

## BTT\*.\*P

## Twisted-Pair Power Extracting Taps



### FEATURES

- ❑ 5 MHz -1 GHz BANDWIDTH
- ❑ ABILITY TO ACCEPT PLUG-IN MODULES FOR IMPROVED RETURN PATH PERFORMANCE:
  - ❑ CABLE EQUALIZATION (T-EQ-\*)
  - ❑ RETURN PATH ATTENUATION (T-RPA/S-\*)
  - ❑ CABLE SIMULATION (T-CS-\*)
- ❑ 12 AMP POWER PASSING
- ❑ SURGE RESILIENT
- ❑ TWISTED PAIR POWER EXTRACTING
- ❑ AUTO-SEIZE F-CONNECTORS
- ❑ CURRENT LIMITING
- ❑ BACKWARD COMPATIBLE
- ❑ RF/AC BYPASS CAPABILITY
- ❑ AVAILABLE AS AN UPGRADE

### BTT-P POWER EXTRACTING TAP

- ❑ BTT2.\*P (10 VALUES: 4-29)
- ❑ BTT4.\*P (9 VALUES: 7-29)
- ❑ BTT8.\*P (7 VALUES: 10-29)

### BTT-P/U POWER EXTRACTING TAP UPGRADE

- ❑ BTT2.\*P/U (10 VALUES: 4-29)
- ❑ BTT4.\*P/U (9 VALUES: 7-29)
- ❑ BTT8.\*P/U (7 VALUES: 10-29)

### INTRODUCTION

Motorola's new product line of BTT\*.\*P 1 GHz power extracting taps are capable of delivering video, telephony, and data over the broadband hybrid fiber-coax system. These taps have all of the same features and performance as our standard N-series taps, including 12 ampere power passing and surge resiliency, but with the additional feature of power extracting for cable telephony applications. Network

powering of telephony devices is critical for system reliability in these applications.

The BTT-P taps extract power from the cable feeder and deliver it to the network interface device (NID) located on the side of the home. RF signals are distributed through the F-ports to the coaxial drop. The AC power is distributed via twisted pair.

### CABLE EQUALIZER MODULE

The cable equalizer (T-EQ-\*) plug-in module attenuates the return path signal originating from the customer premise in an effort to reduce the effects of system ingress. The cable equalizer also tightens the window of return path signal variation to allow more efficient operation of return transmitters in optical nodes. The module is field configurable via removal of the tap faceplate in order to allow operators to maximize the return path performance.

### RETURN PATH ATTENUATOR MODULE

The return path attenuator (T-RPA/S-\*) plug-in module provides the same benefits as the cable equalizer module, but accomplishes this via a diplex filter. As a result, the T-RPA/S-\* is system split dependent and provides less impact to the forward drop signal than the cable equalizer. The high pass filter (T-HP/S-52) operates in the same manner as the T-RPA/S-\* module, but attenuates the return path even greater. This is useful in ingress problem areas where customers are presently not using return path services.

### CABLE SIMULATOR MODULE

The cable simulator (T-CS-\*) plug-in module for the BTT-P tap provides additional benefits for use in systems containing Motorola's high output level GaAs RF amplifiers and optical nodes. The cable simulator plug-in maintains low loss in the return

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drop path, while attenuating the forward drop signals to the proper system design levels.

### BTT-P POWER EXTRACTING TAP

The BTT-P Broadband Telecommunications Tap is designed to provide AC powering via twisted pair. This tap has an AC powering compartment located on the faceplate. This compartment contains the twisted pair terminals and current limiting devices. The powering compartment is sealed using rubber gasketing and gel insulation and is accessible when the faceplate is installed. Strain relief for the twisted pairs is also provided in this compartment.

### AUTO-SEIZE F-CONNECTOR

The auto-seize F-connector is designed to improve system reliability by increasing the clamping force over standard F-connectors. This aids in the prevention of oxides by providing a gas tight seal. This new design encompasses a greater surface/contact area than the industry standard 2-point contact F-connector and improves contact resistance. The F-connector also has minimal insertion force that lessens the opportunity to scratch the plating of the contact. Please reference the diagram below.

