CONTENTS

LIST OF ILLUSTRATIONS & TABLES

2.1 PREPARING CABLES FOR STAR-CONNECTED WORK STATIONS

2.1.1 Specification of Required Materials

Figure 2.1-1

General

Most cables required for connecting work stations to a computer must be prepared at the installation site. Figure 2.1-1 illustrates the different types of cables that may be required when work stations are star-connected to a computer.

PLEASE NOTE THE MAXIMUM LENGTHS INDICATED!

Two types of cables and six types of connectors are used, see following specifications.

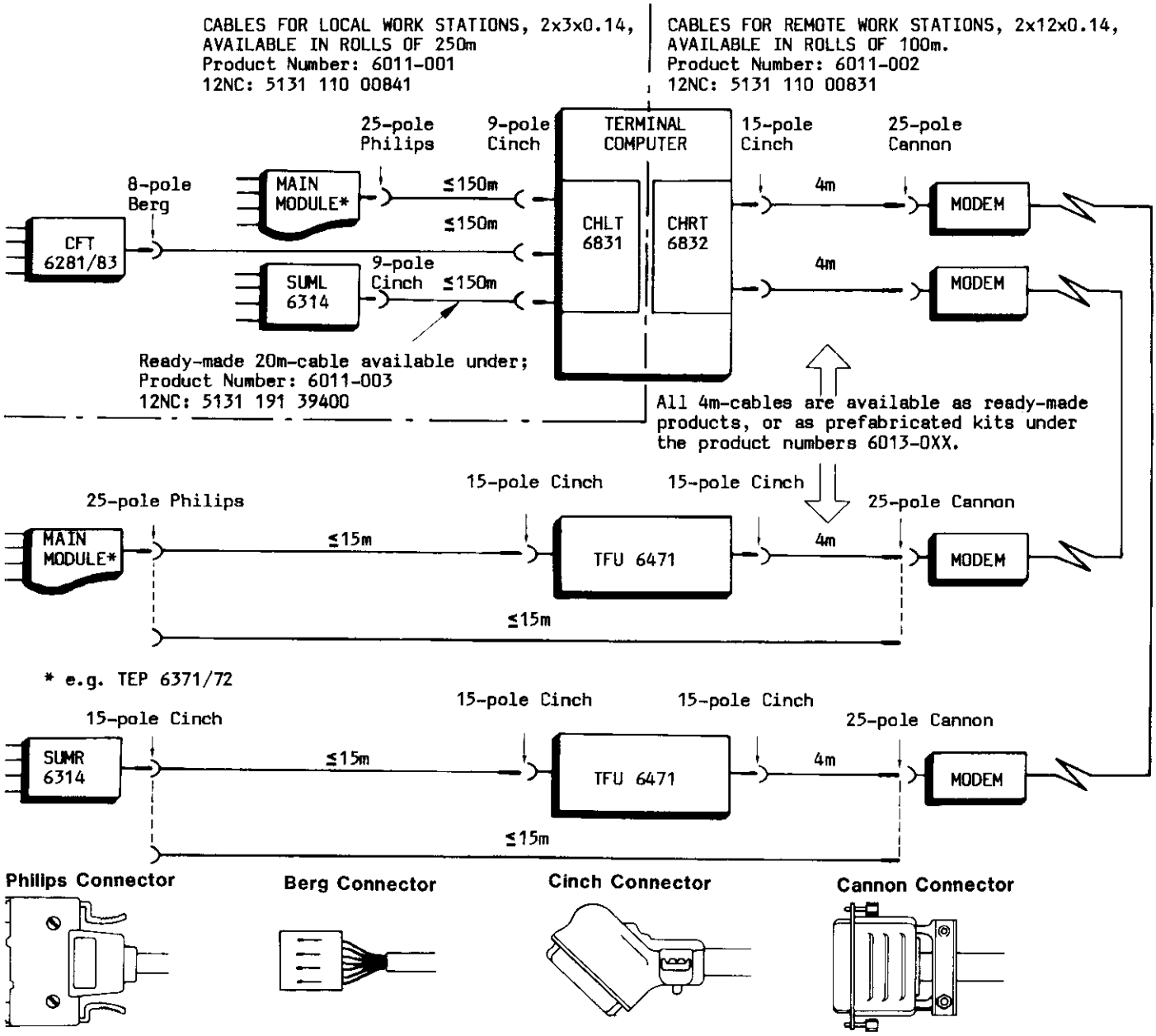


Figure 2.1-1 Cables for Star-Connected Work Stations

Cables for Local Work Stations

The cables for local work stations have 3 twisted pairs of conductors and are screened. Required specification and a typical manufacturer's (Kromberg & Schubert) part number is:

3 x 2 x 0.14 mm, grey, outside diameter 5.6 ± 0.4 mm
Kroshu type 37 080 30

Other cable to the same specification, and made by any other manufacturer, may be used instead.

Within Philips the cable is available in 6kg-rolls of 250 m under;

Product number: 6011-001
12NC: 5131 110 00841

Cables for Remote Work Stations

The cables for remote work stations have 12 twisted pairs of conductors and are screened.

Required specification and a typical manufacturer's (Kromberg & Schubert) part number is:

12 x 2 x 0.14 mm, grey, outside diameter 9.1 ± 0.4 mm
Kroshu type 37 081 20

Other cable to the same specification, and made by any other manufacturer, may be used instead.

Within Philips the cable is available in 8kg-rolls of 100 m under;

Product number: 6011-002
12NC: 5131 110 00831

9-pole Cinch Connector

All cable ends that are to connect to the CHLT, or to a SUML, must be fitted with 9-pole female connectors consisting of:

- Cinch Shell R43 81960 00 000
- Cannon Connector DEC 9S-FO
- Cannon Sockets 030-1953 00 000

Kits containing all parts required to mount 50 connectors (excluding cable markers) are available under;

Product number: 6012-004
12NC: 5131 191 44500

15-pole Cinch Connectors

All cable ends that are to connect to the CHRT, a TFU or a SUMR must be fitted with 15-pole male/female connectors (1 male and 3 female terminations). These connectors consist of:

- Cinch Shell R43 81962 00 000 (with cable entry bored out to 12 mm diameter)
- Cannon Connector DAC 15C-FO
- Cannon Sockets 030-1953 00 000 (female terminations)
- Cannon Pins 030-1952 00 000 (male terminations)

Kits containing all parts required to mount 50 connectors (excluding cable markers) are available under;

	Female type	Male type
Product number:	6012-002	6012-003
12NC:	5131 191 44300	5131 191 44400

25-pole Philips Connector

A cable end that is to connect to a TEP 6371 must be fitted with a 25-pole female connector, consisting of:

- Philips Shell
- Cannon Connector DBC 25S-FO
- Cannon Sockets 030-1953 00 000

Kits containing all parts required to mount 50 connectors (excluding cable markers) are available under;

Product number: 6012-006
12NC: 5131 191 91100

25-pole Cannon Connector

A cable end that is to connect to a modem must often (exceptions occur) be fitted with a 25-pole male connector, consisting of:

- Cannon Shell DB 24659
- Cannon Connector DBC 25P-FO
- Cannon Pins 030-1952 00 000
- Lock D 20419

Kits containing all parts required to mount 50 connectors (excluding cable markers) are available under;

Product number: 6012-001
12NC: 5131 191 44200

8-pole Berg Connector

A cable end that is to connect to a CFT 6281/83 must be fitted with an 8-pole female connector, consisting of:

- Berg Connector Block 65043-033
- Berg Sockets 47712
- Philips Connector Unit

Kits containing all parts required to mount 50 connectors (excluding cable markers) are available under;

Product number: 6012-001
12NC: 5131 194 30200

Ready-Made or Prefabricated Cables

The following cables are available as ready-made products, or as prefabricated kits:

- Ready-made 20m-cable for CHLT-SUML.
  Product number: 6011-003
  12NC: 5131 191 39400

- Ready-made 4m-cable for CHRT/SUMR/TFU - Modem ITT, GH 2054.
  Product number: 6013-011
  12NC: 5131 191 33710

- Prefabricated 4m-cable for CHRT/SUMR/TFU - any modem (modem end open).
  Product number: 6013-002
  12NC: 5131 191 89700

- Prefabricated 4m-cable for modem connection, both cable ends open.
  Product number: 6013-001
  12NC: 5131 191 41700

2.1.2 Routing and Labelling

Figure 2.1-2

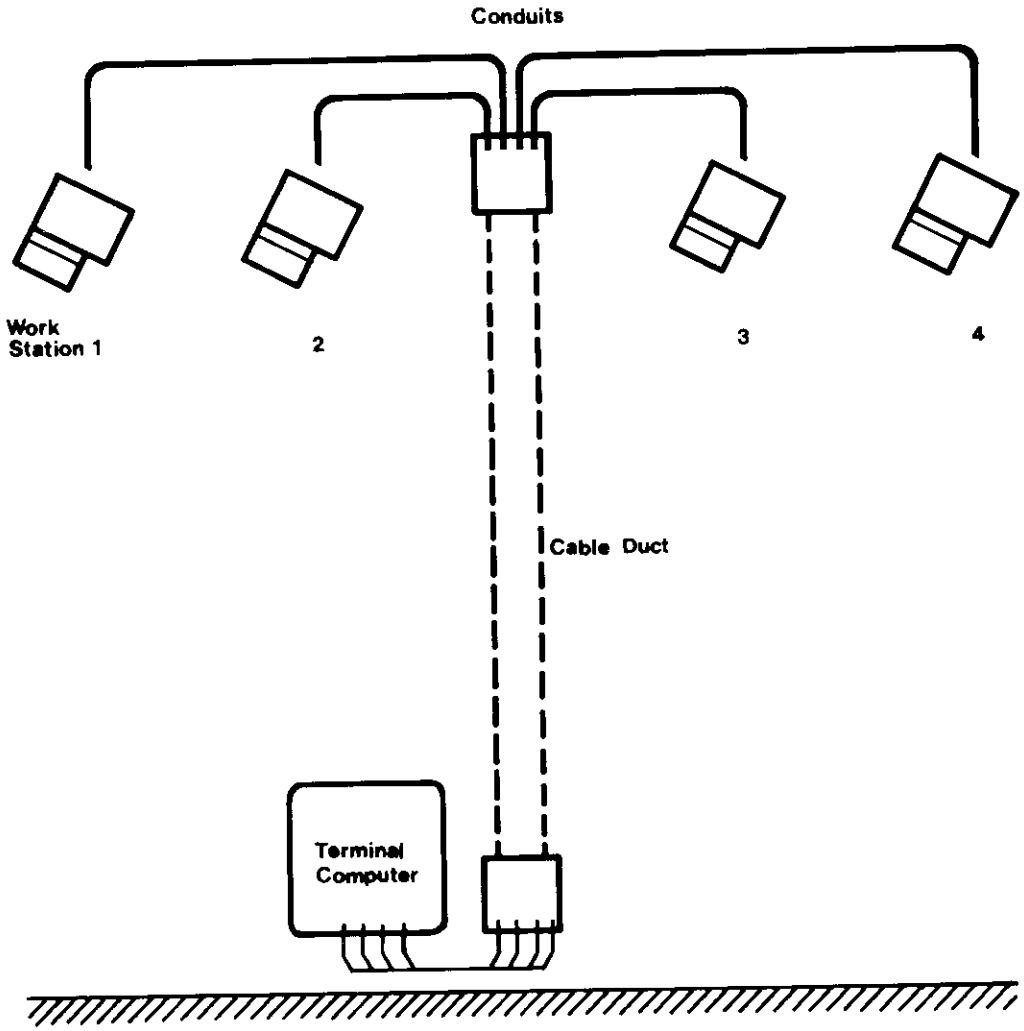
All cables longer than 4 m should be routed the shortest practical way between interconnecting units, but should be protected against mechanical damage by running them in ducts, where available, or in conduits (plastic or metal). The cable should emerge from this protection not more than 1 m from the unit it is to connect to at either end. This means that a combination of duct and conduit routing must sometimes be used.

If conduits are used, they must not be bent to a radius of less than 200 mm, and no more cables than can be easily accommodated, should be routed through each conduit. Note also that although normal mains cables and signal cables can be routed together through the same conduit, signal cables should not be closer than 30 mm to high voltage power cables, when parallel to them.

Crossing of high voltage cables is permitted, but the angle should be at approx. 90° to minimise interference effects.

Once the cables are laid in place, they should be cut to length, ensuring sufficient free cable to allow the units to be moved for service purposes.

All cables should be provided with a plain label at each end, and a cable drawing that illustrates the routing and fitted labels should be made up.



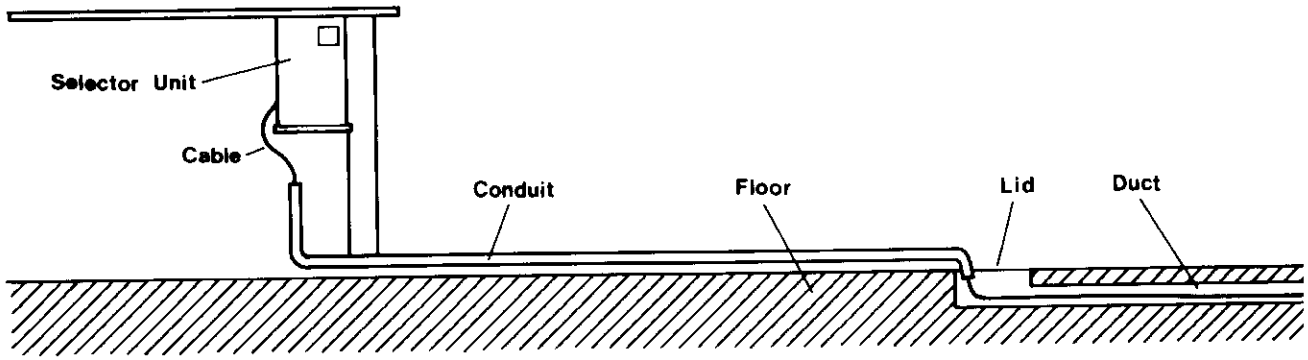


Figure 2.1-2 Examples of Cable Routing for Star-Connected Work Stations

2.1.3 Assembly Instructions

Special Tools Required

In addition to normal electricians tools, the following are required for mounting the connectors on the cables:

- Crimping tool for Cannon pins 030-1952-00-000 (AWG 20) and Cannon sockets 030-1953-00-000 (AWG 20), which can be either;
  MS-3193-1: Crimping tool plus Locator AWG 20 or,
  MS-3193-4 (MIL-T-22520) Crimping tools plus Turret (selectable wire dimensions).

  Such tools are manufactured by:

  a. Daniels Manufacturing Comp.
  b. Buchanan Electrical Products omp. Union
  c. Thomas & Bett

- Suitable insertion/removal tools such as Cannon CIET-20 MDB

- Equipment to heat shrink the tubings

- Crimping tool AMP 49935 (for AMP jointing sleeves, 34137)

- Crimping tool Berg 13921, for Berg connectors (CFT-cables)

Mounting Cinch Connectors Figure 2.1-3

- Cut the cable to its precise length (allowing for subsequent movement of equipment for servicing).

- Thread the cable marker(s), shrink tubing(s) and the connector shell onto the cable.

- Strip the cable end (A), apply the copper-foil tape (B), fold back the screen and secure with electro tape (C).

- For 15-pole connectors only; separate, cut and strip the return wires (see sub-section 2.1.4) and twist them together with the C-wire. Thread on and crimp the jointing sleeve and insulate with shrink tubing. Cut off wires not used at the end of the cable sheath (D), (see sub-section 2.1.4).

- Strip 4 mm of each wire end (including the C-wire in 15-pole connectors) and crimp on the sockets or the pins.

- Fit the sockets/pins into appropriate positions of the connector block according to sub-section 2.1.4.

- Fit the shell and shrink tubing(s), ensuring that there is good contact between the clamp and the cable screen (F, G).

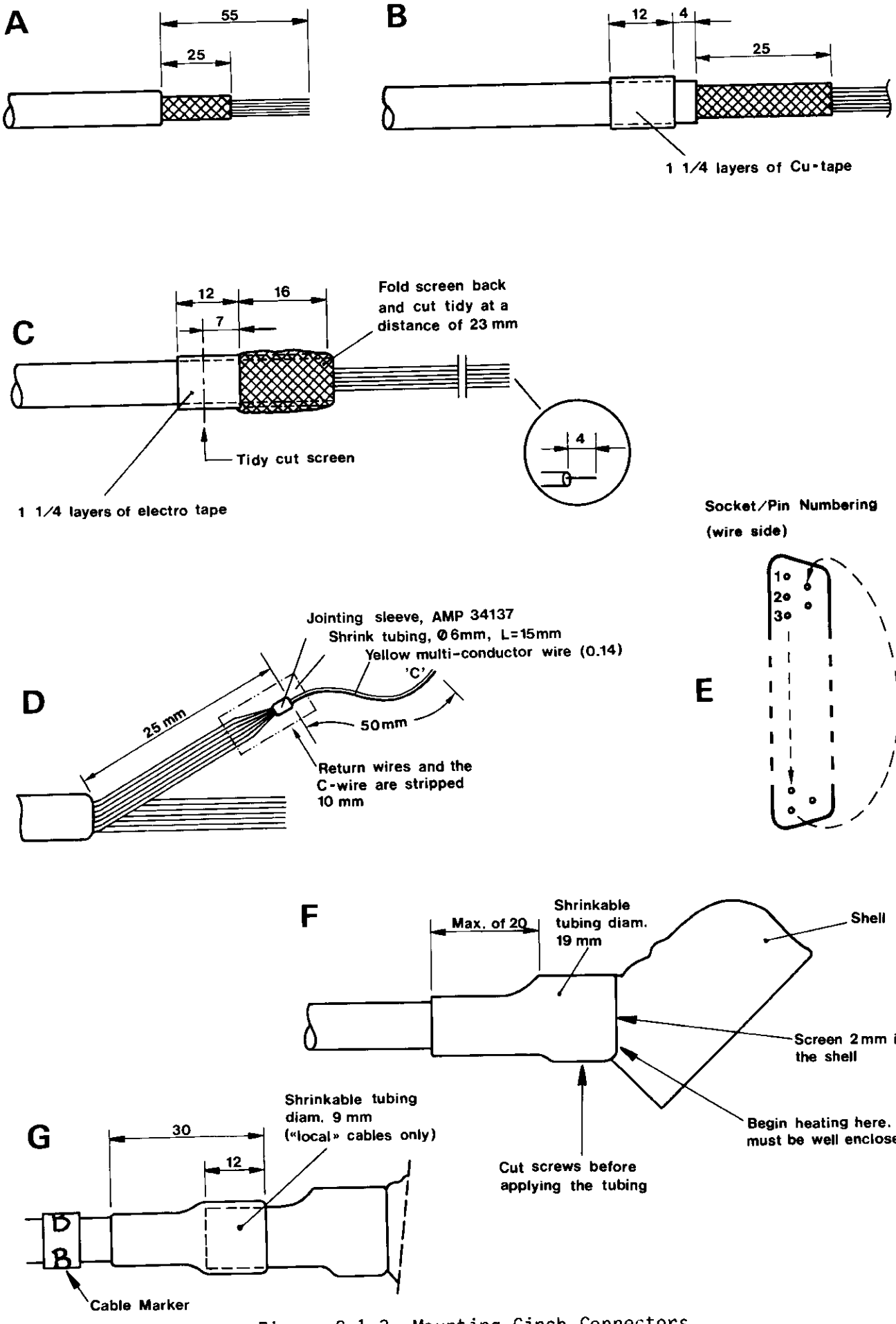


Figure 2.1-3 Mounting Cinch Connectors

Mounting Philips Connectors Figure 2.1-4

- Cut the cable to its precise length (allowing for subsequent movement of equipment for servicing).
- Thread the cable marker(s) and metal tubing D onto the cable (the wide tubing for 12-pair 'remote' cables, and the narrow tubing for 3-pair 'local' cables).
- Cut and remove 55 mm of the cable sheath. Adjust the metal tubing to be in line with the edge of the remaining cable sheath.
- Fold the screen back over the tubing, and cut it tidy at the rear edge of the tubing.
- For 12-pair 'remote' cables only; cut and strip the return wires (see sub-section 2.1.4) and twist them together with the C-wire. Thread on and crimp the jointing sleeve and insulate with shrink tubing. Cut off wires not used at the end of the cable sheath (see sub-section 2.1.4).
- Strip 4 mm of each wire end (including the C-wire in 12-pair cables) and crimp on the sockets. Thread the wires through connector support E and fit the sockets into appropriate positions of the connector block according to sub-section 2.1.4.
- Assemble connector block F, support E and springs G together with the base of the shell (H).
- Fix the cable to the base of the shell by screwing the two clamps (I) over the screen and the metal tubing (wide clamp groove against 12-pair 'remote' cables and narrow groove against 3-pair 'local' cables).
- Arrange a neat wire package behind the connector block, assemble the locking arms (J) with springs (K) and screw on the top of the shell (L).

