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Installation and Operating Instructions For High Power Fiber-optic Repeater System

(MW-FBDA-PCS-xxx-50W)

& FiberopticBase Interface Unit

(FBIU)

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1. OVERVIEW:

The Fiber optic repeater system is an excellent solution for BTS coverage extension by means of Fiber optic link and remote high power RF head.
The system consists of two conversion boxes;

- FBIU (Fiberoptic Base Interface Unit)
- FBDA (Fiber optic Bi Directional Amplifier)

One fiber, for both uplink and downlink directions connect the FBIU to the FBDA. Using fiberoptic cable allows long distance transmission, up to 20 Km.

1.1 FBIU

The FBIU is installed near the BTS and is connected to the BTS by RF cables. A Fiberoptic transceiver converts the Downlink RF signals to optical signals and the uplink optical signal to RF. A high power attenuator is used as power adjustment between BTS Tx power and Fiberoptic transceiver requirements. A separate attenuator is used for Rx direction.

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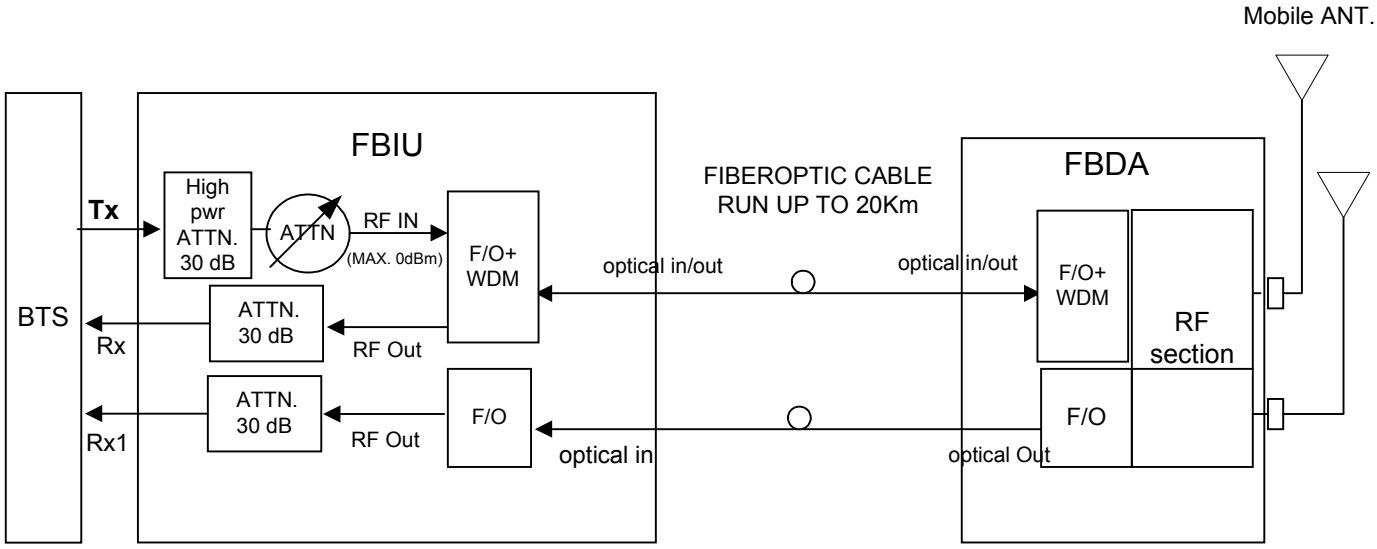
1.2 FBDA

The FBDA is installed near the area to be covered and is connected to the mobile antenna. A Fiberoptic transceiver converts the Downlink optical signals to RF signals and the uplink RF signals to optical signals. A duplexer in the FBDA separates the uplink and downlink signals thus enabling the use of the same antenna for receiving and transmitting. The duplexer has sharp out of band attenuation for better isolation between the receiving and transmitting paths and for reduction of out of band interfering signals. A high power amplifier in the downlink path produces high RF power to the antenna. A pre-amplifier is used to drive the uplink signals from the antenna to the Fiberoptic transceiver input to maintain reasonable NF (noise figure) in the uplink path. The FBDA contains a monitoring unit to monitor the operation of the active elements inside the FBDA. Whenever a fault occurs an ALARM signal is sent to the FBIU.



