1818 E. Orangethrope Ave
Fullerton, CA 92831
Tel. +1.714.515.1100
www.kmwcomm.com

USER MANUAL FOR POD SYSTEM

(Version 0.9)

Document No.: MUN0630-2015

Date: November 31, 2016

Revision History

Version	Author	Descriptions	Date
0.1	KMW	Initial Release	5/14/2015
0.2	KMW	Update FCC Regulation Statement	12/23/2015
0.3	KMW	Update RF specification on 2.2 and 5	1/12/2016
0.4	KMW	Update FCC RF Exposure information	1/15/2016
0.5	KMW	Make typo correct	1/18/2016
0.6	KMW	Change the RF Radiation Exposure	2/4/2016
0.7	KMW	Update RF Exposure statement and HAAT information	2/24/2016
0.8	KMW	Update AWS band	10/31/2016
0.9	KMW	Update SAFETY AND REGUALTION WARNING NOTICE	11/1/2016

Change List

Version	Change list	Contents

© KMW USA Inc.
1818 E. Orangethrope Ave, Fullerton, CA 92831
Tel. +1 (714) 515-1100
www.kmwcomm.com

List for Acronyms

AGC	**Automatic Gain Control**
ALC	**Automatic Level Control**
BDA	**Bi-Directional Amplifier**
BOM	**Bill of Material**
BTS	**Base Transceiver Station**
DAS	**Distributed Antenna System**
DL	**Downlink**
Downlink	**Path covered from the Base Transceiver Station (BTS) to the subscribers' service area via the repeater**
HEU	**Head-end Unit**
IF	**Intermediate Frequency**
LNA	**Low Noise Amplifier**
LTE	**Long Term Evolution**
MS	**Mobile Station**
NMS	**Network Management System**
PA	**Power Amplifier**
PSU	**Power Supply Unit**
RF	**Radio Frequency**
RU	**Remote Unit**
UL	**Uplink**
Uplink	**Path covered from the subscribers' service area to the Base Transceiver Station (BTS) via the repeater**
Uptime	**Time during which a Unit or Module is in operation**
VSWR	**Voltage Standing Wave Ratio**

© KMW USA Inc.
1818 E. Orangethrope Ave, Fullerton, CA 92831
Tel. +1 (714) 515-1100
www.kmwcomm.com

Table of Contents

1. POD System Overview 14
   1.1 Features of POD System 14
   1.2 POD System Architecture 15
   1.3 POD System Configuration 17
      1.3.1 SISO Configuration 17
      1.3.2 MIMO Configuration 18
   1.4 POD System Scalability & Limitation 19
2. POD system Components 21
   2.1 Head-end Unit 21
      2.1.1 POD-H-DMCU (DAS Main Control Unit) 23
         2.1.1.1 Functions and features 23
         2.1.1.2 Specifications 23
         2.1.1.3 LED, LCD & Key PAD, Reset 23
         2.1.1.4 Ethernet Ports 24
         2.1.1.5 DC power input port & power switch 24
         2.1.1.6 External Alarm Port 24
         2.1.1.7 Ground port 25
         2.1.1.8 Alarms 25
      2.1.2 POD-H-SRU 26
         2.1.2.1 Functions and features 26
         2.1.2.2 Specifications 26
         2.1.2.3 DC input port & Fuse 26
         2.1.2.4 FAN port 27
         2.1.2.5 Ground port 27
      2.1.3 POD-H-SCM 28
         2.1.3.1 Functions and features 28
         2.1.3.2 Specifications 28
         2.1.3.3 LED, LCD & Key PAD, Reset 28
         2.1.3.4 Ethernet Port 29
         2.1.3.5 Communication port 29
         2.1.3.6 Alarms 29
      2.1.4 POD-H-MCM 30
         2.1.4.1 Functions and features 30
         2.1.4.2 Specifications 30
         2.1.4.3 LED, LCD & Key PAD, Reset 30
         2.1.4.4 Ethernet Ports 31

© KMW USA Inc.
1818 E. Orangethrope Ave, Fullerton, CA 92831
Tel. +1 (714) 515-1100
www.kmwcomm.com

2.1.4.5 External Alarm Ports 32
2.1.4.6 Communication port 32
2.1.4.7 Alarms 32
2.1.5 POD-H-FEM-L-x 33
2.1.5.1 Functions and features 34
2.1.5.2 Specifications 34
2.1.5.3 RF Port and LED 35
2.1.5.4 Communication port 36
2.1.5.5 Alarms 36
2.1.6 POD-H-FEM-H-x 37
2.1.6.1 Functions and features 38
2.1.6.2 Specifications 38
2.1.6.3 RF port and LED 39
2.1.6.4 Communication port 40
2.1.6.5 Alarms 40
2.1.7 POD-H-COM-8 41
2.1.7.1 Functions and features 41
2.1.7.2 Specifications 41
2.1.7.3 RF port and LED 41
2.1.7.4 Communication port 42
2.1.7.5 Alarms 42
2.1.8 POD-H-DTM-8x8 43
2.1.8.1 Functions and features 43
2.1.8.2 Specifications 43
2.1.8.3 RF port and LED 43
2.1.8.4 Communication port 44
2.1.8.5 Alarms 44
2.1.9 POD-H-HOM-L 45
2.1.9.1 Functions and features 45
2.1.9.2 Specifications 45
2.1.9.3 RF port and LED 45
2.1.9.4 Optic port 46
2.1.9.5 Communication port 46
2.1.9.6 Alarms 46
2.1.10 POD-H-HOM-H 48
2.1.10.1 Functions and features 48
2.1.10.2 Specifications 48

2.1.10.3 RF port and LED 48
2.1.10.4 Optic port 49
2.1.10.5 Communication port 49
2.1.10.6 Alarms 49
2.1.11 POD-H-STM-8x4 51
2.1.11.1 Functions and features 51
2.1.11.2 Specifications 51
2.1.11.3 RF port and LED 52
2.1.11.4 Communication port 53
2.1.11.5 Alarms 53
2.1.12 POD-H-PSU-x 54
2.1.12.1 Functions and features 54
2.1.12.2 Specifications 54
2.1.12.3 LED 54
2.1.12.4 Ethernet Port 54
2.1.12.5 AC input on/off Switch & DC output on/off switch 54
2.1.12.6 AC input port & DC output port 55
2.1.12.7 Rack ID 55
2.1.12.8 Ground port 56
2.1.12.9 Alarms 56
2.1.13 POD-H-CDU 57
2.1.13.1 Functions and features 57
2.1.14 POD-H-FAU 57
2.1.14.1 Functions and features 57
2.1.14.2 The rules for installing FAN unit 57
2.1.14.3 Port 57
2.1.14.4 Alarms 58
2.2 Remote Unit 59
2.2.1 7/5/3 band RU for commercial band service (POD-R-7S8CPAWB-2730-AC/DC) 59
2.2.1.1 Functions and features 59
2.2.1.2 Specifications 59
2.2.1.3 RF ports and LED 62
2.2.1.4 Debug Window 63
2.2.1.5 Alarms 65
2.2.1.6 Grounding 65
2.2.2 PS700/800 RU for public safety 700/800 frequency band service (POD-R-P78-27-AC/DC) 66
2.2.2.1 Functions and features 66

2.2.2.2 Specifications 66
2.2.2.3 RF ports and LED 67
2.2.2.4 Debug Window 68
2.2.2.5 Battery Backup Port 69
2.2.2.6 Alarms 70
2.2.2.7 Grounding 71
3. Equipment Installation 72
3.1 Inspection before equipment installation 72
3.1.1 The Part list for each unit 72
3.1.1.1 Head-end Unit 72
3.1.1.2 Remote Unit 73
3.2 Head-end Unit Equipment Installation 74
3.2.1 Installation Head-end Unit in a 19” rack 74
3.2.1.1 The sequence for mounting head-end unit 75
3.2.2 Grounding 76
3.2.3 Optic port Cleaning 76
3.3 Remote Unit 77
3.3.1 Wall Mount for 3/5/7 band RU and PS700/800 RU 77
3.3.2 Grounding 78
3.3.2.1 3/5/7 band RU, PS700/800 RU 78
4. Cable Connection 79
4.1 Head-end Unit Cable Connection 79
4.1.1 Cable 79
4.1.2 Cable Connection Example for frequency bands with FDD type 80
4.1.3 Cable Connection for TDD 2.6G frequency band 82
4.1.4 Cable Connection Example for Public Safety 700/800 band 84
4.1.5 Cable Connection Example for MIMO configuration 85
4.1.6 Cable connection between multiple Racks 87
4.2 Remote Unit Cable Connection 88
4.2.1 7/5/3 band & PS700/800 RU 88
4.2.1.1 Cable 88
4.2.1.2 Optic cable connection 89
4.2.1.3 AC or DC power cable connection 90
4.2.1.4 Ethernet cable connection for connecting with Expansion RU 91
5. Specification 92
5.1 Electrical Specifications (Low power HFM – Low power RU) 92
5.2 Additional Model Names 94

© KMW USA Inc.
1818 E. Orangethrope Ave, Fullerton, CA 92831
Tel. +1 (714) 515-1100
www.kmwcomm.com

Figures

Figure 1-1 DAS Overall Block Diagram 15
Figure 1-2 How it works 16
Figure 1-3 SISO Configuration 17
Figure 1-4 MIMO Configuration 18
Figure 1-5 POD System Scalability 19
Figure 2-1 Head-end Unit Front View 21
Figure 2-2 Head-end Unit Rear View 21
Figure 2-3 POD-H-DMCU 23
Figure 2-4 LED, LCD & Key PAD, Reset 23
Figure 2-5 Ethernet Ports 24
Figure 2-6 DC power input port & power switch 24
Figure 2-7 External Alarm Ports 25
Figure 2-8 POD-H-SRU Front View 26
Figure 2-9 POD-H-SRU Rear View 26
Figure 2-10 DC input port & Fuse 27
Figure 2-11 FAN port 27
Figure 2-12 POD-H-SCM 28
Figure 2-13 LED, LCD & Key PAD 28
Figure 2-14 Ethernet Port 29
Figure 2-15 Communication Port 29
Figure 2-16 POD-H-MCM 30
Figure 2-17 LED, LCD & Key PAD, Reset 31
Figure 2-18 Ethernet ports 31
Figure 2-19 External Alarm Ports 32
Figure 2-20 Communication Port 32
Figure 2-21 POD-H-FEM-L-x Front & Rear View 33
Figure 2-22 POD-H-FEM-L-x RF port and LED 35
Figure 2-23 Communication Port 36
Figure 2-24 POD-H-FEM-H-x Front & Rear View 37
Figure 2-25 POD-H-FEM-H-x RF port and LED 39
Figure 2-26 Communication Port 40
Figure 2-27 POD-H-COM-8 41
Figure 2-28 POD-H-COM-8 RF port and LED 41
Figure 2-29 Communication Port 42
Figure 2-30 POD-H-COM-8 43
Figure 2-31 POD-H-DTM-8x8 RF port and LED 43
Figure 2-32 Communication Port 44
Figure 2-33 POD-H-HOM-L 45
Figure 2-34 POD-H-HOM-L RF port and LED 45
Figure 2-35 optic port 46
Figure 2-36 Communication Port 46
Figure 2-37 POD-H-HOM-H 48
Figure 2-38 POD-H-HOM-H RF port and LED 48
Figure 2-39 optic port 49
Figure 2-40 Communication Port 49
Figure 2-41 POD-H-STM-8x4-DL 51
Figure 2-42 POD-H-STM-8x4-UL 51