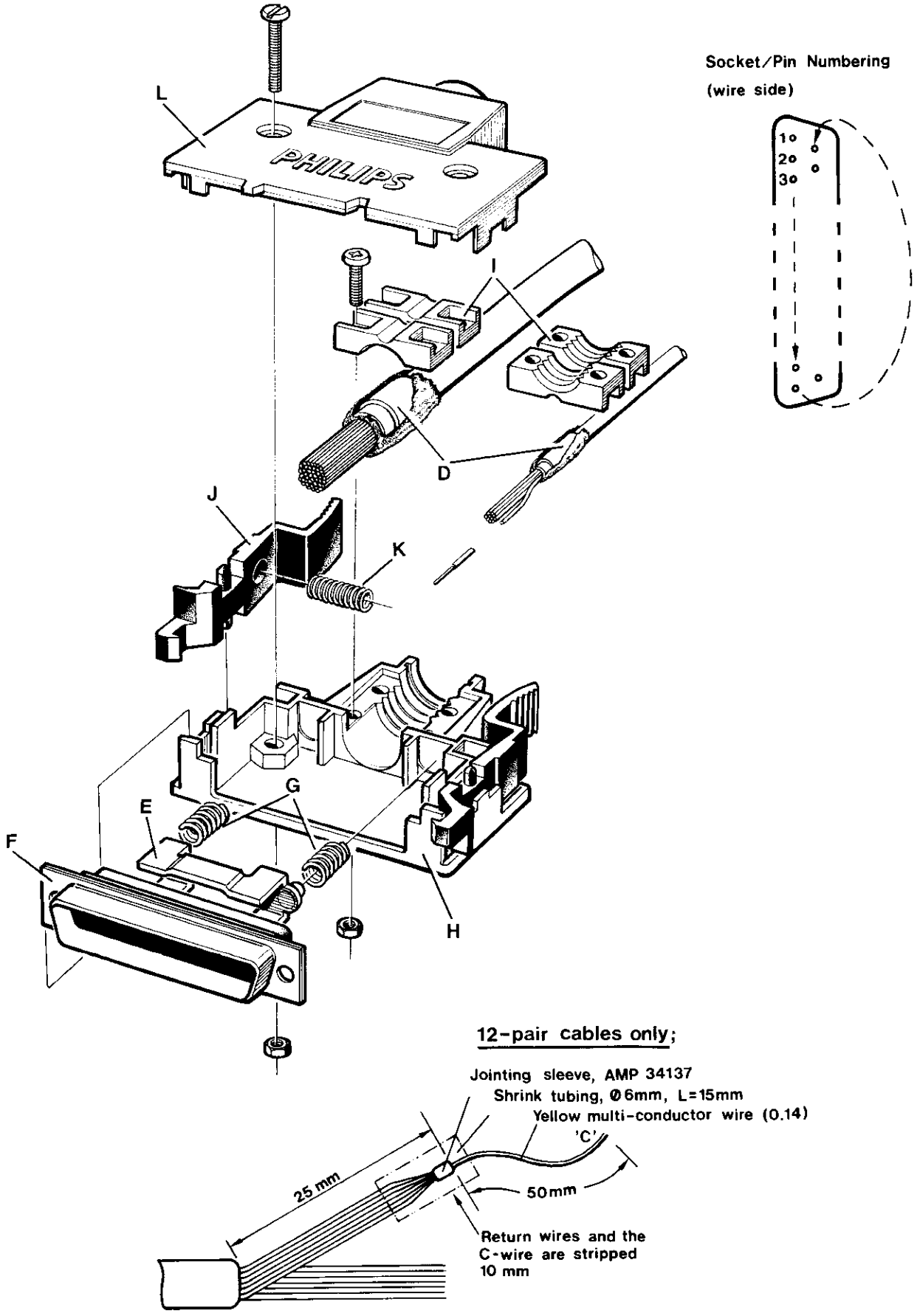
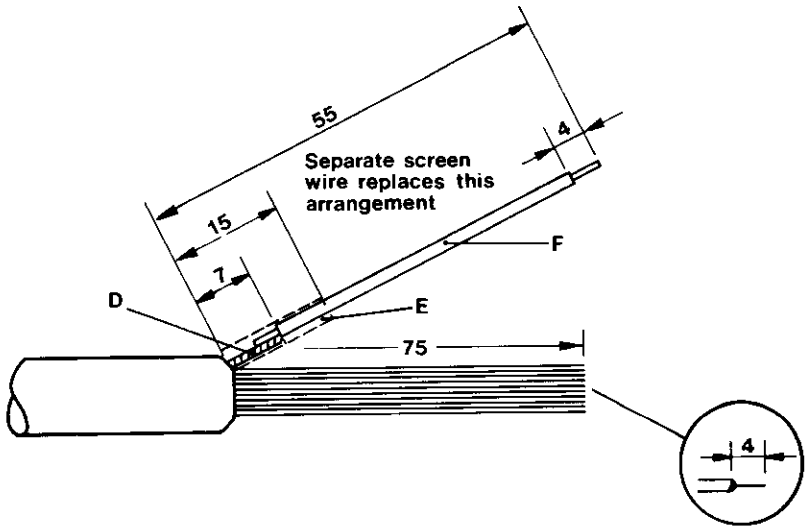


Figure 2.1-4 Mounting Philips Connectors

Mounting Cannon Connectors Figure 2.1-5

- Cut the cable to its precise length (allowing for subsequent movement of equipment for servicing).
- Thread cable marker(s), shrink tubing and connector shell on to the cable.
- Strip the cable end.
- For cables without separate screen wire; split the screen and twist it into a "wire" (D), solder the F-wire to the twisted part and insulate with PVC tubing (E).
- For cables with separate screen wire; cut the screen at the end of the cable sheath and cut the screen wire to a length of 55 mm, insulate with PVC tubing (diameter: 2.5 mm, length: 45 mm).
- Separate, cut and strip the return wires (see sub-section 2.1.4) and twist them together with the C-wire. Thread on and crimp the jointing sleeve and insulate with shrink tubing.
- Cut off wires not used at the end of the cable sheath (see sub-section 2.1.4).
- Strip 4 mm of remaining wires (including the C-wire and any F-wire) and crimp on Cannon pins.
- Fit the pins into appropriate positions of the connector block according to sub-section 2.1.4.
- Apply the shrink tubing and mount the shell.



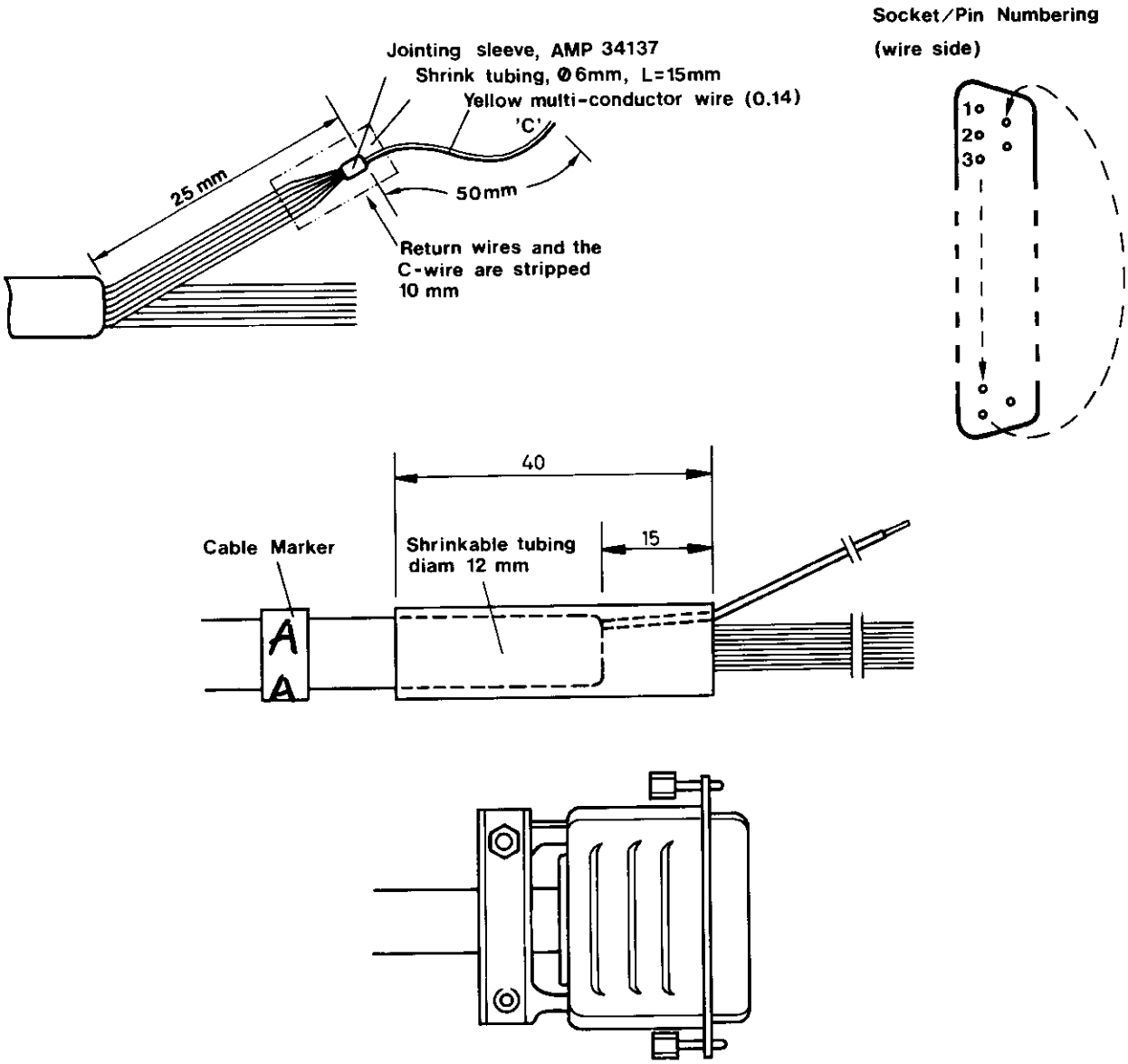
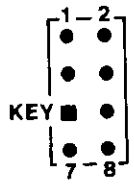


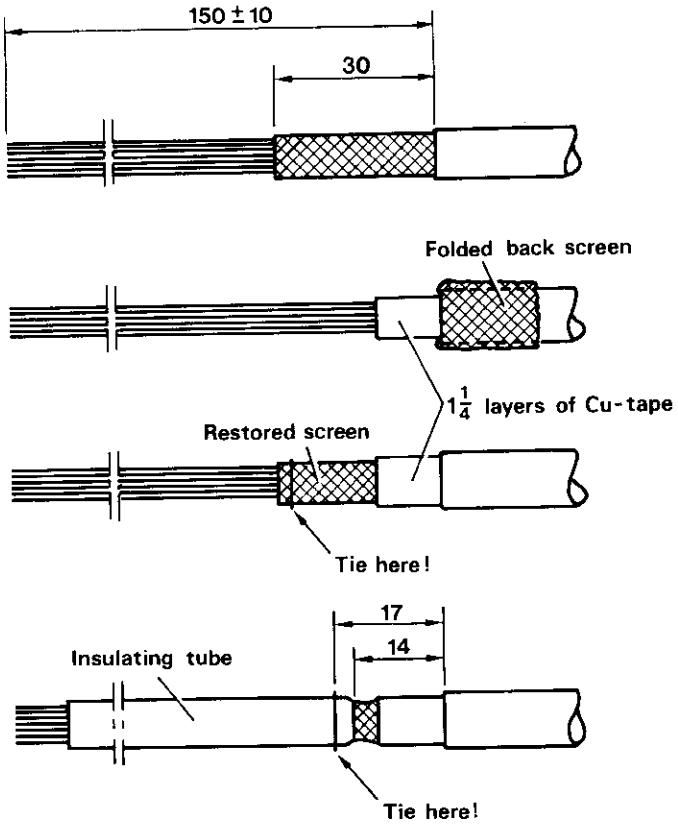
Figure 2.1-5 Mounting Cannon Connectors

Mounting Berg Connectors Figure 2.1-6

- Cut the cable to its precise length (allowing for subsequent movement of equipment for servicing).
- Thread on cable marker(s) and strip the cable end according to top figure.
- Fold screen back over the sheath and apply 1 1/4 layers of Cu-tape around the wires, close to the sheath.
- Restore the screen and apply another 1 1/4 layers of Cu-tape, now around the screen over the previous layers.
- Tie the fore part of the screen, thread on the insulating tube and tie it at the rear end.
- Strip 4 mm of the wire ends and crimp on the sockets.
- Fit the sockets into appropriate positions of the connector block according to sub-section 2.1.4.
- Mount the connector unit, ensuring that there is a good contact between the bare Cu-tape and the lower clamp.

Socket seen from wire side





PHILIPS CONNECTOR UNIT

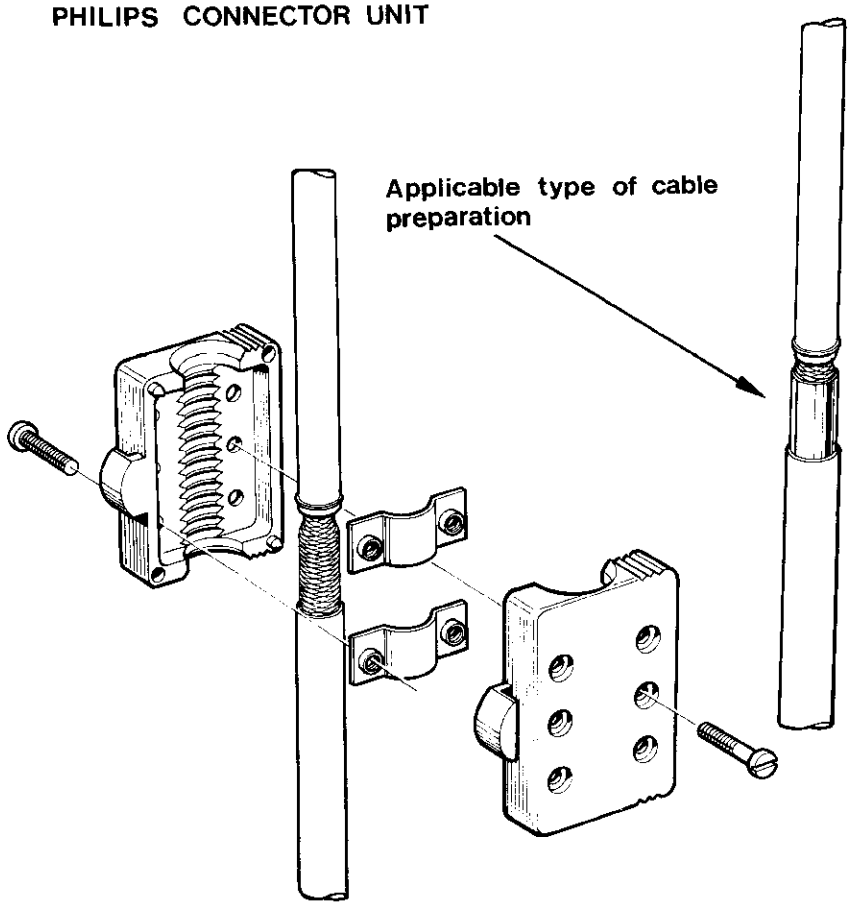


Figure 2.1-6 Mounting Berg Connectors

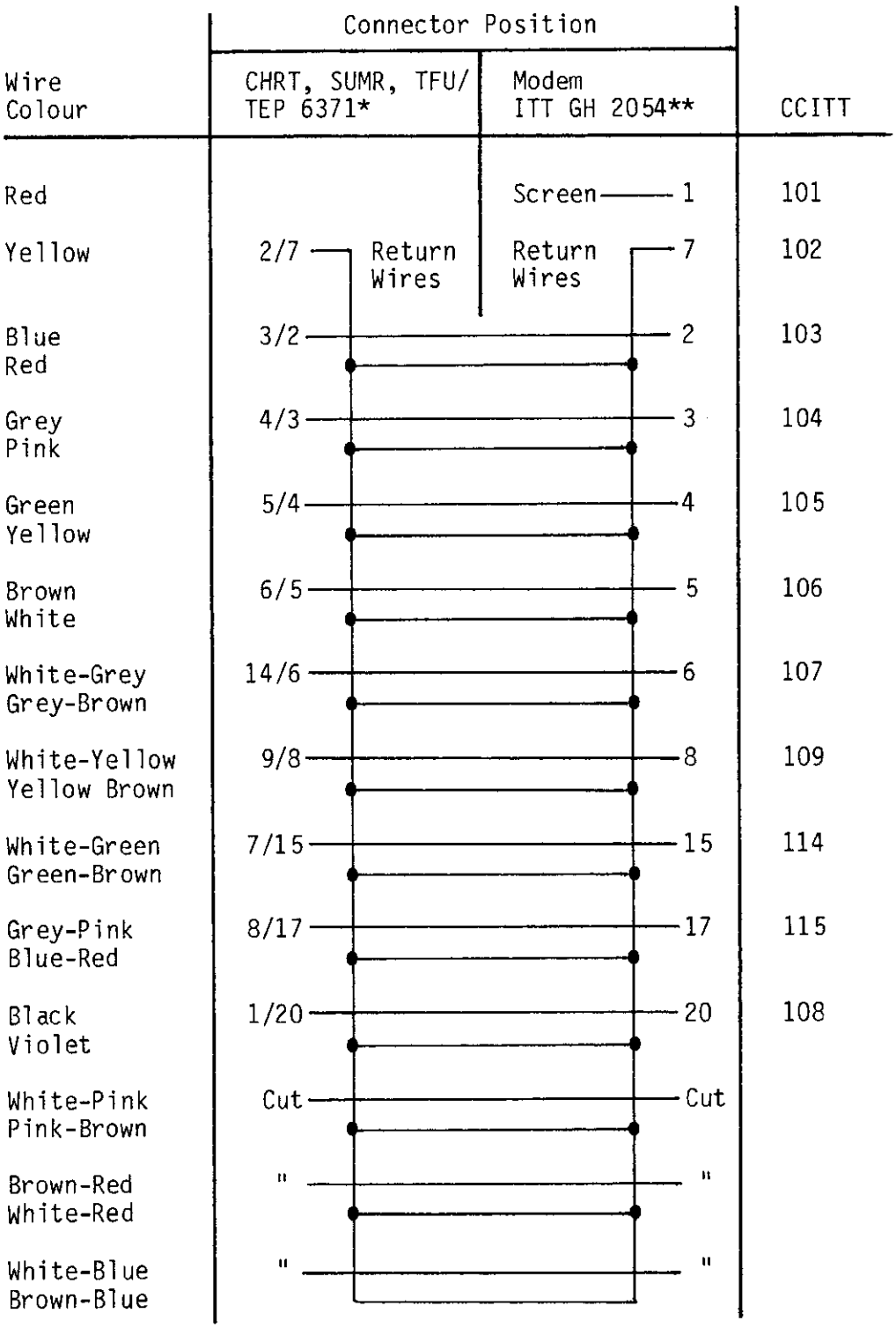
2.1.4 Interconnection Diagrams

Local Work Station Cables

Wire Colour	Connector Position: CHLT	Connector Position: SUML, Main Module/CFT 6281,6283*	Signal
Grey	1	1/1	Data in to TC
Pink	2	2/2	" " " "
Green	3	3/3	Data out from TC
Yellow	4	4/4	" " " "
Brown	5	5/7	Clock from TC
White	9	9/6	" " "

* First position number applicable for connectors that terminate at SUML or Main Module (e.g. TEP 6371/72). Second number applicable for terminations at CFT 6281 or CFT 6283.

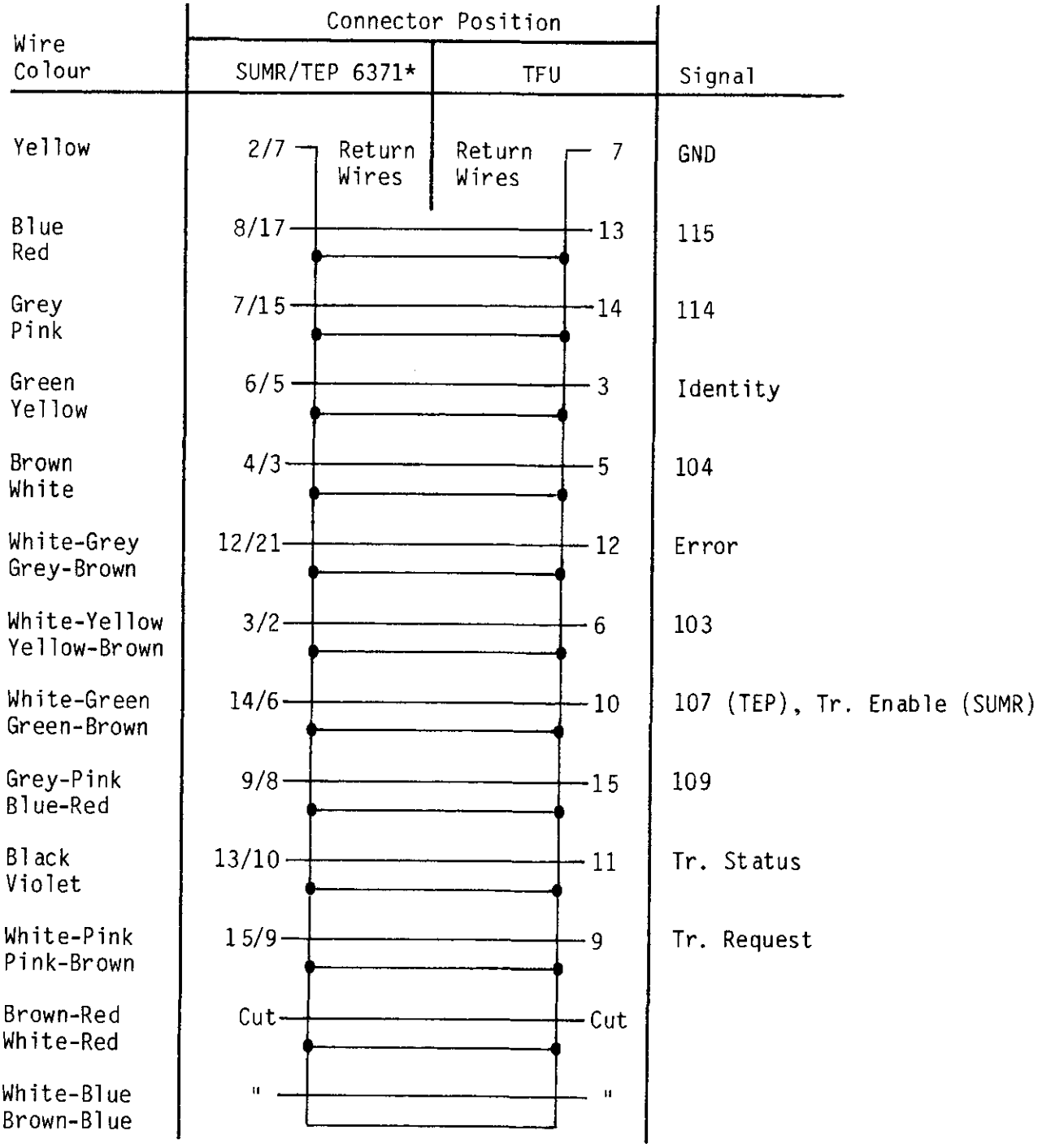
Modem Cables for Remote Work Stations



* First position number applicable for connectors that terminate at CHRT, SUMR or TFU. Second number applicable for TEP 6371 terminations.

** The pin numbers given for "Modem" are applicable for ITT GH 2054. If other modem is used; check the relation between pin numbers and "CCITT" numbers (connect against "CCITT" numbers)!

Cables Between Remote Work Stations and TFU



* First position number applicable for connector that terminates at SUMR, second number applicable for TEP 6371 termination.

2.2 PREPARING CABLES FOR MULTIDROP-CONNECTED WORK STATIONS

2.2.1 Basic Materials Required

Figure 2.2-1

General

Figure 2.2-1 illustrates the cabling necessary when work stations are multidrop-connected to a computer. The head line of a local network must always be prepared at the installation site, whilst the drop cables are available as ready-made accessories or prefabricated kits. This subsection defines the basic materials required for the interconnections shown in the figure.

> NOTE THE RELATION BETWEEN THE NUMBER OF WORK STATIONS AND THE MAXIMUM LENGTH OF LOCAL HEAD LINE!

