Type 10, Type 10 Universal, and Type 10 Universal Connectorized Mounting Shelves

Contents

1. Description and Application

General

1.1   The Type 10 Mounting Shelf (Figures 1-1 and 1-2) provides relay-rack or apparatus-case mounting for Tellabs Type 10 modules. These modules plug into 56-pin card connectors at the rear of the shelf. Gold-plated, bifurcated contacts in these connectors ensure positive contact with each module. Type 10 Shelves are normally shipped unwired but can be custom-wired for specific applications at extra cost. Contact your Tellabs sales representative for information on custom wiring.
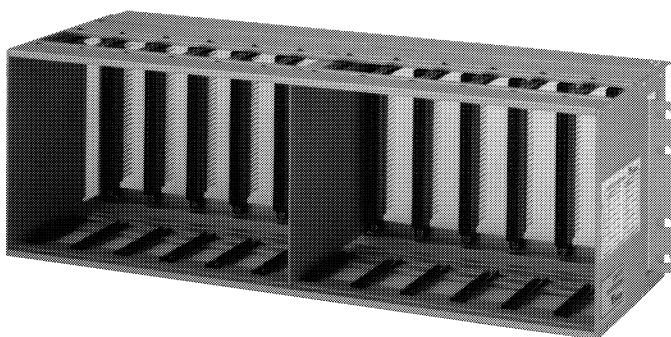
*Figure 1-1   Type 10 Shelf for Relay-Rack Installation (Model 1012 Shown)*
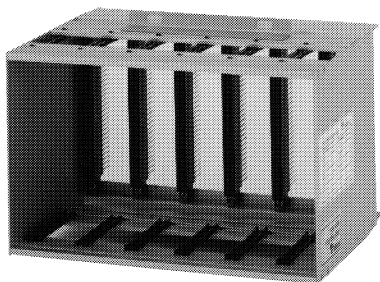
Figure 1-2   1006 Shelf for KTU or Apparatus Case Installation

Reason for Revision/Reissue

1.2 This practice section is revised to comply with the current practice format and to incorporate the information contained in addendum 76.A8210XX. In addition, the information on the Type 10 Universal Shelf backplate has been expanded for greater clarity.

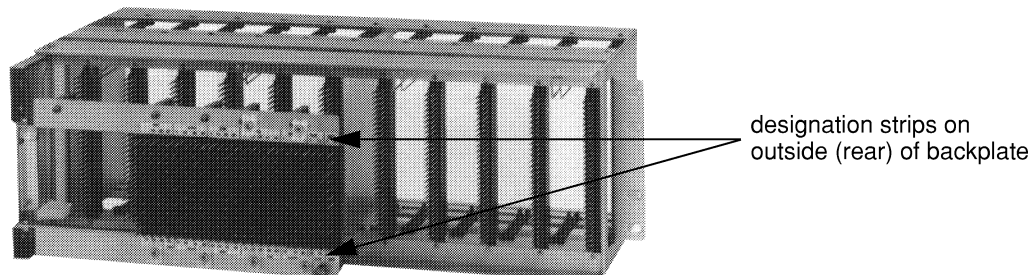## Shelf Versions and Applications

1.3 Relay-rack-configured Type 10 Shelves are available in standard versions, in universal versions, and in universal connectorized versions. The distinguishing characteristics of all versions are covered in paragraphs 1.7 and 1.8. On standard (non-universal) Type 10 Shelves, all connections between modules and to equipment external to the shelf are made via wire-wrapping pins on the back of the shelf (Figure 1-3). The Type 10 Universal Shelf (Figure 1-4) and Universal Connectorized Shelf (Figure 1-6) each have a rear-mounted hinged backplate at which mainframe tie cables are terminated. The Universal Shelf terminates these tie cables via wire-wrapping, while the Universal Connectorized Shelf is equipped with three 25-pair female Amphenol-type cable connectors for tie-cable termination. The Universal Connectorized Shelf also has four 12-pin wire-wrapping connectors on the backplate for battery, ground, and ring generator connections.
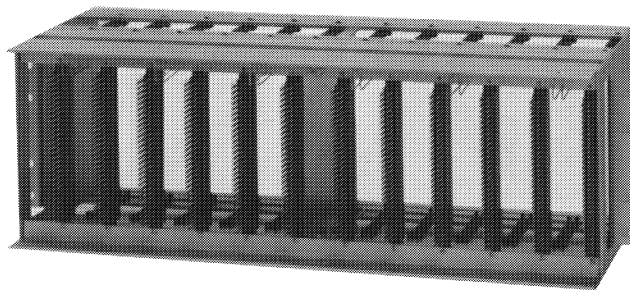
Figure 1-3   Rear of Type 10 Shelf