© KMW USA Inc.
1818 E. Orangethrope Ave, Fullerton, CA 92831
Tel. +1 (714) 515-1100
www.kmwcomm.com

Figure 2-43 POD-H-STM-8x4-DL RF port and LED 52
Figure 2-44 POD-H-STM-8x4-UL RF port and LED 52
Figure 2-45 Communication Port 53
Figure 2-46 POD-H-PSU-x 54
Figure 2-47 POD-H-PSU-x LED 54
Figure 2-48 Ethernet Port 54
Figure 2-49 AC input on/off Switch & DC output on/off switch 55
Figure 2-50 AC input port & DC output port 55
Figure 2-51 Rack ID 55
Figure 2-52 POD-H-CDU 57
Figure 2-53 POD-H-FAU 57
Figure 2-54 Remote Unit – 7/5/3 band 59
Figure 2-55 Remote Unit External Interfaces 62
Figure 2-56 Debug Window 63
Figure 2-57 Port name for each RU type 64
Figure 2-58 Remote Unit – PS700/800 66
Figure 2-59 Remote Unit - PS700/800 External Interfaces 67
Figure 2-60 Debug Window 68
Figure 2-61 Port name for each RU type 69
Figure 2-62 Battery backup port 70
Figure 3-1 Head-end Unit Rack Mount (Front & Rear view) 74
Figure 3-2 Head-end Unit - Rack Mount Sequence 75
Figure 3-3 Optic Connector Cleaning (left) and Optic Port Cleaning (right) 76
Figure 3-4 LC/APC Optic Connector Dust Cap 76
Figure 3-5 3/5/7 band RU, PS700/800 RU – wall mount bracket 77
Figure 3-6 3/5/7 band RU, PS700/800 RU – Install RU into wall mount bracket 77
Figure 3-7 3/5/7 band RU, PS700/800 RU – RU installed on the wall 78
Figure 3-8 3/5/7 band RU grounding 78
Figure 4-1 Head-end - cables 79
Figure 4-2 Cable Connection Example for frequency bands with FDD type 80
Figure 4-3 Cable Connection Example #1 for TDD 2.6G frequency band 82
Figure 4-4 Cable Connection Example for Public Safety 700/800 band 84
Figure 4-5 Cable Connection for FDD frequency band (MIMO) support 85
Figure 4-6 Connection Diagram for Rack Inter Connection 87

© KMW USA Inc.
1818 E. Orangethrope Ave, Fullerton, CA 92831
Tel. +1 (714) 515-1100
www.kmwcomm.com

Tables

Table 1-1 POD System Scalability & Limitations 20
Table 2-1 Size, weight, and power consumption (Head-end Unit) 22
Table 2-2 POD-H-DMCU LED Operation 23
Table 2-3 Pin map - External Alarm Port 25
Table 2-4 POD-H-DMCU - Alarms 25
Table 2-5 POD-H-SCM LED Operation 28
Table 2-6 POD-H-SCM - Alarms 29
Table 2-7 POD-H-MCM LED Operation 31
Table 2-8 POD-H-MCM - Alarms 32
Table 2-9 POD-H-FEM-L-x frequency range 34
Table 2-10 POD-H-FEM-L-x Size, weight, and power consumption 34
Table 2-11 POD-H-FEM-L-x LED Operation 36
Table 2-12 POD-H-FEM-L-x - Alarms 36
Table 2-13 POD-H-FEM-H-x frequency range 38
Table 2-14 POD-H-FEM-H-x Size, weight, and power consumption 38
Table 2-15 POD-H-FEM-H-x LED Operation 40
Table 2-16 POD-H-FEM-H-x - Alarms 40
Table 2-17 POD-H-COM-8 LED Operation 42
Table 2-18 POD-H-COM-8 - Alarms 42
Table 2-19 POD-H-DTM-8x8 LED Operation 44
Table 2-20 POD-H-DTM-8x8 - Alarms 44
Table 2-21 POD-H-HOM-L LED Operation 45
Table 2-22 POD-H-HOM-L - Alarms 46
Table 2-23 POD-H-HOM-L LED Operation 49
Table 2-24 POD-H-HOM-H - Alarms 49
Table 2-25 POD-H-STM-8x4 LED Operation 53
Table 2-26 POD-H-STM-8x8 - Alarms 53
Table 2-27 POD-H-PSU-x LED Operation 54
Table 2-28 Rack ID 56
Table 2-29 POD-H-PSU - Alarms 56
Table 2-30 POD-H-FAU - Alarms 58
Table 2-31 3/5/7 band RU - 700M, SMR800 + 850M Specifications 60
Table 2-32 3/5/7 band RU – PCS, AWS Specifications 60
Table 2-33 3/5/7 band RU – WCS, 2.6G Specifications 61
Table 2-34 7/5/3 band RU LED Operation 62
Table 2-35 3/5/7 band RU – Alarms 65
Table 2-36 PS700/800 RU - Specifications 67
Table 2-37 7/5/3 band RU LED Operation 68
Table 2-38 Pin map - Battery Backup Port 70
Table 2-39 PS700/800 band RU – Alarms 70
Table 5-1 POD DAS 2-Band RU Electrical Specifications (POD-R-P78-27-AC/DC) 92
Table 5-2 POD DAS 7-Band RU Electrical Specifications (POD-R-7S8CPAWB-2730-AC/DC) 93
Table 5-3 Basic Model and Additional Models on 2-Band Remote Unit 94
Table 5-4 Basic Model and Additional Models on 7-Band Remote Unit 94

© KMW USA Inc.
1818 E. Orangethrope Ave, Fullerton, CA 92831
Tel. +1 (714) 515-1100
www.kmwcomm.com

SAFETY AND REGUALTION WARNING NOTICE

Only qualified personnel should handle the POD equipment. Any person involved in installation or operation of the POD should understand and follow these safety guidelines.

REGULATION
Obey all general and regional installation and safety regulations to prevent any kinds of safety accidents such as potential electric shock, or RF exposure while installation, maintenance, or operation.

FCC REGULATION

- Use of unauthorized antennas, cables, and/or coupling devices not conforming with ERP/EIRP and/or indoor-only restrictions is prohibited.

- FCC Part 15.19 Statements
  - This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

- FCC Part 15.105 statement
  - This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

- FCC Part 15.21 statement
  - Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

- RF Exposure Statement
  - The antenna(s) must be installed such that a minimum separation distance of at least 60 cm with 3dBi antenna gain or 300 cm with 11dBi antenna gain or is maintained between the radiator (antenna) and all persons at all times. This device must not be co-located or operating in conjunction with any other antenna or transmitter.

- FCC part 20 Industrial Booster statement (*FCC ID: ZUQR7S8CPAWB-2730 & ZUQR-P78-27*)
  - **WARNING**. This is **NOT** a **CONSUMER** device. It is designed for installation by **FCC LICENSEES** and **QUALIFIED INSTALLERS**. You **MUST** have an **FCC LICENSE** or express consent of FCC Licensee to operate this device. Unauthorized use may result in significant forfeiture penalties, including penalties in excess of $100,000 for each continuing violation.

- FCC part 90 Industrial Booster statement - THIS IS A 90.219 CLASS B DEVICE (*FCC ID: ZUQR-P78-27*)
  - **WARNING**. This is **NOT** a **CONSUMER** device. It is designed for installation by **FCC LICENSEES** and **QUALIFIED INSTALLERS**. You **MUST** have an **FCC LICENSE** or express consent of FCC Licensee to operate this device. You **MUST** register Class B signal boosters (as defined in 47 CFR 90.219) online at

www.fcc.gov/signal-boosters/registration. Unauthorized use may result in significant forfeiture penalties, including penalties in excess of $100,000 for each continuing violation.

- FCC part 27.5 / SRSP 518 (FCC ID: ZUQR7S8CPAWB-2730)
  - Antennas must be installed in accordance with FCC 27.50 and SRSP 518. With 11dBi gain antennas the height of the antenna above average terrain (HAAT) must not exceed 4777m for IC. For different gain antennas refer to the relevant rules.

- FCC part 90.635 requirement (*FCC ID: ZUQR-P78-27*)
  - Antennas must be installed in accordance with FCC 90.635. With 11dBi gain antennas the height of the antenna above average terrain (HAAT) is permitted over 1372m. For different gain antennas refer to the relevant rules.

- Fixed stations operating in the 1710-1755 MHz band are limited to a maximum antenna height of 10 meters above ground.

IC REGULATION

- RSS-131 Section 5.3 – (The input and output impedances)
  - The Manufacturer's rated output power of this equipment is for single carrier operation. For situations when multiple carrier signals are present, the rating would have to be reduced by 3.5 dB, especially where the output signal is re-radiated and can cause interference to adjacent band users. This power reduction is to be by means of input power or gain reduction and not by an attenuator at the output of the device.
- RSS-GEN, Sec. 7.1.2 – (transmitters)
  - Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that necessary for successful communication.
  - Conformément à la réglementation d'Industrie Canada, le présent émetteur radio peut fonctionneravec une antenne d'un type et d'un gain maximal (ou inférieur) approuvé pour l'émetteur par Industrie Canada. Dans le but de réduire les risques de brouillage radioélectrique à l'intention desautres utilisateurs, il faut choisir le type d'antenne et son gain de sorte que la puissance isotroperayonnée quivalente (p.i.r.e.) ne dépassepas l'intensité nécessaire à l'établissement d'une communication satisfaisante.
- RSS-GEN, Sec. 7.1.2 – (detachable antennas)
  - This radio transmitter (identify the device by certification number, or model number if Category II)has been approved by Industry Canada to operate with the antenna types listed below with the maximum permissible gain and required antenna impedance for each antenna type indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.
  - Le présent émetteur radio (identifier le dispositif par son numéro de certification ou son numéro de modèle s'il fait partie du matériel de catégorie I) a été approuvé par Industrie Canada pour fonctionner avec les types d'antenne énumérés ci-dessous et ayant un gain admissible maximal et l'impédance requise pour chaque type d'antenne. Les types d'antenne non inclus dans cette liste,ou dont le gain est supérieur au gain maximal indiqué, sont strictement interdits pour l'exploitation de l'émetteur.

- RF Radiation Exposure
  - This equipment complies with RF radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 60 cm with 3dBi antenna gain or 300 cm with 11dBi antenna gain between the radiator and your body. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter. RF exposure will be addressed at time of installation and the use of higher gain antennas require larger separation distances.
  - L'antenne (ou les antennes) doit être installée de façon à maintenir à tout instant une distance minimum de au moins 60 cm avec le gain d'antenne 3dBi ou 300 cm avec 11dBi gain d'antenne entre la source de radiation (l'antenne) et toute personne physique. Cet appareil ne doit pas être installé ou utilisé en conjonction avec une autre antenne ou émetteur.

ELECTRIC SHOCK

The POD System uses the AC or DC power with high voltage level which could result in electric shock and may cause severe injury.

LASER SAFETY

To avoid eye injury, do not look directly into the optical ports, patch cords or optical cables. Always assume that optical output is on.

To avoid the potential of radiation exposure, do not leave optic connectors uncovered when not connected.

To check fiber cable connection, use an optical power meter and this should be performed by only technicians familiar with fiber optic safety practices and procedures.

This equipment uses a Class 1 LASER according to FDA/CDRH Rules. This product conforms to all applicable standards of 21 CFR Chapter 1, Subchapter J, Part 1040

SAFETY

The POD system should not be modified or used for any other purposes without authority's permission in any cases. This could cause fires, electric shock or other injuries.