### ADVANCED F-PORT WEATHER SEALING

All P-Series taps have the added feature of advanced F-port weather sealing. Conventional taps require physical termination of the F-port to ensure a 100% moisture seal; this includes "epoxy sealed" taps. The Motorola P-series tap does not require any physical termination to ensure a 100% F-port weather seal. However, Motorola does continue to recommend the use of 75-Ohm terminations on all unused ports for optimal RF performance.

### CURRENT LIMITING

Each twisted pair is limited to a maximum of 0.35 amperes at 90 volts. This is achieved through the use of a self-resetting current limiting device. This device can be removed to block power from the twisted pair terminals.

### BACKWARD COMPATIBILITY

All BTT-P Series taps are backward compatible with Motorola/General Instrument FFT-"F", "G", "H", "J", "K" and standard "N" Series tap housings.

### RF/AC BYPASS CAPABILITY

The BTT-P power extracting taps also offer the added feature of feeder-line continuity when the faceplate is removed. This is achieved through the use of a make-before-break switch that is contained in the tap housing. This feature allows the tap faceplate to be removed without interrupting service on the feeder.

For customers with existing BTT style taps without the bypass feature, an external RF/AC bypass jumper (BTT-RF/AC) is available to perform this function. The jumper is installed only when the faceplate is being changed. The jumper is then removed and may be used again.

### POWER EXTRACTING UPGRADE

Taps within the BTT-P product line are available as complete taps with RF/AC bypass capability or as an upgrade. The BTT-P/U power extracting tap upgrades contain the faceplate and electronics without the RF/AC bypass housing. The upgrade can be used to convert existing FFT taps to power extracting. These products allow the system operator to add services incrementally as required.

### DESIGN FLEXIBILITY

The BTT-P series of taps offers 26 different models to accommodate system design needs and lower construction costs. The BTT-P tap features a swivel center conductor seizure mechanism allowing for aerial or pedestal installations. This eliminates the need to remove the seizure screws, while a detent in the swivel mechanism provides for proper alignment for either installation mode. The modular design of the BTT-P provides interchangeability of tap assembly bottom plates without removing the housing from the cable. The housing is common for 2-, 4-, and 8-way taps.

### MECHANICAL SPECIFICATIONS

Hostile weather conditions are addressed by surface chromate conversion over a die-cast housing and faceplate made of 360-aluminum alloy. A weather seal gasket of molded neoprene prevents moisture and dust from entering the unit and a separate RF gasket ensures FCC interference specification compliance. An umbrella type cover design shields internal components by preventing the buildup of rainwater. Unique, waterproof self-sealing "F" ports prevent breathing through the ports, even if the house drop is disconnected. All threads of the four captive



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stainless steel bolts are coated with water-repellent, anti-seizure lubricant to prevent the bolts from seizing to the base plate. In addition, the nickel-plated brass SCTE complaint ports offer increased strength and protection against corrosion in severe environmental conditions. The port lengths are one-half inch to accommodate locking terminators.

**SPECIFICATIONS\***

**Bandwidth**

Passband: 5-1000 MHz

**Powering**

Current Limiting (per port): 350 mA @ +60°C,  
850 mA @ -40°C  
Twisted-pair Wire Gauge: 22-24 AWG

**Isolation**

RF/AC Isolation: 100 dB minimum  
RFI: 90 dB minimum

**Current Handling**

Power Passing: 12 amperes maximum (60/90 volts)

**Low Frequency Hum:**

Hum modulation - 70 dB minimum @ 10 amperes  
(60/90 volts)

**High Frequency Transients:**

Hum modulation - 73 dB for input voltage slew rates  
below 0.3V/uS.

