Picocell 1900 Antenna System Installation

Installation Method – 12-0152

September 4, 1998

Issue Number 1.02

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Co-Author at RICH:

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Comments:

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1.0 General Information

1.1 Description

Purpose: To install the Public Microcell antenna system in an indoor environment.

Caution: This method is to be used exclusively for an indoor application; it does not support an outdoor antenna application. Should you undertake an outdoor application, the following procedures must be performed in accordance with Northern Telecom grounding practices; in specific, Northern Telecom Standard 4122. Antennas located outdoors must be provisioned with lightning protectors (Northern Telecom Part Number NT3P21DA) where the antenna cable enters the building, and must be connected to a low impedance ground. For more information, refer to Northern Telecom Standard 4122.

This Methods specifies Andrew type cables and connectors which are recommended for the Picocell 1900 system. If equivalent cables have been provisioned from other manufacturers refer to the instructions provided with the types for cable and connectors provided..

Equipment: ..... •1900 MHz indoor antennas
•Heliax RF cable
•N-type male connectors
•RF Combining Hybrids
•50 Ohm 1Watt Terminator.

Application: Both initial installs and extensions.

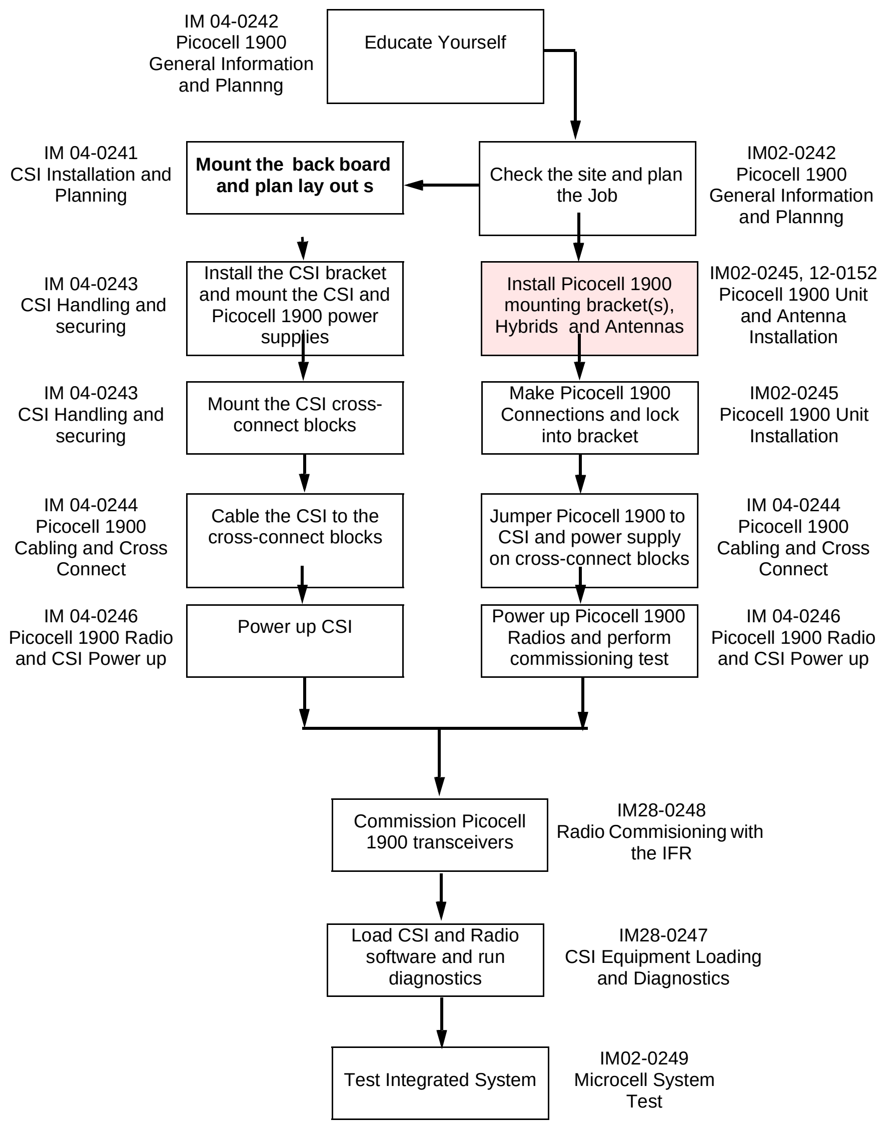
Service Impact: No impact for initial installs. Extensions will require removing the affected partition from service.

1.2 Reason for Reissue

Changes from Project Team Review Sept 1, 1998:

- Updated sections 1.1, 3.3
- Revised figures 12 and 13
- Add appendix A
- redo of tables in section 7.1 to 7.2 for legibility

Figure 11 – You Are Here Diagram



1.3 Reason for Reissue

This is the initial release of this method.

2.0 Material Requirements

2.1 Required Documents

Installation Safety Manual (ISM/IM0) - can be requested from the Regional Tool Facility.

The Methods contained in this document provide the necessary instructions to mount equipment and install cabling. This document is not sufficient to permit the complete system installation as the system design documents are required which list the RF design, floor plan and layout.

A system design specification and layout must be provided by a qualified RF or System Engineer. The design specification and layout will define radio and antenna locations as well as cable types and cable routing including:

- The location of the antennas, orientation and their position tolerances.
- The routes the cables should follow.
- The physical location of Picocell 1900 radios and Hybrids.
- RF Channel assignments and labeling scheme for cables and connectors.
- Define coverage areas and cell partitions, RF losses, gains and power levels.
- Specify Cable types and lengths for each size cable in each coverage area.
- Connectivity charts indicating "Antenna–to–Hybrid" cabling information indicating hybrid port assignments.

Note: The system design specification may call for configurations which may conflict with information in this document. In these cases the System design document shall supersede information contained in this method unless specified otherwise.

2.2 Tools.

Table 1 – Tool list

U.S. Tools	**Canadian Tools**	**Description**
		Knife Tack Hammer Pliers Damp Cloth 1000W Heat Gun Wire Brush Flat File Portable Workbench Solvent Thin Angled Wire Snips Fine Toothed Hacksaw Andrew pin soldering pliers Resistance soldering iron or industrial soldering iron Wrenches: 9/16", 19/32", 11/16 13/16", 3/4, two 21mm, one 24mm, two adjustable wrenches, one adjustable torque wrench Straight screwdriver 3/8" Drill, assorted bits (inc. 1/4") and 1 1/4" hole cutter Stepladder - Andrew pin alignment tool (Andrew p/n 224360): *used to straighten and correctly orient the pin to the conductor.* - Resistance soldering iron: *if possible, this is preferable to a normal soldering iron because it heats faster, provides greater heat, and is easier to use. If this is not an option use an industrial/ heavy use soldering iron.* - Andrew pin depth gauge for N-Male connectors (Andrew p/n 224380): *used to establish that the pin is set to the correct depth inside of the connector.* - Andrew pin soldering pliers (Andrew p/n 224377): *used to hold the contact pin while it is being soldered.*

Supplies

Table 2 –Supplies			
Item	**PEC**	**CPC**	**Description**
1			**Solder: 63/37 RMA flux core.** **•Tape** **•Garnet Cloth (240 or finer)** **•Solvent Comothene, Vythene or other non-flammable cleaning fluid.**
2			

2.3 Forms

No forms are required to perform this method.

2.4 Parts List

Table 3 – Parts List			
Item	**PEC**	**CPC**	**Description**
1		A0735776	Omni Ceiling Mount Antenna e/w N (f)
2		A0736188	Directional Wall mOunt Antenna e/w N (f)
3		A0735611	Dual 4 port Hybrid
4		A0737243	Dual 8 port Hybfid
5		A0600384	N-N (f-f) Adapter
6		B0241275	N(m) to TNC(m) RF cable 1.8M
7		A0609689	50 Ohm Termination

See Table 4 on page 22 and Table 5 on page 23 for RF cables and connectors

3.0 Precautions and Preparations

3.1 Precautions

Observe the general safety precautions against personal injury and equipment damage outlined in the ISM/IM0 at all times.

3.2 Preparations

Prior to starting the operations presented in this method, arrange all materials and tools at the work location so as to minimize fatigue and inconvenience.

Inventory the installation components, documentation (installation manual, floor plans and connectivity chart) and tools you will need.

This method contains tasks that require at least two people to carry them out.

3.3 Sequence

This is a stand-alone method. It is to be performed after Method 02-0242, Picocell 1900 General Information." See Figure 1 for sequencing information.

1. From the System layout and floor plans, locate where the Hybrids are to be situated. Mount Back boards to support the hybrids if specified and Mount the Hybrid(s) to the back-board.
2. Use the System layout and floor plans to determine where the antennas are to be located, and mount the antennas. In the case of Omni antennae it will be required to mount the antenna after the cable has been run and terminated.
3. Run the cable between Hybrids, antennas and Picocell transcievers and Hybrids as specified on the system layout. Tag and designate all cables.
4. Terminate cables with connectors, connect cables to hybrids, antennas and Picocell 1900 transceivers.

CAUTION Take precautions when working on ladders to avoid damage or injury from falling or dropped cables and objects. RF cable is stiff and unwieldy and the antennas may be mounted in office or high traffic areas. Carrying out the installation during off hours to minimize interference with office staff.