Backplate Pin Field on 10XXU Shelf

1.4 The wire-wrapping pins on the backplate of Type 10 Universal Shelves are arranged in 12 rows of 24 pins each. At the top and bottom of both the outside (rear) and inside of the backplate are designation strips that identify areas (e.g., **xmt**, **rcv**, **2W**, and **sig**) in the pin field and pin numbers in each area. Pin numbering for each designated area begins at the top row of the first column of pins, runs vertically (downward) to the bottom (twelfth) row, and continues with the top pin in the adjacent pin column. This pattern is identified on the designation strips, which are shown in Figure 1-5.

designation strips on outside (rear) of backplate

Figure 1-4   Type 10 Universal Shelf

| rcv				xmt				2W				sig					misc			bat		gen	
1	13	25	37	1	13	25	37	1	13	25	37	1	13	25	37	49	1	13	25	1	13	1	13

↕ pins 1 through 12 of 48-pin **rcv** area
(pattern continues in next pin column
and repeats in the other areas)

12	24	36	48	12	24	36	48	12	24	36	48	12	24	36	48	60	12	24	36	12	24	12	24
	rcv				xmt				2W				sig					misc			bat		gen

designation strip, bottom outside of backplate

gen		bat		misc			sig					2W				xmt				rcv			
13	1	13	1	25	13	1	49	37	25	13	1	37	25	13	1	37	25	13	1	37	25	13	1

designation strip, top inside of backplate

pins 1 through 12 of 48-pin **rcv** area
(pattern continues in next pin column
and repeats in the other areas) ↕

| 24	12	24	12	36	24	12	60	48	36	24	12	48	36	24	12	48	36	24	12	48	36	24	12
gen		bat		misc			sig					2W				xmt				rcv			

designation strip, bottom inside of backplate

Figure 1-5   Backplate Designation Strips (with Explanations), Type 10 Universal Shelf

Backplate Connectors and Pins on 10XXUC Shelf

1.5   As mentioned above, Figure 1-6 shows the Type 10 Universal Connectorized Shelf. The outside of its hinged backplate is shown in Figure 1-7. The pin arrangement on the inside of the backplate is shown in Figure 2-5 later in this practice.
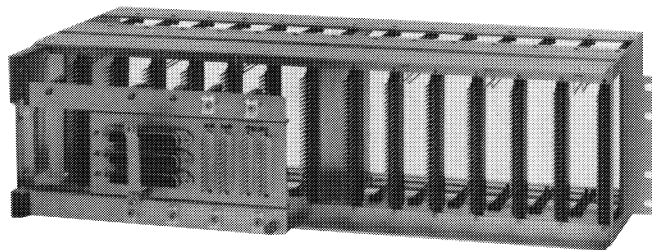
Figure 1-6   Type 10 Universal Connectorized Shelf
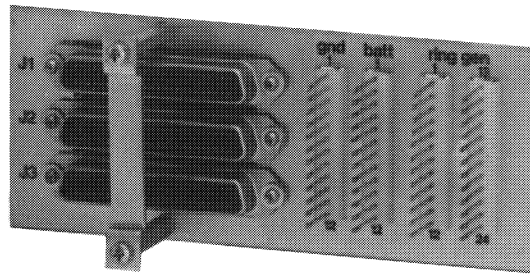
Figure 1-7   Outside View of Backplate, Type 10 Universal Connectorized Shelf

Backplate-to-Module-Connector Jumpers, 10XXU and 10XXUC Shelves

1.6   On both Type 10 Universal and Type 10 Universal Connectorized Shelves, jumpers are distributed from the wire-wrapping pin field on the inside of the backplate (the side facing the rear of the shelf) to wire-wrapping pins at the back of the individual module mounting positions. The backplate and its connector and pins function much like an intermediate distributing frame, allowing the CO installer to terminate all mainframe tie cables (via either wire-wrapping or 25-pair connector) when the shelf is installed. Then, as requirements arise, jumpers can be run from the inside of the backplate to the wire-wrapping pins on the rear of the 56-pin card-edge connectors at the appropriate module positions. When a disconnect (removal) or change order is received, only the jumpers, and not the tie cable, need be cut and removed or changed.

Versions, Mounting, and Capacities

1.7   Seven versions of the basic (non-universal) Type 10 Shelf are available. Four are designed specifically for relay-rack mounting, while the remaining three mount in KTU apparatus cases (or, via mounting bars, in a relay rack). Some Type 10 Shelves will accept slightly wider Type 400 modules as well as Tellabs Type 10 modules. Those shelves designed to house only Tellabs Type 10 modules permit a slightly greater mounting density (see Table 1).

shelf	capacity	application	module type
1002	2 modules	KTU or apparatus case	Type 10 or Type 400
1004	4 modules	KTU or apparatus case	Type 10 or Type 400
1006	6 modules	KTU or apparatus case	Type 10 or Type 400
1011	11 modules	19-inch relay rack	Type 10 or Type 400
1012	12 modules	19-inch relay rack	Type 10 only
1013	13 modules	23-inch relay rack	Type 10 or Type 400
1014	14 modules	23-inch relay rack	Type 10 only

Table 1-1   Type 10 Shelf Versions

1.8   Four versions of the Type 10 Universal Mounting Shelf (the 1011U, 1012U, 1013U, and 1014U) and four versions of the Type 10 Universal Connectorized Mounting Shelf (the 1011UC, 1012UC, 1013UC, and 1014UC) are available. Their capacities and applications and the modules that they accommodate are the same as those listed in Table 1 for the 1011, 1012, 1013, and 1014 Shelves, respectively.