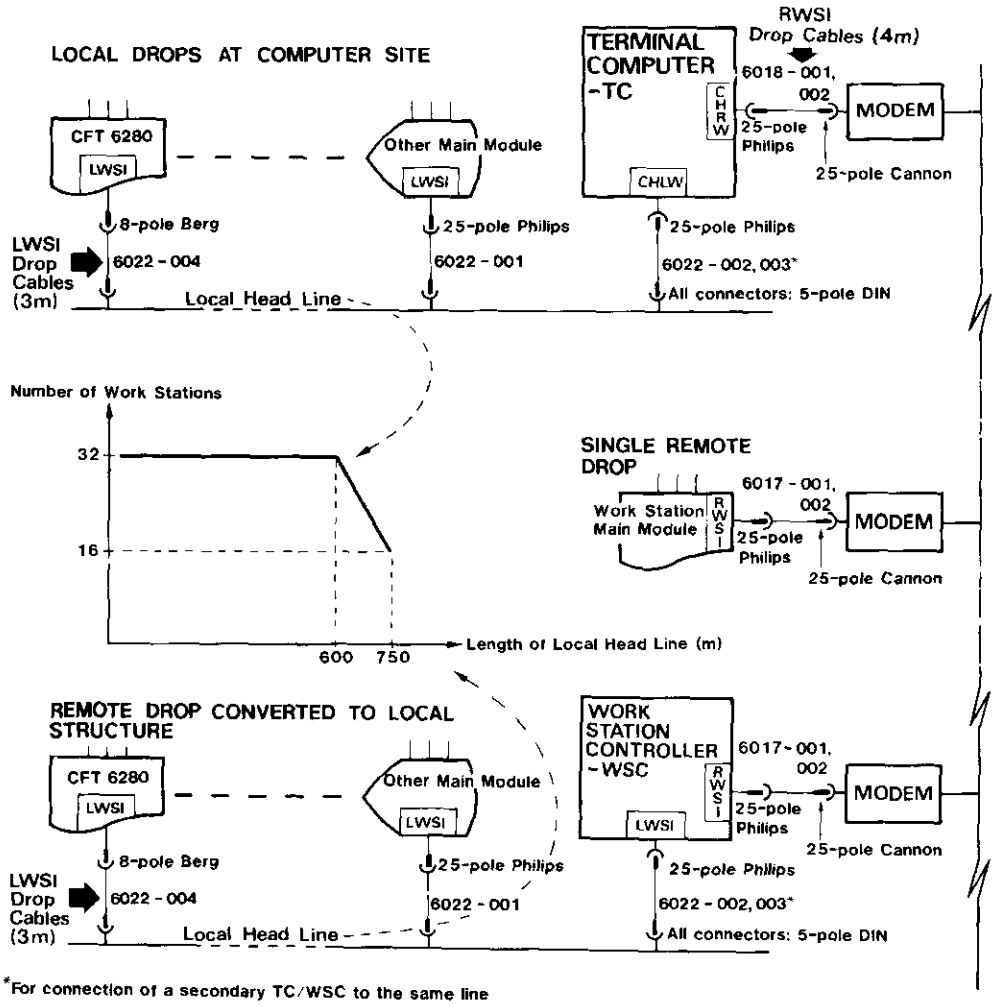


Figure 2.2-1 Cables for a typical Multidrop Configuration

Cable for Local Head Line

The head line of a local network is made up from the same cable type as the local star lines, see subsection 2.1.1 - Cables for Local Work Stations.

Connection Boxes

Figure 2.2-2

Each drop on a local head line is made via a connection box that allows the connection of one work station via a 3m drop cable. Kits containing all parts required to mount 50 connection boxes are available under;

Product number; 6021-001
12NC:

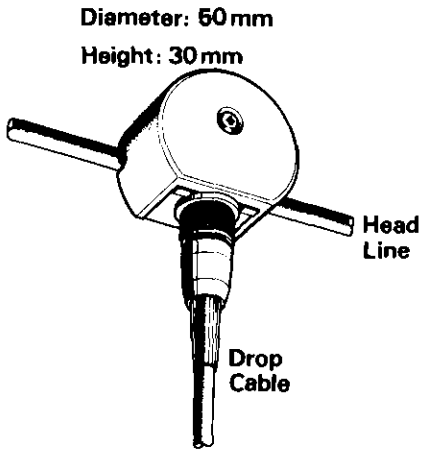


Figure 2.2-2 Connection Box

Terminating Resistors

Both ends of a local head line must be provided with two terminating resistors (even if the computer is connected to one of the ends). The resistor values depend on the number of connected work stations (via 3 m drop cables):

- 1-8 work stations = 270 ohm
- 9-32 work stations = 390 ohm

Ready-Made LWSI Drop Cables

The following 3m-cables are available as ready-made accessories for connecting computers and work stations to the head line of a local network:

- Cable to primary computer's interface, CHLW 6895
  Product number: 6022-002
  12NC: 5131 194 16900

- Cable to secondary computer's interface, CHLW 6895 (used for computer-to-computer communications)
  Product number: 6022-003
  12NC: 5131 194 38100

- Cable to the LWSI of a work station's main module (e.g. TEP 6371/72, GTP 6374, VDU 6347, MDA 6411)
  Product number: 6022-001
  12NC: 5131 194 16700

- Cable to the LWSI of a CFT 6280
  Product number: 6022-004
  12NC:

Ready-Made or Prefabricated RWSI Drop Cables

The following 4m-cables are available as ready-made accessories, or as prefabricated kits, for connecting computers and work stations to a remote line via modems:

- Prefabricated cable kit for connecting terminal computer (CHRW 6896) or work station controller to modem, modem end open.
  Product number: 6018-001
  12NC:

- Ready-made cable for connecting terminal computer (CHRW 6896) or work station controller to modem according to ECMA V23/V26.
  Product number: 6018-002
  12NC:

- Prefabricated cable kit for connecting a work station main module to modem, modem end open.
  Product number: 6017-001
  12NC:

- Ready-made cable for connecting a work station main module to a modem according to ECMA V23/V26.
  Product number: 6017-002
  12NC:

2.2.2 Detailed Specification of Drop Cable Materials

General

Although it is recommended to use ready-made or prefabricated drop cables, there may be circumstances that forces the installation engineer to make his own drop cables. This subsection therefore gives a detailed specification of the materials required for making such cables. However, keep in mind that:

> LOCAL DROP CABLES SHOULD NOT BE LONGER THAN 3 M, AND REMOTE DROP CABLES MUST NOT BE LONGER THAN 15 M, OTHERWISE THE SYSTEM'S PERFORMANCE WILL BE AFFECTED!

Cable for Local Drops

Local drop cables are made up from the same cable type as local star lines, see sub-section 2.1.1 - Cables for Local Work Stations.

Cable for Remote Drops

Remote drop cables are made up from the same cable type as remote star lines, see sub-section 2.1.1 - Cables for Remote Work Stations.

5-pole DIN Plug

All local drop cables are fitted with a 5-pole DIN plug at the end that matches the connection boxes of the local head line.

Kits containing all parts required to mount 50 plugs are available under;

Product number: 6012-008
12NC:

25-pole Philips Connectors

All drop cables, except for 6022-004 to CFT 6280, are fitted with Philips connectors at the end opposite to the local head line or the modem. Female connectors are used against work station main modules, male connectors against terminal computers and work station controllers.

Kits containing all parts required to mount 50 connectors are available under;

	Female type	Male type
Product number:	6012-006	6012-005
12NC:	5131 191 91100	5131 191 91000

8-pole Berg & 25-pole Cannon Connectors

A local drop cable for the CFT 6280 is fitted with an 8-pole female connector of type Berg at the device end, and remote drop cables are usually fitted with a 25-pole male connector of type Cannon at the modem end. Kits for mounting such connectors are defined in subsection 2.1.1.

2.2.3 Routing

Head Line

The head line of a local network should be routed the shortest practical way between the drop points (connection boxes), but should be protected against mechanical damage by running it in ducts, where available, or in conduits (plastic or metal). The line should emerge from this protection not more than 1 m from each connection box.

When routing the line in conduits built into the walls, it should be noted that the exits to connection boxes must easily accomodate two cables, one incoming to the box and one outgoing to the next box (see construction of connection box in Figure 2.2-3).

The head line is allowed to be routed in the same conduit as normal mains cables, and in parallel with high voltage power cables, only if they are not closer to each other than 30mm . Crossing of high voltage cables is permitted, but should be at approximately 90° to minimise interference effects.

> WHEN ROUTING THE CABLE BEFORE FITTING CONNECTION BOXES - MAKE SURE THAT A SUFFICIENT CABLE LOOP IS LEFT AT EACH DROP POINT!

Drop Cables

Local drop cables of 3 m-lengths are usually installed without any special protection against mechanical damage, i.e. these cables are usually not routed in conduits or similar aids. However, special circumstances that require such protections may be at hand, and in such cases you should pay the same attention to interference considerations as for the head line.

Remote drop cables, that are allowed to reach a length of 15 m, will more likely require some kind of protection, and the same interference considerations should be taken into account even here.

2.2.4 Assembly Instructions

Special Tools Required

For covering the full assembly work, including also the production of drop cables, you will need the tools defined in subsection 2.1.3.

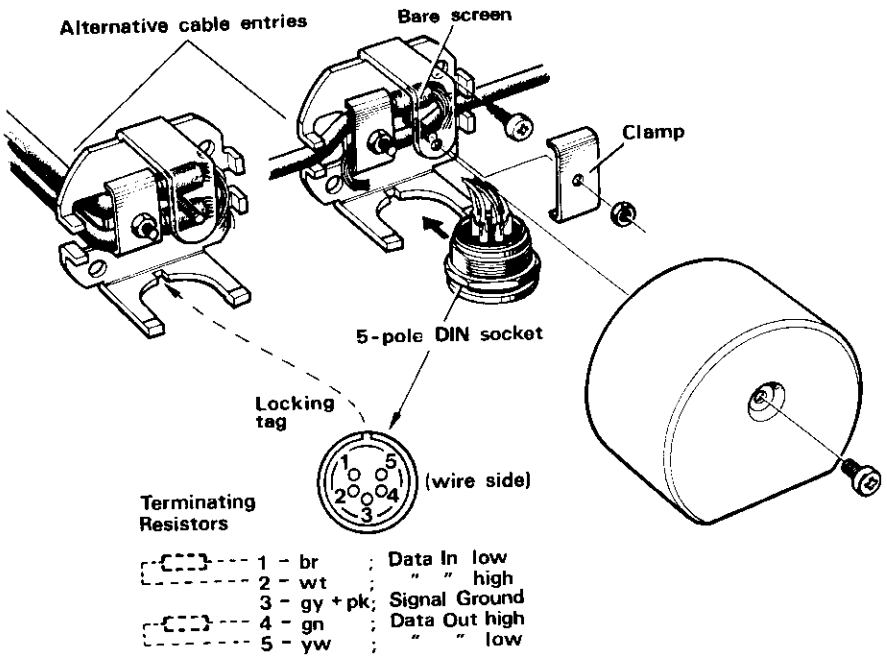
Mounting Connection Boxes on Local Head Lines Figure 2.2-3

- Screw the base plate of the connection box onto the applicable surface, properly positioned to match the cable routing.
- Cut the cable and hold both ends in clamped positions according to the applicable alternative in Figure 2.2-3. Cut each end so that 50 mm remains after the second clamp.
- Strip the cable end, apply electro tape to level the cable sheath and fold back the screen. Cut the screen tidy to a length of 17 mm.
- Strip wire ends and rejoin the two cable ends by soldering the wires together in the DIN socket positions shown in Figure 2.2-3.
- Ensure that the locking tag of the DIN socket fits into the slot of the base plate, and screw the socket firmly to the plate.
- Fix the cables to the base plate by screwing on the two clamps. Ensure that no strands from screen or wires are able to cause short-curcuits.
- If the cable is routed on the surface; remove the two prepunched flaps from the cover to open the cable entries.
- Screw on the cover to the base plate.

NOTE

TERMINATING RESISTORS (VALUES ACCORDING TO SUBSECTION 2.2.1) MUST BE FITTED IN THE CONNECTION BOXES AT EACH END OF THE LINE. THE RESISTORS ARE SOLDERED IN BETWEEN THE SOCKET POSITIONS 1 AND 2, AND BETWEEN THE POSITIONS 4 AND 5.

Connection Box



Cable Preparation

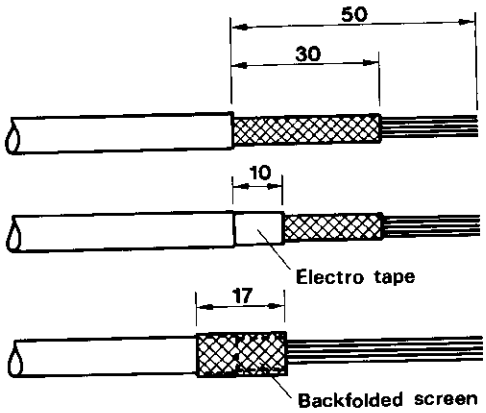


Figure 2.2-3 - Mounting Connection Boxes

Mounting DIN Plugs on Local Drop Cables Figure 2.2-4

- Thread connector parts A, B, C and D onto cable as shown in figure.
- Prepare cable end and strip wire ends.
- Loosen pin holder (F) and solder wires into appropriate plug positions.
- Fix cable in clamp holder (E), reassemble with pin holder (F) and push ground casing (C) onto the assembled holders.
- Solder screen wire to the ground casing (C) as shown in figure.
- Assemble complete plug by screwing the end piece (A) onto the clamp holder (E).

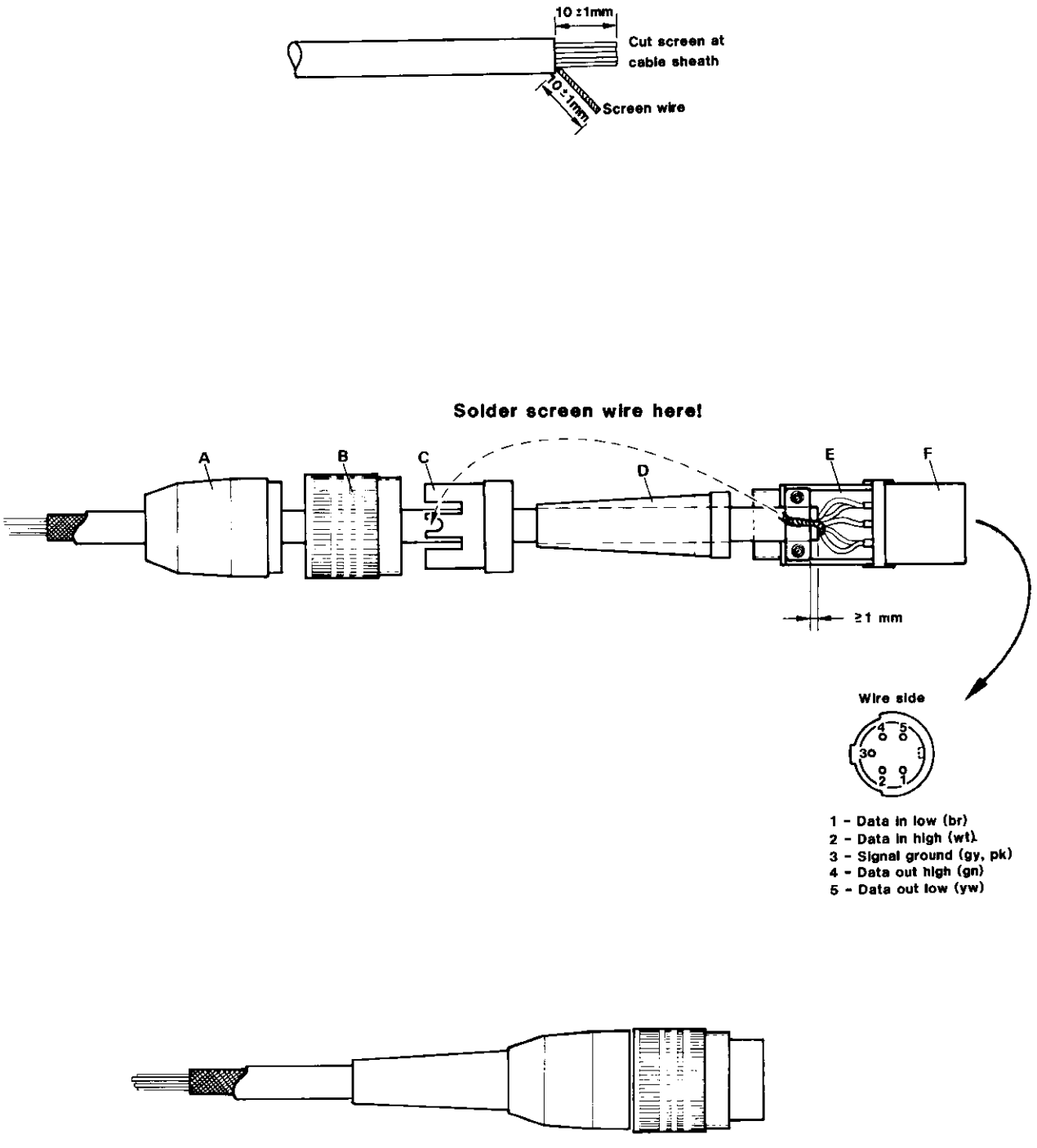


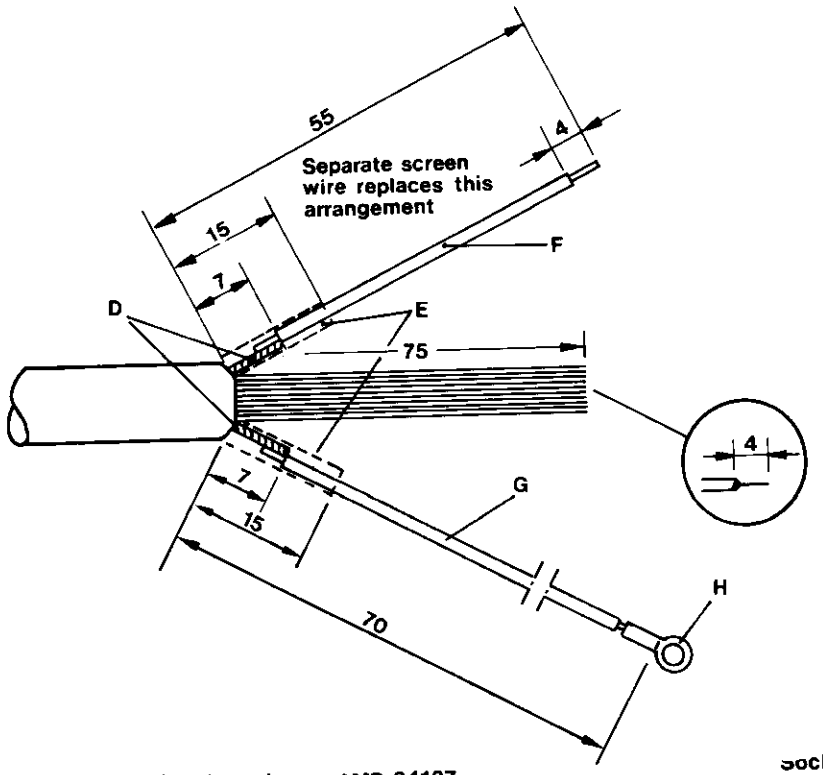
Figure 2.2-4 Mounting Din Plugs

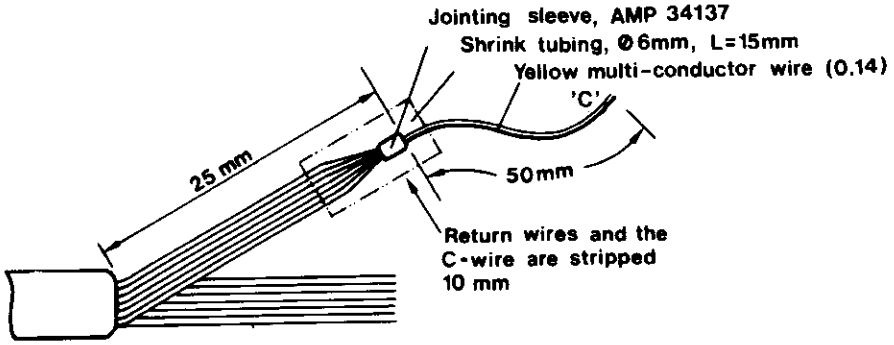
Mounting Cannon Connectors Figure 2.2-5

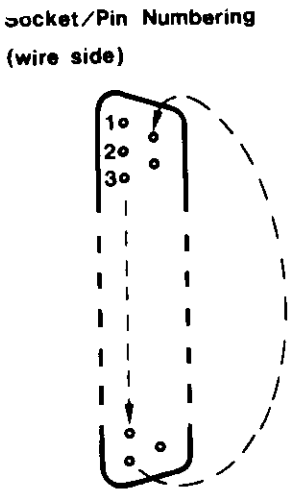
- Thread shrink tubing and connector shell on to the cable, strip the cable end.
- For cables without separate screen wire; split the screen and twist it into two "wires" (D), solder the F- and G-wires to the twisted parts and insulate with PVC tubing (E).
- For cables with separate screen wire; cut the screen wire to a length of 55 mm, insulate with PVC tubing (diameter: 2.5 mm, length: 45 mm). Split the screen and twist it into one "wire" (D). Solder the G-wire to the twisted part and insulate with PVC tubing (E).
- Separate, cut and strip the return wires (see subsection 2.2.5) and twist them together with the C-wire. Thread on and crimp the jointing sleeve and insulate with shrink tubing.
- Strip 4 mm of wire ends (including the C-wire and any F-wire) and crimp on Cannon pins.
- Fit the pins into appropriate positions of the connector block according to subsection 2.2.5.
- Strip the G-wire and crimp on the screw terminal (H).
- Apply the shrink tubing and mount the shell, ensuring that the screw terminal is firmly fastened to the rear part of the shell.

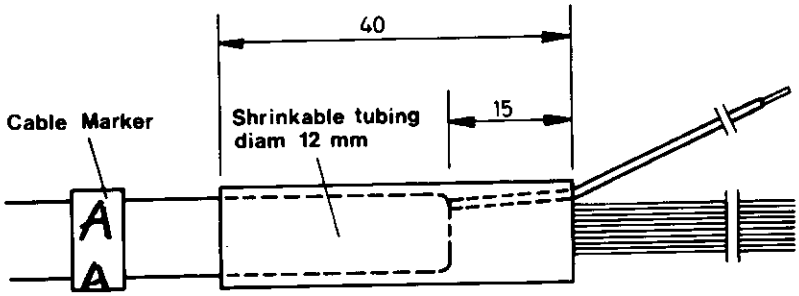
Mounting other Connectors

Other drop cable connectors (Philips and Berg) are mounted according to the technique described in subsection 2.1.3, however, now consulting the Interconnection Diagrams in subsection 2.2.5.