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4.0 Procedure

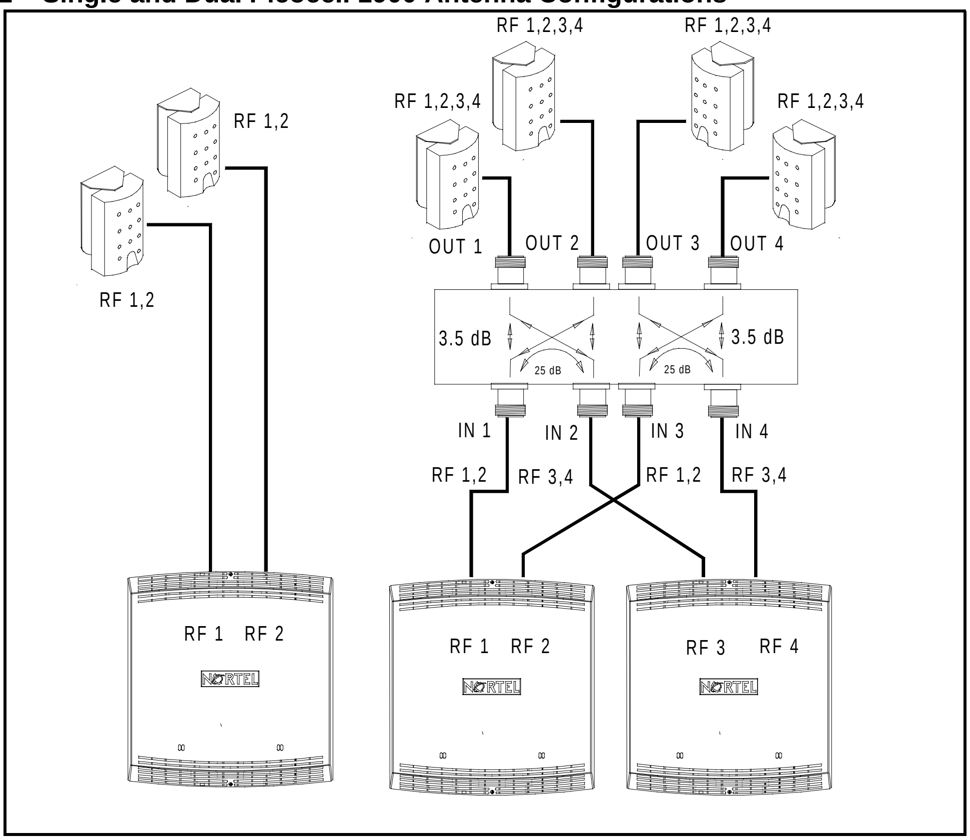
4.1 Overview

This Method includes procedures to mount and connect a Picocell 1900 antenna system. Picocell 1900 transceivers may be connected to antennae directly or combined through hybrids to antennas. Appendix A provides some reference information for 4 port Hybrids.

Dual 4 Port Hybrid

The Dual 4 port hybrid shown in Figure 1 is a bi-directional RF device which combines input ports to the output ports and provides isolation between inputs. The 4 port hybrid Insertion loss is typically 3.5 dB or less. Connecting one antenna from each transceiver to one 4 port hybrid input configures each RF channel on all 4 antennae. Cell partitions with 2-4 antennas use a dual 4 port Hybrid. Cell partitions with 5-8 antennas use a dual 8 port hybrid.

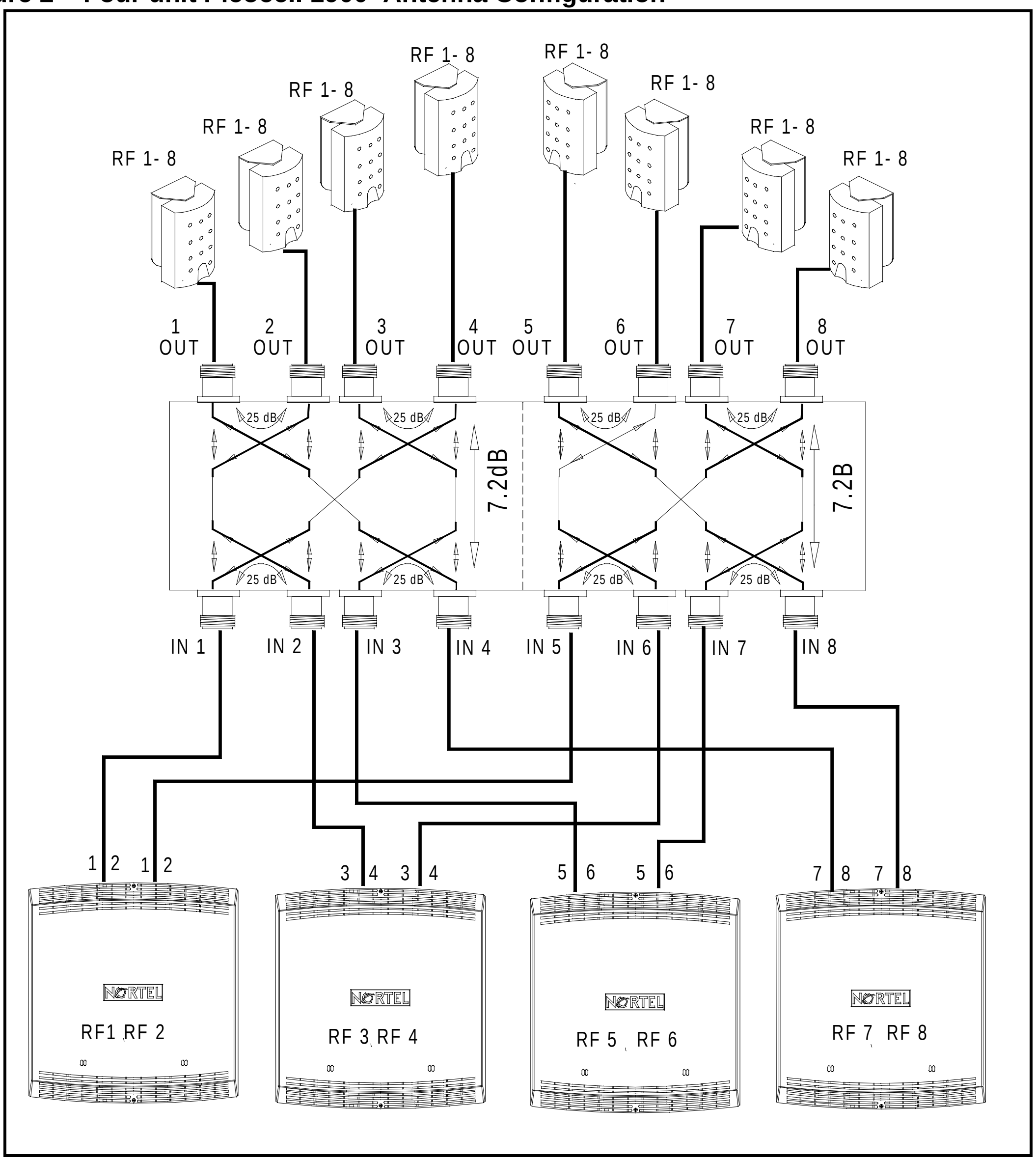
Figure 1 – Single and Dual Picocell 1900 Antenna Configurations



Dual 8 port Hybrid

The dual 8 port hybrid shown in Figure 2 is a multiple hybrid device, which internally configures 4 port hybrids to connect 4 input ports to 4 output ports with isolation between input ports. Insertion loss on the 8 port hybrid is typically 7.2 dB or less. The two antennae from each transceiver connect to an input on each 8 port hybrid and so configures each RF channel on all antennae connected to the hybrid outputs. Low-loss coaxial cables connect between the antennae, hybrids and transcievers.