Physical Characteristics

1.9 The Type 10 Shelf is approximately 6 inches high and protrudes approximately 4.75 inches in front of and 0 inches behind the upright frame channel of a standard relay rack. The Type 10 Universal and Universal Connectorized Shelves are approximately 6 inches high and protrude approximately 4.75 inches in front of and 1.5 inches behind the upright frame channel of a standard relay rack. Four mounting screws are provided with each shelf for securing the shelf to the rack or apparatus case.

1.10 Type 10, Type 10 Universal, and Type 10 Universal Connectorized Shelves are constructed of lightweight brushed aluminum. Large ventilation openings in the top and bottom of each shelf provide a vertical chimney for the escape of heat generated by the electronic equipment mounted therein. When a number of shelves are stacked in a relay rack, convection currents drawn through the chimney aid in keeping the equipment cool. An integral brace-plate between module positions at the center of relay-rack versions of the shelf ensures rigidity and prevents warpage. Plastic card guides in the interior of the shelf allow modules to be easily inserted into their correct plug-in connectors.

2. Installation

Inspection

2.1 Immediately after unpacking the Type 10, Type 10 Universal, or Type 10 Universal Connectorized Mounting Shelf, inspect it for any shipping damage. If damage is found, file a claim with the carrier as soon as possible. If the shelf is stored, inspect it again prior to installation.

Mounting

2.2 The 1002, 1004, and 1006 Shelves mount in KTU apparatus cases by means of mounting ears on the top and bottom of each shelf. If these shelves are to be mounted in a relay rack, mounting bars must be used across the rack to provide points of attachment for the mounting ears. Both 19-inch (Tellabs part no. 10.1635B) and 23-inch bars (Tellabs part no. 10.1634B) are available. These mounting bars are sold separately, so two are required.

2.3 Relay-rack-configured Type 10 Shelves (the 1011, 1012, 1013, and 1014, as well as their Universal and Universal Connectorized counterparts) require an average of 3.5 mounting spaces (6-1/8 inches) per shelf in racks with 1-3/4-inch mounting spaces and 3.0 mounting spaces (6.0 inches) per shelf in racks with 2-inch mounting spaces. The maximum numbers of Type 10 Shelves that can be mounted in relay racks of various heights are listed in Tables 2-1 and 2-2.

type of rack support	overall height	no. of mounting spaces	maximum no. of Type 10 Shelves
floor	5 feet 2-1/8 inches	31	8
floor	7 feet 0 inches	43	12
floor	9 feet 0 inches	56	16
overhead	8 feet 8 inches	48	13
overhead	11 feet 6 inches	68	19

Table 2-1 Shelf Capacity, 19- or 23-Inch Rack with 1-3/4-Inch Mounting Spaces

type of rack support	overall height	no. of mounting spaces	maximum no. of Type 10 Shelves
floor	7 feet 0 inches	37	12
overhead	8 feet 8 inches	42	16
overhead	11 feet 6 inches	62	20

Table 2-2 Shelf Capacity, 23-Inch Rack with 2-Inch Mounting Spaces

2.4 Relay-rack-configured Type 10 Shelves can be mounted in any desired arrangement in 19- or 23-inch racks with 1-3/4-inch mounting spaces (i.e., drilled on 1-3/4-inch centers). In the most efficient arrangement (Figure 2-1), shelves 1 and 2 together occupy exactly seven mounting spaces. This leaves complete mounting spaces immediately above and below shelves 1 and 2 for mounting additional equipment (such as a jackfield, fuse panel, or, as shown, another shelf). This arrangement is the most efficient because it minimizes the occurrence of unusable partial mounting spaces.

Note: *When mounting Type 10 Shelves per Figure 2-1, be certain that the screw holes in the shelf mounting ears and those in the relay rack are lined up exactly as shown and that screws (two per mounting ear) are inserted exactly where indicated in the figure. Note that a 1⁄4-inch gap will occur between shelves 1 and 2; this gap will also occur between shelves 3 and 4, 5 and 6, etc. No gap will exist between shelves 2 and 3, 4 and 5, etc. If shelf 1 is mounted properly, the others will automatically fall into the correct pattern.*

2.5 When relay-rack-configured Type 10 Shelves are mounted in 23-inch racks with 2-inch mounting spaces (i.e., drilled on 2-inch centers), each shelf occupies 3.0 mounting spaces and there are no gaps between shelves. For maximum density, install the first shelf as close to the top of the rack as alignment of the mounting holes allows.