FBDA SYSTEM BLOCK DIAGRAM

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2. SUBSYSTEM DESCRIPTION:

2.1 FBDA

Refer to installation and operation instructions for MW-FBDA-PCS-xxx-50W

2.2 FBIU

The FBIU is the BTS interface of the system. It contains one Fiberoptic transceiver and attenuators for uplink and downlink paths and power supply.

2.2.1 Fiberoptic transceiver

The Fiberoptic transceiver converts the signal form RF to optical in the downlink direction and from optical signal to RF in the uplink direction.

2.2.2 Attenuators

Assuming that the output power of BTS is +30dBm, a 30 dB high power external attenuator is required. In practice, more attenuation can be added for different system setting.

For the RX path a separate 30 dB attenuator is connected at the F/O unit output.

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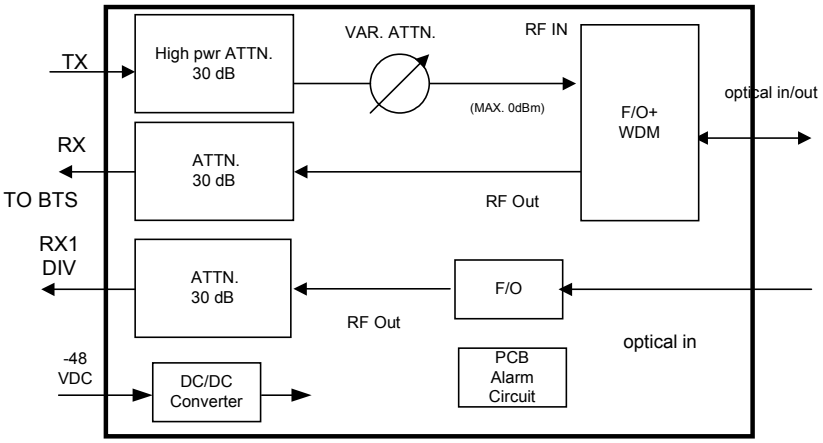

FIG 2: FBIU RF BLOCK DIAGRAM

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3 . SYSTEM SPECIFICATIONS:

3.1 RF SPECIFICATIONS

(optical loss adjusted to 0dBm, all attenuators 30 dB)

Frequency Range	Uplink (RX)	Downlink (TX)
	Per system	Per system
Passband Gain @ min attenuation	16 dB Nom.	10dB Nom.
Passband Ripple	± 1.0 dB typical	± 1.0 dB typical
Manual Attenuation Range	0 to 16 db cont. (FBDA side)	0-10 dB in 1dB steps (FBIU side) 0-30 dB in 2dB steps (FBDA side)
Noise Figure @+25°C (optical loss less than 3 dB)	6.0 dB max	N.A.
Up-Link 3rd Order Intermodulation Products @two tones -3 dBm each at FBIU Rfiber Output	55 dBc typical	N.A.
Down-Link 3rd Order Intermodulation Products @two tones +37 dBm each at Output	----------	50 dBc min.
AGC Power Level(Factory Set)	0 ± 1.0 dBm nom.	40±1 dBm
AGC Range	30 dB min	10
Impedance Level	50 Ohms	
VSWR In	1.5 : 1 typ	
VSWR Out	2.0 : 1 typ	

System Frequency Range

SYSTEM TYPE	MODEL No	DOWN-LINK	UP-LINK
Block B	MW-FBDA-PCS-B-50W	1950-1965	1870-1885
Block D+B+E	MW-FBDA-PCS-DE-50W	1945-1970	1865-1890
Block B+E+F	MW-FBDA-PCS-BF-50W	1950-1975	1870-1895
Block D+B+E+F	MW-FBDA-PCS-DF-50W	1945-1975	1865-1895

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3.2 FBDA ALARM SPECIFICATIONS

RemoteFault Indication (Summarized alarm)	Alarm is sent on the serial data link of the FO transmitter to FBIU
Fault List :	Power Supply Over-voltage or Under-voltage
	Uplink Amplifier Over Current or Under Current
	Downlink Power Amplifier Over Current or Under Current
	FO Transceiver Over Current or Under Current
	FO Receiver Power fall (Bad Optical Connection)
	Fan Over Current or Under Current
Electrical Fault Indication LED	Illuminated LED on Monitor Box for each Electrical Fault
Fiber Optic Connection Fault Indication LED	Illuminated LED on FO Transceiver when Optical Connection is performing Correctly. LED is OFF when FO Receiver Power falls.
FBIU alarm output	D type 9pin male, N.C. relay contact between pin 2 and pin 4, open for active alarm + Illuminated LED on front panel.