Figure 2 – Four unit Picocell 1900 Antenna Configuration



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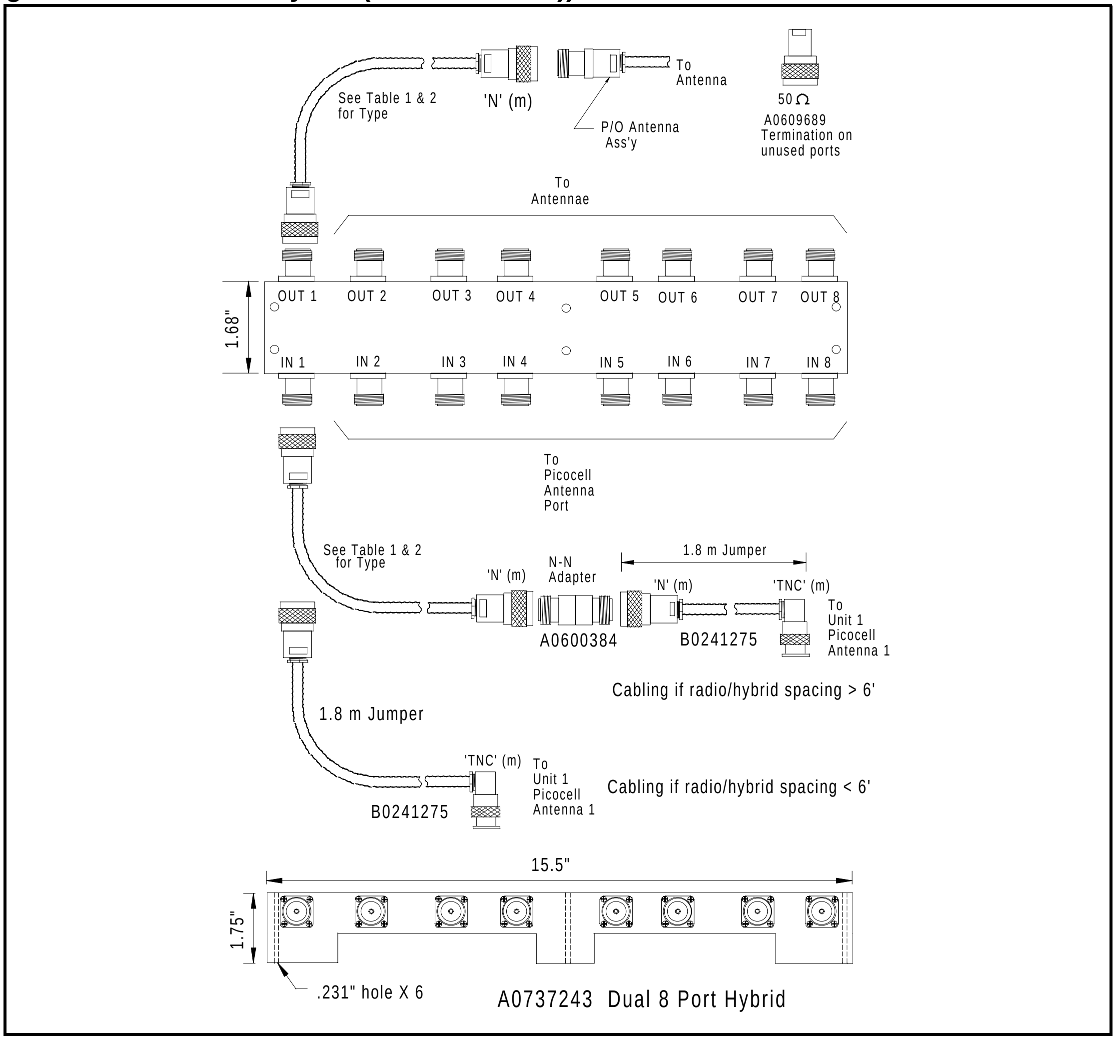
5.0 Mounting the Hybrid(s)

Hybrids may be mounted on bare wall surfaces; transceivers must follow mounting guidlines listed in IM 02-0245. Typical back board mounting is illustrated in Figures 5 and 6. Hybrids are passive devices and may be mounted in enclosed spaces; leave room for cabling and test access. Ceiling mounting of hybrids should include custom brackets with nut and bolt fasteners with IDS clips (see IM 02-0245) to support the hybrid and cables. Supporting hybrids on ceilings with common dry wall anchors is not recommended. The hybrid requires a mounting kit consisting of:

- 2.5" x # 10 wood screws
- washers 1/2" outside diameter
- a hole drilling template

Figure 3 – Dual 8 Port Hybrid (CPC A0737243))



Note: The Hybrid(s) should be mounted to permit the RF cables to enter and leave with out excessive bending and stress on connectors.

Procedure 1 – Mounting the Hybrid:

1. Choose a location for the Hybrid(s) so cabling to Picocell 1900 units and antennas will form neatly off. Use the drilling template to mark the screw holes. Predrill the holes if necessary. Screw the Hybrid(s) to the mounting board.

2. Terminate unused output ports with 50 Ohm 1Watt Terminations (Andrew part # 50T-007, NT part # A0609689).

Figure 4 – Dual 4 Port Hybrid (CPC A0735611)

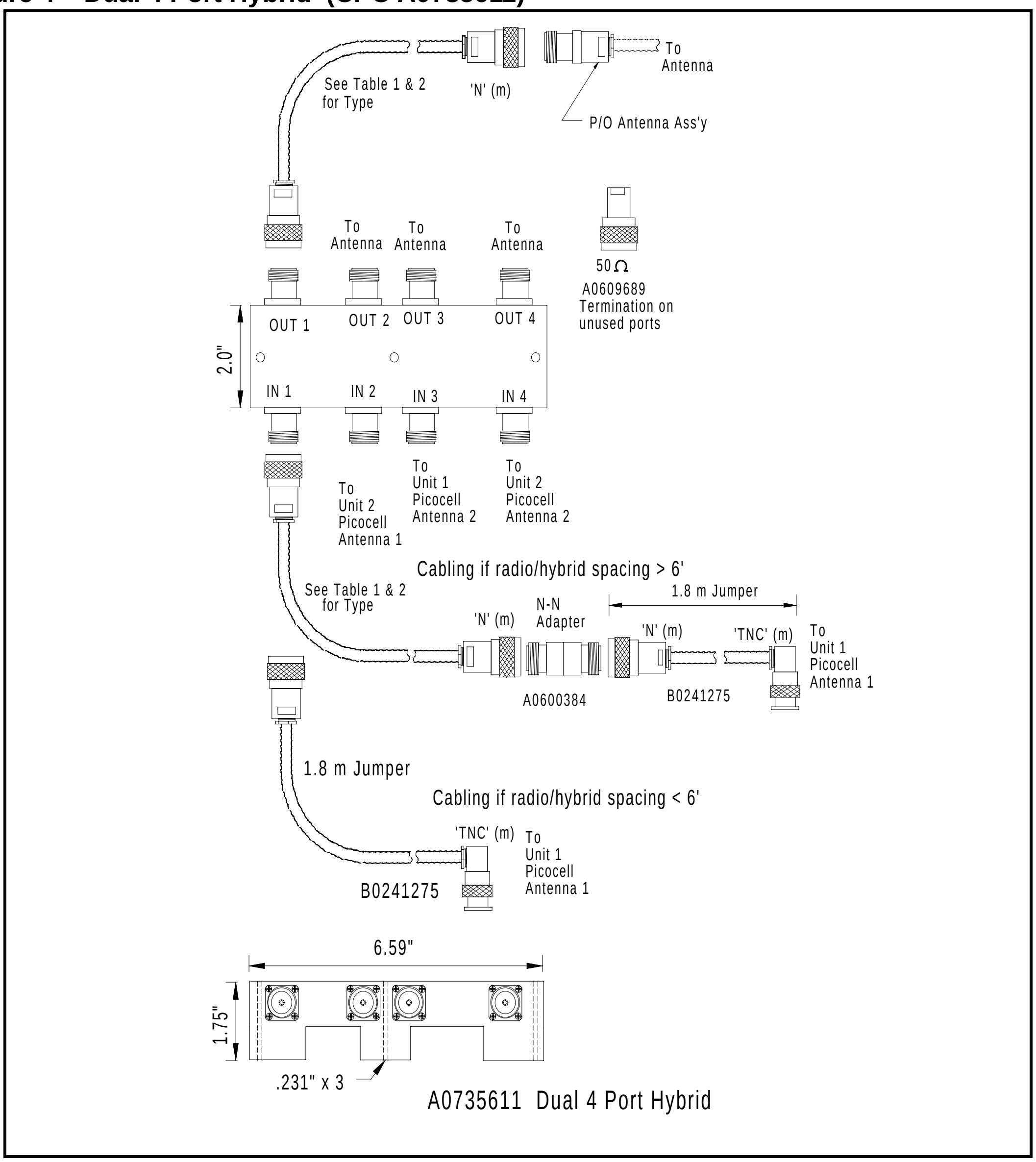


Figure 5 – Dual 8 port Back board Mounting (Typical)