**Tap Value**

2-ways	+/- 1.50 dB
4-ways	+/- 1.50 dB
8-ways	+/- 2.0 dB

**Tap to Tap Isolation**

5-30 MHz	20 dB
30-750 MHz	25 dB
750-100 MHz	20 dB

**Return Loss**

Drop	10-30 MHz	16 dB
	30-600 MHz	18 dB
	600-1000 MHz	16 dB

**Return Loss**

In/Out	5-30 MHz	16 dB
	30-600 MHz	18 dB
	600-1000 MHz	16 dB

**Mechanical**

SCTE IPS-SP-400 – F-port Interface  
SCTE IPS-SP-420 – Entry Port Interface

**Emission**

FCC-Part 76, Subpart K  
EN 50083-2, Cenelec

**Surge Resistance**

IEEE Category B1 C62.41-1991

**Environmental**

ASTM G 53- Weathering  
ASTM D 3170 – Chip Resistance  
ASTM G 21 – Fungus Growth Rate of Zero  
EN 50083-1  
ASTM D 1171

**Dimensions**

5.5 x 3.7 x 5.6 inches (14.0 x 9.4 x 14.2 cm)

**Weight**

1.7 lb. (0.77 kg)

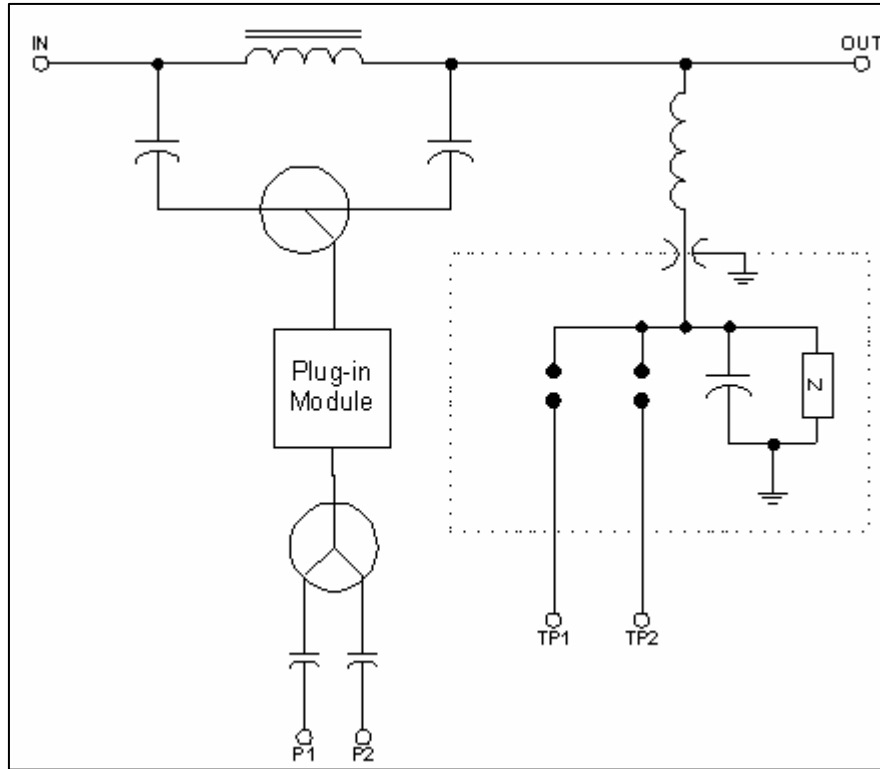
**Tap Color Codes**

<u>dB Value</u>	<u>Background</u>	<u>Lettering</u>
4	Purple	White
7	Green	Black
10	Red	Black
12	Red	Black
14	Yellow	Black
15.5	Yellow	Black
17	White	Black
20	Black	White
23	Orange	White
26	Lt. Orange	Black
29	Lt. Orange	White

*\*Specifications are subject to change without notice.*



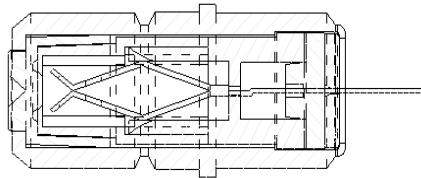
**BTT-P Block Diagram**



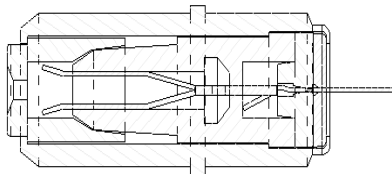
*\*Plug-In Module may be T-JP, T-EQ-\*, T-RPA/S-\*, T-HP/S-52, or T-CS-\*. Block Diagram shown is for a 2-port tap. The 4-port and 8-port taps will have additional splitters after the plug-in module.*