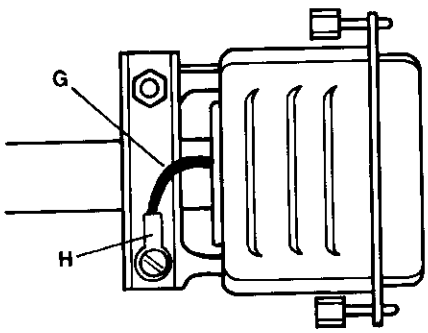


Figure 2.2-5 Mounting Cannon Connectors

2.2.5 Interconnection Diagrams

Local Drop Cables 6022-001/002

Wire Colour	Connector Position DIN	Connector Position Philips	Signal
Grey	3	7	Signal Ground
Pink	3	7	Signal Ground
Green	4	3	Data Out-high
Yellow	5	5	Data Out-low
Brown	1	4	Data In-low
White	2	2	Data In-high

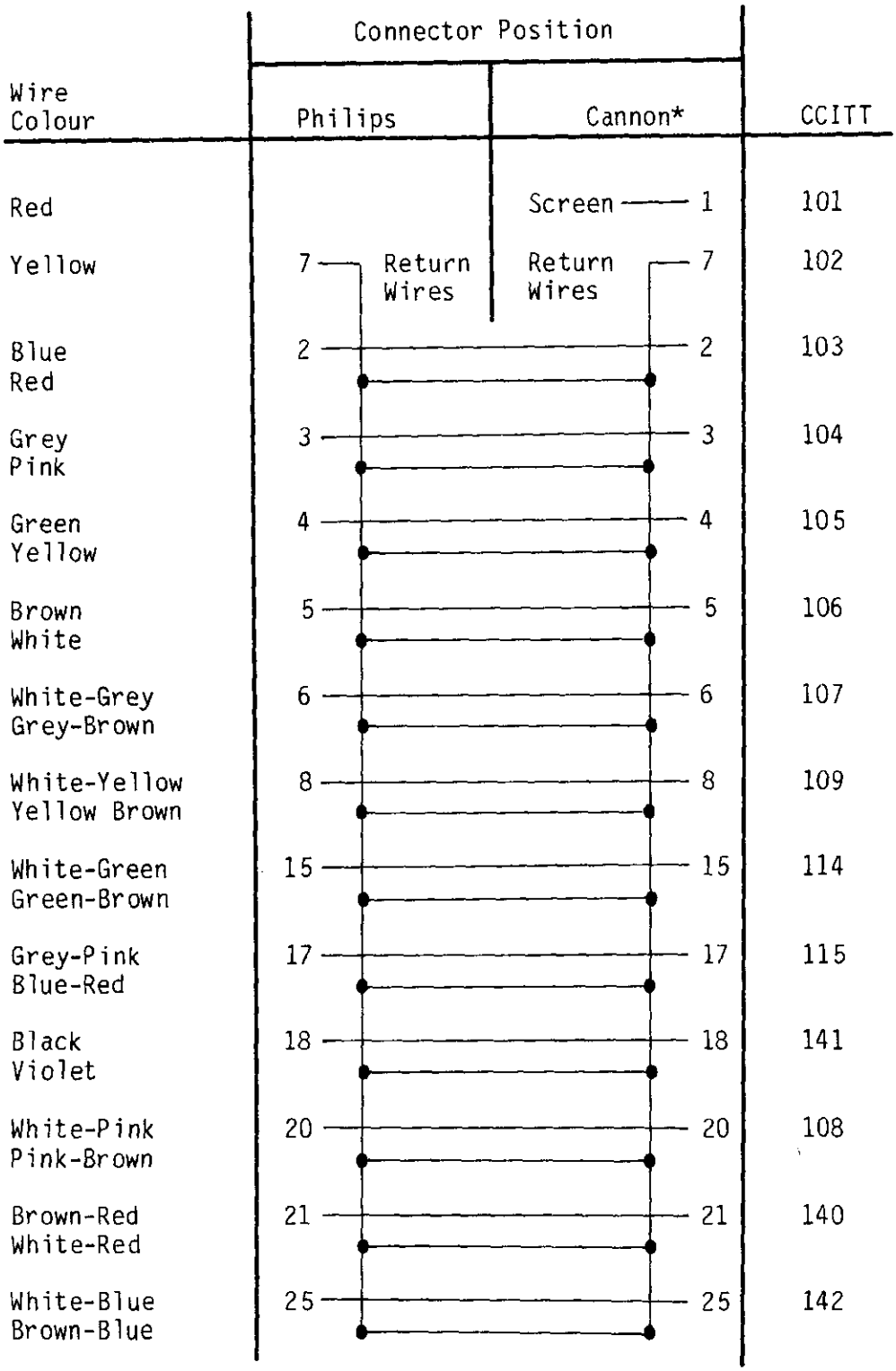
Local Drop Cable 6022-003

Wire Colour	Connector Position DIN	Connector Position Philips	Signal
Grey	3	7	Signal Ground
Pink	3	7	Signal Ground
Green	4	4	Data Out-high
Yellow	5	2	Data Out-low
Brown	1	3	Data In-low
White	2	5	Data In-high

Local Drop Cable 6022-004

Wire Colour	Connector Position DIN	Connector Position Berg	Signal
Grey	3	1	Signal Ground
Pink	3	7	Signal Ground
Green	4	4	Data Out-high
Yellow	5	5	Data Out-low
Brown	1	3	Data In-low
White	2	2	Data In-high

Remote Drop Cables 6017-001/002 and 6018-001/002



* Fitted only on 6017-002 and 6018-002, both 001-versions are open towards modem.

2.3 PREPARING CABLES FOR ON-LINE CONNECTIONS

2.3.1 Specification of Required Materials

General

Modem cables for on-line connections may appear in many different versions, depending on different types of line controllers and modems. Ready-made cables are available for the most common combinations of line controllers and modems, and prefabricated kits (with "open" connectors) are available for making cables for other combinations.

However, common for all cables is that they have a limited length (4-5 m) and are composed of the same basic elements;

- Cable consisting of 12 twisted pairs of conductors (12 x 2 x 0.14 mm, Kroshu type 37 081 20).
- 25-pole female connector of Cinch type for termination at CHLC-plug, or (for CHLC 6838/6839) a 26-pole female connector for rack mounting.
- 25-pole male connector of Cannon type for modem termination.

Ready-Made or Prefabricated Cables

The following ready-made or prefabricated cables are available:

CHLC Type	Modem Type or Interface	Cable Identifications	
		Product No.	12NC
Open (Cinch)	Open	6014-001	5131 191 41800
6834/6836	Open	6014-002	5131 191 89800
6834/6836	ITT GH 2054	6014-011	5131 191 34400
6835	ITT GH 2052C-16	6014-012	5131 191 47000
6835	24 LSI Racal Milgo	6014-013	5131 191 61900
6837	TSU	6014-014	5131 191 62000
6838/6839	Open	6015-002	5131 191 94300
6838/6839	See note	6015-003	5131 191 94400
6891	X21/HDLC	6016-002	5131 194 09300

Note: CHLT 6838 can be connected to an asynchronous V23 modem not using CCITT 115.
CHLC 6839 can be connected to a synchronous V23 modem not using CCITT 119.

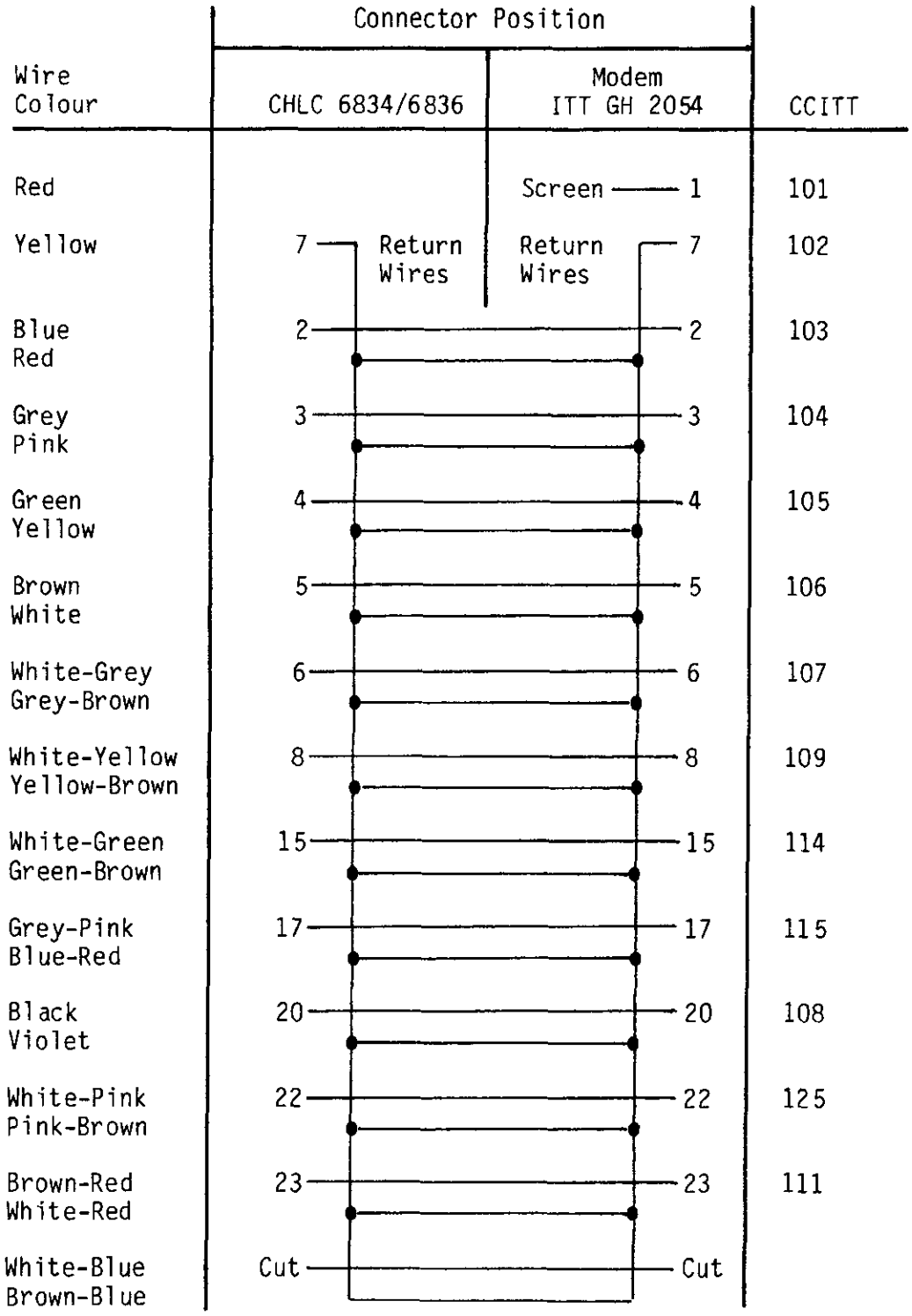
2.3.2 Assembly Instructions

When assembling prefabricated cables, you must have access to the special tools mentioned in sub-section 2.1.3.

Cinch- and Cannon connectors are mounted according to the technique described in sub-section 2.1.3, however, now consultating the Interconnection Diagrams in sub-section 2.3.3.

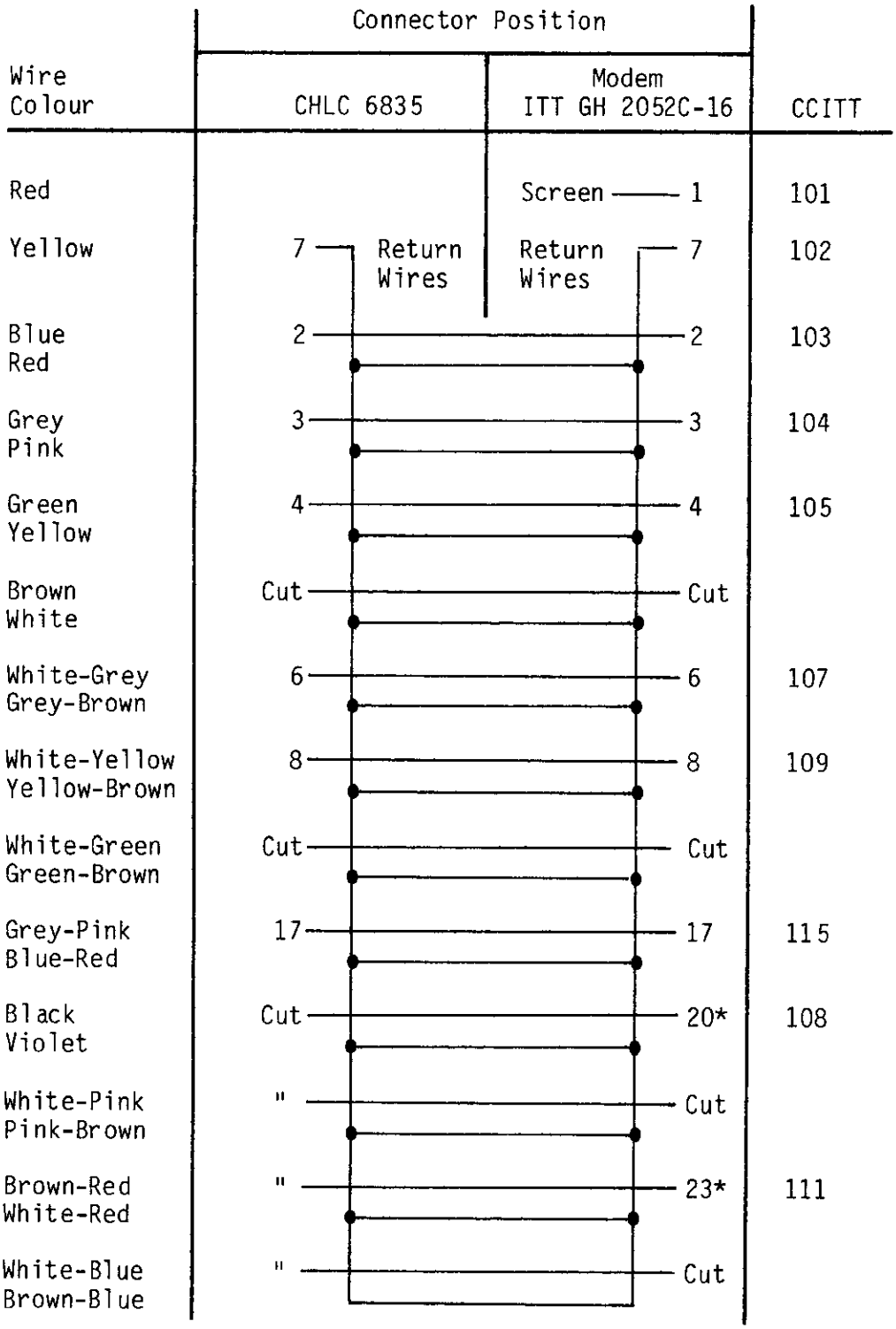
2.3.3 Interconnection Diagrams

Cable for CHLC 6834/6836 - Modem ITT GH 2054 (6014-011)



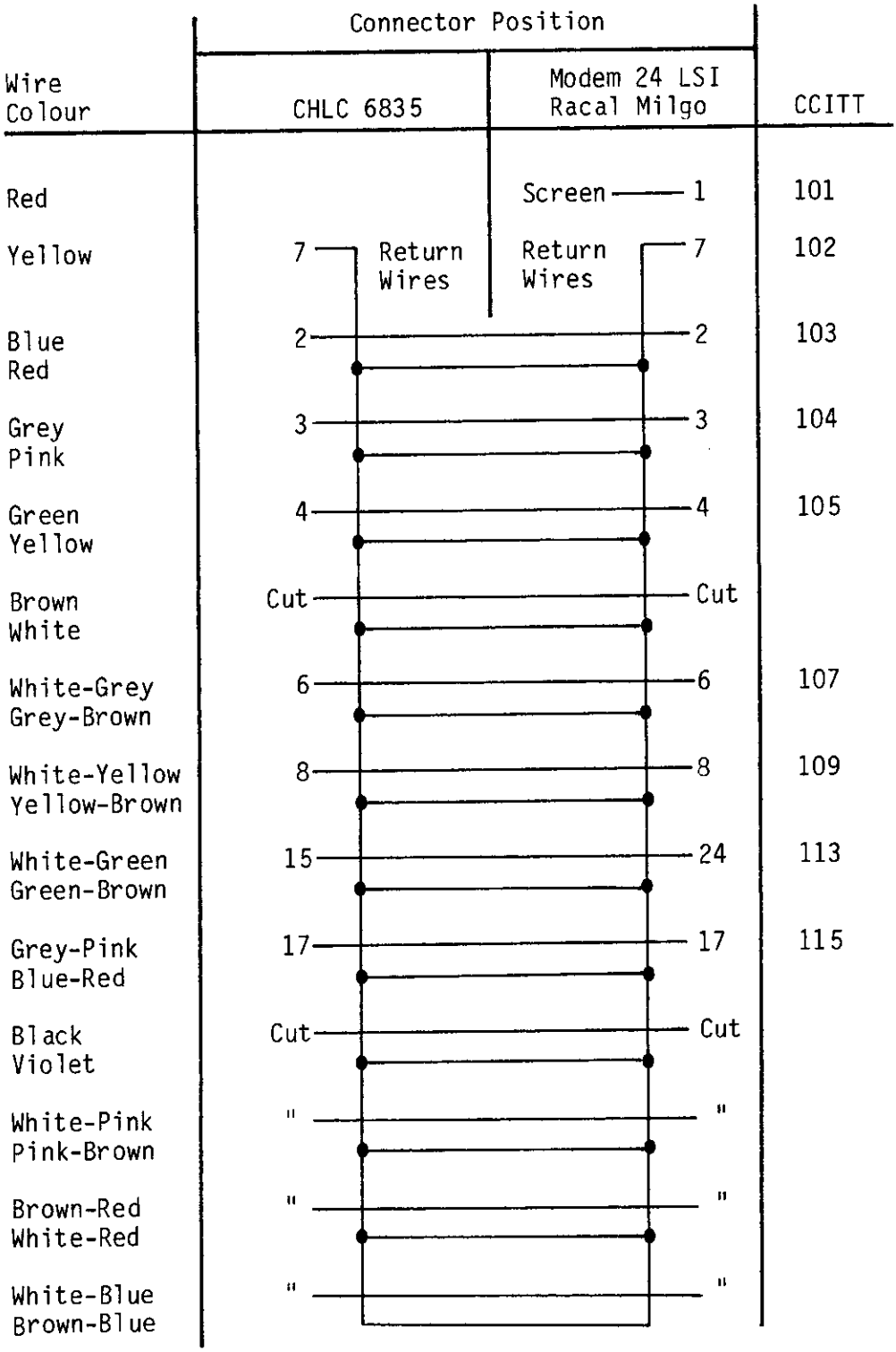
Note: Factory-made cables may have a different structure with cut return wires, a single-wire connection between the "7-pins" and a connection between screen and shell at the modem end. Even the wire colours may differ.

Cable for CHLC 6835 - Modem ITT GH 2052C-16 (6014-012)

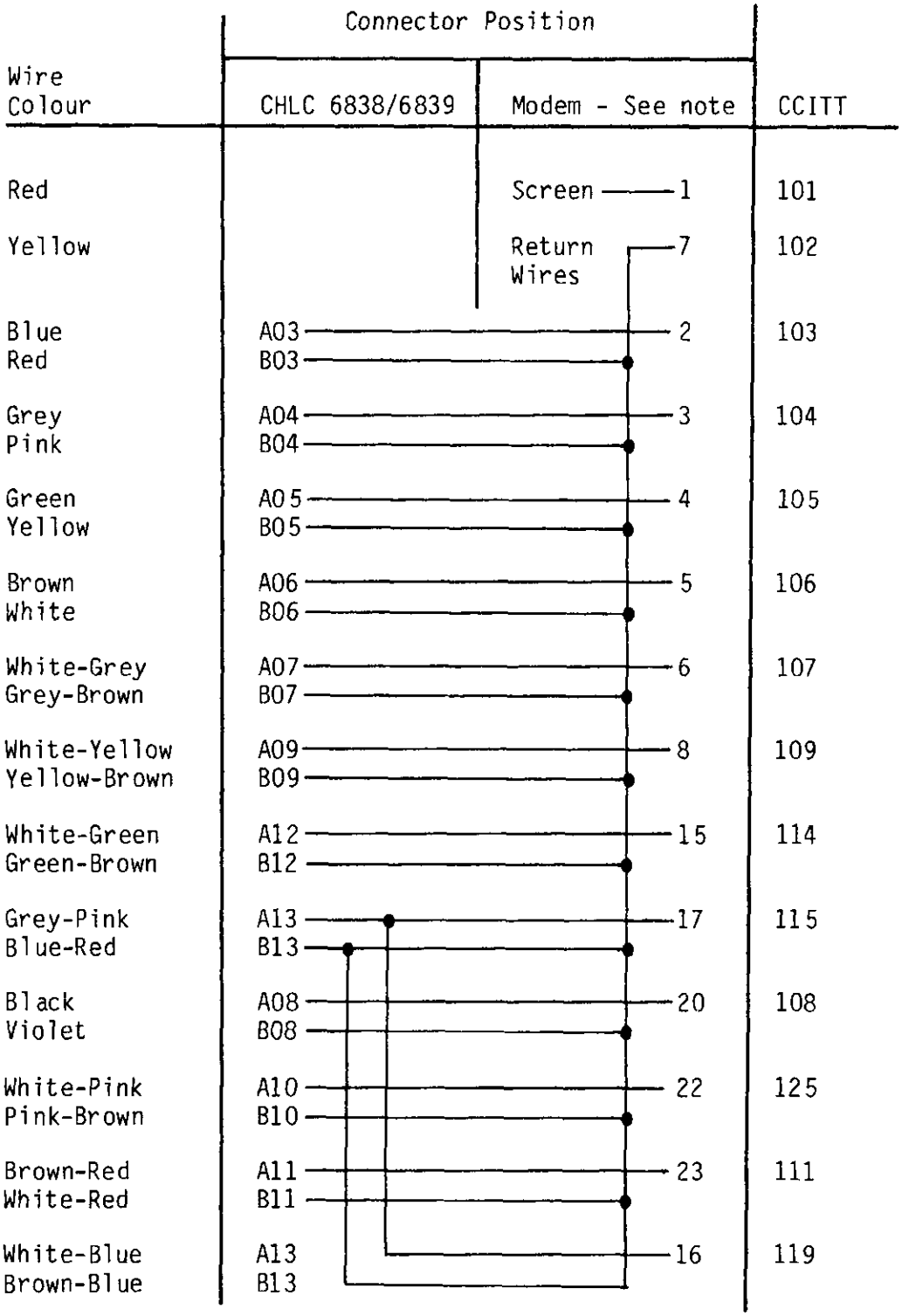


* Connected to pin 9 (+12V) in the modem connector.

Cable for CHLC 6835 - Modem 24 LSI Racal Milgo (6014-013)



Cable for CHLC 6838/6839 - Asynchronous/Synchronous Modem (6015-003)



Note: Cable fitted for 6838 and an asynchronous V23 modem not using CCITT 115, and for 6839 and a synchronous V23 modem not using CCITT 119. However, if the modem uses both signals, adjust modem or cable as follows:

- Adjust modem by removing; CCITT 115 in an asynchronous connection, CCITT 119 in a synchronous connection.
- Adjust cable by removing corresponding pins in the connector at the modem end (pin 17 or pin 16).

Cable for CHLC 6891 - X21/HDLC Interface (6016-002)

Wire Colour	Connector Position: CHLC 6891	Connector Position: X21/HDLC Interface	CCITT
	1 Screen	Screen 1	
Blue	2	2	
Red	9	9	
Grey	3	3	
Pink	10	10	
Green	4	4	
Yellow	11	11	
Brown	5	5	
White	12	12	
White-Grey	6	6	
Grey-Brown	13	13	
White-Yellow	7	7	
Yellow-Brown	14	14	
White-Green	15*	8	
Green-Brown	15*	15	
Grey-Pink	Cut	Cut	
Blue-Red	"	"	
Black	"	"	
Violet	"	"	
White-Pink	"	"	
Pink-Brown	"	"	
Brown-Red	"	"	
White-Red	"	"	
White-Blue	"	"	
Brown-Blue	"	"	

* Two wires in the same socket!

2.4 OTHER CABLING

2.4.1 Cables for Extension Units & Peripherals

The cables required for connecting extension units and peripherals to the computer are, with one exception, included as parts of the delivered units. The exception concerns cables for connecting a CTW to the computer; these cables are available as separate items:

- 5131 191 33300, for current loop interface (length 7.5 m)
- 5131 191 90100, for V24 interface (length 7.5 m)

The cables and mounting kits included in delivered units are specified in sections 1.1 and 1.2.

2.4.2 Mains Network

Figure 2.4-1

General Philosophy

The equipment in the PTS 6000 series is all designed to use standard domestic type power connections. Each mains-connected unit is supplied with a power cable having either a moulded on "Euro plug" (designed to fit the majority of European earthed power outlets) or an US (UL/CSA)-type of plug.