3.3 MECHANICAL SPECIFICATIONS:

	FBDA	FBIU
Size	400 x 400 x 300 mm approx.	19” 1Ux250mm
Weight	25 kg. Approx.	3 kg. Approx.
Type	Weatherproof Enclosure for Wall Mounted Installation	In door, rack mount
Power Supply	110 VAC / 2A or 220VAC/1A	-48V DC 1A Molex 2.13 mm , 3 circuits female, male pins

3.4 ENVIRONMENTAL CONDITIONS:

Operating temperature	- 30°C to + 50°C
Storage temperature	- 30°C to + 70°C
Weatherproof conditions	Protected to IP65 (FBDA only)

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4. INSTALLATION PROCEDURE

4.1 Fiber Optic Link Assembly:(both FBDA and FBIU)

4.1.1 Insert main optical fiber trough the **Fiber In/out** hole on the FBDA panel and connect it to the **Optical In/out** connector on the Fiberoptic transceiver. On the FBIU connect the optical fiber to the **Optical In/out** connector on the Fiberoptic transceiver.

4.2 Downlink calibration:

4.2.1 Connect Spectrum analyzer through High Power Attenuator of 40 dB to the Antenna port of the FBDA.

4.2.2 Inject (+20) dBm TX band signal from the FBIU Tx antenna through the optical link.

4.2.3 Adjust Gain on the Fiberoptic transceiver front panel in the FBDA so that RF power at the output is +30dBm.

4.3 Uplink calibration:

4.3.1 Connect Spectrum analyzer to the Rx port of the FBIU.

4.3.2 Inject (–60) dBm RX band signal from the antenna port on the FBDA side through the optical link.

4.3.3 Adjust Gain on the Fiberoptic transceiver in the FBIU so that RF power at the output is -44 dBm.

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4.4 System assembly:

4.4.1 Connect BTS Tx to Tx antenna port on FBIU. (Another 10dB attenuator can be connected to the RF IN port of the Fiberoptic transceiver in the FBIU and the Rotary Attenuator on the FBIU front panel adjusted slightly for system performance optimization).

4.4.2 Connect Spectrum analyzer or Power Meter through High Power Attenuator of 40 dB to the Antenna port of the FBDA.

4.4.3 Turn the system ON, make sure that output power of BTS is no more than +30dBm. In case of higher power, higher attenuation is needed between BASE and FBIU.

4.4.4 Adjust Gain on the Fiberoptic transceiver front panel in the FBDA so that RF power at the output is +40±1dBm.

4.4.5 Turn power off. Disconnect Spectrum analyzer and attenuator from Antenna port on the FBDA and connect Mobile Antenna to the FBDA.