Be careful not to touch the heat sink part to prevent any degree of burns from high temperature of the heat sink.

Do not place the DAS equipments close to flammable materials which could reach high temperatures due to heat dissipation of the DAS equipments.

While working with outdoor DAS equipment with door, make sure to securely fasten the door to prevent any kinds of damages from slamming shut due to abrupt wind.

UL REGULATION

This equipment complies with UL Standard for safety.

© KMW USA Inc.
1818 E. Orangethrope Ave, Fullerton, CA 92831
Tel. +1 (714) 515-1100
www.kmwcomm.com

1. POD SYSTEM OVERVIEW

POD System is a compact and flexible platform which is designed to provide effective service coverage for various indoor and outdoor applications.

POD system supports multiple wireless standards currently being used such as CDMA/EVDO, WCDMA and LTE, as well as high traffic capacity and flexible distribution by sectorization and various flexibilities for future expansions.

POD system supports effectively DAS Network Management system by using Ethernet communications connected to between Head-end Unit and Remote Unit.

1.1 Features of POD System

- A unified platform
  - A single head-end unit supports low & high power RU, indoor & outdoor RU.
  - A single head-end supports all commercial frequencies bands from 700M to 2.6G and public safety frequencies bands including UHF/VHF, PS700 and PS800.
- ALL IP structure
  - All modules and units have its unique IP address which is assigned automatically when installed.
- Supported capacity per a DMCU
  - A DMCU supports up to 4 racks. (a rack can support up to 7 H-SRUs)
  - A DMCU supports up to 4 H-OIMs and 6 H-OEMs.
- The User-friendly Web based GUI
  - Web based GUI interface at head-end unit and Remote Unit.
  - Firmware download for all connected active modules at remote site and right at the head-end
  - Sectorization/commissioning at remote site and right at the head-end
- Easy installation, commissioning and optimization
  - Auto system commissioning
  - DAS tree/Inter-connection diagram/rack diagram
  - System configuration backup/restore
- Monitoring functions for DAS system
  - Downlink spectrum monitoring which is built in H-FEM
  - SNMP/Remote monitoring & control
  - Uptime
  - Save log @H-DMCU, save alarm history @each module
- Monitoring interface for other equipments connected to DAS
  - Ethernet port forward function
  - Input/output ports for external alarm monitoring
- Hot Swap
  - All modules installed in H-SRU support hot swap function, so all the modules can be replaced without powering down H-SRU.
- Documentation
  - Auto BOM Generation
  - System Information Generation
  - Provide external memory for saving documents such as closeout package, user manual
- SMB-L connector (SMB with lock)
  - SMB-L connector makes RF cable connections between RF ports easier, comparing to SMA connector.

© KMW USA Inc.
1818 E. Orangethrope Ave, Fullerton, CA 92831
Tel. +1 (714) 515-1100
www.kmwcomm.com

- The cable with SMB-L connector provides more stable tight connection because SMB-L connector has lock function, comparing to SMB connector. The cable with SMB connector might be untied or loosened easily by vibration or unintentional cable pulling.
- The RF cable with SMB connector can be used instead of the RF cable with SMB-L connector because SMB-L connector has compatibility with SMB connector.

1.2 POD System Architecture

Figure 1-1 represents the overall DAS block diagram of KMW DAS system, POD.

POD consists of HEU (head-end Unit), and RU (Remote unit). HEU provides the interface between plurality of BTS and plurality of RUs, and RUs are deployed over multiple shadow regions to provide wireless service coverage to mobile users in shadow regions.

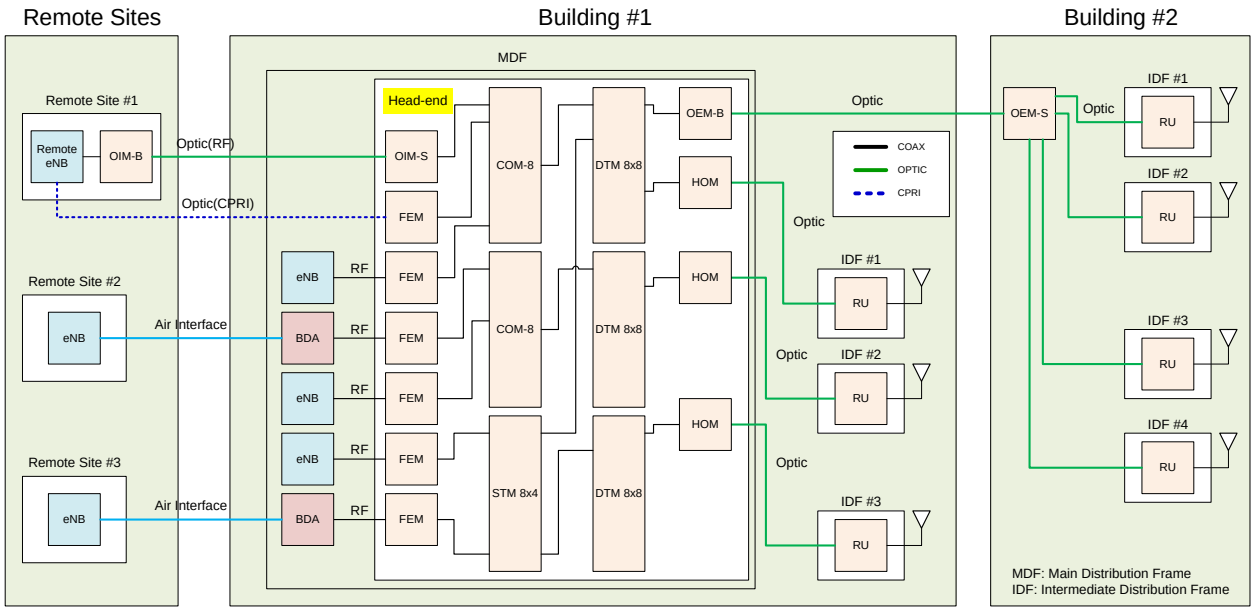


Figure 1-1 DAS Overall Block Diagram

Figure 1-1 shows general signal flow and module composition of POD DAS system.

POD DAS System supports various methods to connect with BTS such as direct connection to BTS through RF coaxial cable, connection to BTS via antenna through BDA, and connection to BTS by CPRI digital interface over optic. If user wants air interface with BTS, it is necessary for user to select proper BDA product separately because POD DAS system does not include any kinds of BDA.

H-FEM provides the interface between various base station having different frequency band/technology and POD DAS system, and H-COM combines downlink signal received from H-FEM and distributes uplink signals received from DTM to FEM. H-DTM combines downlink signals from H-COM and then distributes to H-HOM, also combines uplink signals from several H-HOM and then distributes to H-COM. H-HOM converts downlink RF signal received from H-DTM to optic signal and then transfers to RU, also converts uplink optic signal received from RU to RF signal and then transfers to H-DTM. RU provides wireless service coverage to users by transmitting downlink signal received from H-HOM through the antenna. Also, it transfers to HOM after converting uplink signal received from mobile stations through the antenna to optic signal.

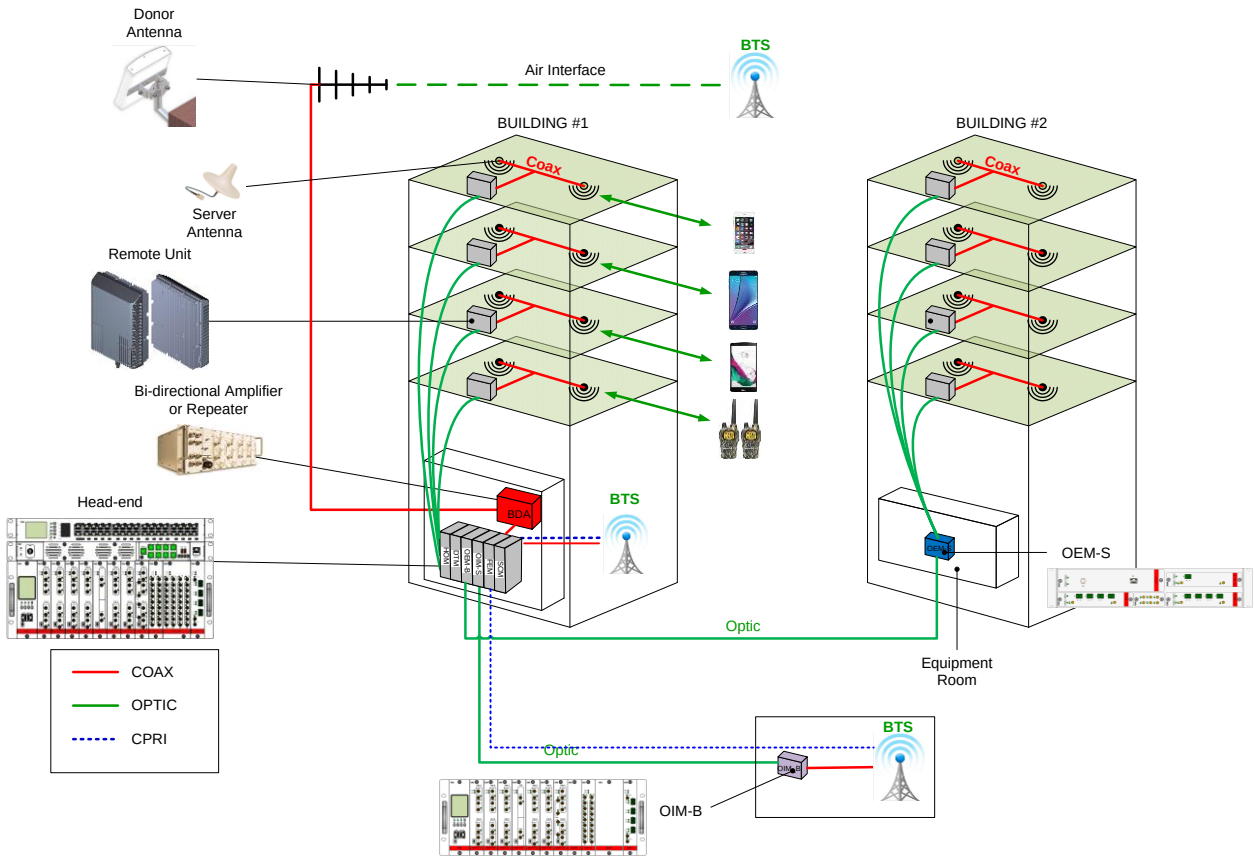


Figure 1-2 How it works

Figure 1-2 is a practical example of POD DAS system. It shows how to distribute various BTS signals from Head-end Unit to multiple Remote Units.

Especially, in case of buildings away from Head-end location which needs multiple remote units, it is composed by the structure which distributes to multiple remote units after transmitting signal to other building through only one optic line using H-OEM, not transmits the signal by individual optic line according to required the number of remote units.

Also, it supports the connection between Head-end and base station through optic line using H-OIM when base station is away from head-end location.