Tie Cable Installation (10XXU and 10XXUC Shelves)

2.6 Tellabs recommends the use of three tie cables from the main frame to the Universal and Universal Connectorized Shelves. The use of separate transmit, receive, and signaling/ 2wire cables minimizes crosstalk and separates high and low transmission levels. On Universal Shelves, tie cables are terminated to appropriate wire-wrapping pins on the rear of the backplate (Figure 1-6). On Universal Connectorized Shelves, tie cables are terminated at connectors **J1** through **J3** (Figure 1-7). Two 12-pin wire-wrapping connectors, **batt** and **gnd**, are used for battery and ground connections, respectively. Two 12-pin connectors labeled **ring gen** are used for ringing generator connections. Routing of tie cables is described in paragraphs 2.7 and 2.8.
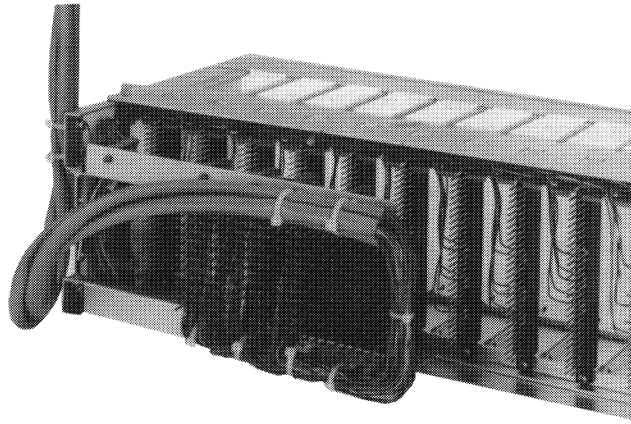
10XXU (Universal) Shelves

2.7 Tie cables from the mainframe are routed to the Universal Shelf from the left side (looking at the shelf from the rear). As the cable approaches the shelf, two tie mounts are provided to stabilize and properly route the