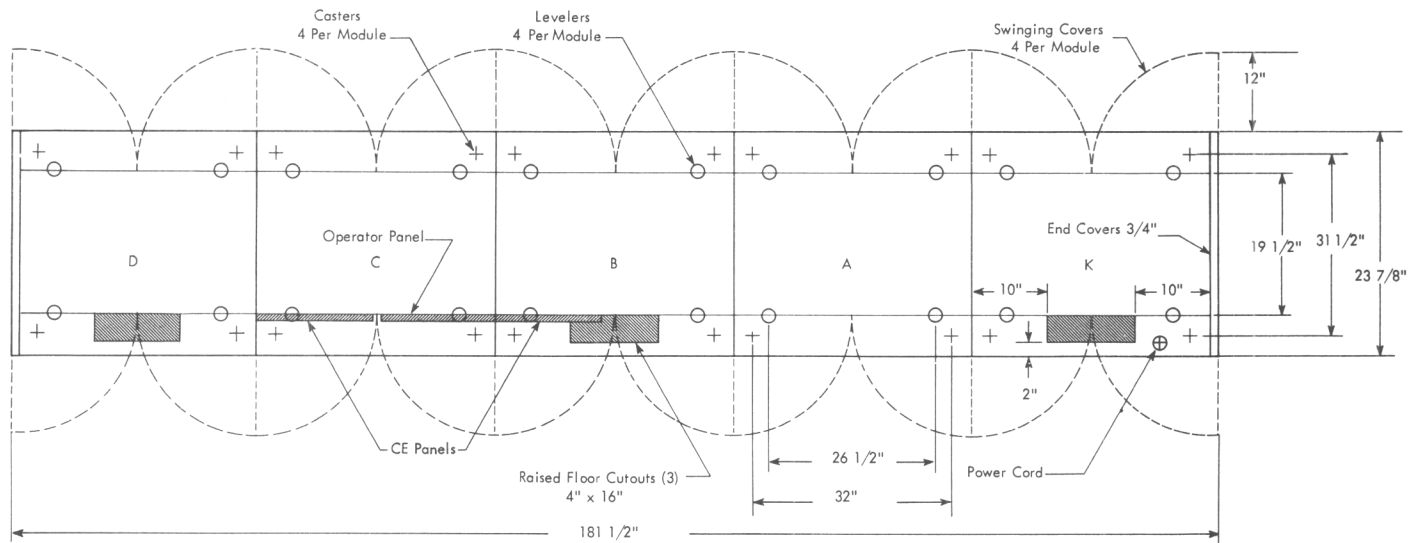
Service Clearances:
 42" Front
 36" Rear
 30" On Ends

May be abutted to other units of similar construction. Limit assemblies to 5 modules.