1.3 POD System Configuration

1.3.1 SISO Configuration

- Assumption
  - Supported frequency Band: 700M, SMR800, 850M, PCS, AWS, WCS, 2.6G
  - # of RU: 2
- System Configuration

Module or Unit	Q'ty	Comments
H-DMCU or H-MCM	1	Main Controller
H-PSU or H-PSM	1	Power Supply Unit
H-FEM-L-7	1	700M
H-FEM-L-S8	1	SMR800
H-FEM-L-C	1	850M
H-FEM-L-P	1	PCS
H-FEM-L-A	1	AWS
H-FEM-L-W	1	WCS
H-FEM-L-B	1	2.6G
H-COM-8	1	
H-HOM-L	1	
7 band RU	2	

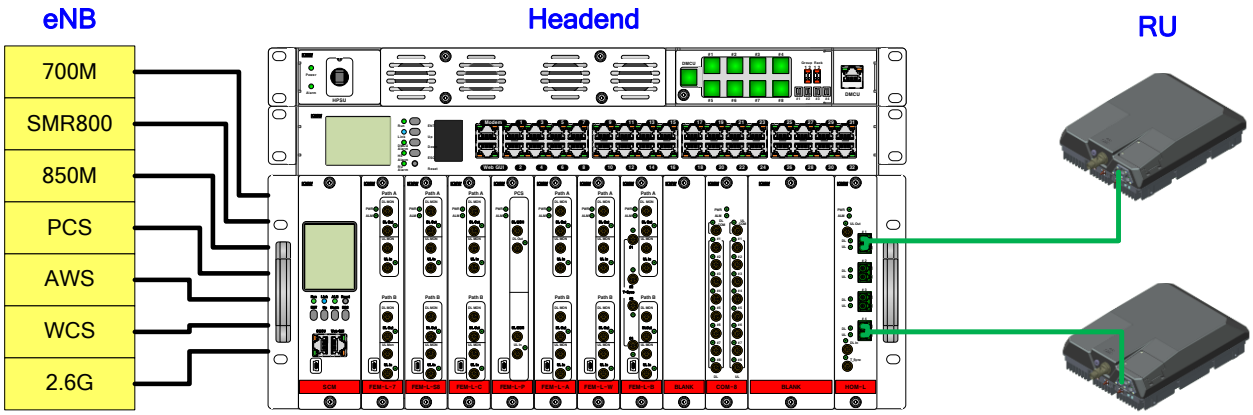


Figure 1-3 SISO Configuration

1.3.2 MIMO Configuration

- Assumption
  - Supported frequency Band
    - > SISO: 700M, SMR800, 850M, PCS, AWS, WCS, 2.6G
    - > MIMO: 700M, PCS, AWS, 2.6G
  - # of RU: 2
- System Configuration

Module or Unit	Q'ty	Comments
H-DMCU or H-MCM	1	Main Controller
H-PSU or H-PSM	1	Power Supply Unit
H-FEM-L-7	1	700M
H-FEM-L-S8	1	SMR800
H-FEM-L-C	1	850M
H-FEM-L-P	2	PCS
H-FEM-L-A	1	AWS
H-FEM-L-W	1	WCS
H-FEM-L-B	1	2.6G
H-COM-8	2	
H-HOM-L	2	
7 band RU	4	

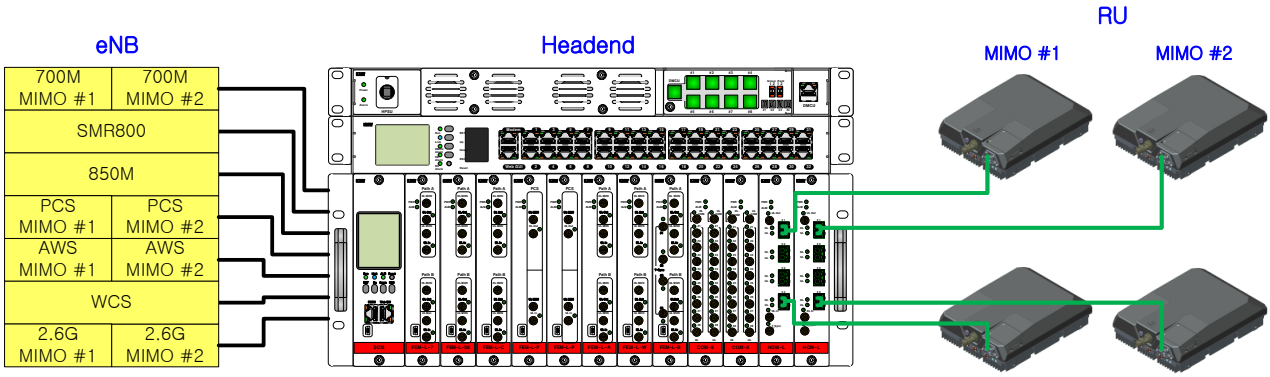


Figure 1-4 MIMO Configuration

1.4 POD System Scalability & Limitation

Figure 1-5 shows maximum capacity of POD system composed by one DMCU

Figure 1-5 POD System Scalability

Table 1-1 POD System Scalability & Limitations

		Supported maximum number			# of path/Module
		POD System[1)]	/Rack	/H-SRU	
H-DMCU		1			
RACK		4			
H-PSU		4	1[2)]		
H-SRU		26	7		
H-FEM	H-FEM-L	208	84[3)]	12[4)]	2[9)]
	H-FEM-H				1
H-COM-8		26	26	12[4)]	
H-DTM 8x8		26	26	6[4)]	
HOM		32	28	4[5)]	
RU		256[6)]	224[7)]	32[8)]	
H-OIM-B		4	4	4	
H-OEM-S		6	6	6	

1) Table 1-1 shows hardware capacity of one POD system.
2) One H-PSU supports one rack with 7 H-SRU which is fully filled with modules.
3) The number of supported H-FEM/rack = 7 H-SRU x 12 H-FEM/H-SRU = 84
4) One H-SRU consists of 12 slots. So, it supports up to 12 modules with 1 slot size (H-FEM & H-COM-8) and 6 modules with 2 slot size (H-DTM 8x8).
5) The number of supported HOM/H-SRU is limited up to four (4).
6) The number of supported RU in POD system is limited up to 256.
7) The number of supported RU/rack = 7 SRU/rack x the number of supported RU/SRU = 224
8) The number of supported RU/H-SRU = 4 HOM/SRU x 4 path/HOM x 2 RU/path = 32
9) H-FEM-L-P (PCS) supports only one path.

© KMW USA Inc.
1818 E. Orangethrope Ave, Fullerton, CA 92831
Tel. +1 (714) 515-1100
www.kmwcomm.com

2. POD SYSTEM COMPONENTS

2.1 Head-end Unit

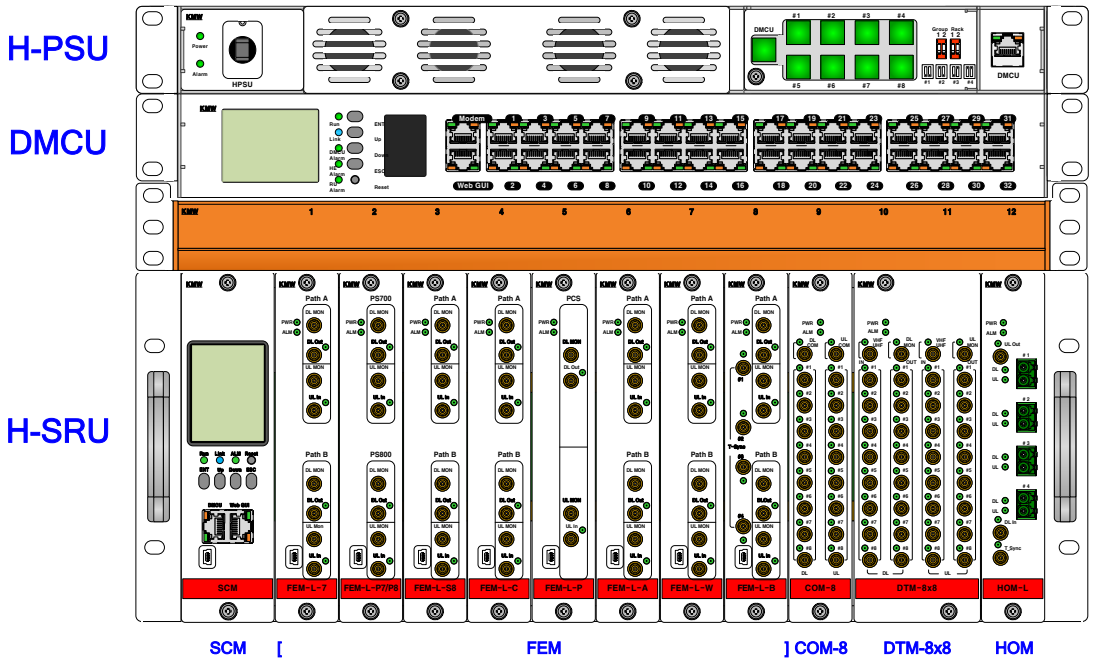


Figure 2-1 Head-end Unit Front View

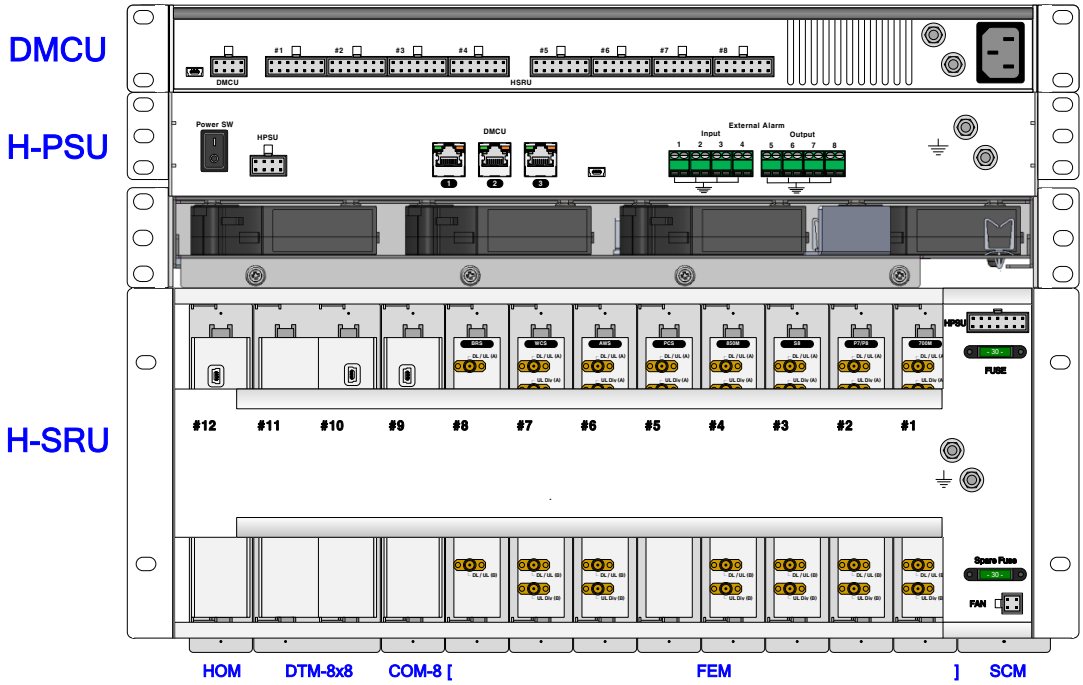


Figure 2-2 Head-end Unit Rear View

- Head-end Unit consists of
  - H-DMCU (Head-end DAS Main Control Unit)
  - H-PSU(Head-end Power Supply Unit)
  - H-SRU(Head-end Subrack Unit)
  - H-SCM(Head-end Subrack Control Module)
  - H-FEM(Head-end Front End Module)
  - H-COM(Head-end Combing Module)
  - H-DTM(Head-end Distribution Module)
  - HOM(Head-end Optic Module)
  - H-STM(Head-end Sectorization Module)
  - H-OEM(Head-end Optic Expansion Module)
  - H-OIM(Head-end Optic Interface Module)
- Specification
  - Size, weight, and power consumption