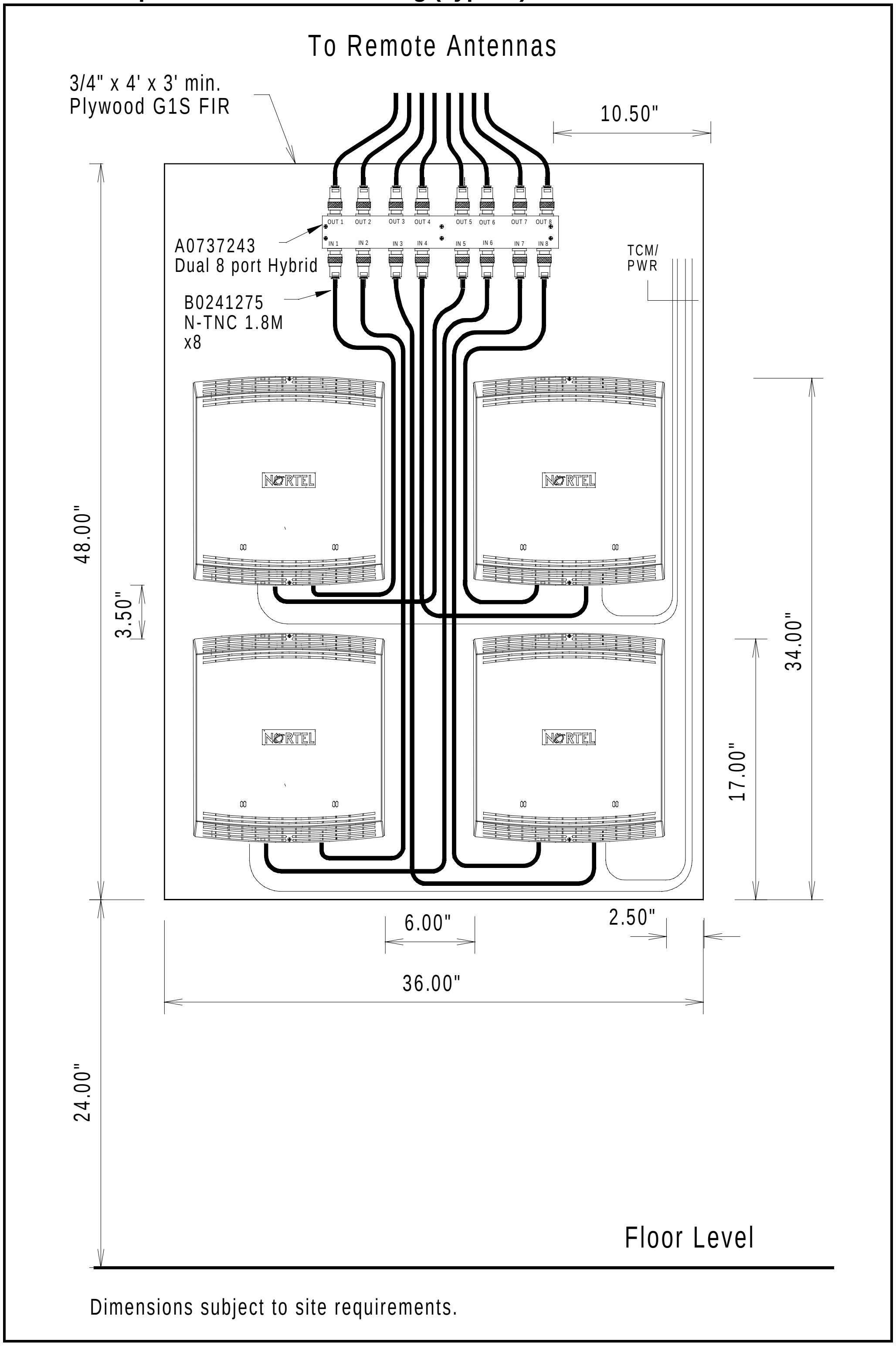


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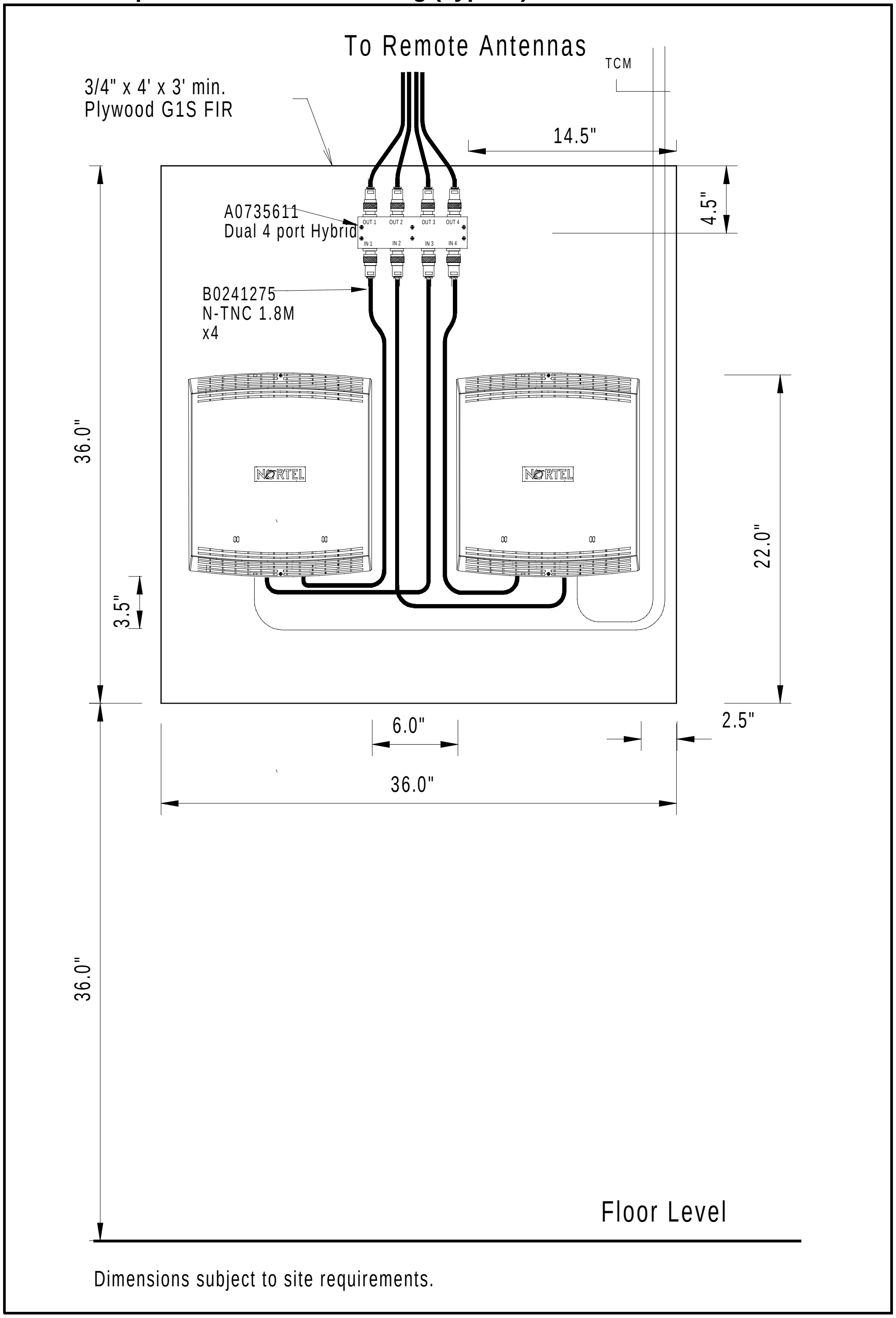
Figure 6 – Dual 4 port Back board Mounting (Typical)



6.0 Picocell 1900 Antennas

Two antennas types are supported in this document which may be provided in the system design. the The directional antenna must be mounted vertically on the wall and may swivel over a +/- 30 degree range, with the front of the antenna facing in the direction of RF propogation.

The Omni antenna is only mounted on ceilings and weighs .52 lb (.23kg) and does not require any extra support. The wall mount Directional antenna weighs .5 lb as well. Refer to the floor plan for tolerances on deviating from the ideal position should it not be possible to mount in the specified position due to obstructions.

Antenna Mounting hardware kit

- 1" x #10 wood screws
- Drywall anchors

Figure 7 – Directional (Cushcraft part number: S1857AMP10NF, CPC: A0736188

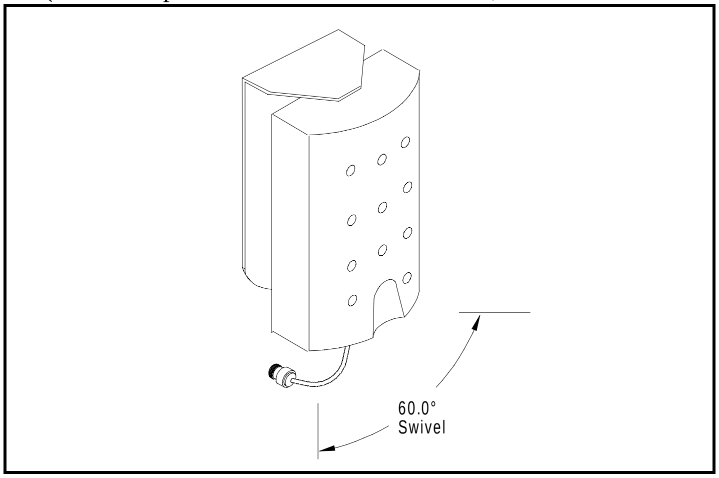
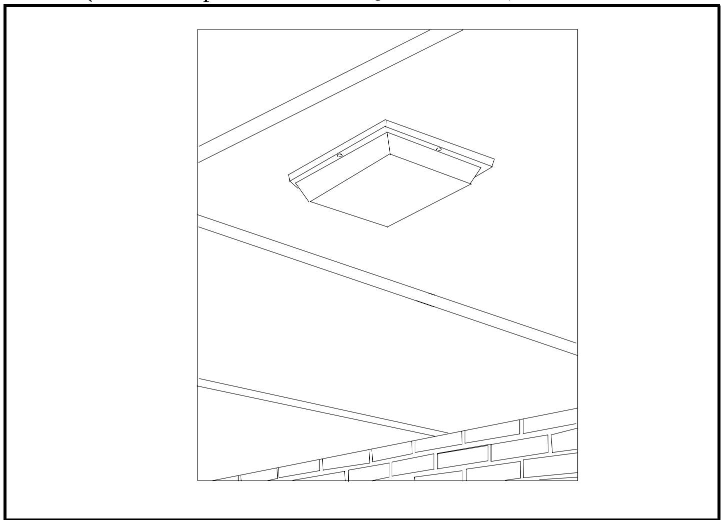