In installations where some different type of power outlet is used, which is not compatible with any of the standard plugs, an alternative EARTHED connector must be fitted by the installation personell to all pieces of equipment.

Mains Integrity

No special mains filtering is required as all equipment is protected against mains bourne interference.

No special "no break" or standby power sources are required since the equipment is fully protected against mains failure. As soon as power is resumed normal operation can recommence, no transaction data is ever lost. It is also possible to switch work stations off and on when required without effecting the system. Other equipment such as desk lamps, typewriters, cleaning equipment, etc. can be connected to the same mains network as the terminal system without fear of interference.

Power Requirements

Most mains-connected modules of the terminal system are adaptable to single phase AC supplies of 100-127V/60 Hz and 200-240V/50 Hz. Required voltage accuracy is ± 10% and required frequency accuracy is ± 2%. The maximum permitted harmonic distortion is 5%. Noise from the mains source should not exceed a transient amplitude of 1.2 kV with a rise time of 100 ns and a duration of 10 µs.

Power Outlets

Each terminal computer must be allocated an earthed outlet fed through a separate fuse, provided with a label marked 'Terminal Computer'. Close to this outlet, and on another fuse circuit, a further outlet should be provided, to enable connection of service equipment.

Consideration should always be given to service requirements and power outlet positions must be such that units can be moved for servicing without disconnecting the mains lead.

Each work station should have the required number of earthed power outlets within 1 m, including one spare for the connection of service equipment.

Any peripherals connected to the terminal computer should be provided with outlets in the same way.

Figure 2.4-1 shows an example of how the mains network for a terminal system might be layed out.

Earthing Requirements

The only requirement is that all power outlets used for the terminal system should be connected to the same safety earth.

Device per fuse

With the exception of the terminal computer, which must have a separate fused outlet, all other outlets can be connected to plain 10A slow-blow fuses in any configuration up to the maximum loading of each fuse, whilst allowing a 20% margin for connecting test equipment or maintenance aids.

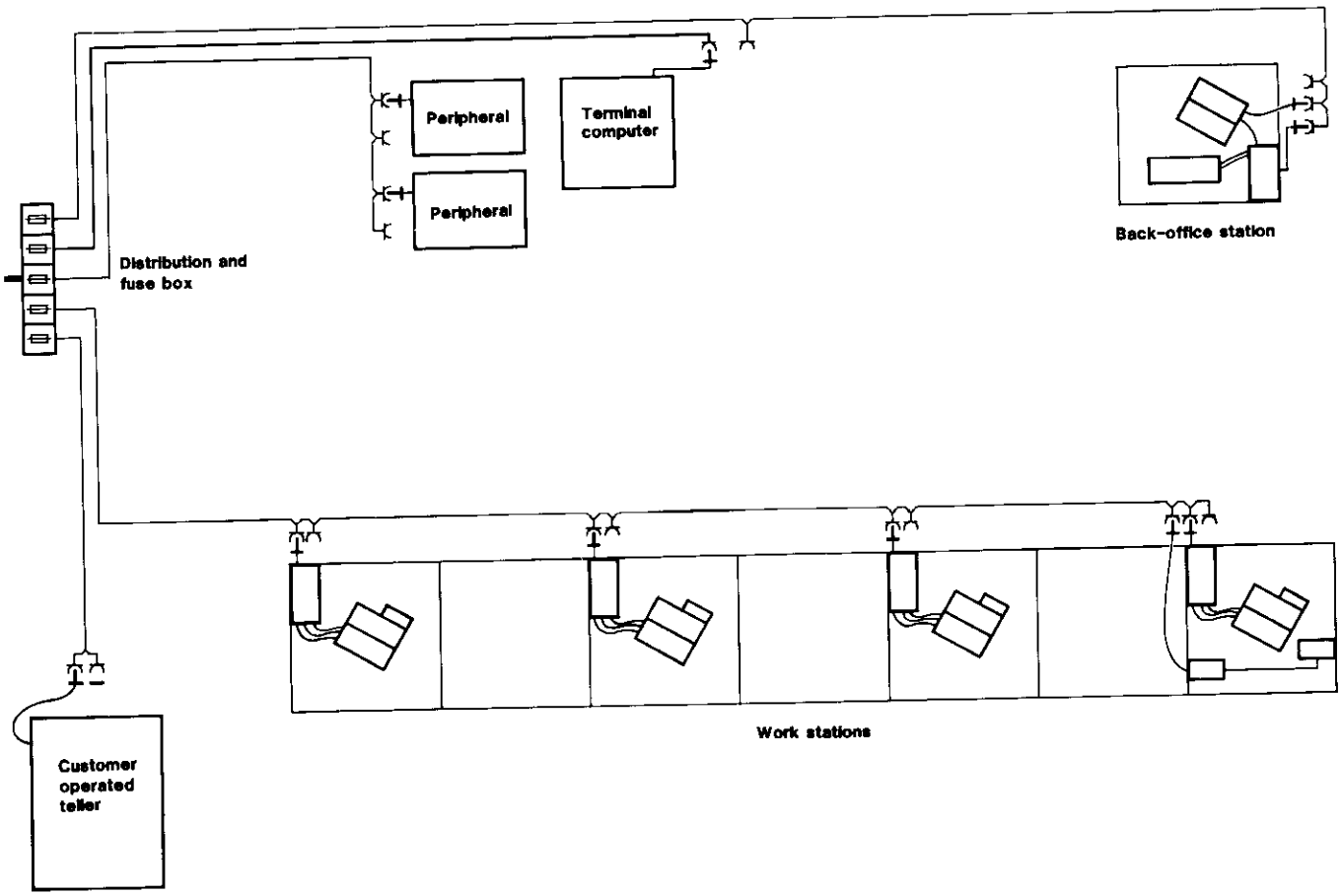


Figure 2.4-1 Example of the mains network for a terminal system. Note that each equipment position has a spare power outlet, and that the terminal computer has its own fuse - the service outlet being on another circuit.

2.5 INSTALLING COMPUTER & EXTENSION CABINETS

2.5.1 General

Unpacking Figure 2.5-1

When being delivered the cabinets are packed as illustrated in Figure 2.5-1. For unpacking; remove top lid and lift off the cardboard that encloses the cabinet. The cabinet is then carefully lifted off the pallet and placed on the floor.

> CAUTION
>
> NEVER TRY TO TILT AND TURN THE CABINET TO GET IT DOWN FROM THE PLINTH, MAN MAY BE HURT OR EQUIPMENT DAMAGED! ALWAYS USE A SLING AND A PARTNER FOR LIFTING DOWN THE CABINET.

If an installed cabinet for some reason must be transported any longer distances, it should again be packed in the same manner.

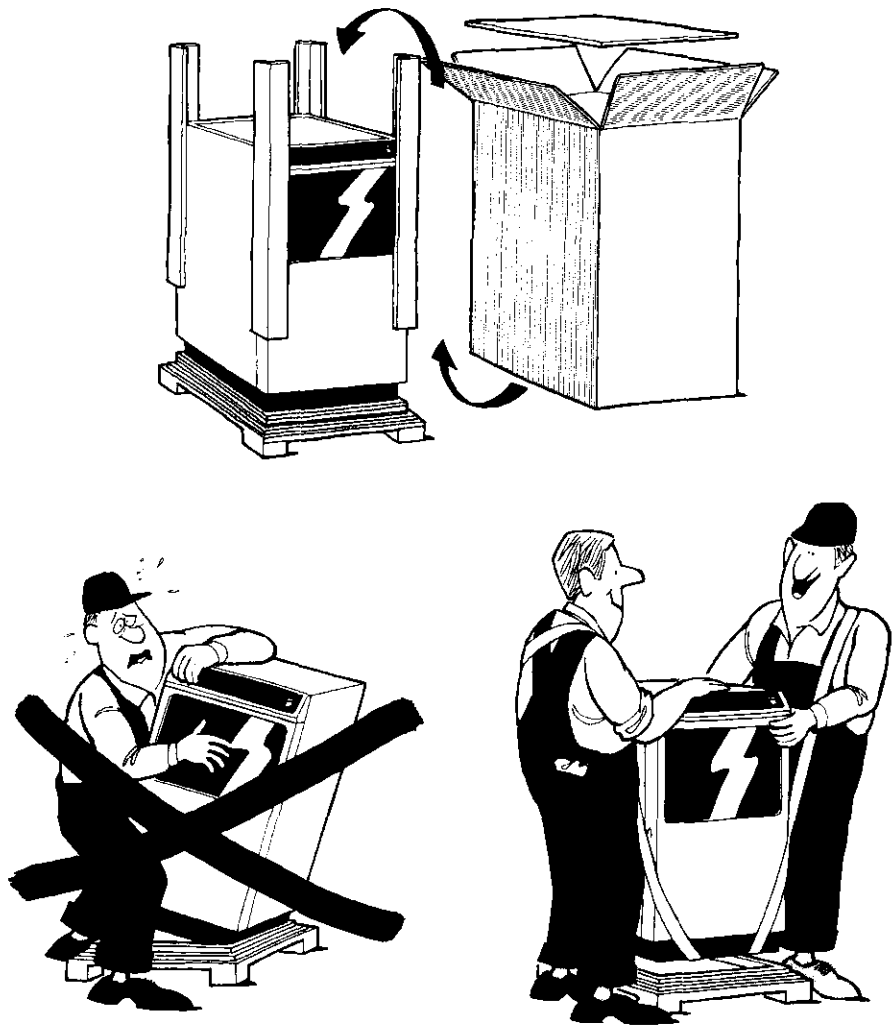


Figure 2.5-1 Unpacking Cabinets

Locating Cabinets

Figure 2.5-2

Place the cabinet at the location settled beforehand, fixed by the routing selected for external cables. Ensure that a free area according to Figure 2.5-2 is available around the cabinet for servicing purposes. Pay also attention to any shelves etc. above the cabinet. a free space of 100 mm must be left above the cabinet. The same space must also be left behind the cabinet. However, the later type of cabinet (with air inlet via the rear cover) can be placed close to a wall, but must then have free access to air from the sides.

Now place the cabinet in service position, i.e. pulled out from the wall to get access to the rear.

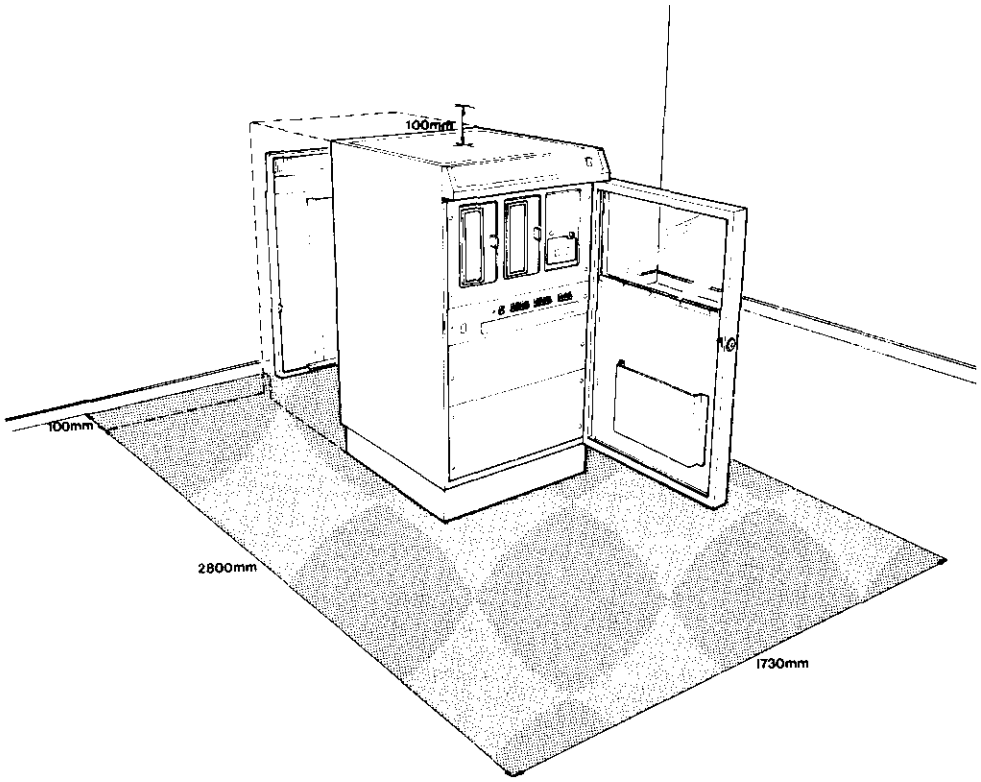


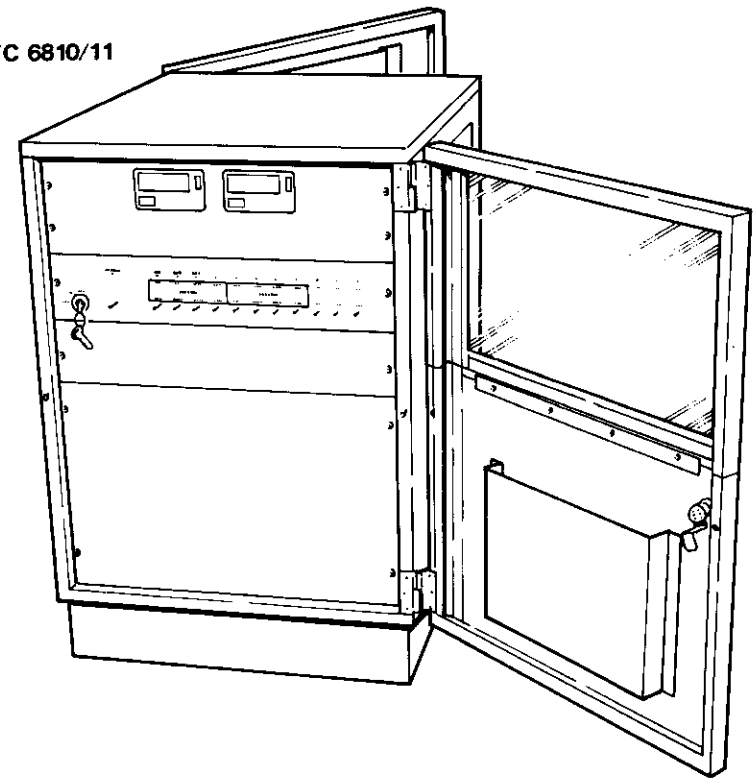
Figure 2.5-2 Locating Cabinets

Removing Covers

Figure 2.5-3

TC 6810/11 and EXU 6863 have hinged doors both at the front and at the rear. Other cabinets have such a door only at the front. The rear cover is here of a type that can be lifted off, held in position by a mechanism that is released from the front, underneath the centre section of the "nose". These cabinets have also a removable top cover, released by pulling down two snap locks from inside at the rear edge (Figure 2.5-3).

TC 6810/11



TC 6812/13/14/24

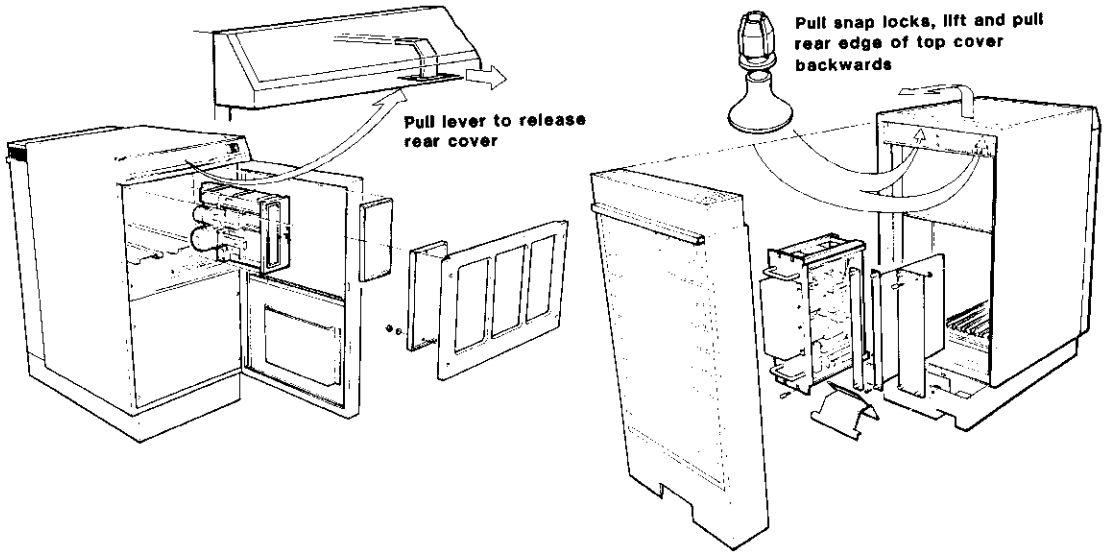


Figure 2.5-3 Cabinet Covers

2.5.2 Checking Submodules & Interconnections

General

The submodules of a computer system are usually fitted in the cabinets when these are delivered, but can under certain circumstances be delivered as separate items. Whether fitted or not, all submodules should be checked according to the following before the system is completed and started.

Rack Disposals

Figure 2.5-4/5

The basic units of the different computer configuration are located in the rack as shown in the Figures 2.5-4/5 (rear views). Undefined rack positions are freely disposed. However, master units and memory should, if possible, be located in TC cabinets (absolutely necessary in TC 6810/11 systems) and should be arranged in such a way that the OKI/OKO-wiring can be made in a sequential way from left to right on the backpanel, sub-section 2.5.4).

In EXU 6864 there are no rack positions allocated to certain units, however, note that the positions 1-2 are closer to each other than remaining positions, and cannot be used for units with fixed front panels.

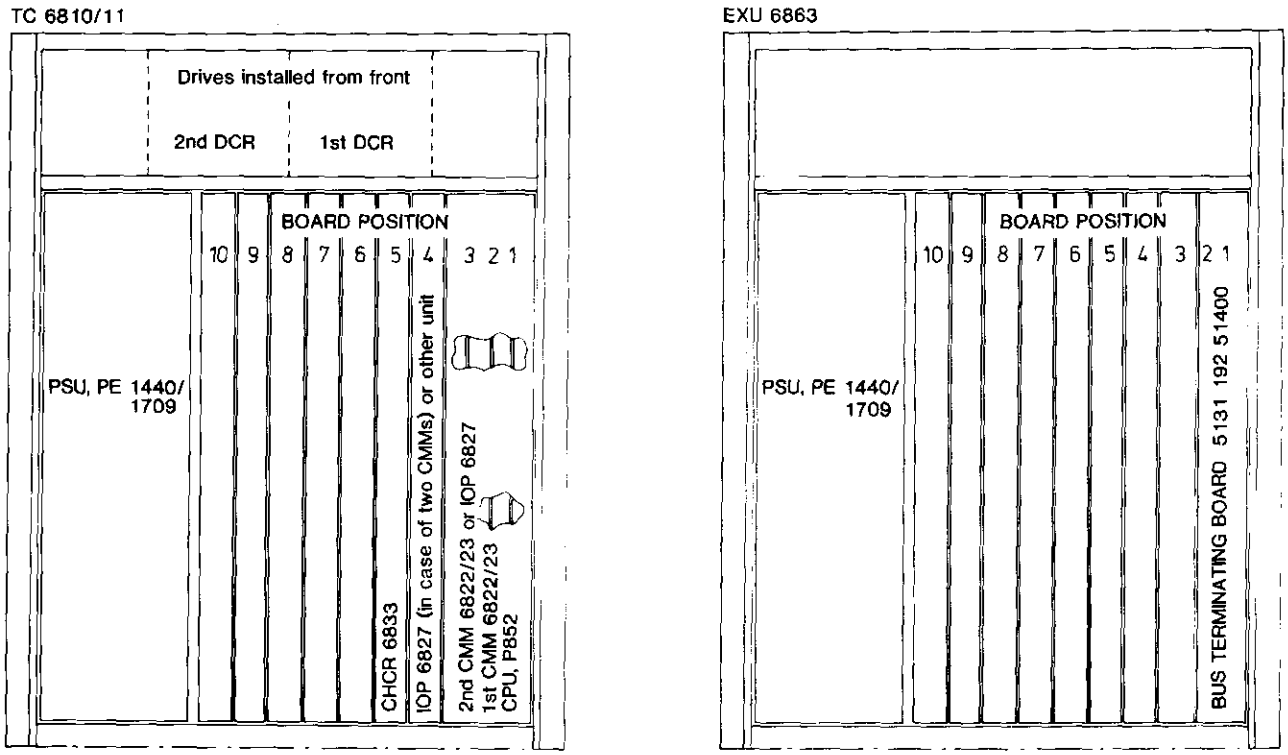


Figure 2.5-4 Rack Disposals in TC 6810/11 & EXU 6863

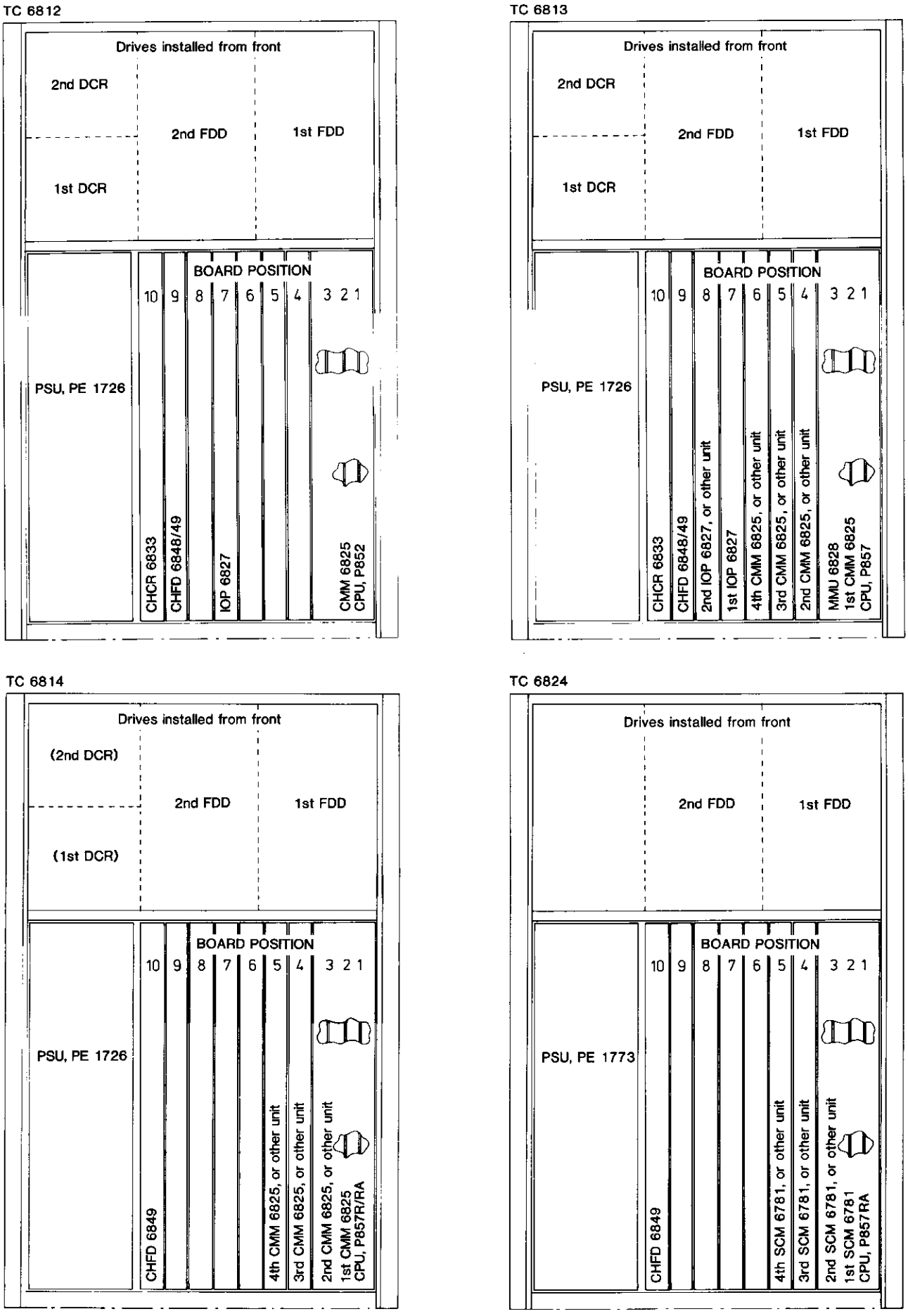


Figure 2.5-5 Rack Disposals in TC 6812/13/14 & TC 6824

Mains Voltage Adaptations

Ensure that the PSU of each cabinet is labelled for the mains source being at hand, and that any range and voltage selectors are set in correct positions:

- PE 1440, no selectors, just for 220V/50Hz
- PE 1709-01, voltage selector
- PE 1709-02, no selectors, just for 120V/60Hz
- PE 1726, range and voltage selectors
- PE 1773, range and voltage selectors

For detailed information, see chapter 7.