Table 2-1 Size, weight, and power consumption (Head-end Unit)

	Size(H x W x D)		Weight		Power consumption (W)
	inch	mm	lb	Kg	
POD-H-DMCU	2.1 x 19.0 x 19.7	52.4 x 482.6 x 499.5	6.6	3.0	28.5
POD-H-SRU	7.0 x 19.0 x 19.7	177 x 482.6 x 499.5	16.3	7.4	
POD-H-SCM	7.0 x 1.8 x 17.8	177 x 46.5 x 452.5	2.9	1.3	16.2
POD-H-MCM	7.0 x 3.1 x 17.8	177 x 79 x 452.5			24.0
POD-H-FEM-L	Refer to Table 2-10				
POD-H-FEM-H	Refer to Table 2-14				
POD-H-COM-8	7.0 x 1.3 x 17.8	177 x 31.8 x 452.5	5.5	2.5	4.8
POD-H-DTM-8x8	7.0 x 2.5 x 17.8	177 x 64.1 x 452.5	11.5	5.2	12
POD-H-HOM-L	7.0 x 1.3 x 17.8	177 x 31.8 x 452.5	5.5	2.5	30
POD-H-HOM-H	7.0 x 1.3 x 17.8	177 x 31.8 x 452.5	9	4.1	30
POD-H-STM-DL-8x4	7.0 x 2.5 x 17.8	177 x 64.1 x 452.5	11	5	
POD-H-STM-UL-8x4	7.0 x 2.5 x 17.8	177 x 64.1 x 452.5	11	5	
POD-H-OEM-B	7.0 x 1.3 x 17.8	177 x 31.8 x 452.5	5.3	2.4	30
POD-H-OEM-S	7.0 x 1.3 x 17.8	177 x 31.8 x 452.5	5.5	2.5	30
POD-H-OIM-B	7.0 x 1.3 x 17.8	177 x 31.8 x 452.5	5.3	2.4	30
POD-H-OIM-S	7.0 x 1.3 x 17.8	177 x 31.8 x 452.5	5.5	2.5	30
POD-H-PSU	1.7 x 19.0 x 19.7	44 x 482.6 x 499.5	13.9	6.3	85 @no load
POD-H-PSM	7.0 x 2.5 x 17.8	177 x 64.1 x 452.5			
POD-H-CDU	1.4 x 19.0 x 12.0	35.2 x 482.6 x 304.2	2.4	1.1	
POD-H-FAU	1.4 x 17.3 x 10.6	36 x 440 x 270	3.5	1.6	12

  - Operating temperature: 14 ~ 122°F (-10 ~ 50°C)
  - Power input
    - > H-FEM,H-COM, H-STM, H-DTM, H-HOM, H-OIM, H-FAU: DC 24V
    - > POD-H-PSU-AC/POD-H-PSM-AC: AC 100~240V (47~63Hz)
    - > POD-H-PSU-DC/POD-H-PSM-DC: DC -48V

© KMW USA Inc.
1818 E. Orangethrope Ave, Fullerton, CA 92831
Tel. +1 (714) 515-1100
www.kmwcomm.com

2.1.1 POD-H-DMCU (DAS Main Control Unit)

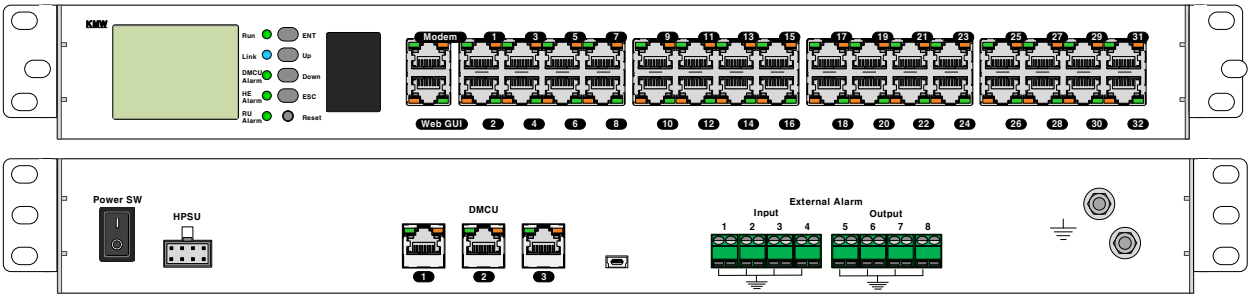


Figure 2-3 POD-H-DMCU

2.1.1.1 Functions and features

- Controls, monitors, and generates alarms for all connected modules and units in a POD DAS system
- Supports up to 4 racks.
- Supports up to 4 H-OIMs and up to 6 H-OEMs.
- Provides web-based GUI interface to user
- Provides the user interface to control and monitor using LCD window and key pad.
- Send alarms to O&M system by SNMP.
- Ethernet port forward function
- Provides external input/output ports for external alarm monitoring

2.1.1.2 Specifications

- Size, weight, and power consumption: refer to Table 2-1

2.1.1.3 LED, LCD & Key PAD, Reset

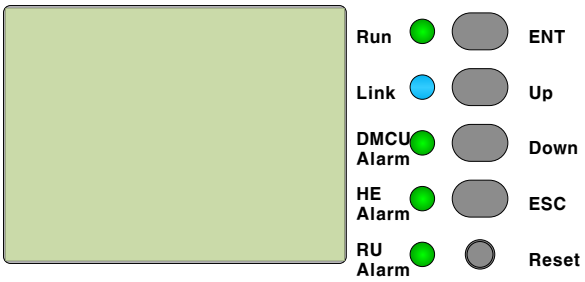


Figure 2-4 LED, LCD & Key PAD, Reset

- LCD window and key pad
  - H-DMCU provides the user interface to control and monitor using LCD window and key pad.
- Reset
  - Used for H-DMCU reset.
- LED

Table 2-2 POD-H-DMCU LED Operation

		Specifications
Run	Solid Green	When power is on.
	OFF	When power is off.
Link	Solid Yellow	When H-DMCU cannot communicate with at least one module among modules which are directly connected to H-DMCU such as H-SCM or H-PSU.

	OFF	When H-DMCU communicates with all modules which are directly connected with H-DMCU such as H-SCM or H-PSU.
DMCU Alarm	Solid Yellow	When H-DMCU has minor alarm.
	OFF	When H-DMCU has no alarm.
HE Alarm	Solid Yellow	When at least one module or unit in the head-end has minor alarm.
	Solid Red	When at least one module or unit in the head-end has major alarm.
	OFF	When all modules and units in the head-end have no alarm.
RU Alarm	Solid Yellow	When at least one RU has minor alarm.
	Solid Red	When at least one RU has major alarm.
	OFF	When all RUs have no alarm.

2.1.1.4 Ethernet Ports

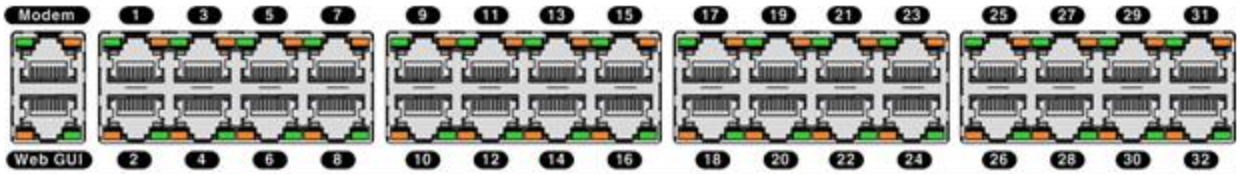


Figure 2-5 Ethernet Ports

- Modem port
  - Connected to wireless modem which provides connection with O&M center.
- Web GUI port
  - Used to access to web-based GUI using notebook or desktop PC.
- 1~32 Ethernet Port
  - Connected to H-SRU or H-PSU so that H-DMCU can monitor and control the connected H-PSUs and all modules installed in H-SRU.
  - Connected to external device to provide port forwarding function.

2.1.1.5 DC power input port & power switch

24V DC power for DMCU is fed from POD-H-PSU and can be turned on or off by power switch.

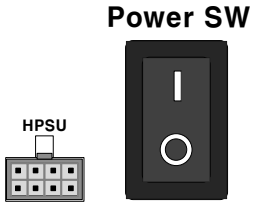


Figure 2-6 DC power input port & power switch

2.1.1.6 External Alarm Port

H-DMCU provides 4 alarm inputs to get the alarm statuses of the connected any external devices. Then, the input conditions are reported to the O&M system.

H-DMCU also provides 4 alarm outputs to control the external devices or to signal any alarm condition or status information to the external devices.

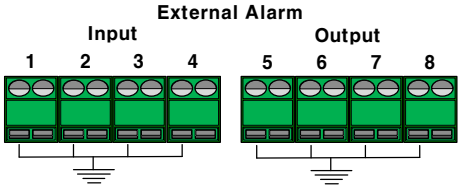


Figure 2-7 External Alarm Ports

Table 2-3 Pin map - External Alarm Port

Pin Assign		Specifications
1	External Input #1	External Alarm input #1 pin
2	External Input #2	External Alarm input #2 pin
3	External Input #3	External Alarm input #3 pin
4	External Input #4	External Alarm input #4 pin
5	External Output #1	External Alarm output #1 pin
6	External Output #2	External Alarm output #2 pin
7	External Output #3	External Alarm output #3 pin
8	External Output #4	External Alarm output #4 pin

2.1.1.7 Ground port

- Refer to section 3.2.2

2.1.1.8 Alarms

Table 2-4 POD-H-DMCU - Alarms

Alarm Name	Description	Remedy	Alarm Severity	LED color
High Temperature	Temperature high	Check environment	Minor	Yellow
Low Temperature	Temperature too low		Minor	Yellow
Head-end Composite	Head-end composite alarms	Check Head-end unit	Major/Minor	Red/ Yellow
RU Composite	RU composite alarms	Check RU	Major/Minor	Red/ Yellow
External Input (1~4)	External input signal	Check connected external unit	Minor	Yellow
AC Fail	H-PSU AC Fail	Check H-PSU	Major	Red
DC Fail	H-PSU DC Fail	Check H-PSU	Major	Red
PSU Comm. Fail	H-PSU Communication Fail	Check UDP cable connection	Minor	Yellow
SCM Comm. Fail	H-SCM Communication Fail	Check UDP cable connection	Minor	Yellow

© KMW USA Inc.
1818 E. Orangethrope Ave, Fullerton, CA 92831
Tel. +1 (714) 515-1100
www.kmwcomm.com