Figure 8 – Omni Antenna (Cushcraft part number: SQ1853P12NF, CPC: A0735776



Procedure 2 – Ceiling Mount Omni Antennas

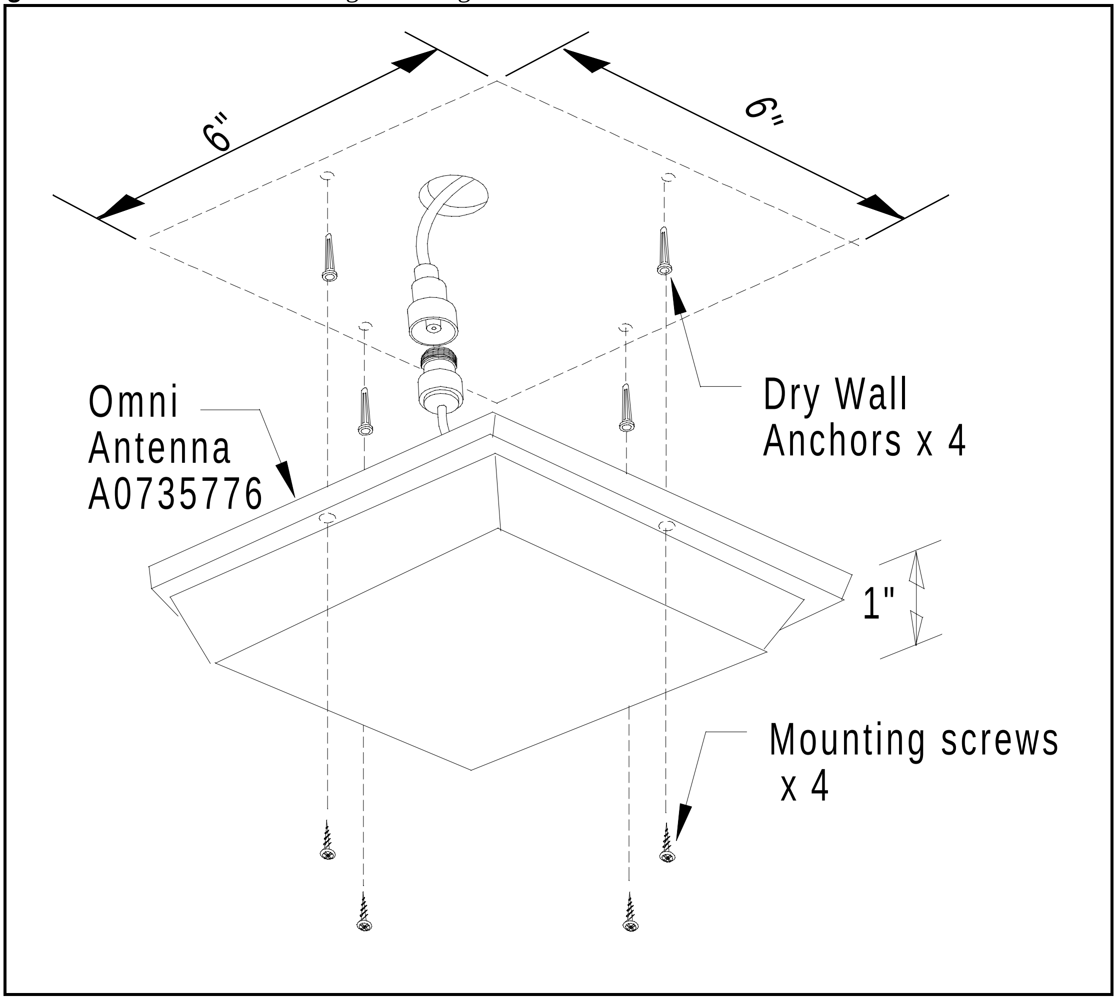
1. Mark out the location of the antenna on the ceiling, and the direction it is supposed to face. Check to see if there are any obstructions. Make adjustments if necessary but stay within the tolerances stated on the floor plan.

2. Use the mounting flange on the antenna to mark the screw holes on the ceiling. Predrill the holes, and place the drywall anchors.

3. Connect the antenna to the transmission line and then screw the antenna in place, see Figure 9.

   Note: For surfaces that will not accept wood screws (such as concrete, brick and steel), you must select and supply the appropriate hardware yourself.

Figure 9 – Omni Antenna Ceiling Mounting



Procedure 3 – Mounting Directional Antenna and Wall Bracket

1. Approximately position the antenna and bracket. Use the bracket or template provided with the antenna to mark and drill pilot holes for the wall anchors. See Figure 10.

2. Drill the Cable access hole if required.

3. Use the two screw holes on the mounting brackets back plate to mark the screw holes on the wall. screw the antenna bracket in place. Position the antenna just above the access hole

4. The cable may be run down the outside wall surface from the ceiling . For installations in buildings with hollow walls, the cable may be passed through the cable hole in the mounting bracket through the wall and then up into the ceiling cavity.

   Note: For surfaces that will not accept wood screws (such as concrete, brick and steel), you must select and supply the appropriate hardware yourself.

Figure 10 – Directional Antenna Wall Mounting

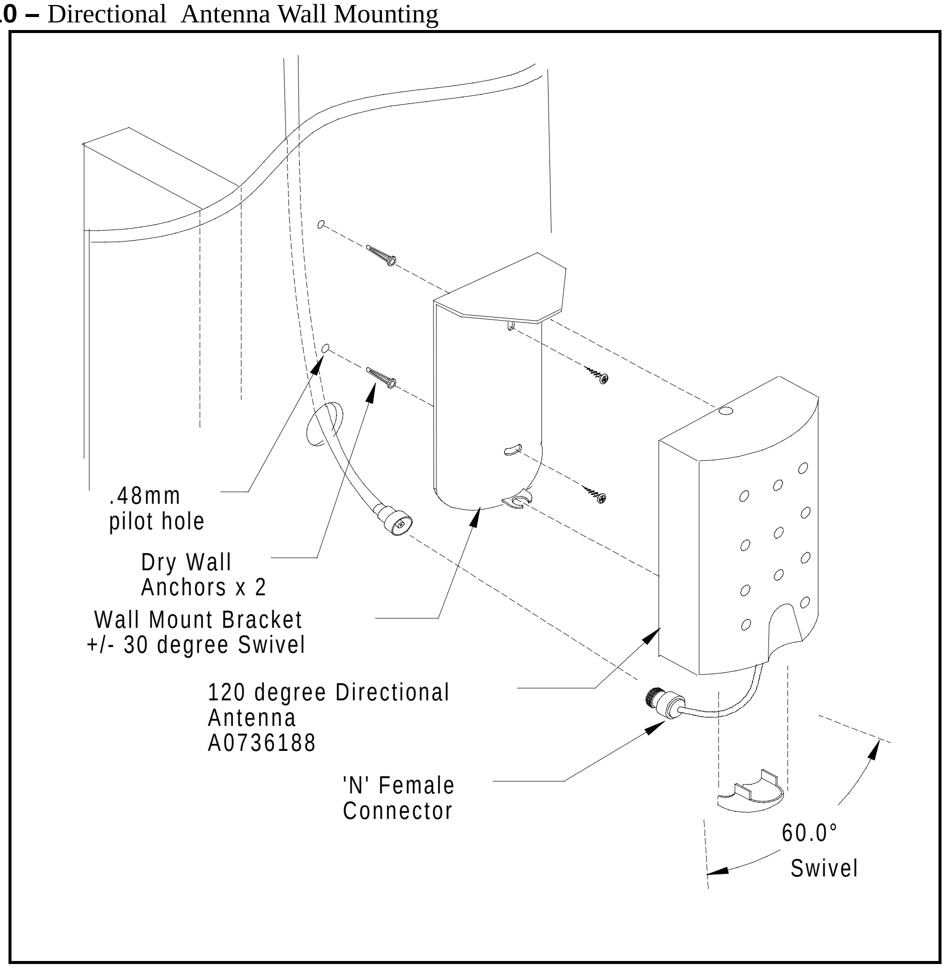


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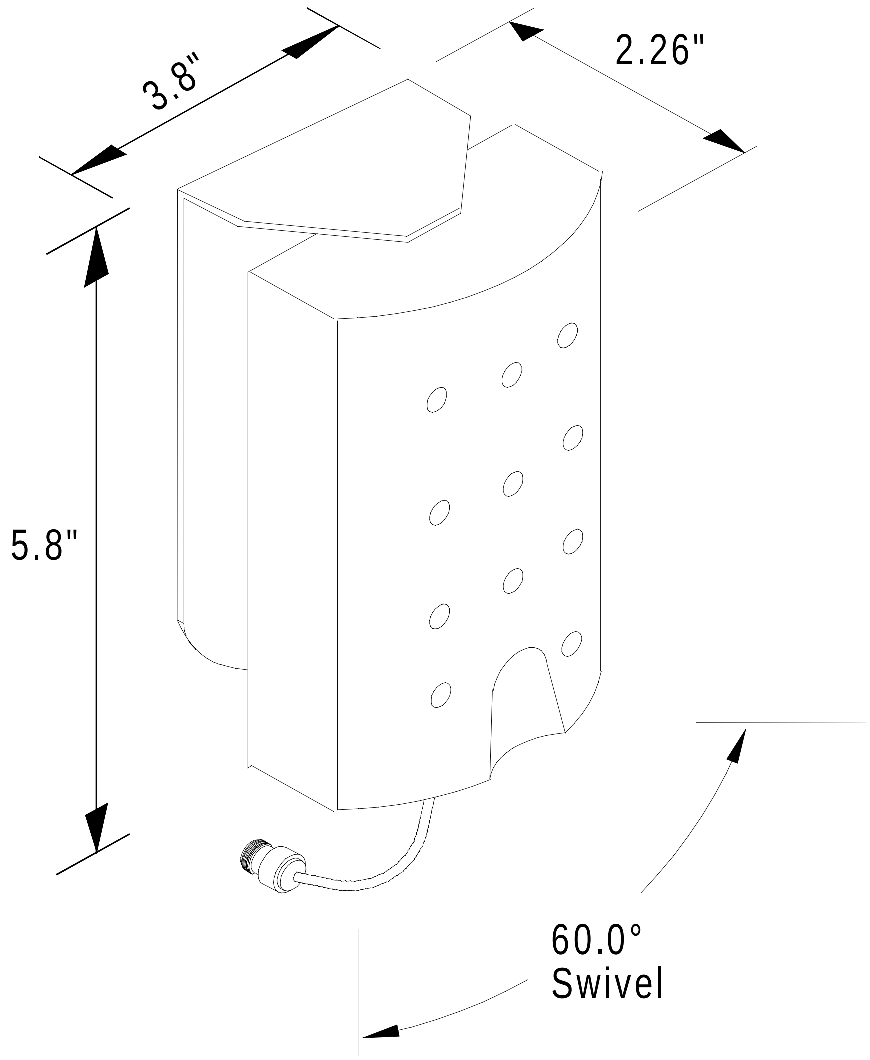
Figure 11 – Directional Antenna dimensions