Mains Frequency Adaptations

The cabinets used for TC 6812/13, and early models of TC 6814 and EXU 6864, have a fan unit that is centered under the rack, and that requires different A.C. supply at different mains frequencies. Ensure that the fan motor is supplied with 140V at 50Hz and 180V at 60Hz. The selection is made on BU11 in the PSU PE 1726/02, see chapter 7. (A PSU of type PE 1726/01 may have been modified and has then a similar selection facility.)

Ensure that any flexible disc drives are labelled for the correct mains frequency. If necessary to convert from 50Hz to 60Hz (or vice versa), see chapter 12.

U-Link and Switch Settings

Most submodules of the computer system are equipped with U-links and/or switches, used for adapting certain performance characteristics to the requirements. You should ensure that links and switches are correctly positioned on:

- Board units plugged into the rack.
- Flexible disc drives.
- Rack Backpanels

All links and switches are specified in the relevant submodule chapter, from chapter 6 and onwards.

Interconnections & Special Items

Ensure that power- and signal cables are correctly fitted according to chapter 6. Also ensure that correct terminations are fitted in extended systems (subsection 2.5.6) and that a bleeder resistor is connected to the +24V supply from power supply units in EXUs.

2.5.3 Installing Separately Delivered Submodules

General

Any submodules that have been separately delivered (and checked according to

subsection 2.5.2) are plugged into the appropriate rack positions, considering the allocations of certain rack positions for specific submodules (Figure 2.5-4/5). Any interconnection cables required are then fitted according to chapter 6 (Module Interconnections and Power Distribution).

Power Supply Unit & Battery Module

The PSU is fixed to the rack with four screws, two at the top and two at the bottom of its front panel. Then connect the A.C. input cable (with plug separated from source) and, CAREFULLY, the A.C./D.C. supply cables. Consult the relevant Power Distribution diagram in chapter 6, and the relevant PSU assembly in chapter 7.

The battery modules of a TC 6824, each including two 12V batteries, are fully charged at the time when they are leaving the factory and should be kept separately until the time for delivery to the customer. Before installation the batteries should be checked and if needed also charged (see chapter 7).

When installing the batteries, the red cable from the P10 connector is fixed on the positive pole of one battery, while the blue cable is fixed on the negative pole of the other battery. The loose white cable supplied is used to connect the remaining two poles, completing a series connection (see chapter 7).

The batteries are held in place by two pressure plates. A foam-rubber pad is placed between battery and plate. The plates fit into slots on one side of the battery box, while screws are used to fix the plates to the other side. Note that there are two possible positions for the pressure plates, allowing for different battery dimensions.

The battery box itself is fixed by screws to the front panel.

Board Units Plugged Into Rack

Board units that have an attached front panel are fixed to the rack with the top and bottom screws. Other boards must be covered with loose panels, fixed to the rack in the same way.

DCR Drives Figure 2.5-6

DCR drives are held in position by the panels fitted in front of them, screwed to the rack. When fitting just one DCR, it should be placed to the left in TC 6810/11 and in the lower position in TC 6812/13. The unused position is then covered with a blind panel. NOTE: An unused position for DCR 6861 (in TC 6810/11) should also be fitted with a dummy board; 5131 191 36300.

FDDs are secured by screws on top of rack (available when top cover has been removed) and the front panel screwed to the frame of the rack. When fitting just one FDD, it should be placed to the left with the righthand position covered by a blind panel (opposite to figure 2.5-6!).

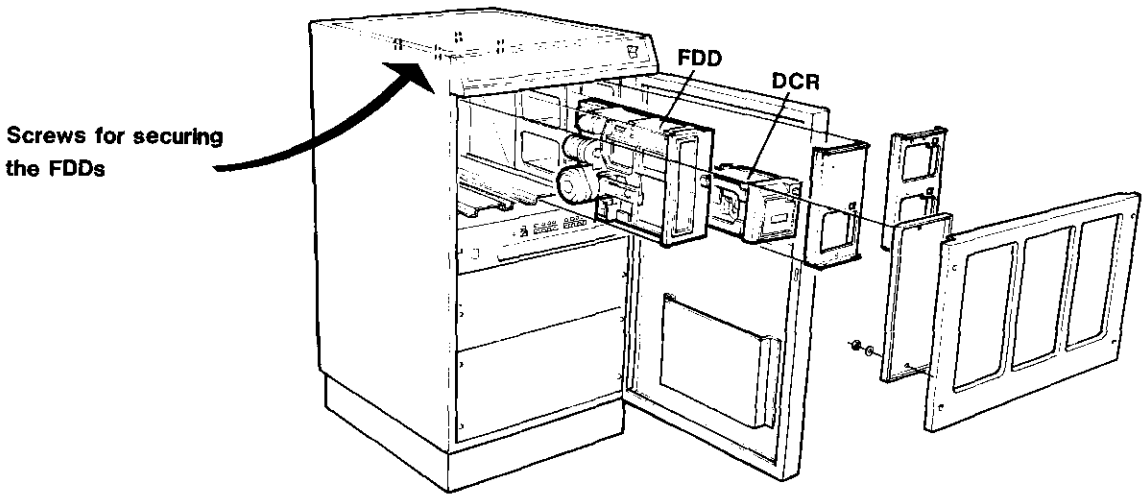


Figure 2.5-6 Installing DCRs & FDDs

Note that racks of later production date are equipped with FDD rails that can be adapted either to FDD 6867 (250 Kbytes), or to FDD 6791 (1 Mbyte). It's just a matter of turning the bottom stop block, and moving the top bracket to desired positions (Figure 2.5-7).

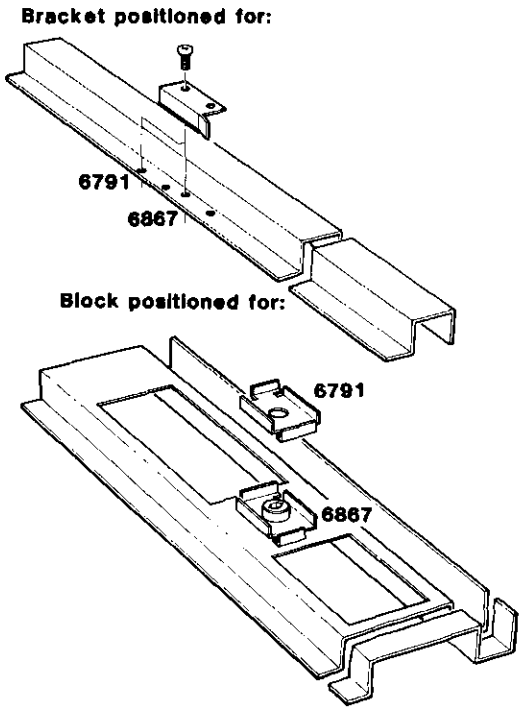


Figure 2.5-7 Adapting Rack to FDD 6867/6791

2.5.4 Additional Backpanel Wiring

Master Priority Chain

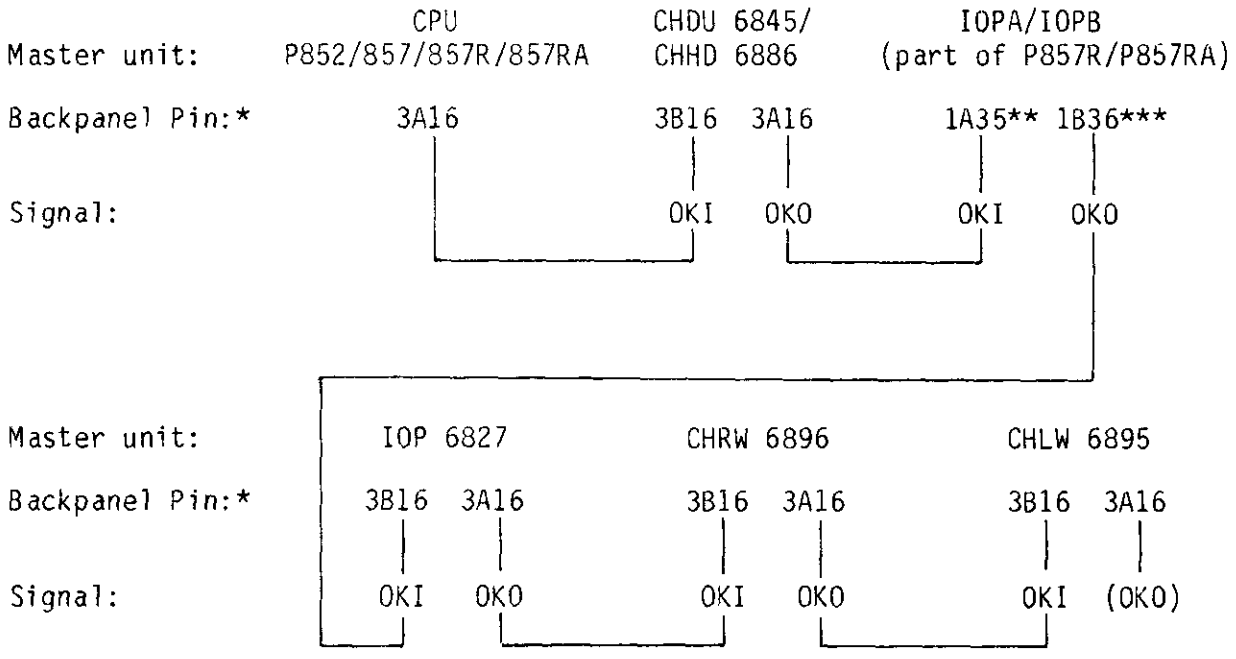
Computer sub-modules that are classified as masters, i.e. that are able to request the bus for direct access to the memory, must be arranged in a priority chain. This chain is basically defined as follows:

1st priority: CHDU 6845 or CHHD 6886
2nd " : IOPA/IOPB (portion of CPU P857R/857RA)
3rd " : IOP 6827
4th " : CHRW 6896
5th " : CHLW 6895
6th " : CPU P852, P857 or P857R/857RA

In systems where one or more of these masters are missing, the priority chain is condensed by linking together the remaining masters with their relative priorities maintained. Should a system be equipped with more than one master unit of the same type, the additional units are linked in "below" the first one of that type.

The priority chain is established by adding backpanel wires, on earlier backpanels by means of insulated 1/4 mm wires with wrapped connections. Later versions of backpanels have special "Master Priority Posts" that enable a faster and easier way of chaining; the interconnections are now made by means of ordinary U-links or (when longer distances) by socketed wire links, see chapter 6.

ENSURE THAT APPLICABLE UNITS ARE LINKED INTO THE PRIORITY SYSTEM AS SHOWN BELOW (FOR TC-EXU LINKS, SEE SUB-SECTION 2.5.6)



* For physical pin locations see chapter 6!
** Also available on post OKIA on Backpanel 1B
*** Also available on post OKOB on Backpanel 1B

Table 2.5.1, continued

Computer Interface Unit	Hexadec Address Code	Dec Break Level	Break Output Pin	Break Input Pin 6827 1:=1st* 2:=2nd*	Break Input Pin P857R(A) A=IOPA B=IOPB	Decimal Interrupt Level	Note
CHDU 6845	17	---------- Master Unit ----------				48	1st disc
	37					48	2nd disc
CHCD 6847	0D	--	--	--	--	35	Card Reader
	0F	15	3A43	2:4B06	B:1A26	34	Line Printer
CHFD 6848	09	09	3A43***	2:4B12	B:1A20	30	1st disc
	19						2nd disc
	(29	---------- Not supported with liability ----------					3rd disc)
	(39	---------- Not supported with liability ----------					4th disc)
CHFD 6849	09	09	3A43	2:4B12	B:1A20	30	1st disc
	19						2nd disc
	(29	---------- Not supported with liability ----------					3rd disc)
	(39	---------- Not supported with liability ----------					4th disc)
	2E	--	--	--	--	09	SOP Control
CHHD 6886	17	---------- Master Unit ----------				48	1st HDU
	37					48	2nd HDU
CHLC 6891	0A	--	--	--	--	12	Receiver
	0B	--	--	--	--	13	Transmitter
CHLW 6895	06	---------- Master Unit ----------				26	1st CHLW
	07	---------- Master Unit ----------				27	2nd CHLW
	26	---------- Master Unit ----------				24	3rd CHLW
	27	---------- Master Unit ----------				25	4th CHLW
CHRW 6896	3A	---------- Master Unit ----------				18	1st CHRW
	3B	---------- Master Unit ----------				19	2nd CHRW
	2A	---------- Master Unit ----------				20	3rd CHRW
	2B	---------- Master Unit ----------				21	4th CHRW

* See previous definition
** Addresses within parentheses are used when operating on IOP channels
*** Operation on IOP channel should be avoided

Table 2.5.2 Bus Addresses, Break & Interrupt Levels defined for concentrator applications

Computer Interface Unit	Hexadec Address Code	Dec Break Level	Break Output Pin	Break Input Pin 6827 1:=1st* 2:=2nd*	Break Input Pin P857R(A) A:=IOPA B:=IOPB	Decimal Interrupt Level	Note
CHLT 6831	03	--	--	--	--	24	1st CHLT
	13	--	--	--	--	25	2nd CHLT
CHRT 6832	01	--	--	--	--	16	1st CHRT
	11	--	--	--	--	17	2nd CHRT
CHCR 6833	0E	14	3A43	2:4B07	B:1A25	08	DCR Control
	2E	--	--	--	--	09	SDP Control
CHMT 6842	0C	12	3A43	2:4B09	B:1A23	44	IOP mandatory
CHDU 6844	08	08	3A43	2:4B13	B:1A19	40	1st disc
	18						2nd disc
	28						3rd disc
	38						4th disc
CHCD 6847	0F	15	3A43	2:4B06	B:1A26	34	Line Printer
CHFD 6848	09	09	3A43**	2:4B12	B:1A20	30	1st disc
	19						2nd disc
	(29	---------- Not supported with liability ----------					3rd disc)
	(39	---------- Not supported with liability ----------					4th disc)
CHFD 6849	09	09	3A43	2:4B12	B:1A20	30	1st disc
	19						2nd disc
	(29	---------- Not supported with liability ----------					3rd disc)
	(39	---------- Not supported with liability ----------					4th disc)
CHLC No. 1	02	--	--	--	--	12	Receiver
	12	--	--	--	--	13	Transmitter
CHLC No. 2	22	--	--	--	--	14	Receiver
	32	--	--	--	--	15	Transmitter
CHLC No. 3	04	--	--	--	--	10	Receiver
	14	--	--	--	--	11	Transmitter
CHLC No. 4	05	--	--	--	--	18	Receiver
	15	--	--	--	--	19	Transmitter
CHLC No. 5	06	--	--	--	--	20	Receiver
	16	--	--	--	--	21	Transmitter
CHLC No. 6	07	--	--	--	--	22	Receiver
	17	--	--	--	--	23	Transmitter
CHLC No. 7	20	--	--	--	--	26	Receiver
	30	--	--	--	--	27	Transmitter
CHLC No. 8	21	--	--	--	--	28	Receiver
	31	--	--	--	--	29	Transmitter
CHLC No. 9	23	--	--	--	--	32	Receiver
	33	--	--	--	--	33	Transmitter
CHLC No.10	24	--	--	--	--	36	Receiver
	34	--	--	--	--	37	Transmitter
CHLC No.11	25	--	--	--	--	38	Receiver
	35	--	--	--	--	39	Transmitter
CHLC No.12	26	--	--	--	--	42	Receiver
	36	--	--	--	--	43	Transmitter
CHLC No.13	27	--	--	--	--	46	Receiver
	37	--	--	--	--	47	Transmitter
CHLC No.13	0A	10	***	2:4B11	B:1A21	46	Receiver
TRUNK	08	11	***	2:4B10	B:1A22	47	Transmitter

* See previous definition
** Operation on IOP channel should be avoided
*** See applicable CHLC in Table 2.5-1

Memory Address Lines (TC 6824) Figure 2.5-8

When using a memory capacity that exceeds 256 kByte in TC 6824, it is necessary to extend the memory address lines to the memory module(s), AND TO ALL MASTER UNITS! This is done by adding U-links on backpanel 1A as shown in Figure 2.5-8. With a maximum memory capacity of 0.5 MByte it is sufficient to link MAD 256; with even bigger memory (max. 1 MByte), it is necessary to link both MAD lines.

> CAUTION!
> When using a master with less address range than provided memory, disable excessive memory range by grounding applicable address input(s) in memory positions (A42 for a master range of 0.5 MByte, A42 and A43 for 256 kByte).

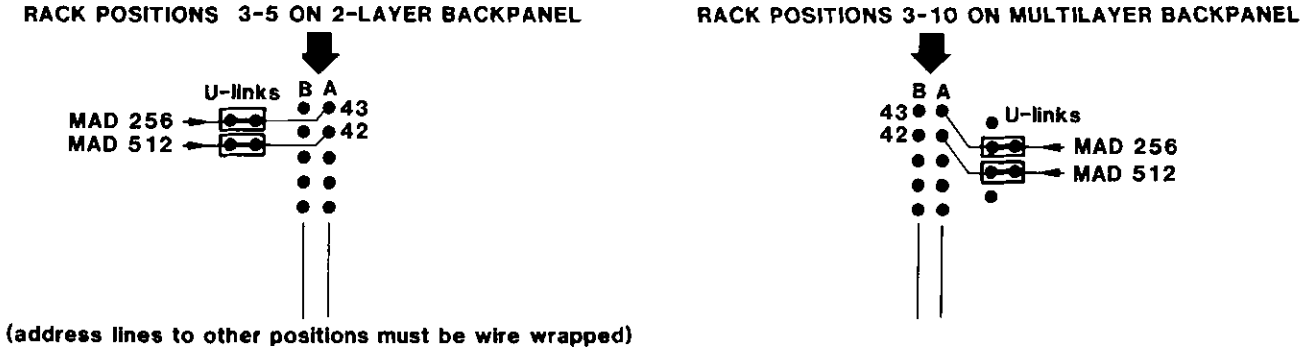


Figure 2.5-8 Extending Memory Address Lines in TC 6824

2.5.5 Optional Control Facilities

Power Control in TC 6812/13/14 Figure 2.5-9

The A.C. supply to the FDDs can be switched on/off by applying +5V/0V to wire wrap post FDD (S1N) on backpanel 1A, see Figure 2.5-9.

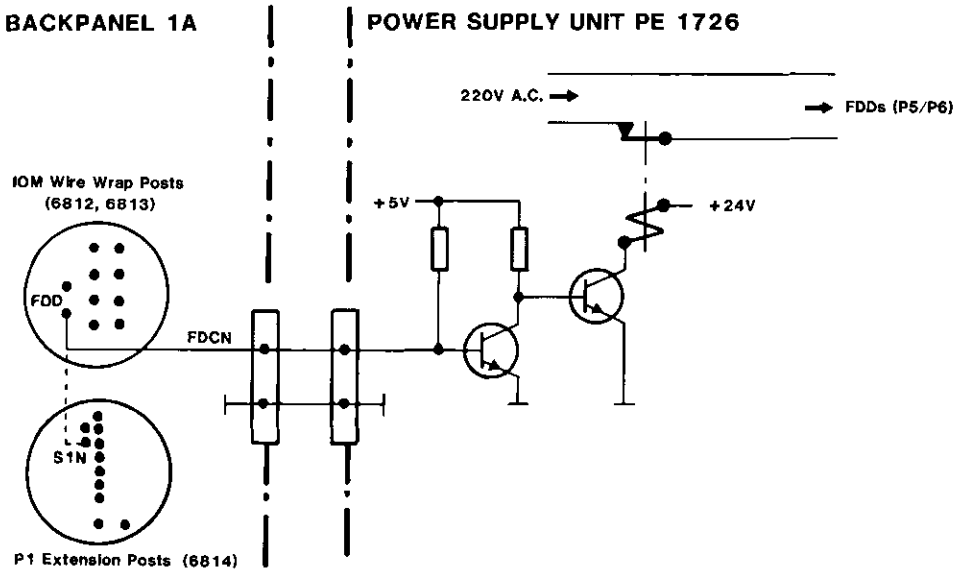


Figure 2.5-9 Controlling A.C. Supply to FDDs in TC 6812/13/14

Power Control in TC 6824 Figure 2.5-10

TC 6824 provides a possibility to connect a remote ON/STAND BY switch for controlling the computer's A.C. and D.C. supply. The remote switch is connected to the free fast-on pins at the rear of the SOP, and is enabled when the SOP's rotary switch is set in position REMOTE. When enabled the remote switch operates in the same manner as the local ON/STAND BY switch (this one enabled when the rotary switch is set in position ON LOCK). An enabled switch in ON state means full A.C. and D.C. supply from the PSU, whilst the STAND BY state means that the PSU is only supporting the memories with maintained charging of batteries.

The A.C. supply to the FDDs can be switched on/off by applying +5V/0V to extension post SON on backpanel 1A. The optional A.C. supply via P8/P9 can be controlled in the same manner via extension post S1N.