2.1.2 POD-H-SRU

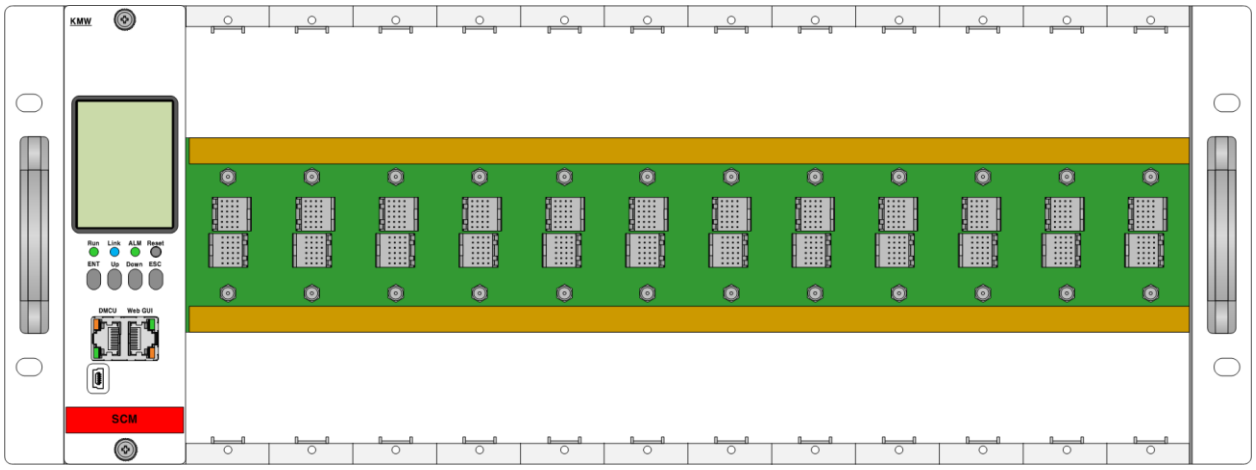


Figure 2-8 POD-H-SRU Front View

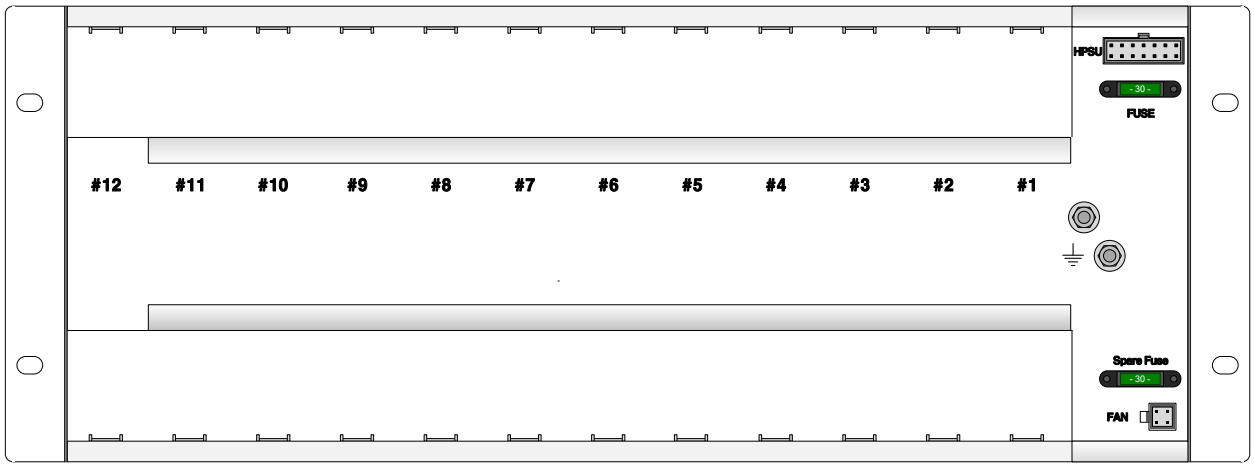


Figure 2-9 POD-H-SRU Rear View

2.1.2.1 Functions and features

- One H-SRU supports 12 slot including one SCM and other modules such as H-FEM, H-COM, H-DTM, HOM.
- Supplies 24V DC power received from H-PSU to each individual module through the backboard.
- Supplies 24V DC power to H-FAU (Fan Unit) for dissipating heat comes from the modules installed in POD-H-SRU.
- Provides communication path between installed modules and SCM through backboard.

2.1.2.2 Specifications

- Size, weight, and power consumption : refer to Table 2-1

2.1.2.3 DC input port & Fuse

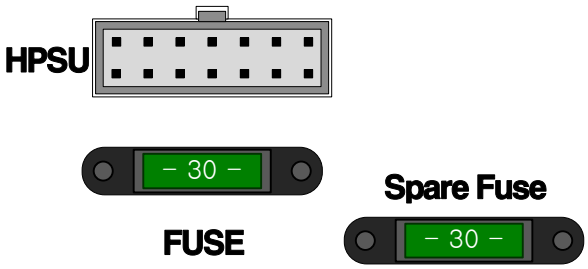


Figure 2-10 DC input port & Fuse

- DC Input port
  - The 24V DC power is supplied from H-PSU through this port, and this port includes H-SRU ID, rack ID which is set by 'Rack ID' dip switch in H-PSU.
- FUSE
  - Current capacity: 15A
  - The fuse protects the damages of all modules installed in H-SRU due to high current.
  - H-SRU provides spare fuse for just in case fuse is broken.

2.1.2.4 FAN port

Figure 2-11 FAN port

- DC Power is supplied into the FAN Unit through this port.
- FAN fail alarm is transferred to H-SCM through this port.

2.1.2.5 Ground port

- Refer to section 3.2.2

2.1.3 POD-H-SCM

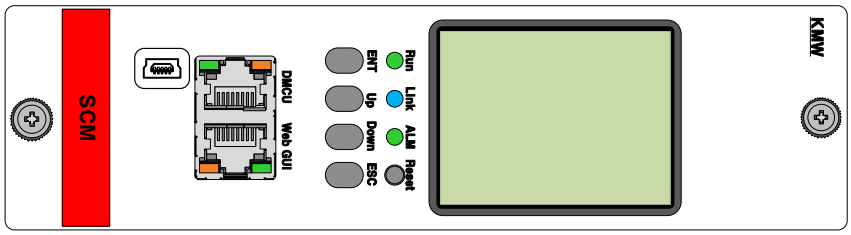


Figure 2-12 POD-H-SCM

2.1.3.1 Functions and features

- One H-SCM can be installed in one H-SRU.
- Provides web-based GUI interface to user
- Provides the user interface to control and monitor using LCD window and key pad.
- Provides physical path between H-DMCU and all modules in H-SRU
- Controls FAN on/off and FAN speed and monitors FAN alarm.
- Periodically, gather the data from all modules in H-SRU and send it to H-DMCU through DMCU port.
- Periodically, gather the data from RUs connected to H-HOM in H-SRU and send it to H-DMCU through DMCU port.

2.1.3.2 Specifications

- Size, weight, and power consumption : refer to Table 2-1

2.1.3.3 LED, LCD & Key PAD, Reset

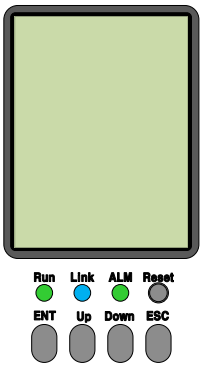


Figure 2-13 LED, LCD & Key PAD

- LCD window and key pad
  - H-SCM provides the user interface to control and monitor using LCD window and key pad.
- Reset
  - Used for H-SCM reset.

Table 2-5 POD-H-SCM LED Operation

		Specifications
RUN	Solid Green	When power is on.
	OFF	When power is off.
Link	Solid Yellow	When H-SCM cannot communicate with at least one module among modules installed in H-SRU.
	OFF	When H-SCM communicates with all modules installed in H-SRU.
Alarm	Solid Red	When H-SCM has major alarm.

	Solid Yellow	When H-SCM has minor alarm.
	OFF	When H-SCM has no alarm.

2.1.3.4 Ethernet Port

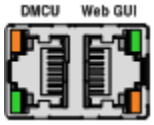


Figure 2-14 Ethernet Port

- DMCU port
  - Provides physical communication path between H-DMCU and all modules in H-SRU by connecting DMCU port of H-SCM to available one port among Ethernet port #1~#32 of H-DMCU.
- Web GUI port
  - Used to access to web-based GUI using notebook or desktop PC.

2.1.3.5 Communication port

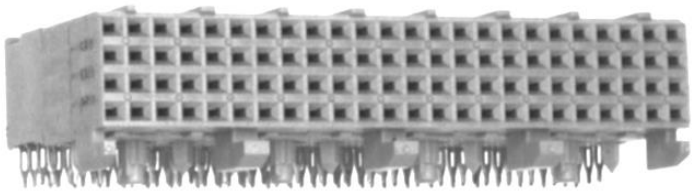


Figure 2-15 Communication Port

- This port provides communication path between H-FEM-H-x, H-COM, H-DTM, H-STM, HOM-x or H-SCM installed in H-SRU through backboard of H-SRU.
- +24V DC is provided through this communication port from backboard of H-SRU.
- H-SCM acquires ID information such as Rack ID, Sub rack ID and Slot ID through this communication port. The IP address of H-SCM is assigned automatically using the acquired ID information.

2.1.3.6 Alarms

Table 2-6 POD-H-SCM - Alarms

Alarm Name	Description	Remedy	Alarm Severity	LED color
High Temperature	Temperature high	Check environment	Minor	Yellow
Low Temperature	Temperature too low		Minor	Yellow
FAN	FAN Fail	Check FAN	Minor	Yellow
Module Comm. Fail	Module Communication Fail	Check Module connection	Minor	Yellow

2.1.4 POD-H-MCM

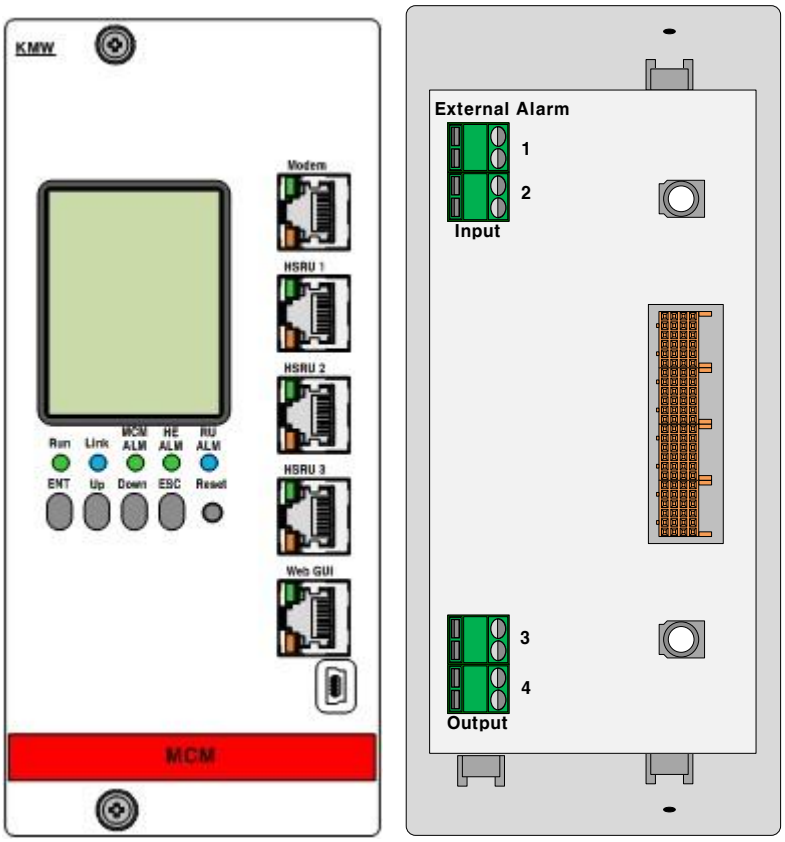


Figure 2-16 POD-H-MCM

2.1.4.1 Functions and features

- In case of small size DAS system, H-MCM can replace H-DMCU.
- Controls, monitors, and generates alarms for all modules and units connected to H-MCM via Ethernet cable, backboard of H-SCM, or optic cable.
- Provides web-based GUI interface to user
- Provides the user interface to control and monitor using LCD window and key pad.
- Send alarms to O&M system by SNMP.
- Input/output ports for external alarm monitoring

2.1.4.2 Specifications

- Size, weight, and power consumption : refer to Table 2-1

2.1.4.3 LED, LCD & Key PAD, Reset

Figure 2-17 LED, LCD & Key PAD, Reset

- LCD window and key pad
  - H-MCM provides the user interface to control and monitor using LCD window and key pad.
- Reset
  - Used for H-MCM reset.
- LED

Table 2-7 POD-H-MCM LED Operation

		Specifications
Run	Solid Green	When power is on.
	OFF	When power is off.
Link	Blink Green	When H-MCM cannot communicate with at least one module or units connected to H-MCM.
	OFF	When H-MCM communicates all modules and units connected to H-MCM.
MCM Alarm	Blink Green	When H- MCM itself has minor alarm.
	OFF	When H- MCM itself has no alarm.
HE Alarm	Blink Green	When at least one module or unit connected to H-MCM has minor alarm.
	Solid Red	When at least one module or unit connected to H-MCM has major alarm.
	OFF	When all modules and units connected to H-MCM have no alarm.
RU Alarm	Blink Green	When at least one RU connected to H-MCM has minor alarm.
	Solid Red	When at least one RU connected to H-MCM has major alarm.
	OFF	When all RUs connected to H-MCM have no alarm.