7.0 Cable Types and Connectors

Andrew cables and connectors are recommended for use throughout the Picocell 1900 antenna system. One exception is the Huber-Suhner Jumper at the Picocell 1900 transceiver. The tables below lists recommended connector and cable types. The Andrew Corporation connector catalog numbers, Nortel CPC part number, manufacturer and insertion loss is listed below. Circumstances may result in equivalent cable types being specified or sourced from other manufacturers. Use the original Equipment Manufacturer's (OEM) instructions supplied with the connectors for assembly.

The N(m) to TNC(m) jumper connects the main transmission line to the Picocell 1900 transceiver which requires a flexible cable for entry.

Table 4 – Andrew Cable Types and Insertion Loss

Cable Description	CPC	Manufacturer	Loss[a] (dB/100m)
0.25″ Foam Superflex: FSJ1-50A	R0116633	Andrew	28.6
0.25″ Plenum, Foam Superflex: ETS1-50T	R0116910	Andrew	28.0
0.375″ Foam: LDF2-50	R0116726	Andrew	17.1
0.5″ Foam: LDF4-50A	R0116728	Andrew	11.3
0.5″ Foam Superflex: FSJ4-50B	R0116634	Andrew	17.7
0.5″ Plenum, Foam: FT4-50T	R0116883	Andrew	20.3
RF Antenna Cable (TNC male to N-Male) (This is a Jumper cable 1.8 m long and 1.5 dB attenuation)	B0241275	Huber Suhner	75.0

a. AT 2 GHz, VSWR 1.0, ambient temperature 24°C. Losses does not include Connector Losses

Table 5 – Andrew Connectors

Connector Description	CPC	Manufacturer	For Use with	Comments
0.25″ N-Male: 41PW	A0382258	Andrew	0.25″ Coax	
0.375″ N-Male: L42PW	A0621669	Andrew	0.375″ Coax	Use with LDF cables
0.375″ N-Male: 42SPW	A0621669	Andrew	0.375″ Coax	Use with Superflex cables
0.5″ N-Male: L44PW	A0615483	Andrew	0.5″ Coax	Use with LDF cables
0.5″ N-Male: 44SEW	A0381727	Andrew	0.5″ Coax	Use with Superflex cables
50W termination, Male: 50T-007	A0609689	JFW	Hybrids	Terminating unused ports of the hybrids
Adapter N-Female to N- Female	A0600384	Andrew		Connecting Jumper to Co-ax cable

7.1 RF Cable Installation

RF cables should normally be placed in conduit or cable trays. Where this is not possible the Heliax cable should be supported every 24 ". The Systems Engineer must determine if cabling meets Fire Regulations and Building codes. Notify the System Engineer of deviations in cable routing from the System design document .

Table 6 –Heliax Minimum Bending Radius

Cable	Nominal diameter	Diameter over jacket	Minimum bending radius
FSJ1-50A	1/4"	.29"	1"
ETS1-50T	1/4"	.29"	1"
LDF2-50	3/8"	.44"	3.75"
ETS2-50T	3/8"	.415"	1"
FSJ4-50B	1/2"	.52"	1.25"
LDF4-50A	1/2"	.63"	5"
FT4-50T	1/2"	.60"	5"

Procedure 4 – Placement of RF Cable

1. Inspect the cable for possible damage and verify the cable type being placed with the system layout. Also verify that the cable type being used meets the requirements for insertion loss as specified in the layout. See Table 4. Maximum lengths and insertion Losses should be detailed on the System layout or floor plan.

   Note: Use of a cable reel stand is recommended to minimize stress when placing the cable. Maintain the cable bending radius outside the minimum values listed in Table 6 on page 23.

2. Place the cable as directed in the System Layout.

   Note: When placing the RF cable equipped with connectors, use protective plugs to prevent connector damage. It may be impossible to run the cable equipped with the connector. In this case run the cable to the antenna, leave slack to attach the connector.

3. Run the cable through the ceiling access hole at the antenna location and attach the connector to the antenna See "Picocell 1900 Antennas" on page 18 .

4. Cut the cable to the desired length.

   Note: Allow enough length at each end to terminate the connector and allow the cable to be neatly formed to the Antenna or Hybrid. Coiling back excess cable is not recommended in order to minimize cable insertion loss.

5. Attach connectors and label the end of the cable according to the designation it has been given in the connectivity chart.

6. Attach the connector to the appropriate output port on the Hybrid, and secure the cable to the mounting wall. The cables should be neatly formed and secured.

   Caution: Do not apply excessive force to cable ties to avoid deforming or denting the cable shield. Heliax cable damaged with dents or bending tighter than the minimum bending radius will degrade performance. Damaged cables should be replaced.

7.2 RF Cable Connector Assembly

The instructions listed in this procedure are typical, based on standard Andrew parts listed here and may be used where suppliers instructions are not available. Andrew connectors are normally supplied with assembly instructions.

> The instructions supplied by Andrew shall supersede the information listed in this document unless specified otherwise. Some cable types may require special Andrew tools, refer to the original instructions supplied with the connector for their use.

Table 7 –Connector Torque Specifications

Cable description	Cable #	Connector	Required torque
1/4" Heliax superflexible standard jacket	FSJ1-50A	F1PNM-HF (41PW)	48 in/lb
1/4" Heliax superflexible plenum	ETS1-50T	F1PNM-HF (41PW)	48 in/lb
3/8" Heliax foam dielectric standard jacket	LDF2-50	L2PNM (L42PW)	48 in/lb
3/8" Heliax foam dielectric superflexible, plenum	ETS2-50T	F2PNM (42SPW)	96 - 144 in/lb
1/2" Heliax superflexible standard jacket	FSJ4-50B	F4PNM (44SEW)	96 - 144 in/lb
1/2" Heliax foam dielectric standard jacket	LDF4-50A	L4PNM (L44PW)	142 -146 in/lb
1/2" Heliax foam dielectric plenum	FT4-50T	L4PNM (L44PW)	142 -146 in/lb

Procedure 5 – Preparing the Heliax cable:

1. Straighten at least 10" of the working end of the cable. Trim 1" off this end of the cable with the fine tooth hacksaw to provide a fresh working edge.

   Note: Crimping the cable, even slightly, is not acceptable.

2. Use a sharp knife and remove some of the jacket to expose the outer conductor. See Figure 12 for the amount of jacket to be removed. Avoid cutting the outer conductor. Remove any burrs on the outside edge of the outer conductor and clean with solvent.

3. Lightly grease the O ring/gasket and the inner surface of the clamping nut with silicone. Be careful to apply the silicone only to the desired areas.

   Note: When putting the gasket on, slide the smooth end of the gasket over the conductor first, being careful not to rip it on the conductor and ensure it is fitted evenly on the conductor.

4. Screw on the clamping nut: Hand thread the clamping nut onto the outer conductor, then use a wrench to tighten it into place.

5. Trim the outer conductor so that only the desired amount is left showing (see Table 5). Use a hacksaw or jewelers saw to cut through the outer conductor. Use a guide to ensure a straight cut, because it is important that the cut be parallel to the edge of the clamping nut. Pull the excess off with a pair of pliers.

6. Cut the inner conductor: Use a hacksaw or jewelers saw to cut the inner conductor to the desired length (see Table 5). Deburr the cut end with a file.

   Note: Hack-saw blades coated with paint are not to be used to avoid contaminating the conductor surface with paint impurities.

7. Clean the foam: Use a small brush to clean all the dirt and metallic particles off the foam. The particles and dirt interfere with the signal traveling through the cable.

8. Separate foam from the outer conductor: (This is not necessary in the 1/4" cable/connector assemblies) Gently separate the foam from the outer conductor. Insert the tip of a knife between the foam and the outer conductor to a depth of 1/16" and separate them so that the outer conductor can be flared. Scrape away any foam clinging to the outer conductor and remove any burrs from the inside edge. Use a small brush to clean the foam again, if necessary.

9. Flare the outer conductor: The 1/4" cable/connector assemblies, FSJ1-50A/41PW and ETS1-50T/41PW, require the outer conductor to be

manually flared against the clamping nut. Proceed to Paragraphs 9g and 9h for flaring the 3/8" and 1/2" cable/connector assemblies.

10. Clean the foam off the inner conductor with a knife. Be careful not to scrape the inner conductor. Use the garnet cloth to remove the adhesive and to ensure that the surface is clean.