4.4.6 Turn power on.

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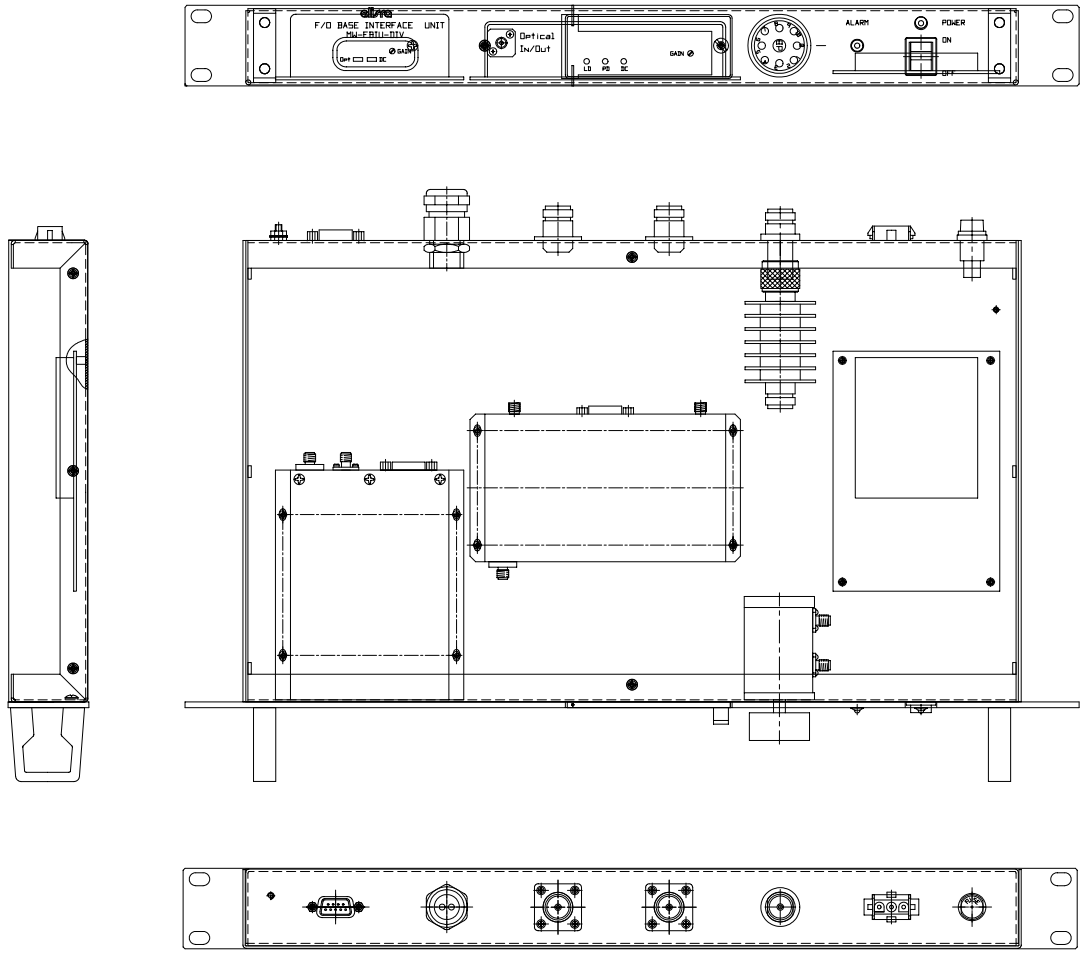
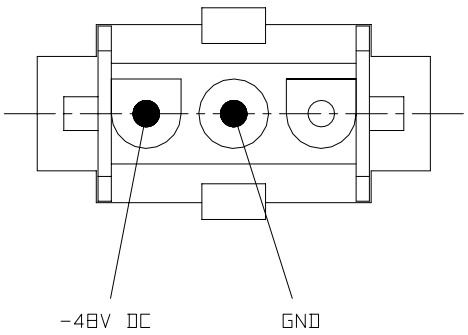


Fig. 3: FBIU MECHANICAL LAYOUT

FBIU DC CONNECTOR



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LIMITED WARRANTY

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This warranty applies only upon the condition that the Product has been installed, maintained and operated under conditions of normal use. The provisions of this warranty shall not apply if, in Dekolink's judgment, the Product has been subject to misuse or neglect, damaged in an accident or by act of vandalism, or repaired or altered in any way that adversely affects its performance or reliability.

To obtain warranty service, Purchaser may, upon the prior written authorization of Dekolink or its authorized service representative, return the defective Product to Dekolink's authorized service center. All shipping and insurance charges are the sole responsibility of Purchaser and are not included in this warranty.
Dekolink expressly excludes and disclaims all other warranties, including but not limited to any warranties of merchantability or fitness for a particular purpose.

Dekolink shall in no event be liable for any special, indirect, incidental, consequential or punitive damages or for loss, damage, or expense, including loss of use, profits, revenue, or goodwill, directly or indirectly arising from purchaser's use or inability to use the merchandise, or for loss or destruction of other property or from any other cause, even if Dekolink has been advised of the possibility of such damage. Some states do not allow the exclusion or limitation of incidental or consequential damages so these limitations may not apply under certain circumstances.

The liability of Dekolink shall in no event exceed an amount equivalent to the purchase price paid by the purchaser for the defective product.

This warranty shall not be extended, altered or varied except by a written instrument duly signed by Dekolink.