2.1.4.4 Ethernet Ports

Figure 2-18 Ethernet ports

- Modem port
  - Connected to wireless modem which provides connection with O&M center.
- Web GUI port
  - Used to access to web-based GUI using notebook or desktop PC.
- HSRU1~HSRU3 Ethernet Port
  - Connected to H-SRU so that H-MCM can monitor and control the connected all modules installed in H-SRU.

2.1.4.5 External Alarm Ports

POD-H-MCM provides 2 alarm inputs to get the alarm statuses of the connected any external devices. Then, the input conditions are reported to the O&M system.

POD-H-MCM also provides 2 alarm outputs to control the external devices or to signal any alarm condition or status information to the external devices.

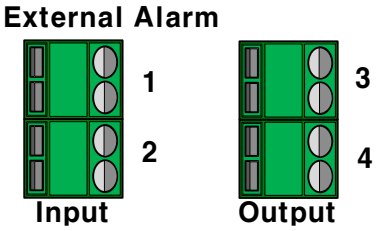


Figure 2-19 External Alarm Ports

2.1.4.6 Communication port

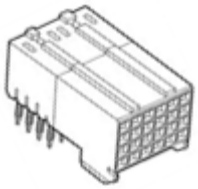


Figure 2-20 Communication Port

- This port provides communication path between H-FEM-H-x, H-COM, H-DTM, H-STM, HOM-x or H-SCM installed in H-SRU through backboard of H-SRU.
- +24V DC is provided through this communication port from backboard of H-SRU.
- H-MCM acquires ID information such as Rack ID, Sub rack ID and Slot ID through this communication port. The IP address of H-MCM is assigned automatically using the acquired ID information.

2.1.4.7 Alarms

Table 2-8 POD-H-MCM - Alarms

Alarm Name	Description	Remedy	Alarm Severity	LED color
High Temperature	Temperature high	Check environment	Minor	Yellow
Low Temperature	Temperature too low		Minor	Yellow
Head-end Composite	Head-end composite alarms	Check Head-end unit	Major/Minor	Red/ Yellow
RU Composite	RU composite alarms	Check RU	Major/Minor	Red/ Yellow
External Input (1~2)	External input signal	Check connected External unit	Minor	Yellow
AC Fail	H-PSU AC Fail	Check H-PSU	Major	Red
DC Fail	H-PSU DC Fail	Check H-PSU	Major	Red
SCM Comm. Fail	H-SCM Communication Fail	Check UDP cable connection	Minor	Yellow

© KMW USA Inc.
1818 E. Orangethrope Ave, Fullerton, CA 92831
Tel. +1 (714) 515-1100
www.kmwcomm.com

2.1.5 POD-H-FEM-L-x

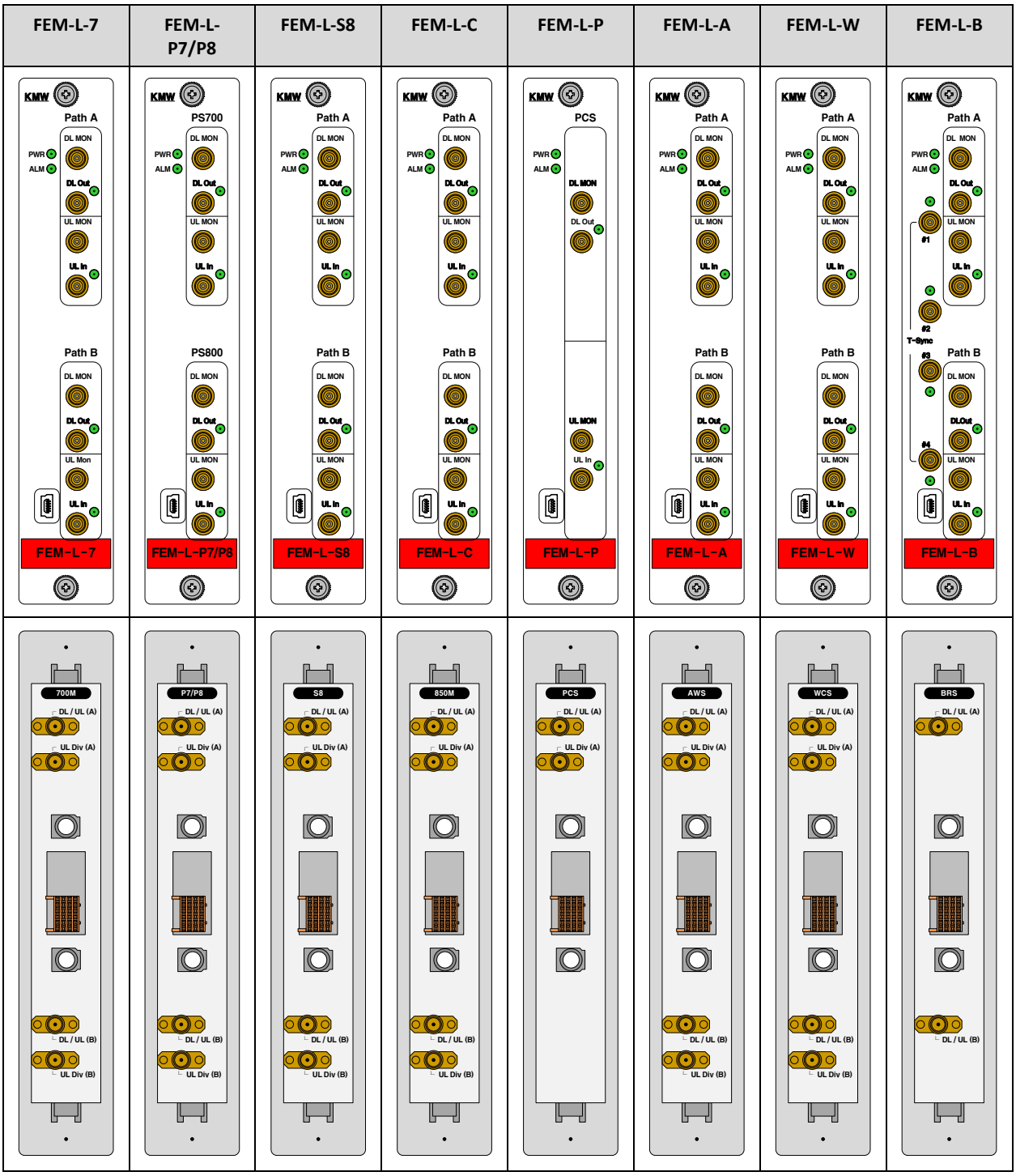


Figure 2-21 POD-H-FEM-L-x Front & Rear View

2.1.5.1 Functions and features

- Provides the interface between DAS and Base station
- Provides independent two RF path except H-FEM-L-P
- ALC function for DL/UL Path
- Spectrum monitoring function for DL Input
- TDD Switching for TD-LTE (POD-H-FEM-L-B only)
- Acquisition and transmission of synchronization signal (POD-H-FEM-L-B only)

2.1.5.2 Specifications

- Frequency range

Table 2-9 POD-H-FEM-L-x frequency range

	Downlink	Uplink	Comments
POD-H-FEM-L-7	728~756 MHz	698~716 MHz (Lower ABC) 777~787 MHz (Upper C)	
POD-H-FEM-L-P7P8	758~775 MHz (PS700) 851~869 MHz (PS800)	788~805 MHz (PS700) 806~824 MHz (PS800)	
POD-H-FEM-L-S8	851~869 MHz	806~824 MHz	
POD-H-FEM-L-C	869~894 MHz	824~849 MHz	
POD-H-FEM-L-P	1930~1995 MHz	1850~1915 MHz	
POD-H-FEM-L-A	2110~2180 MHz	1710~1780 MHz (1710~1755 MHz for BDA application)	
POD-H-FEM-L-W	2350~2360 MHz	2305~2315 MHz	
POD-H-FEM-L-B	2496~2690 MHz		TDD

- Input range
  - -15~20dBm

Table 2-10 POD-H-FEM-L-x Size, weight, and power consumption

	Size(H x W x D)		Weight		Power consumption (W)
	inch	mm	lb	Kg	
POD-H-FEM-L-7	7.0 x 1.3 x 17.8	177 x 31.8 x 452.5	4.9	2.2	22
POD-H-FEM-L-P7P8	7.0 x 1.3 x 17.8	177 x 31.8 x 452.5	4.9	2.2	16
POD-H-FEM-L-S8	7.0 x 1.3 x 17.8	177 x 31.8 x 452.5	4.9	2.2	16
POD-H-FEM-L-C	7.0 x 1.3 x 17.8	177 x 31.8 x 452.5	4.9	2.2	15
POD-H-FEM-L-P	7.0 x 1.3 x 17.8	177 x 31.8 x 452.5	4.9	2.2	9
POD-H-FEM-L-A	7.0 x 1.3 x 17.8	177 x 31.8 x 452.5	4.9	2.2	12
POD-H-FEM-L-W	7.0 x 1.3 x 17.8	177 x 31.8 x 452.5	4.9	2.2	12
POD-H-FEM-L-B	7.0 x 1.3 x 17.8	177 x 31.8 x 452.5	4.9	2.2	13

© KMW USA Inc.
1818 E. Orangethrope Ave, Fullerton, CA 92831
Tel. +1 (714) 515-1100
www.kmwcomm.com