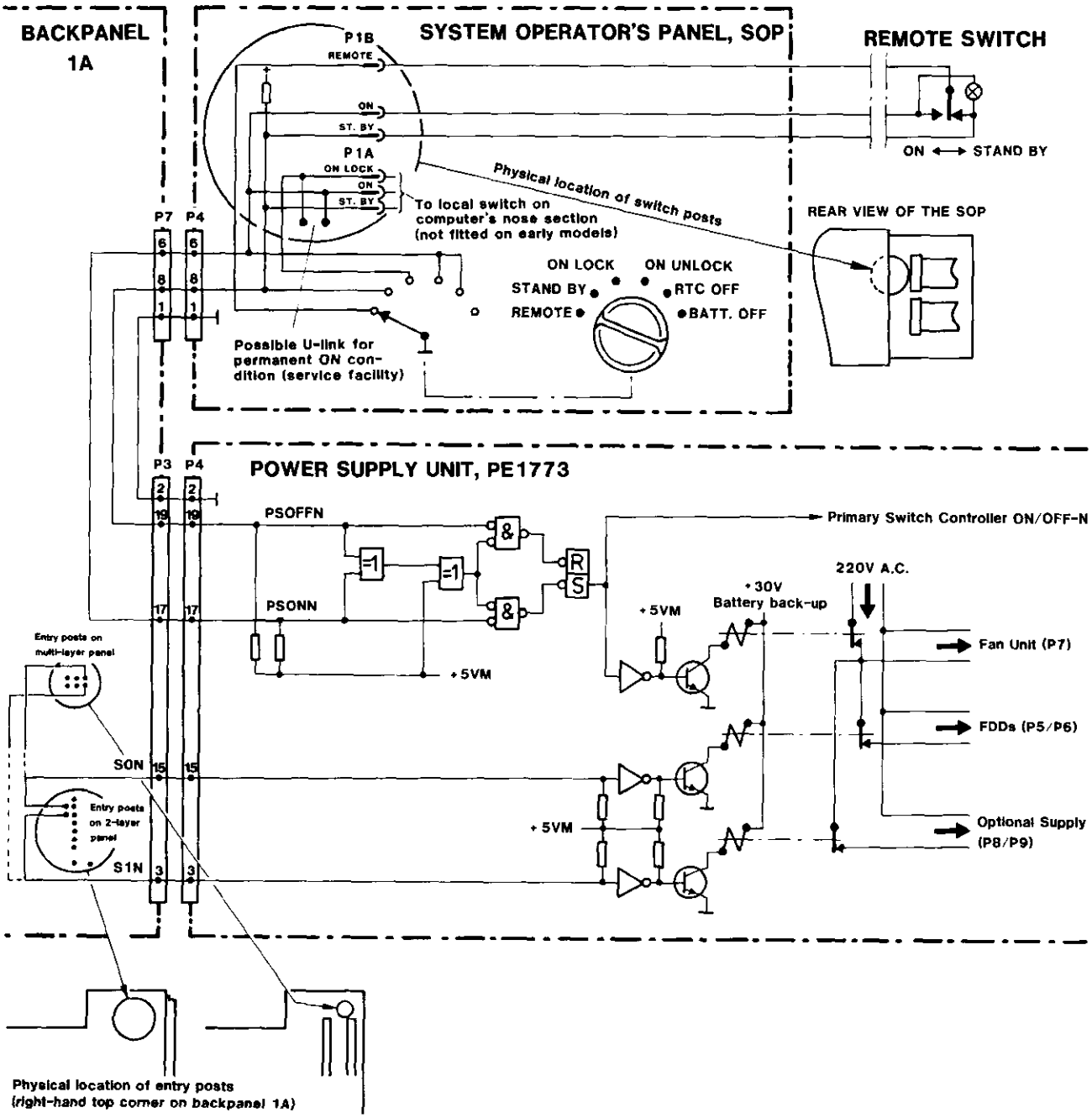


Figure 2.5-10 Optional Power Control in TC 6824

Software Command Exits, TC (6812, 6813) & 6814, 6824 Figure 2.5-11

The control unit integrated in the SOP assembly (CUSOP) provides four control lines that are under software command. These lines can be used for controlling the A.C. supply to FDDs and any optional devices connected to P^{9}/P^{9} on the PSU, see previous pages.

The four lines, software controlled via BIO 00-03 on the ordinary SOP address (usually 2E in hexcode), terminate at the P1 Extension Posts on backpanel 1A. The line sources are all of open-collector-type, which means that the posts can still be used for break extensions etc. if no software commands are used.

Note that the control path represented by BIO 00 is permanently available (intended for FDD control), but remaining control paths must be enabled by a U-link on the CUSOP.

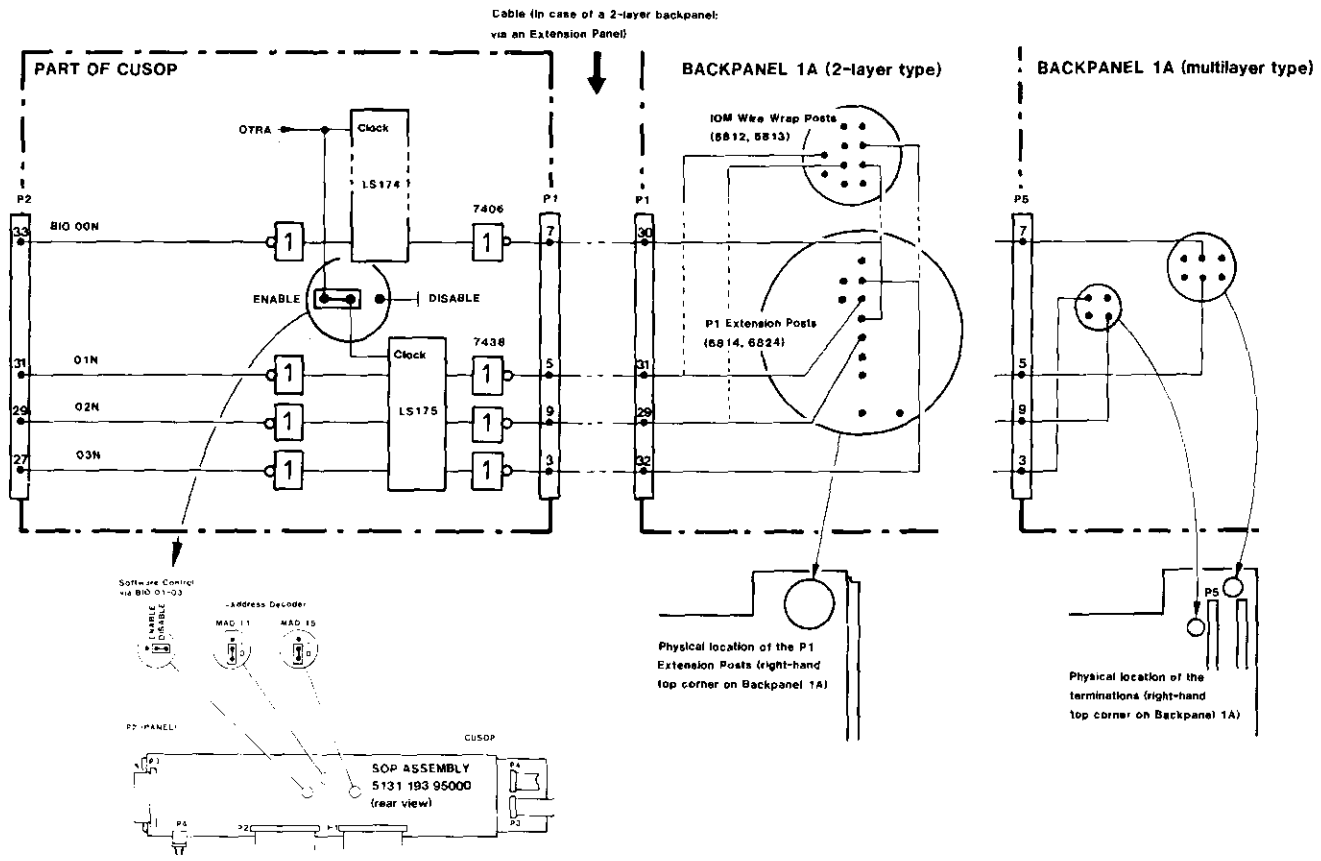


Figure 2.5-11 Software Command Exits in TC (6812, 6813) & 6814, 6824

2.5.6 Connecting External Cables

External Interfaces

Basically there are three types of external interfaces in TC and EXU cabinets:

- Some rack-located board units are using the rear edge connectors (P1,P2/P4, P5) as interfaces. These connectors are facing the backplane of the rack (front of cabinets) and require that necessary sockets are mounted to the backplane.
- Other rack-located board units have the necessary interface connectors fitted on their vertical front plates (facing the rear of the cabinets).
- Extension cables between TC and EXU cabinets are using interface connectors on the rack backpanels (front of cabinets).

Basic Routing

Figure 2.5-12

External cables to the rack backplane area (front of cabinet) are routed under the cabinet (in later type of cabinets; through two 'tunnels' along the sides). These cables are entered into the cabinet by removing small bottom plates in front of the rack backplane, below the rack positions where the cables are to be connected. A removed plate is then replaced by another plate, supplied as a part of an entry kit together with the cable. This new plate is (together with other details of the kit) used for grounding the cable screen and securing the cable to the cabinet. Different types of entry kits are described below, under 'Installing Backplane Cables'.

Other cables, to front plate connectors on rack-located board units, are entered into the cabinet through the lower part of the rear cover. In earlier cabinets it's just a slot in the bottom edge of the covers. However, in the later type of cabinet the rear cover is more than just a cover; it controls the air flow into and out of the cabinet and stands over the fan unit in the extended base section. The cables are now routed on a removable bridge over the fan unit, and through a matching tunnel in the cover. Note the U-shaped metal clip that holds the cables in correct position when the cover is lifted onto the base section.

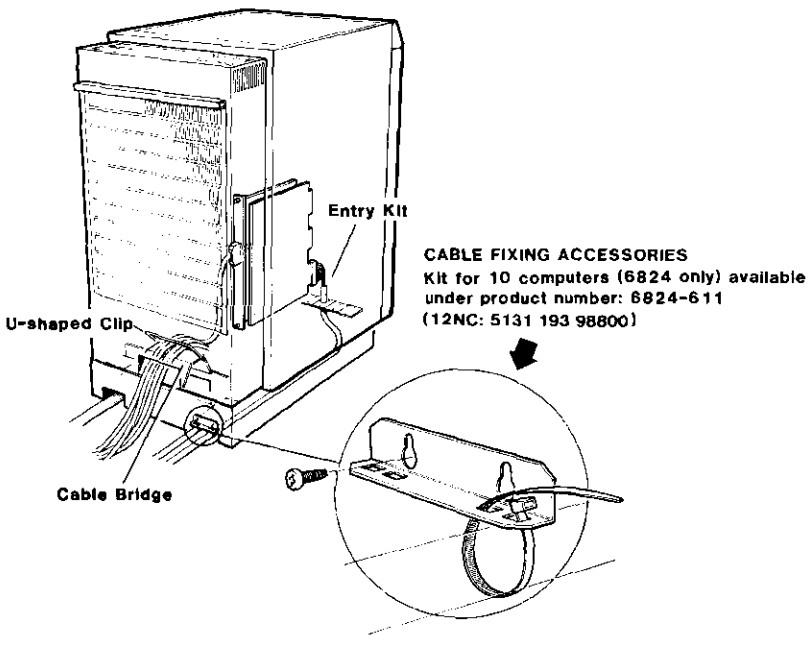


Figure 2.5-12 Basic Routing of External Cables

Basic Installation of Backplane Cables Figures 2.5-13/14

All external cables for backplane installations are delivered with fitted sockets and the necessary entry kits. The sockets are (except for extension cables) basically fixed to the backplane as shown in Figure 2.5-13:

- Screw the supplied studs into top and bottom hole at the appropriate backplane slot. When supplied; fit also the springs shown in figure.
- Thread socket onto the studs, apply supplied washers and lock the socket with the circlips.

Sockets installed in this way will have a small play to match the tolerances of the board edge connectors that are to plug into the sockets. A basic entry kit for grounding screen and securing cable to the cabinet is shown in Figure 2.5-14.

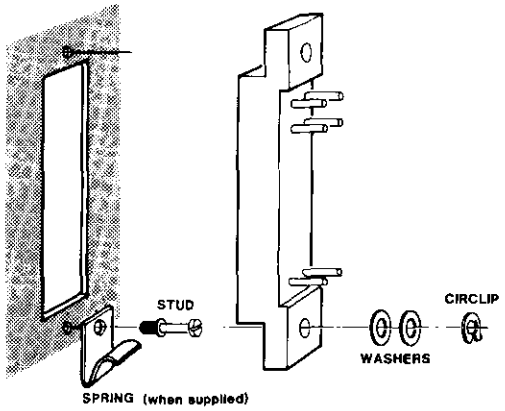


Figure 2.5-13 Basic Installation of Backplane Socket

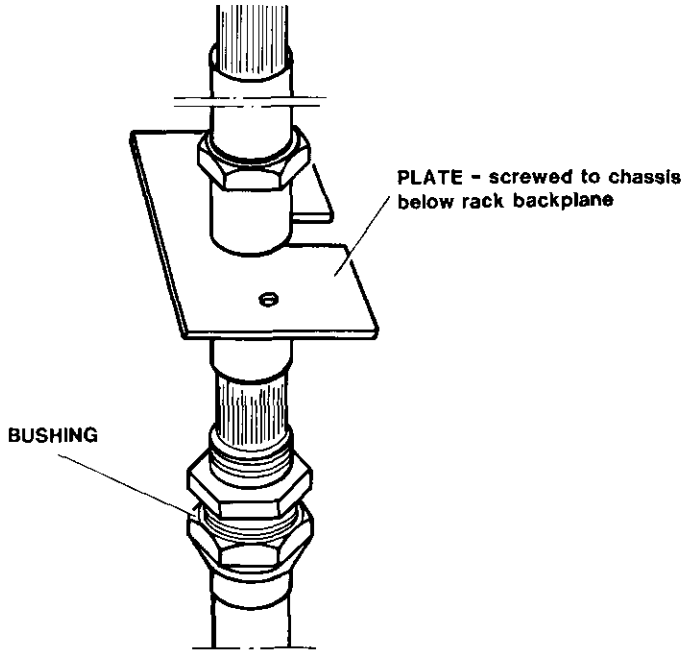


Figure 2.5-14 Basic Entry Kit for Backplane Cables

Extension Cables with Break Lines Figures 2.5-15/16/17

The sockets fitted on bus extension cables are not fixed to the backplane, but connected to appropriate plugs. In TC 6810/11 and EXU 6863 these plugs are located behind the righthand edge of backpanel 1A (Figure 2.5-15). Each specific break line wire wrap post is interconnected with corresponding post in the other cabinet. A break line that originates in the EXU must be wired to one of the EXU posts, and is then picked up from corresponding post in the TC.

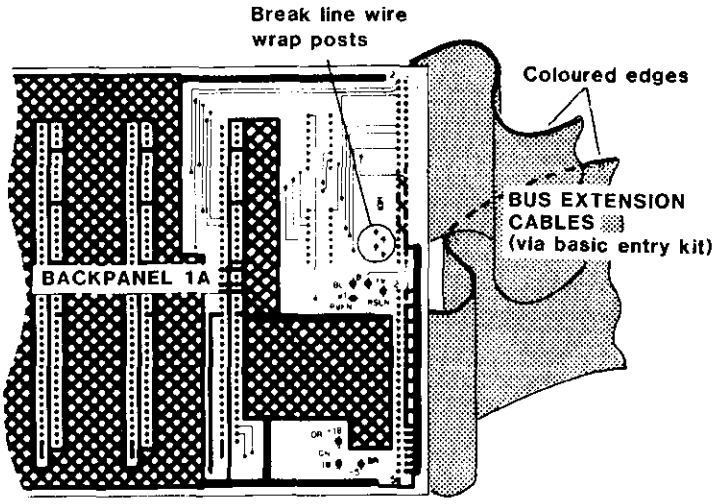


Figure 2.5-15 Connection of Extension Cables in TC 6810/11 & EXU 6863 Cabinets

In other cabinets the extension cables are either connected to an extension panel that is plugged into the edge connectors of backpanel 1A (2-layer type of backpanel), or direct to plugs on backpanel 1A (multilayer type) - see Figure 2.5-16.

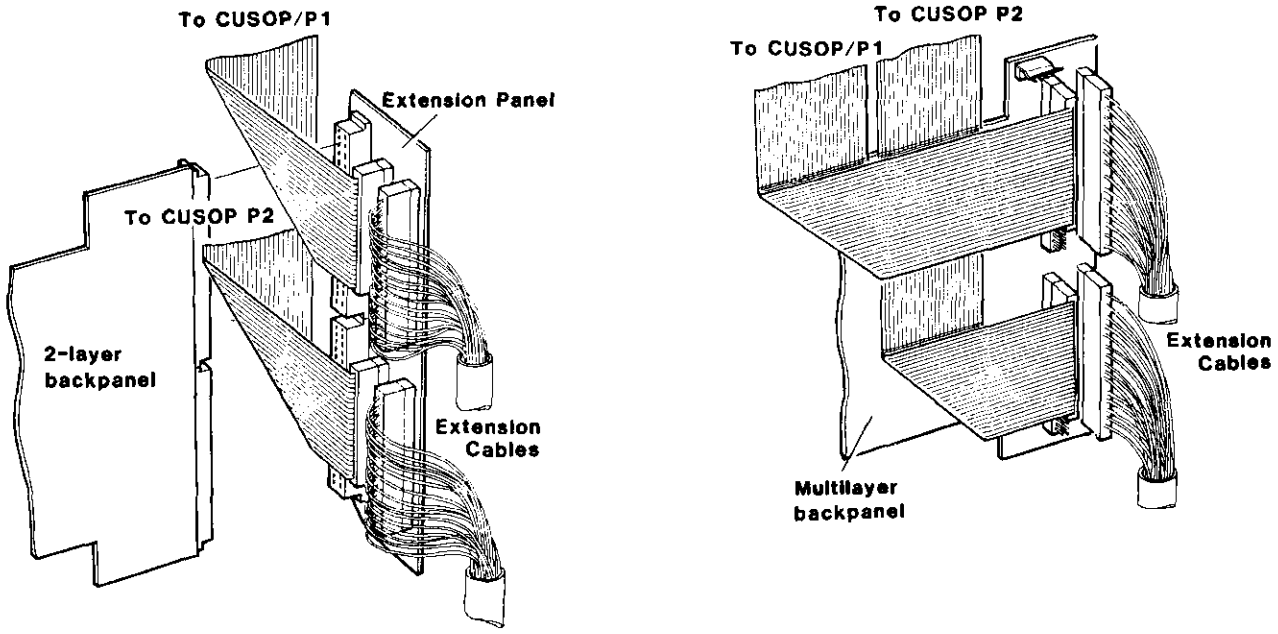


Figure 2.5-16 Connection of Extension Cables in TC 6812/13/14/24 & EXU 6864

Extending Master Bus Signals Figures 2.5-17/18/19

It is now possible to run masters in the first EXU of an extended system, provided that there are no masters with lower priority in the TC (OKO/OKI line not returned from EXU to TC). This requires that some extra master bus signals are linked over to the first EXU cabinet. When using TC and EXU cabinets that are equipped with the new multilayer backpanel (1A), this linking is easily arranged by means of ordinary U-links, see Figures 2.5-17/18. A detailed scheme of the link arrays is shown in Figure 2.5-19.

It should be noted that these master links occupy so many wires that there are just two left for carrying Break signals from the EXUs!

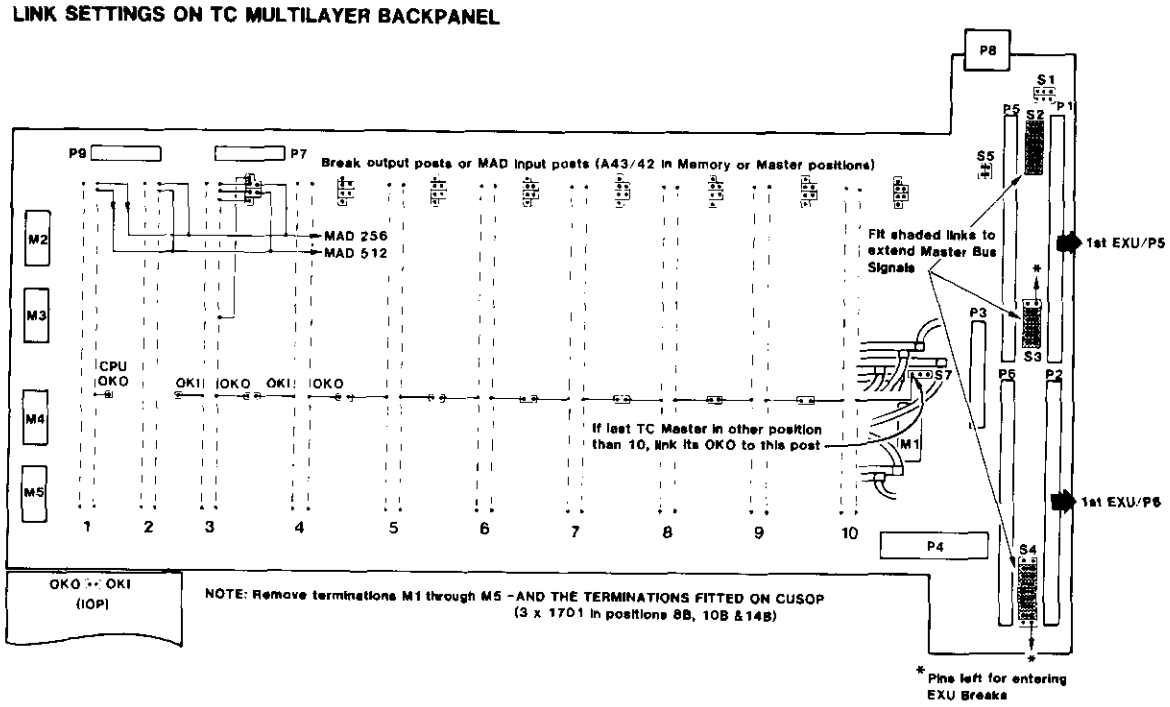


Figure 2.5-17 Master Linking on TC Multilayer Backpanel

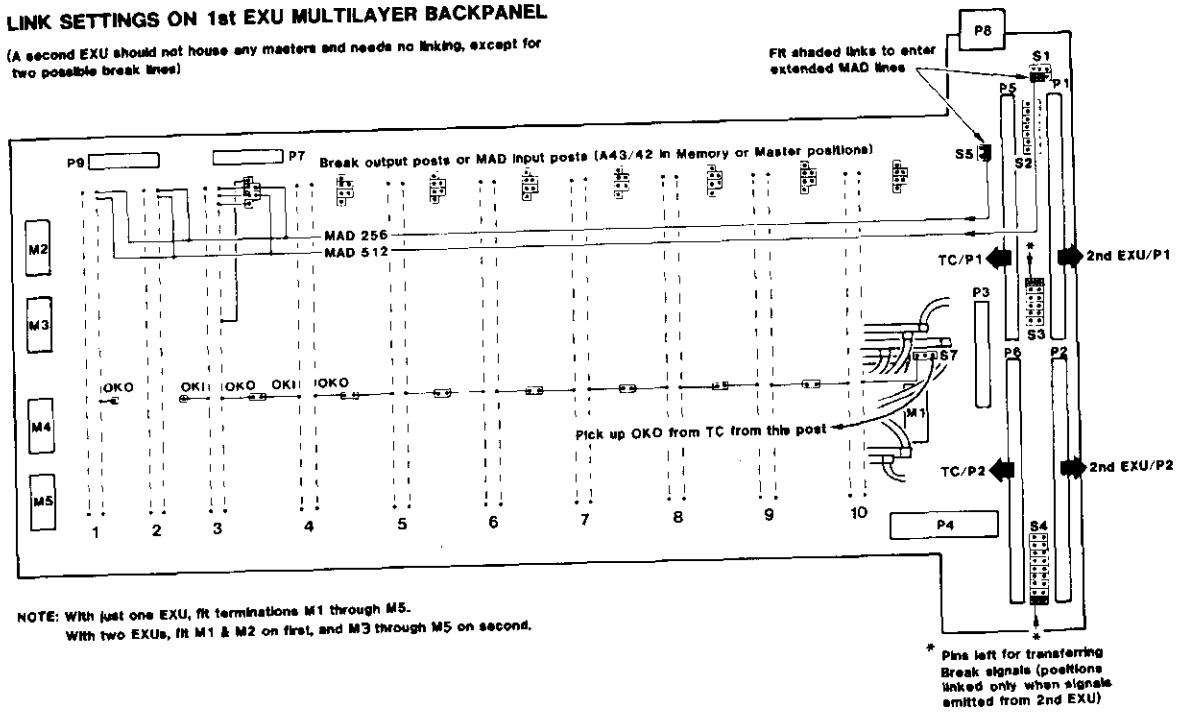


Figure 2.5-18 Master Linking on EXU 1 Multilayer Backpanel

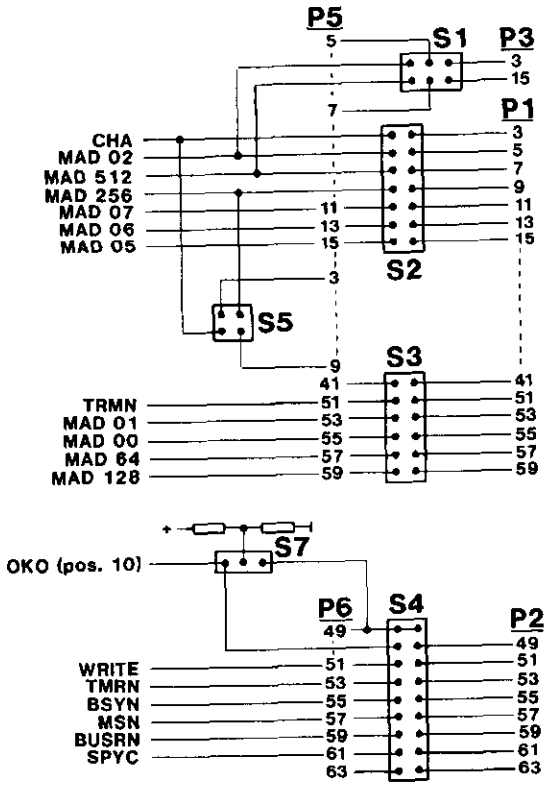


Figure 2.5-19 Multilayer Link Array for Master Bus Signals

In TC and EXU cabinets where one or more racks are equipped with the former 2-layer backpanel, it is still possible to arrange a corresponding master linking. This is now established by using the 2-layer panels' Wire Wrap/Extension posts, earlier used for Break linking. However, in this case there are some restrictions that should be noted:

- TC 6810/11 and EXU 6863 are always excluded from this facility.
- A master EXU cannot be followed by a slave EXU unless both are equipped with multilayer backpanels.
- When memory capacity exceeds 0.5 Mbyte, there is no line left for carrying Break signals from EXU to TC (last line required for MAD 512).