**P-Series F-Connector**

Conventional F-Connector Design



Auto-Seize P-Series F-Connector Design



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**BTT-P TYPICAL INSERTION LOSS (dB)**  
**Typical Performance with Jumper (T-JP) Installed\***

TYPICAL PERFORMANCE								
Insertion Loss (dB)	5 MHz	10 MHz	50 MHz	450 MHz	550 MHz	750 MHz	870 MHz	1000 MHz
BTT2-4P*	-	-	-	-	-	-	-	-
BTT2-7P*	3.4	3.3	3.3	3.9	4.2	4.3	4.5	4.7
BTT2-10P*	1.8	1.4	1.3	1.7	1.8	2.2	2.5	3.1
BTT2-12P*	1.4	1.1	1.1	1.6	1.6	2.0	2.4	3.0
BTT2-14P*	1.2	1.0	0.9	1.5	1.4	1.9	2.2	2.4
BTT2-17P*	1.0	0.9	0.8	1.4	1.2	1.5	1.8	2.1
BTT2-20P*	0.6	0.5	0.5	1.1	1.0	1.4	1.6	2.0
BTT2-23P*	0.3	0.3	0.3	1.0	0.9	1.4	1.6	2.0
BTT2-26P*	0.3	0.3	0.3	1.0	0.9	1.4	1.6	2.0
BTT2-29P*	0.3	0.3	0.3	1.0	0.9	1.4	1.6	2.0
BTT4-7P*	-	-	-	-	-	-	-	-
BTT4-10P*	3.5	3.3	3.3	4.1	4.2	4.6	4.5	4.6
BTT4-14P*	1.7	1.4	1.3	1.9	2.1	2.5	2.9	3.4
BTT4-15.5P*	1.4	1.1	1.1	1.7	1.6	2.0	2.5	3.0
BTT4-17P*	1.2	1.0	1.0	1.4	1.4	1.8	2.1	2.6
BTT4-20P*	0.9	0.8	0.8	1.3	1.2	1.5	1.7	2.0
BTT4-23P*	0.6	0.5	0.5	1.0	1.0	1.4	1.6	1.9
BTT4-26P*	0.3	0.3	0.3	0.8	0.8	1.2	1.4	1.7
BTT4-29P*	0.3	0.3	0.3	0.8	0.8	1.2	1.4	1.7
BTT8-10P*	-	-	-	-	-	-	-	-
BTT8-14P*	3.9	3.5	3.4	4.1	4.3	4.8	4.9	5.9
BTT8-17P*	2.1	1.8	1.7	2.6	2.6	3.2	3.4	4.5
BTT8-20P*	1.5	1.2	1.1	1.8	1.6	2.5	2.7	3.3
BTT8-23P*	1.1	1.0	0.8	1.1	1.1	1.5	1.8	2.5
BTT8-26P*	0.7	0.6	0.5	0.9	0.9	1.3	1.3	2.1
BTT8-29P*	0.4	0.3	0.3	0.7	0.8	1.3	1.5	2.0

\*The BTT-P is shipped standard with a jumper (T-JP) installed into the plug-in module sockets. Specifications are subject to change without notice.