cable. At this point (see Figure 2-2), the tie cable is routed downward into a service loop that allows the hinged backplate to swing open freely. The loop must be full but should not extend below the bottom of the shelf, as it could then interfere with the shelf immediately below. After the service loop, the cable is routed upward and across the top of the backplate to two tie mounts for stability at this end of the loop. Individual leads are then routed downward across the bottom of the backplate and fanned up to the appropriate wire-wrapping pins. Tie mounts are provided across the bottom of the backplate to dress groups of leads. Tie cables to the Type 10 Universal Shelf must be routed as described above to prevent undue bending, fatigue, and resultant physical failure of the cable as the backplate is moved from the open position (Figure 2-3) to the closed position (Figure 2-2).
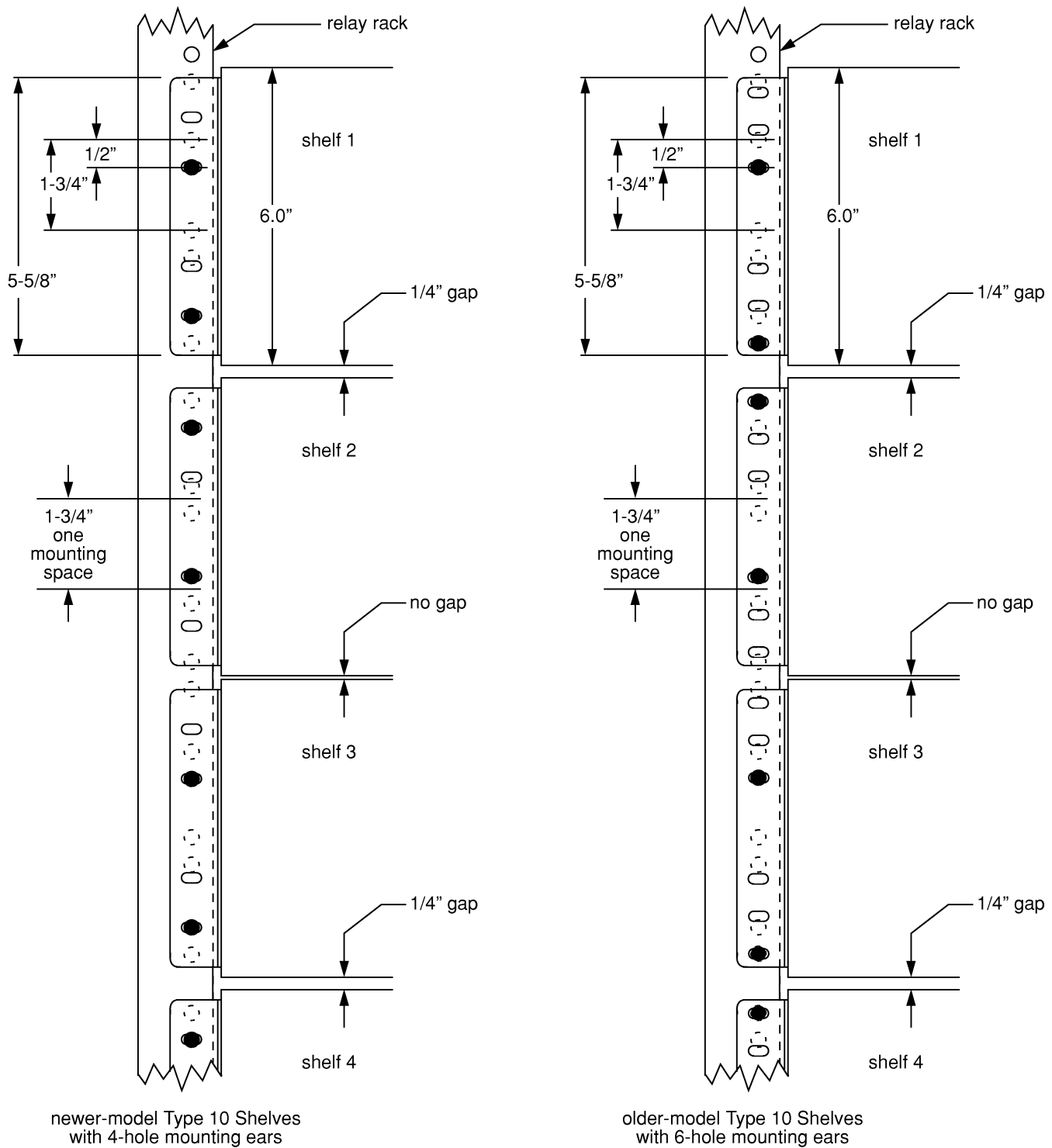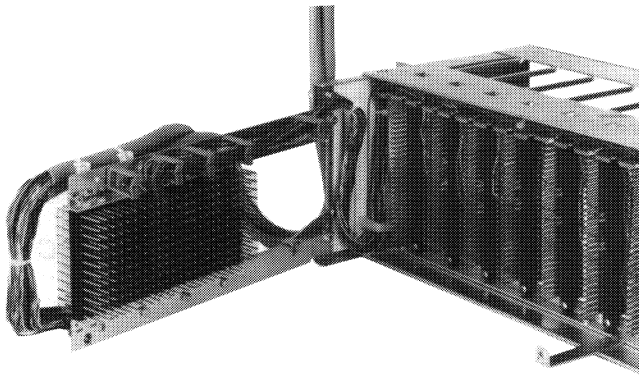
Figure 2-1   *Shelf Lineup for Maximum Density in Relay Racks Drilled on 1-3/4-Inch Centers (Both Newer and Older Shelves Shown)*