Note: The surface must be residue free, leftover foam can interfere with setting the pin on the conductor and can reduce conductivity.

Figure 12 – Outer Sheath Stripping Lengths

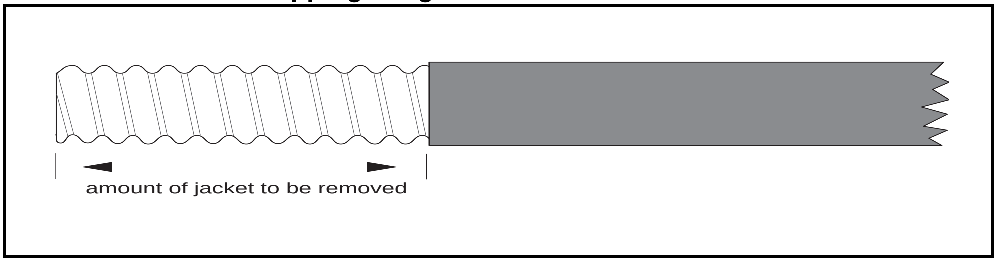


Table 8 –Outer Seath Strip Length

Cable description	Cable #	Distance
1/4" Heliax superflexible standard jacket	FSJ1-50A	7/8"
1/4" Heliax superflexible plenum	ETS1-50T	7/8"
3/8" Heliax foam dielectric standard jacket	LDF2-50	1 1/4"
3/8" Heliax foam dielectric superflexible, ple-num	ETS2-50T	1 1/2"
1/2" Heliax superflexible standard jacket	FSJ4-50B	1 1/2"
1/2" Heliax foam dielectric standard jacket	LDF4-50A	2"
1/2" Heliax foam dielectric plenum	FT4-50T	2"

.

Figure 13 – . Cable With O Ring

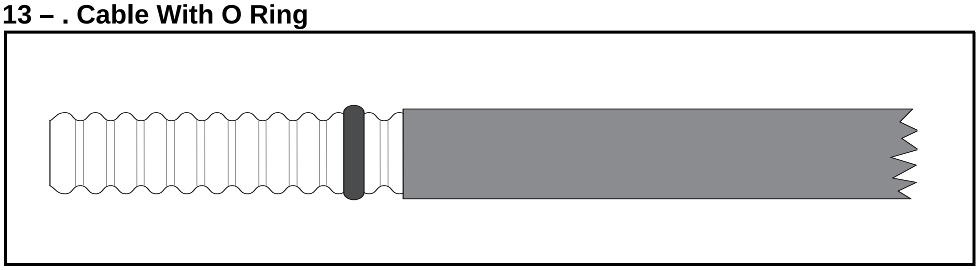


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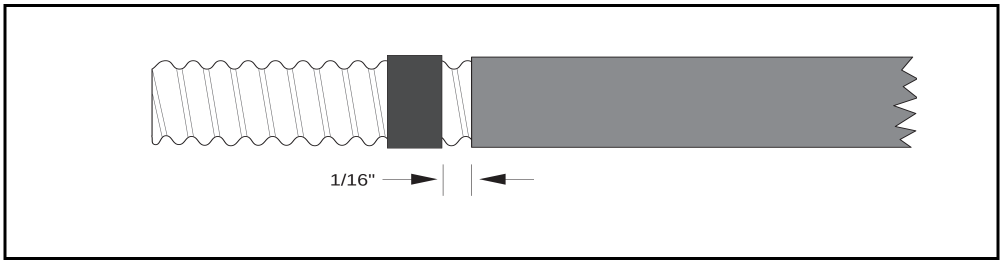
Figure 14 – Cable With Gasket



Put the gasket on the conductor about 1/16 of an inch from the jacket.

Figure 15 – Clamping Nut

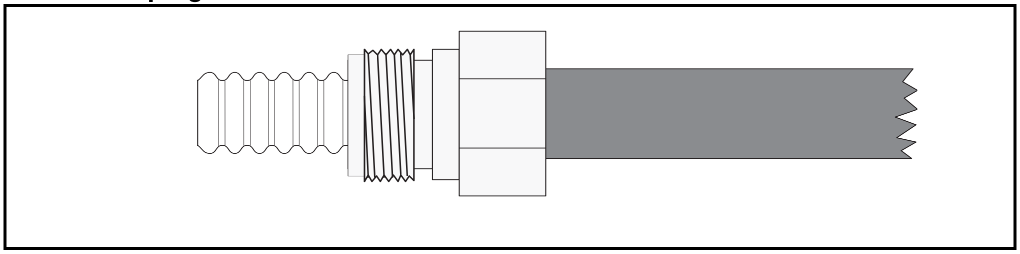


Figure 16 – Trim Outer Conductor

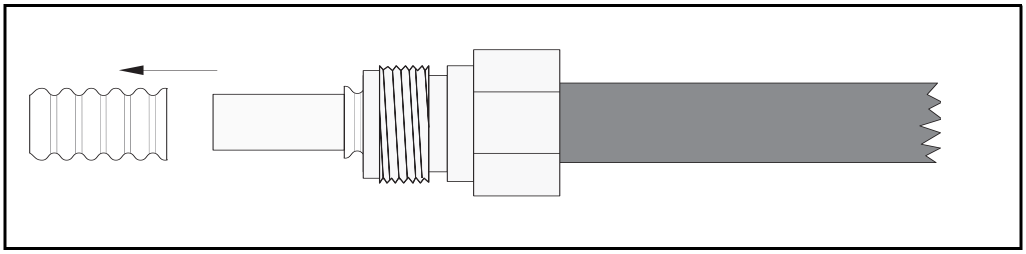


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Table 9 – Outer Conductor Trim Lengths

Cable description	Cable #	Connector	Amount showing
1/4" Heliax superflexible standard jacket	FSJ1-50A	F1PNM-HF (41PW)	1/16"
1/4" Heliax superflexible plenum	ETS1-50T	F1PNM-HF (41PW)	1/16"
3/8" Heliax foam dielectric standard jacket	LDF2-50	L2PNM (L42PW)	flush
3/8" Heliax foam dielectric superflexible, plenum	ETS2-50T	F2PNM (42SPW)	1/32"
1/2" Heliax superflexible standard jacket	FSJ4-50B	F4PNM (44SEW)	1/16"
1/2" Heliax foam dielectric standard jacket	LDF4-50A	L4PNM (L44PW)	flush
1/2" Heliax foam dielectric plenum	FT4-50T	L4PNM (L44PW)	flush

Figure 17 – Center Conductor Finishing

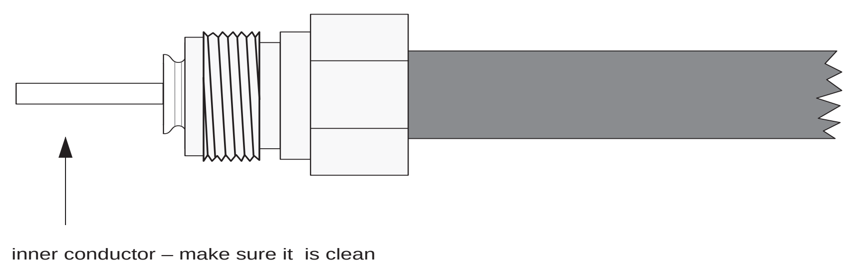


Figure 18 – Size The Inner Conductor

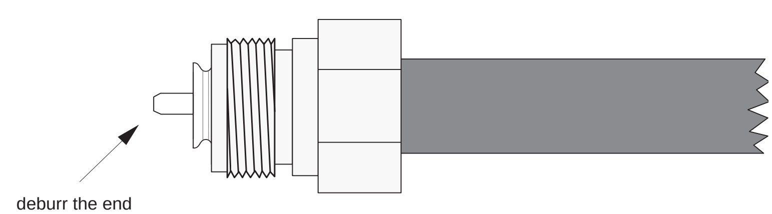
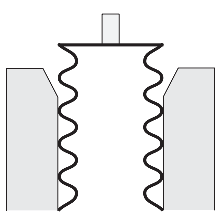


Table 10 –Center Conductor Trim Length

Cable description	Cable #	Connector	Inner conductor length
1/4" Heliax superflexible standard jacket	FSJ1-50A	F1PNM-HF (41PW)	1/4"
1/4" Heliax superflexible plenum	ETS1-50T	F1PNM-HF (41PW)	1/4"
3/8" Heliax foam dielectric standard jacket	LDF2-50	L2PNM (L42PW)	3/16"
3/8" Heliax foam dielectric superflexible, ple-num	ETS2-50T	F2PNM (42SPW)	7/32"
1/2" Heliax superflexible standard jacket	FSJ4-50B	F4PNM (44SEW)	3/16"
1/2" Heliax foam dielectric standard jacket	LDF4-50A	L4PNM (L44PW)	7/32"
1/2" Heliax foam dielectric plenum	FT4-50T	L4PNM (L44PW)	7/32"

Figure 19 – Cable/Clamping Nut



cross-section of the cable and clamping nut

Procedure 6 – Flaring 3/8" and 1/2" cable/connector assemblies:

1. The 3/8" and the 1/2" cable/connector assemblies, LDF2-50/L42PW, ETS2-50T/42SPW, FSJ4-50B/44SEW, LDF4-50A/L44PW, FT4-50T/L44PW, are designed to be self-flaring:

2. Slip the outer body of the connector over the clamping nut, and tighten to the appropriate torque using a set of wrenches; see Table 6 for the appropriate torques. The flaring surface of the outer body will flatten the outer conductor against the clamping nut.