7750 PROGRAMMED TRANSMISSION CONTROL

Plan View

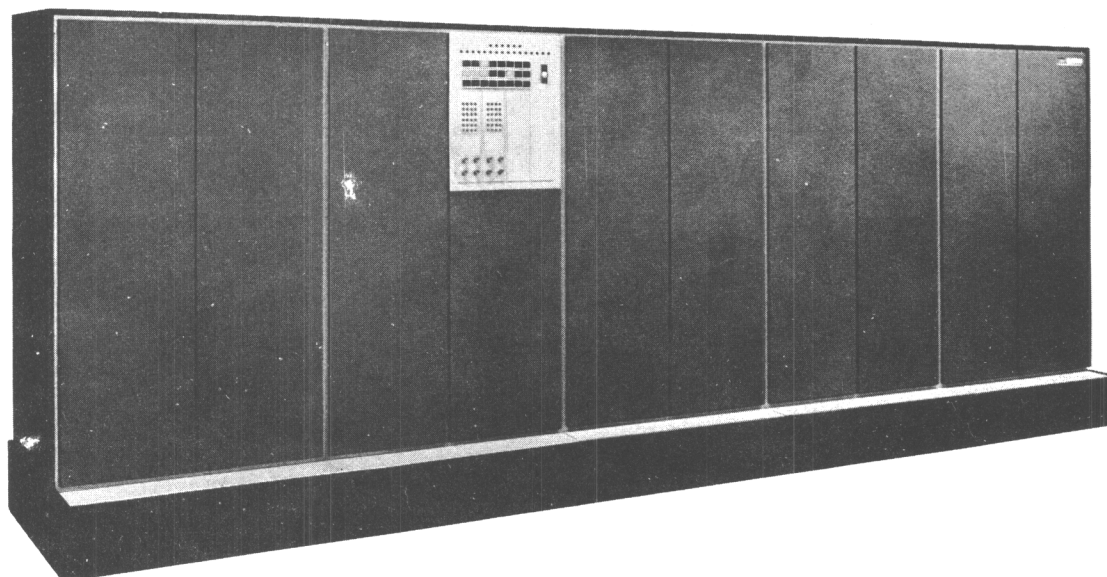


Notes

Height: 70"

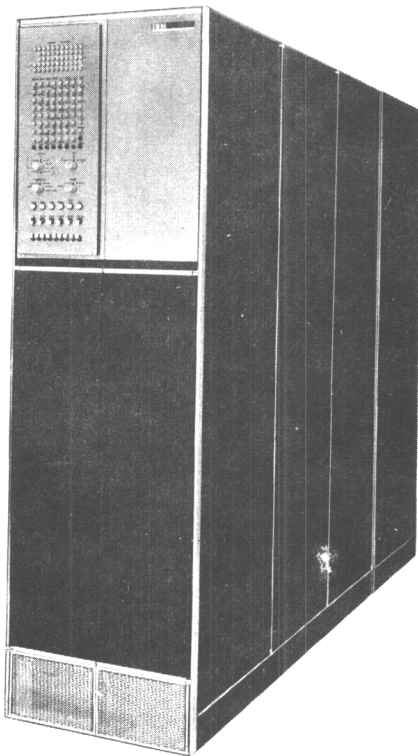
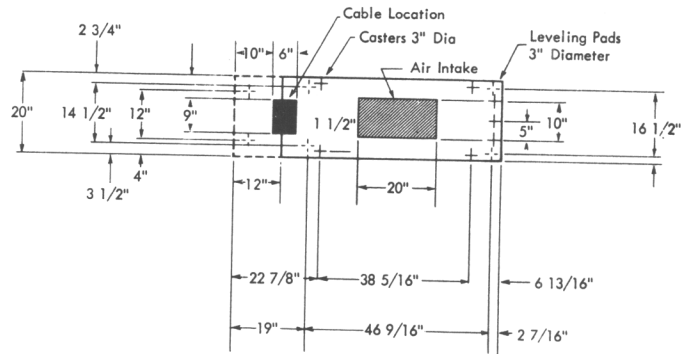
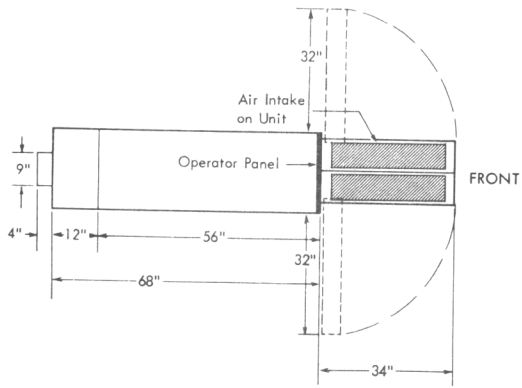
Service Clearances:

Front	Rear	Sides
42"	36"	30"



7907 DATA CHANNEL

Plan View



Notes

Height: 69"

Service Clearances:

30" Rear

60" Front

30" On exposed side

May be abutted to units of similar construction.



2
4
7



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2





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