Figure 2-2   Type 10 Universal Shelf in Operating Configuration (Backplate Locked in Place)

Figure 2-3   Type 10 Universal Shelf with Backplate Swung Open for Jumper Access

10XXUC (Universal Connectorized) Shelves

2.8   Connectorized tie cables from the main frame are routed to the Universal Connectorized Shelf from the left side (looking at the shelf from the rear). As the cable approaches the shelf, go tie mounts are provided to stabilize and properly route the cable. At this point (see Figure 2-2), the cable is routed downward into a service loop in essentially the same manner as for the Universal Shelf. Again, the loop must be full but should not extend below the bottom of the shelf. After the service loop, the cable is routed directly to one of the 25-pair cable connectors. The backplate of the Type 10 Universal Connectorized Shelf has a reversible connector hold-down bracket for use with both low-profile and high-profile cable connector hoods. This bracket is secured via two screws to standoff posts on the rear of the backplate and must be removed to install the 25-pair cables. After the tie cables are installed, replace the bracket as shown in Figure 2-4. Tie cables to the Type 10 Universal Connectorized Shelf must be routed as described above. Non-connectorized tie cables from the main frame (battery, ground, and ring generator connections) are routed to the Universal Connectorized Shelf as described in paragraph 2.7.
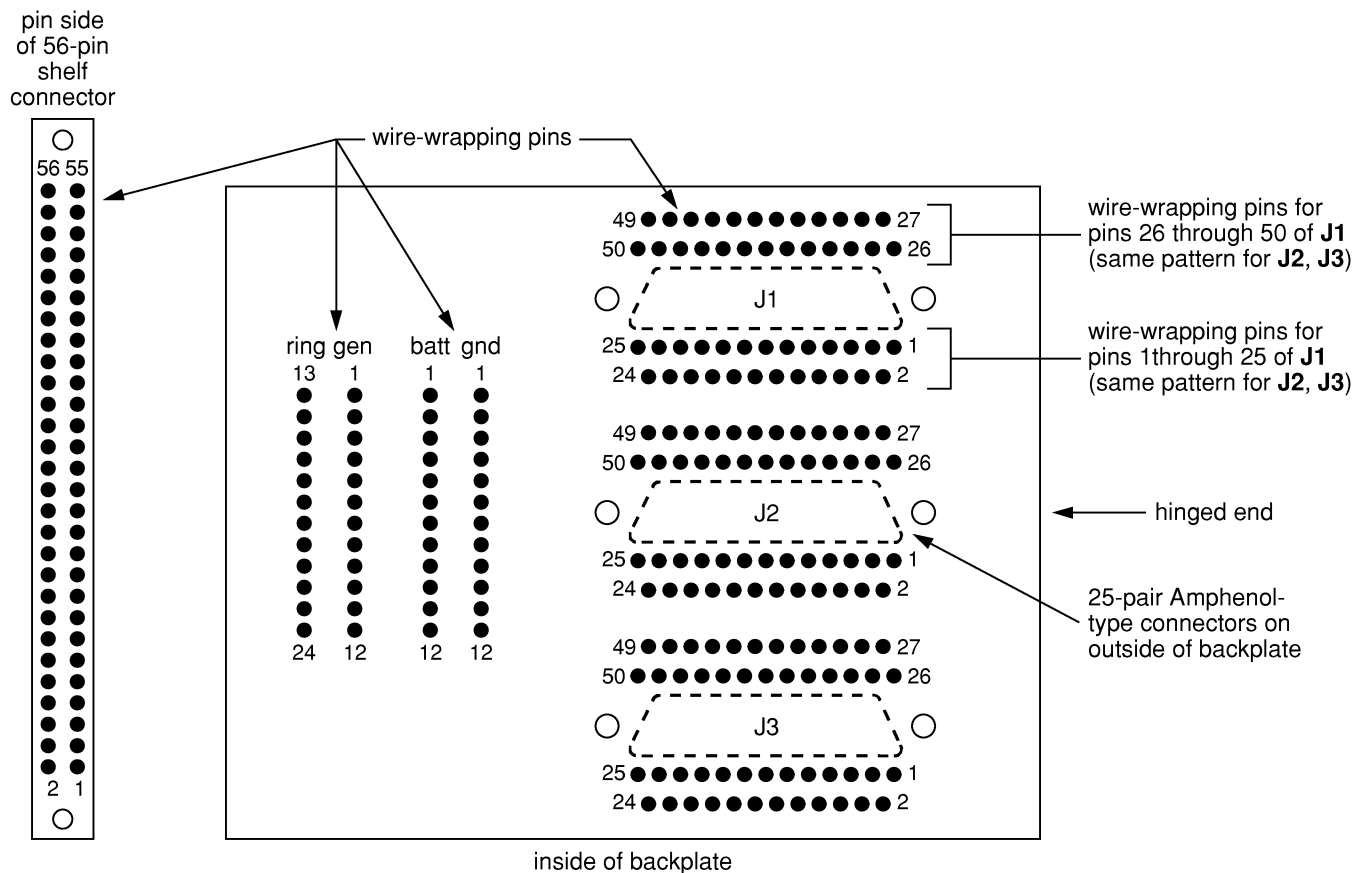
Jumper Installation (10XXU and 10XXUC Shelves)

2.9   Jumper leads from the 10XXU and 10XXUC shelf backplate to various module positions may be installed as required. Figure 2-5 shows the wire-wrapping pins on the inside of the 1012UC shelf backplate (typical for all 10XXUC shelves) and on the 56-pin module connectors of the shelf itself. Jumpers are installed between the backplate pins and the module connector pins. Figure 2-3 provides a visual reference for the following description of jumper-lead routing. (Please note that while Figure 2-3 shows a Type 10 Universal Shelf, jumper

installation and routing on Type 10 Universal Connectorized Shelves are essentially the same.) Leads from the various module positions are routed up and through wire guides at the top of the shelf and then to the left rear side of the shelf, **where a service loop must be constructed** to provide freedom of movement for the hinged backplate and to position the leads to prevent fatigue and subsequent failure as the backplate is opened and closed. One wire saddle is provided near the bottom of the service loop to maintain the loop's position. The loop extends to the bottom of the shelf and returns to the top of the backplate. Individual leads are fanned from the top of the backplate down to appropriate pins. Saddles are provided across the top of the backplate to dress the cable.