Taking all these restrictions into account, the master signals are routed as follows on 2-layer backpanels (shown routing matches 2-layer panels with multilayer panels):

Signal name	Bus connection, slot-pin	Routed via post*	Notes
CHA	10-3A27	IOM/P1 - 32	
MAD 02	10-3B39	" - 31	
(MAD 512	1-3A42)**	" - 30	
(MAD 256	1-3A43)**	" - 29	Upper
MAD 07	10-3B34	" - 28	Post
MAD 06	10-3B35	" - 27	Array
MAD 05	10-3B36	" - 26	
MAD 01	10-3B40	" - 5	
MAD 00	10-3B41	" - 4	
OKO/OKI (TC to EXU)	X-3A16/3B16	IOB/P2 - 7	
WRITE	10-3A26	" - 6	
TMRN	10-3A29	" - 5	
BSYN	10-3A38	" - 4	Lower
MSN	10-3A37	" - 3	Post
BUSRN	10-3A36	" - 2	Array
SPYC	10-3A35	" - 1	
MAD 128	10-3B43	IOM/P1 - 2	
MAD 64	10-3B42	" - 3	

* For physical positions, see chapter 6!
** When necessary, otherwise available for Break signals from EXU to TC.

Bus Signal Terminations

Figure 2.5-20

Figure 2.5-20 shows how to terminate the bus signals in different configurations of TC and EXU cabinets (6810/11 & 6863 excluded). M1 through M5 are the terminator positions on rack backpanel 1A. Please note that CUSOP is also provided with termination facilities (fitted only in case of a single TC). All terminators used are of type 1701.

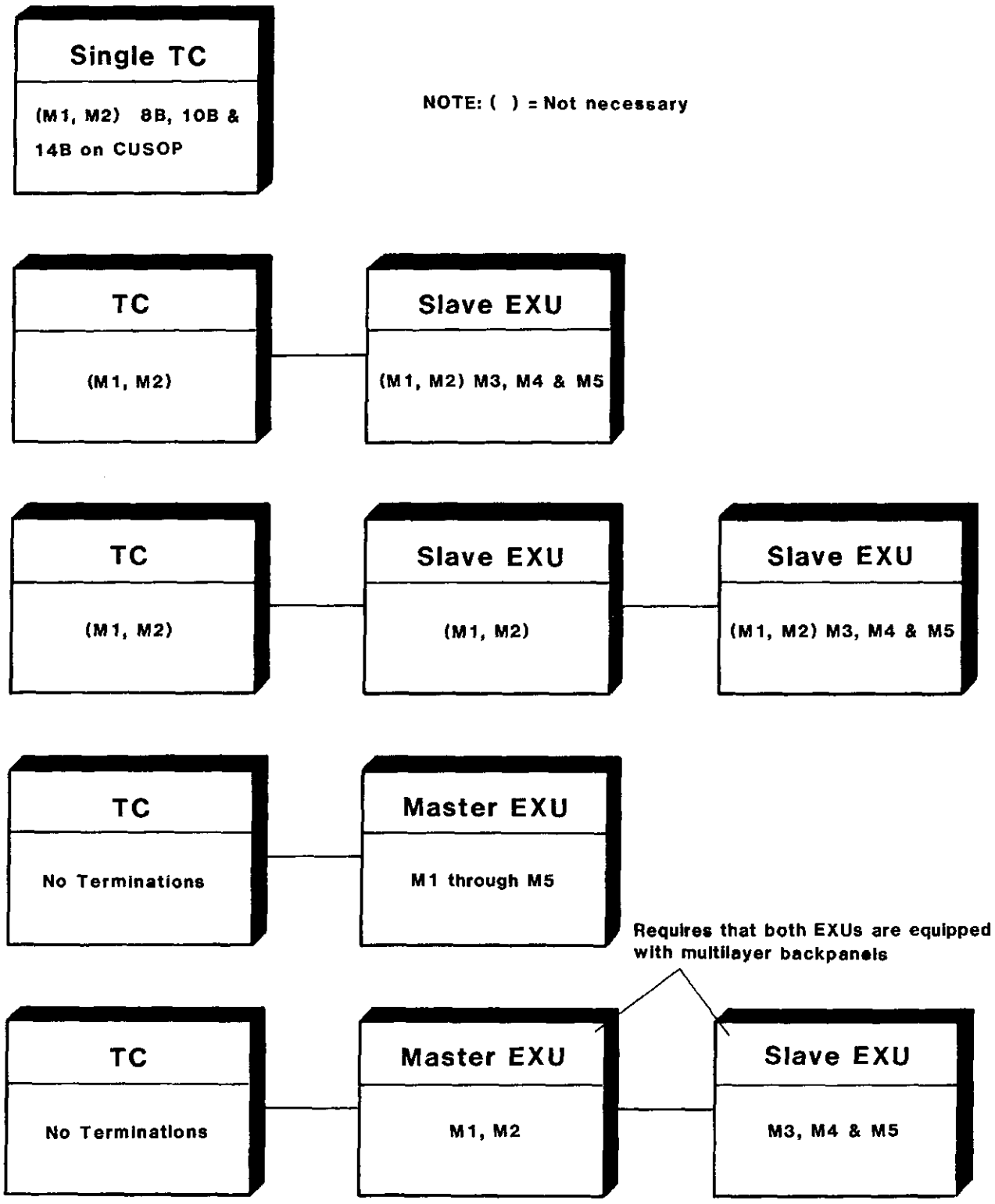


Figure 2.5-20 Bus Signal Terminations

2.5.7 CONNECTOR DETAILS FOR PRINTED CIRCUIT BOARDS

The boards are indentified by the connector layout as shown in Figure:

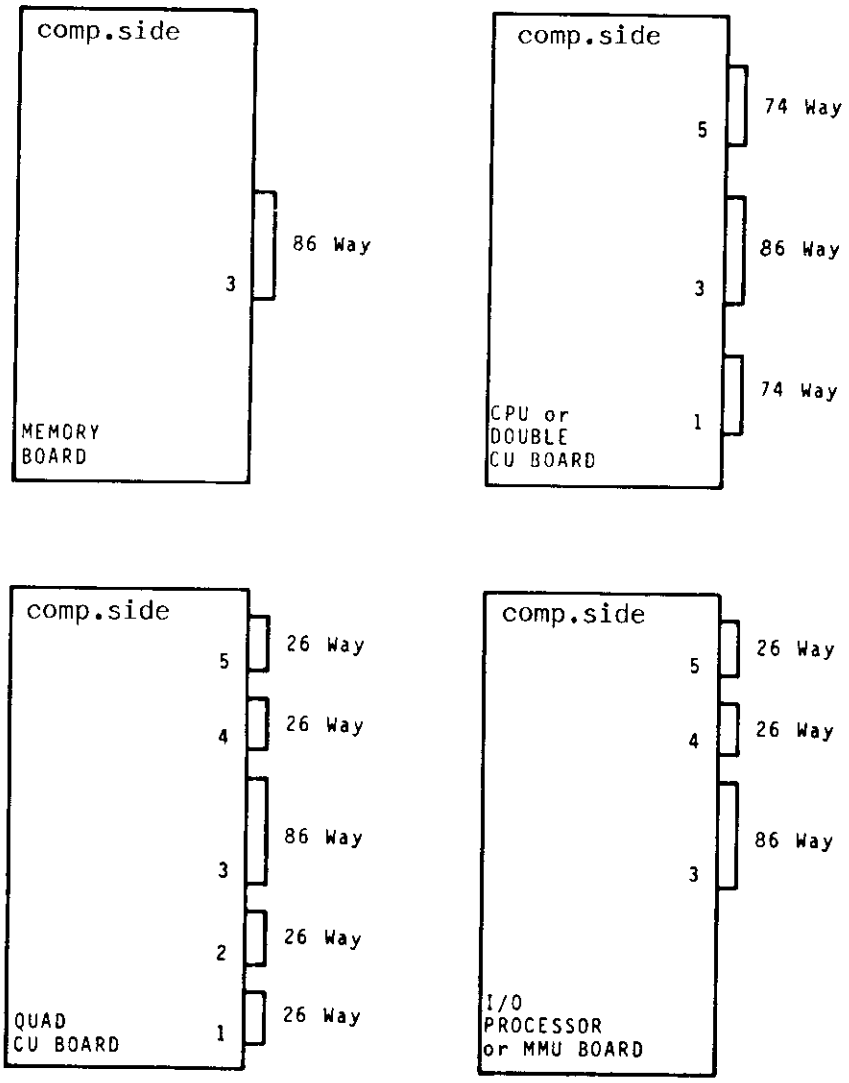
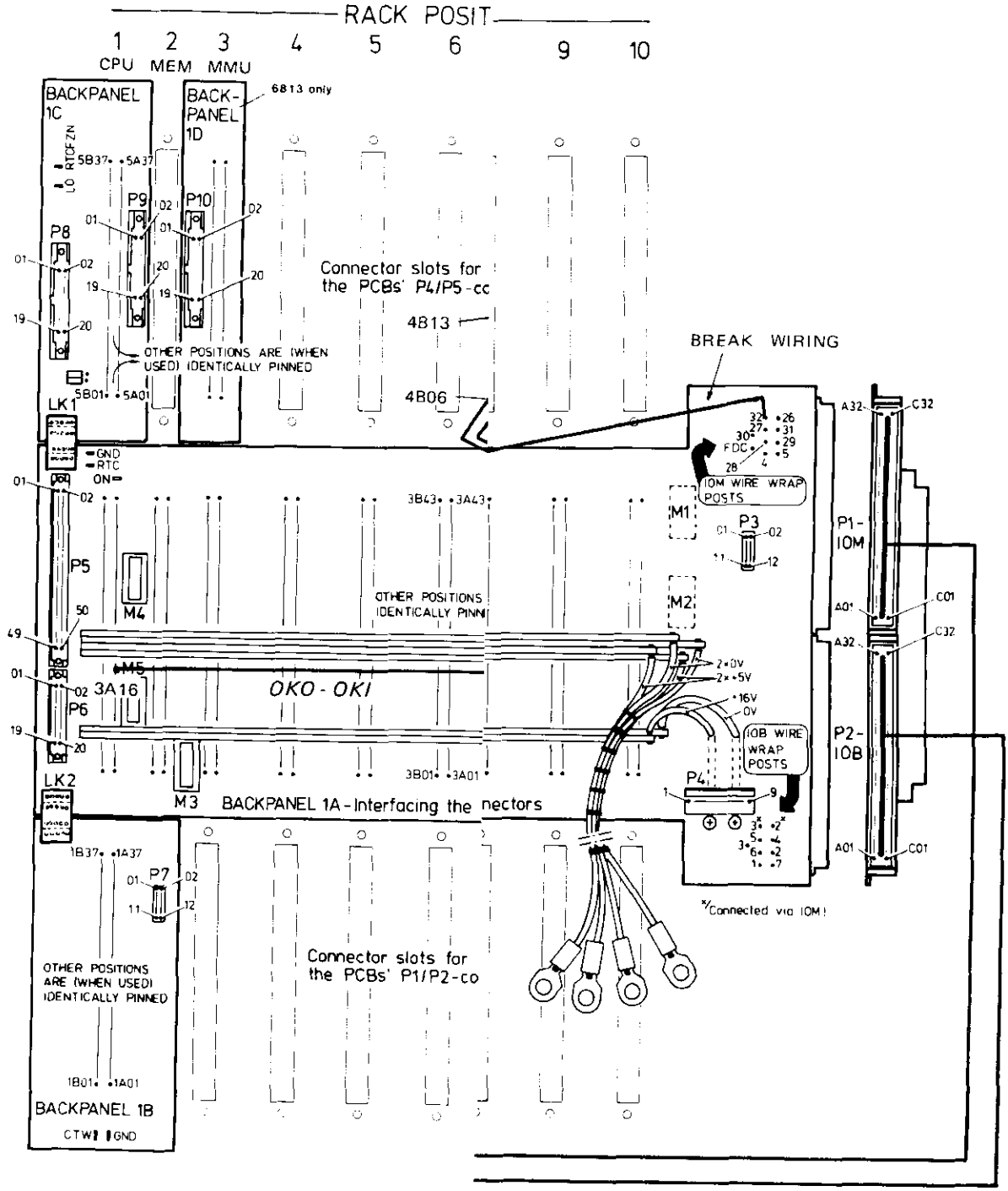


Figure 2.5.21 PRINTED WIRING BOARD-CONNECTOR LAYOUT



ECTION EXTENSION UNIT AND BREAK WIRING

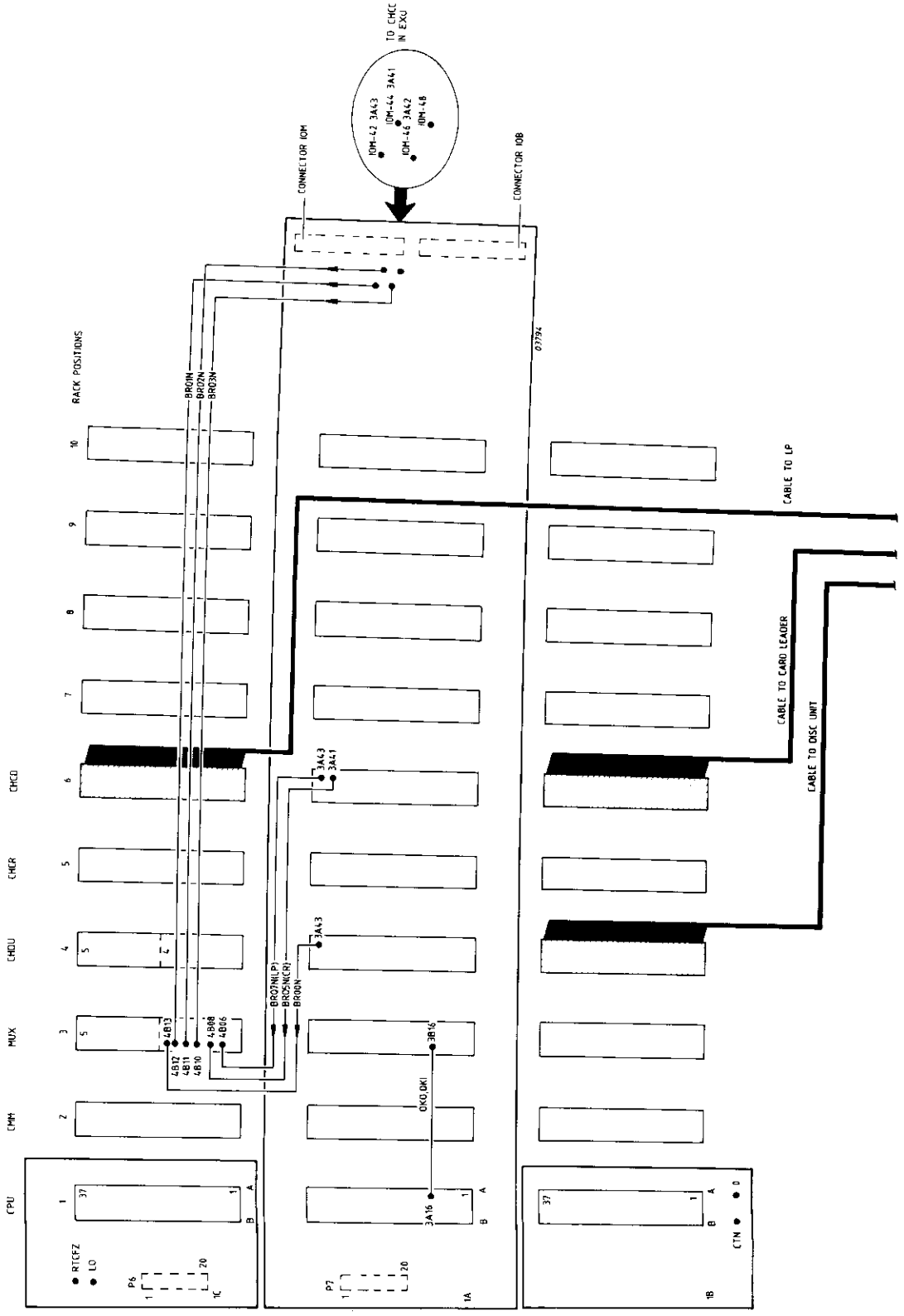


Figure 2.5.23 EXAMPLE BREAKWIRING 6810

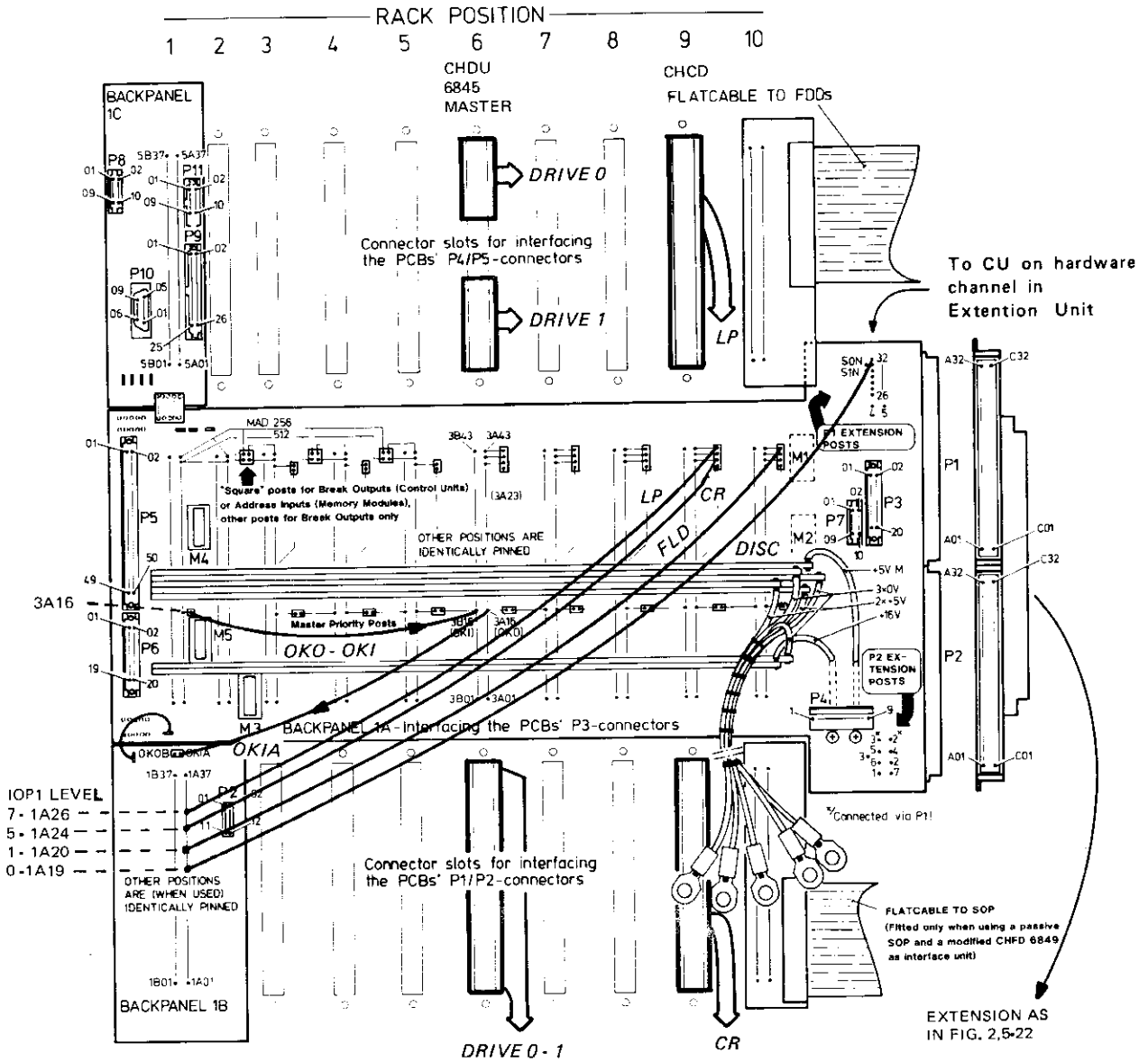


Figure 2.5.24 EXAMPLE BREAK AND OKO-OKI WIRING TC6814/24