**BTT-P MAXIMUM INSERTION LOSS (dB)  
Typical Performance with Jumper (T-JP) Installed\***

Insertion Loss (dB)	MAXIMUM SPECIFICATION							
	5 MHz	10 MHz	50 MHz	450 MHz	550 MHz	750 MHz	860 MHz	1000 MHz
BTT2-4P*	-	-	-	-	-	-	-	-
BTT2-7P*	3.7	3.5	3.5	4.1	4.4	4.5	4.7	5.0
BTT2-10P*	2.1	1.6	1.5	1.9	2.0	2.4	2.7	3.4
BTT2-12P*	1.7	1.3	1.3	1.8	1.8	2.2	2.6	3.3
BTT2-14P*	1.5	1.2	1.1	1.7	1.6	2.1	2.4	2.7
BTT2-17P*	1.3	1.1	1.0	1.6	1.4	1.7	2.0	2.4
BTT2-20P*	0.9	0.7	0.7	1.3	1.2	1.6	1.8	2.3
BTT2-23P*	0.6	0.5	0.5	1.2	1.1	1.6	1.8	2.3
BTT2-26P*	0.6	0.5	0.5	1.2	1.1	1.6	1.8	2.3
BTT2-29P*	0.6	0.5	0.5	1.2	1.1	1.6	1.8	2.3
BTT4-7P*	-	-	-	-	-	-	-	-
BTT4-10P*	3.8	3.5	3.5	4.3	4.4	4.8	4.7	4.9
BTT4-14P*	2.0	1.6	1.5	2.1	2.3	2.7	3.1	3.7
BTT4-15.5P*	1.7	1.3	1.3	1.9	1.8	2.2	2.7	3.3
BTT4-17P*	1.5	1.2	1.2	1.6	1.6	2.0	2.3	2.9
BTT4-20P*	1.2	1.0	1.0	1.5	1.4	1.7	1.9	2.3
BTT4-23P*	0.9	0.7	0.7	1.2	1.2	1.6	1.8	2.2
BTT4-26P*	0.6	0.5	0.5	1.0	1.0	1.4	1.6	2.0
BTT4-29P*	0.6	0.5	0.5	1.0	1.0	1.4	1.6	2.0
BTT8-10P*	-	-	-	-	-	-	-	-
BTT8-14P*	4.2	3.7	3.6	4.3	4.5	5.0	5.1	6.2
BTT8-17P*	2.4	2.0	1.9	2.8	2.8	3.4	3.6	4.8
BTT8-20P*	1.8	1.4	1.3	2.0	1.8	2.7	2.9	3.6
BTT8-23P*	1.4	1.2	1.0	1.3	1.3	1.7	2.0	2.8
BTT8-26P*	1.0	0.8	0.7	1.1	1.1	1.5	1.5	2.4
BTT8-29P*	0.7	0.5	0.5	0.9	1.0	1.5	1.7	2.3

\*The BTT-P is shipped standard with a jumper (T-JP) installed into the plug-in module sockets. Specifications are subject to change without notice.

**BTT-P**  
**Tap to Output Nominal Isolation (dB)**

MODEL NO. 2-P/*	5-10 MHz	10-50 MHz	50-450 MHz	450-600 MHz	600-750 MHz	750-1000 MHz
2-4TP/*	-	-	-	-	-	-
2-7P/*	15	20	25	25	20	20
2-10P/*	18	25	25	25	22	22
2-12P/*	20	25	23	23	23	23
2-14P/*	24	25	30	30	27	25
2-17P/*	27	35	33	33	30	30
2-20P/*	30	35	40	40	40	35
2-23P/*	30	37	40	40	40	35
2-26P/*	36	45	45	45	40	35
2-29P/*	39	45	45	45	40	35

MODEL NO. 4-P/*	5-10 MHz	10-50 MHz	50-450 MHz	450-600 MHz	600-750 MHz	750-1000 MHz
4-7TP/*	-	-	-	-	-	-
4-10P/*	20	20	25	25	25	25
4-14P/*	25	20	30	25	25	25
4-15.5P/*	25	25	30	25	25	25
4-17P/*	27	27	30	30	30	25
4-20P/*	30	30	35	35	35	30
4-23P/*	33	35	40	40	40	35
4-26P/*	36	40	40	40	40	35
4-29P/*	39	40	45	45	45	40

MODEL NO. 8-P/*	5-10 MHz	10-50 MHz	50-450 MHz	450-600 MHz	600-750 MHz	750-1000 MHz
8-10TP/*	-	-	-	-	-	-
8-14P/*	20	25	25	25	25	25
8-17P/*	23	30	30	30	30	25
8-20P/*	30	30	35	35	35	30
8-23P/*	30	35	35	35	35	30
8-26P/*	38	40	40	40	40	35
8-29P/*	40	45	45	40	40	35