2.10 After all wiring is completed, return the hinged backplate to the closed position. To secure the backplate, a spring-loaded fastener at the lower righthand. corner of the backplate is screwed into a receptacle on the main body of the shelf.
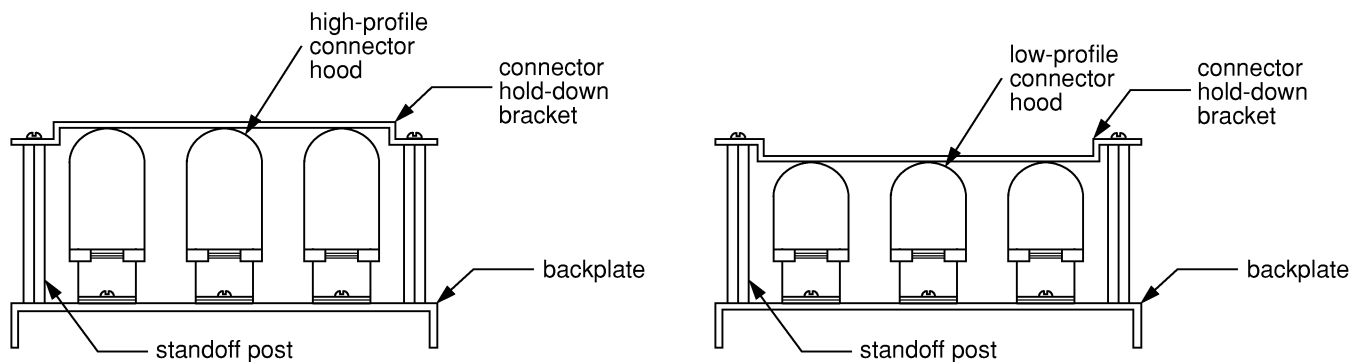
Figure 2-4   Attachment of Reversible Hold-Down Bracket when Used with High-Profile Connector Hoods (Left Illustration) and with Low-Profile Connector Hoods (Right Illustration)

pin side
of 56-pin
shelf
connector

wire-wrapping pins

wire-wrapping pins for
pins 26 through 50 of **J1**
(same pattern for **J2**, **J3**)

wire-wrapping pins for
pins 1through 25 of **J1**
(same pattern for **J2**, **J3**)

ring gen   batt gnd

hinged end

25-pair Amphenol-
type connectors on
outside of backplate

inside of backplate

*Figure 2-5   Inside View of Hinged Backplate and Pin-Side View of 56-Pin Connector on 1012UC
Shelf (Typical of All 10XXUC Shelves)*

3. Specifications

Type 10 Shelves

Capacity and Type of Mounting	• 1002*: 2 modules, KTU apparatus case
	• 1004*: 4 modules, KTU apparatus case)
	• 1006*: 6 modules, KTU apparatus case
	• 1011*: 11 modules, 19-inch (48.3cm) relay rack
	• 1012: 12 modules, 19-inch (48.3cm) relay rack
	• 1013*: 13 modules, 23-inch (58.4cm) relay rack
	• 1014: 14 modules, 23-inch (58.4cm) relay rack
	* Shelf is compatible with Type 400 modules and others of like dimensions.
Connectors	• Module connectors: 56-pin, with bifurcated, gold-plated contacts
	• Wire-wrapping connectors: 0.045-inch square posts
Height and Depth	• Height (all): 5.92 inches (15.04cm)
	• Depth (all): 7.31 inches (18.57cm)
Width (Excluding Mounting Ears)	• 1002: 3.19 inches (8.10cm)
	• 1004: 6.28 inches (15.95cm)
	• 1006: 9.35 inches (23.75cm)
	• 1011: 17.00 inches (43.18cm)
	• 1012: 17.50 inches (44.45cm)
	• 1013: 20.00 Inches (50.80cm}
	• 1014: 20.40 inches (51.82cm)
Weight	• 1002: 12 ounces (0.34kg)
	• 1004: 1 pound 8 ounces (0.68kg)
	• 1006: 2 pounds 9 ounces (1.16kg)
	• 1011: 4 pounds 8 ounces (2.05kg)
	• 1012: 4 pounds 11 ounces (2.12kg)
	• 1013: 5 pounds 2 ounces (2.32kg)
	• 1014: 5 pounds 5 ounces (2.41kg)

Type 10 Universal and Type 10 Universal Connectorized Shelves

Capacity and Type of Mounting	• 1011U* and 1011UC*: 11 modules, 19-inch (48.3cm) relay rack • 1012U and 1012UC: 12 modules, 19-inch (48.3cm) relay rack • 1013U* and 1013UC*: 13 modules, 23-inch (58.4cm) relay rack • 1014U and 1014UC: 14 modules, 23-inch (58.4cm) relay rack * Shelf is compatible with Type 400 modules and others of like dimensions.
Connectors	• Module connectors: 56-pin, with bifurcated, gold-plated contacts • Wire-wrapping connectors: 0.045-inch square posts
Height and Depth	• Height (all): 5.92 inches (15.04cm) • Depth (all): 9.90 inches (25.15cm)
Width (Excluding Mounting Ears)	• 1011U and 1011UC: 17.00 inches (43.18cm) • 1012U and 1012UC: 17.50 inches (44.45cm) • 1013U and 1013UC: 20.00 Inches (50.80cm} • 1014U and 1014UC: 20.40 inches (51.82cm)
Weight	• 1011U: 5 pounds 12 ounces (2.61kg) • 1012U: 6 pounds (2.72kg) • 1013U: 6 pounds 6 ounces (2.89kg) • 1014U: 6 pounds 11 ounces (3.03kg) • 1011UC: 5 pounds 14 ounces (2.68kg) • 1012UC: 6 pounds 1 ounce (2.75kg) • 1013UC: 6 pounds 8 ounces (2.95kg) • 1014UC: 6 pounds 13 ounces (3.09kg)