3. Disassemble the connection and inspect the flare to ensure that there is good metal to metal contact. If it is not correctly flared, repeat the procedure.

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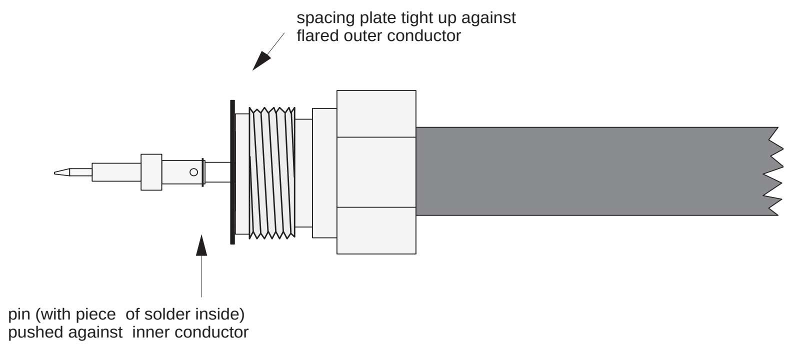
Procedure 7 – Center Conductor Finishing

1. The connector assembly kit comes with a thin spacing plate which is used to set the distance between the pin and the outer conductor. It also shields the dielectric foam from excess heat. Before soldering the pin to the inner conductor, place the spacing gauge over the inner connector against the outer conductor/clamping nut.

2. Cut a piece of solder equal in length to the inner hole of the pin and place in the pin. Place the pin against the end of the inner conductor and apply the soldering iron at the same time applying slight pressure on the pin.

Figure 20 – Assembling the center pin and center conductor.



3. Heat the pin with the soldering iron; as the pin heats up, it will melt the solder. The pin will then slide over the inner conductor. Hold for a second longer to ensure and even flow of solder to avoid a cold solder joint from occuring.

   Note: By first placing solder in the pin a good solder flow is ensured and solder wetting on the pin surface is minimized as is accidentally melting the foam dielectric. It is important to push the pin on as far as it can go. Any excess solder will seep out through the hole on the side of the pin. This is a good indication that solder flowed evenly between the pin and center conductor.

4. Remove any excess solder from the center pin with a fine file. Clean filings off thourghly before final assembly.

   Note: **Avoid scratching the pin when trimming off the excess solder and** ensure that the pin is aligned with the axis of the cable.

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Procedure 8 – Assembling the Connector Body

1. Slide the second O ring onto the groove on the clamping nut and apply a thin coat of silicone grease. Keep all connector threads free of grease. Attach the outer body (and flare ring if necessary):

   Note: The 1/4" connectors have a flare ring that must be inserted into the outer body before it is threaded onto the clamping nut.

2. Thread the outer body onto the clamping nut and tighten the connection with wrenches, see Figure 23. Do not turn the clamping nut to tighten, turn only the outer body until secure. To ensure a proper connection use a torque wrench and tighten to the required torque, see Table 6.

3. you will have difficulty putting the outer body on the clamping nut if the pin is askew. Straighten the pin out slightly and the outer body should go into place.

4. Check pin alignment to verify the center pin is centered. If it is not, slide the pin alignment tool over the pin and center it.

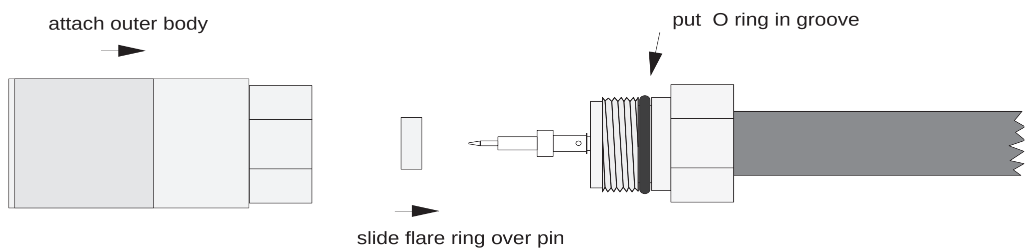
5. Check pin depth with the depth gauge to check the setting of the pin. The gauge shows whether the contact pin is positioned within tolerance. The gauge is pushed onto the pin assembly and a plunger rises to indicate if the pin is installed between the upper and lower tolerance limits. If the pin depth is outside of the tolerances, take off the outer body and check the pin.

   Note: If the pin exceeds the upper tolerance limit, reheat the solder and make sure the pin is pushed all the way on. If this is not the source of the problem, check the length of the inner conductor. If the inner conductor is too long, recut the inner conductor. Re-solder the pin on and repeat procedure 7 and 8.

   Note: If the pin is below the lower tolerance level, the length of the inner conductor has been cut too short. Tightening the clamping nut might correct this situation if the inner conductor has not been cut too short. If it has been cut too short, you will have to start the assembly process over again.

6. Slide the black heat-shrink over the connector and cable; use the heat gun to shrink it in place. Be careful not to melt the heatshrink or the jacket.

Figure 21 – Final Assembly



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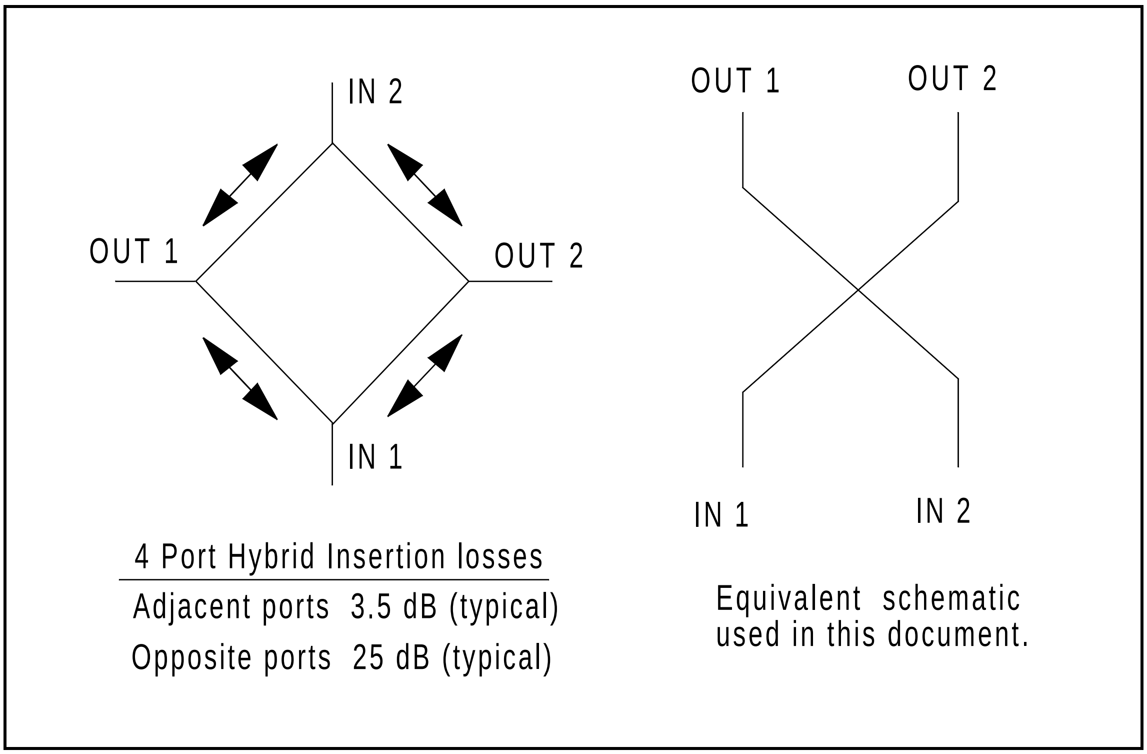
7.3 References

Document	Number	Title
IM	04-0241	Picocell 1900 CSI Installation and Planning
IM	04-0242	Picocell 1900 General Information and Plannng
IM	08-0243	Picocell 1900 CSI Equipment Handling and Securing
IM	04-0244	Picocell 1900 System Cabling and Cross Connect
IM	12-0152	Picocell 1900 Antenna System Installation
IM	02-0245	Picocell 1900 transceiver Installation
IM	12-0152	PICOCELL 1900 Antenna System Installation
IM	22-0246	Picocell 1900 Radio and CSI Power up
IM	24-0247	Picocell 1900 Equipment Loading and Diagnostics
IM	28-0248	Picocell 1900 Radio Commissioning with the IFR 1900
IM	28-0249	Picocell 1900 System Test
Andrew Bulletin	237161	Connector attachment for Heliax FSJ2-50 Coaxial Cable
Andrew Bulletin	237269	Connector attachment for Heliax FSJ4-50B Coaxial Cable
Andrew Bulletin	37383D	Connector attachment for Heliax LDF-50A coaxial Cable
Andrew Bulletin	37439B	Connectors for Heliax FSJ1-50A Superflexible Coaxial Cable
Andrew Bulletin	37572A	Connectors for Heliax LDF2-50 Foam-dielectic Coaxial Cable

Appendix A - 4 Port Hybrid Insertion Losses

The 4 port hybrid provides isolation between opposite input ports and between opposite output ports while providing a nominal 3.5 dB splitting loss between adjacent inputs and outputs. Continuity is bidirectional between adjacent Input and output ports as shown below. Unused ports must be terminated in 50 Ohms to maintain hybrid balance and optimum port return loss.



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