4. *Troubleshooting, Technical Assistance, Repair and Return*

Troubleshooting

4.1 A predetermined procedure to test the wiring in an installed Type 10, Type 10 Universal, or Type 10 Universal Connectorized Shelf is impossible because of variation in wiring schemes. The shelf should be thoroughly physically inspected before mounting, however, to ensure that there are no bent or broken connector pins or other visible defects. If trouble is encountered in an operational shelf, ensure that all modules are seated properly in their slots and operating correctly and that all wiring is correct. If a shelf is suspected of being defective, a new one should be substituted and the test conducted again. If the substitute operates correctly, the original should be considered defective and returned to Tellabs as directed below under "Repair and Return." We strongly recommend that no internal (component-level) testing or repairs be attempted on Tellabs equipment. Unauthorized testing or repairs may void its warranty. Also, if the equipment is part of a registered system, unauthorized repairs will result in noncompliance with Parts 15 and/or 68 of the FCC Rules and Regulations.

Technical Assistance

4.2 Contact Tellabs Technical Assistance as follows:

Location	Telephone	FAX
Tellabs International, Inc., Sucursal, Buenos Aires, **Argentina**	+541.393.0764, .0892, or .0835	+541.393.0732
Tellabs Pty. Ltd., Milson's Point (Sydney), NSW, **Australia**	+61.2.9966.1043	+61.2.9966.1038
Tellabs International, Inc., Rio de Janeiro, **Brazil**	+55.21.233.1604	+55.21.233.1604
Tellabs Communications Canada Ltd., Mississauga, Ontario, **Canada**	905-858-2058	905-858-0418
Tellabs International, Inc., Beijing, **China**	+86.10.6501.1873	+86.10.6501.1871
Tellabs International, Santa Fe de Bogota, **Colombia**	+571.623.3162 or .3216	+571.623.3047
Tellabs International, Inc., **Dubai, U.A.E.**	+971.4.373250	+971.4.376526
Tellabs U.K. Ltd., High Wycombe, Bucks, **England**	+44.1494.555800	+44.1494.555801
Martis Oy, Espoo, **Finland**	+358.9.41.31.21	+358.9.41.31.2815
Tellabs SAS, Guyancourt, **France**	+33.1.345.20838	+33.1.309.60170
Tellabs GmbH, Munich, **Germany**	+49.89.54.90.05.+ext. or 0 (switchboard)	+49.89.54.90.05.44
Tellabs H.K. Ltd., **Hong Kong**	+852.2866.2983	+852.2866.2965
Tellabs GmbH Representative Office, Budapest, **Hungary**	+36.1.2681220	+36.1.2681222
Tellabs International, Inc., Bangalore, **India**	+91.80.2261807	+91.80.2262170
Tellabs Ltd., County Clare, **Ireland**	+353.61.703000	+353.61.703333
Tellabs de Mexico, Mexico City, **Mexico**	525.282.1107, .1432, .1050, or .0981	525.282.0218
Tellabs Singapore PTE, Ltd., **Singapore**	+65.336.7611	+65.336.7622
Tellabs South Africa, Hennopsmeer, **Republic of South Africa**	+27.12.672.8025	+27.12.672.8024
Tellabs International, Inc., Seoul, **South Korea**	+82.2.589.0667 or .0668	+82.2.589.0669

Location	Telephone	FAX
Tellabs Southern Europe S.A., Barcelona, **Spain**	+34.3.414.70.16	+34.3.414.69.25
Tellabs AB, Stockholm, **Sweden**	+46.8.678.4040	+46.8.678.4041
Tellabs International, Inc., Bangkok, **Thailand**	+662.642.7817	+662.642.7820
USA and **Puerto Rico**	800-443-5555*	630-512-7097
*All other **Caribbean** and **South American** locations, or if the toll-free number is busy, telephone 630-378-8800		

Repair and Return

4.3 If equipment needs repair, contact Tellabs' Product Services Department with the equipment's model and issue numbers and warranty date code. You will be issued a Material Return Authorization (MRA) number and instructions on how and where to return the equipment.

Location	Telephone	FAX
Martis Oy, Espoo, **Finland**	+358.0.502.771	+358.0.502.7815
Tellabs Communications Canada Ltd., Mississauga, Ontario, **Canada**	905-858-2058	905-858-0418
Tellabs Ltd., County Clare, **Ireland**	+353.61.703000	+353.61.703333
Tellabs Operations, Inc., **Lisle, IL USA**	(800) 443-5555 (USA and Puerto Rico only), 630-378-8800 (other International)	630-512-7097 (both)

4.4 Repair service includes an attempt to remove any permanent markings made by customers on Tellabs equipment. If equipment must be marked, it should be done with nonpermanent materials and in a manner consistent with the correct handling of electrostatically sensitive devices.