2.1.5.3 RF Port and LED

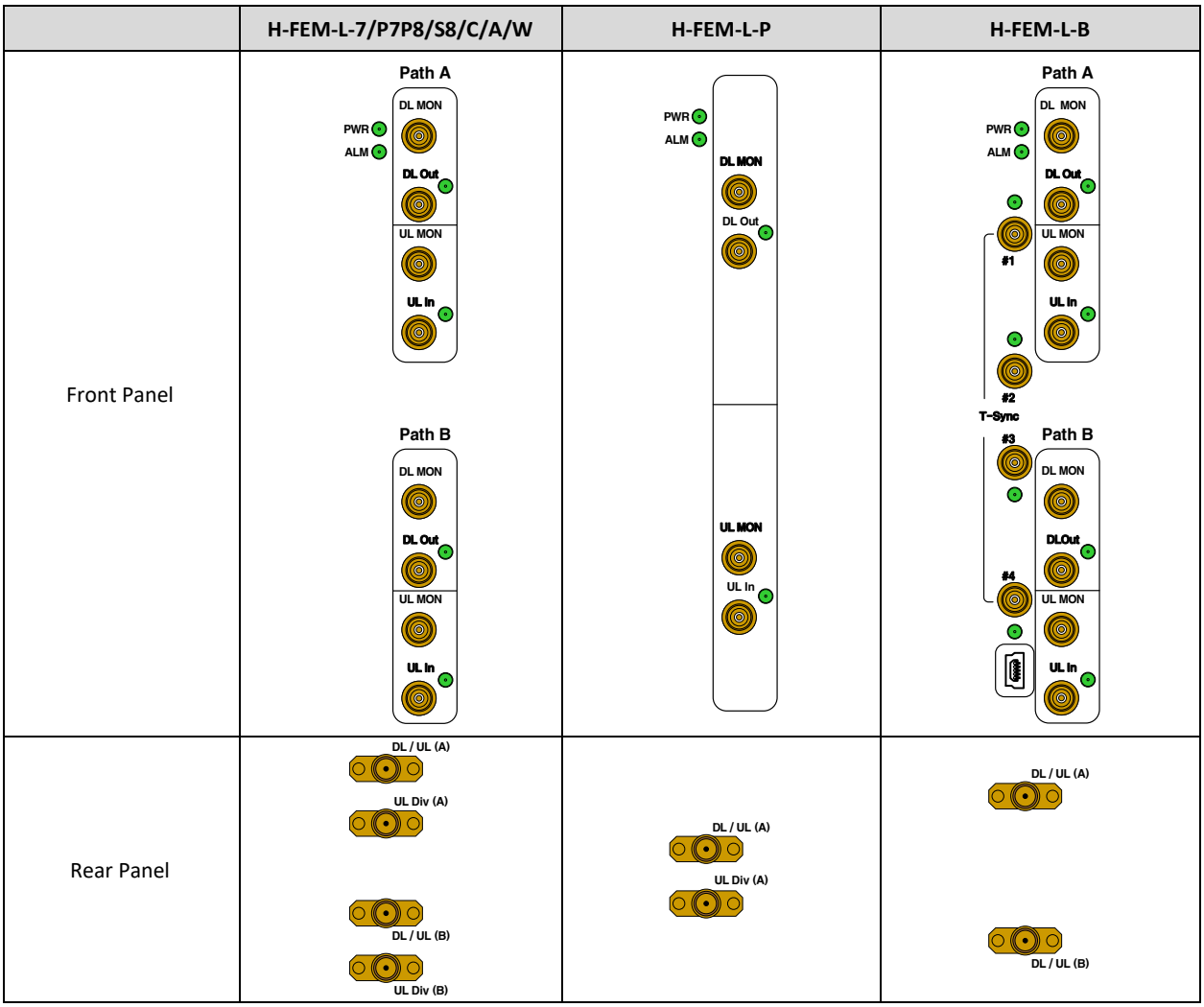


Figure 2-22 POD-H-FEM-L-x RF port and LED

- RF Ports
  - DL/UL-A(B), UL-Div A(B)
    - > Linked to BTS RF ports
    - > When the RF port linked to BTS is duplex port, connect to DL/UL-A(B)
    - > When the RF ports linked to BTS are TX/RX port, connect DL/UL-A(B) to TX port and UL Div A(B) to RX port.
    - > Connector Type: SMA Female
  - Connector Type: SMA DL MON-A(B), UL MON-A(B)
    - > Used to monitor DL input or UL output for path A or B
    - > Connector Type: SMB-L Female
  - DL OUT-A(B), UL IN-A(B)
    - > DL OUT- A(B): DL output port for path A or B, Linked to H-COM or H-DTM
    - > UL IN- A(B): UL input port for path A or B, Linked to H-COM or H-DTM
    - > Connector Type: SMB-L Female

- LED

Table 2-11 POD-H-FEM-L-x LED Operation

		Specifications
PWR	Solid Green	When power is on.
	Off	When power is off.
ALM	Off	When H-FEM-L-x has no alarms.
	Solid Yellow	When H-FEM-L-x has minor alarm.
	Solid Red	When H-FEM-L-x has major alarm.
DL Out	Blink Green	At the cable connection guide, green led blinks to indicate which RF ports should be connected to.
UL In	Blink Green	
T-sync #1~#4	Blink Green	

2.1.5.4 Communication port

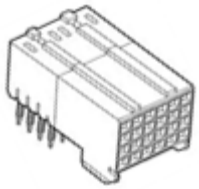


Figure 2-23 Communication Port

- This port provides communication path between H-FEM-L-x and H-SCM through backboard of H-SRU.
- +24V DC is provided through this communication port from backboard of H-SRU.
- H-FEM-L-x acquires ID information such as Rack ID, Sub rack ID and Slot ID through this communication port. The IP address of H-FEM-L-x is assigned automatically using the acquired ID information.

2.1.5.5 Alarms

Table 2-12 POD-H-FEM-L-x - Alarms

Alarm Name	Description	Remedy	Alarm Severity	LED color
High Temperature	Temperature too high	Check environment	Major	Red
	Temperature high		Minor	Yellow
Low Temperature	Temperature too low		Minor	Yellow
Downlink High Input power	RF signal too high	Check H-FEM downlink input level/ attenuator configuration/ALC status	Major	Red
	RF signal high		Major	Yellow
Uplink High Output Power	RF signal too high	Check H-FEM uplink input level/ attenuator configuration/ALC status	Major	Red
	RF signal high		Major	Yellow
Downlink Low Input Power	RF signal too low	Check H-FEM downlink input level/ attenuator configuration/RF cabling	Minor	Yellow
Link	Communication fail	Check pin of communication port/ assigned IP address	Major	Yellow
Freeze	The final stage of Shutdown process	Check if shutdown process is going again after reset	Major	Red
Downlink ALC Activation	ALC activation	Check H-FEM downlink input level/ attenuator configuration	Warning	Yellow
Sync fail (H-FEM-L-B only)	No TDD sync signal is acquired	Check H-FEM downlink signal input received from BTS	Major	Yellow

2.1.6 POD-H-FEM-H-x

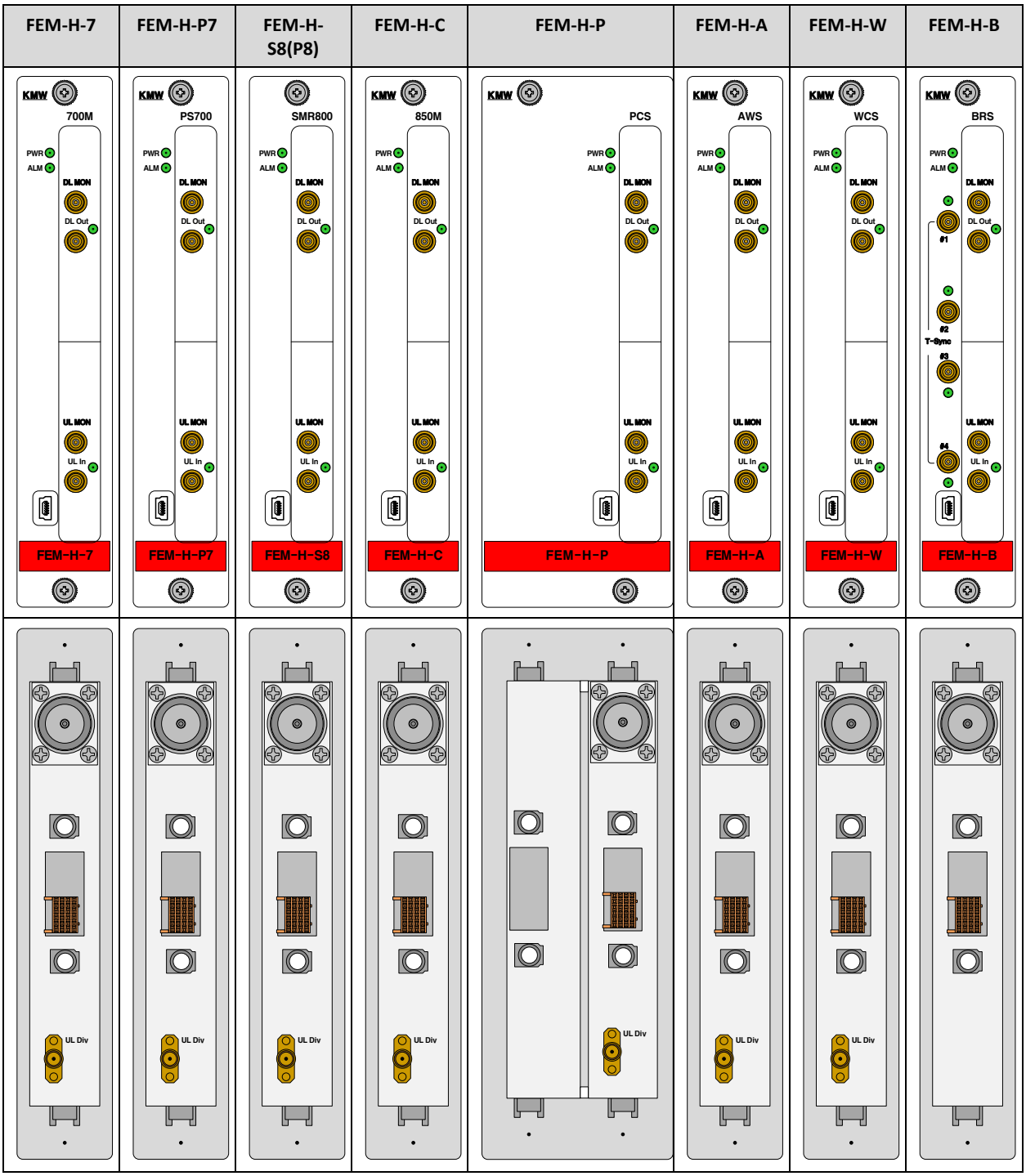


Figure 2-24 POD-H-FEM-H-x Front & Rear View

2.1.6.1 Functions and features

- Provides the interface between DAS and Base station
- ALC function for DL/UL Path
- Spectrum monitoring function for DL Input
- TDD Switching for TD-LTE (POD-H-FEM-H-B only)
- Acquisition and transmission of synchronization signal (POD-H-FEM-H-B only)

2.1.6.2 Specifications

- Frequency range

Table 2-13 POD-H-FEM-H-x frequency range

	Downlink	Uplink	Comments
POD-H-FEM-L-7	728~756 MHz	698~716 MHz (Lower ABC) 777~787 MHz (Upper C)	
POD-H-FEM-L-P7	758~775 MHz	788~805 MHz	
POD-H-FEM-L-P8	851~869 MHz	806~824 MHz	
POD-H-FEM-L-S8	851~869 MHz	806~824 MHz	
POD-H-FEM-L-C	869~894 MHz	824~849 MHz	
POD-H-FEM-L-P	1930~1995 MHz	1850~1915 MHz	
POD-H-FEM-L-A	2110~2180 MHz	1710~1780 MHz (1710~1755 MHz for BDA application)	
POD-H-FEM-L-W	2350~2360 MHz	2305~2315 MHz	
POD-H-FEM-L-B	2496~2690 MHz		TDD

- Input range
  - 15~46dBm

Table 2-14 POD-H-FEM-H-x Size, weight, and power consumption

	Size(H x W x D)		Weight		Power consumption (W)
	inch	mm	lb	Kg	
POD-H-FEM-H-7	7.0 x 1.3 x 17.8	177 x 31.8 x 452.5	5.7	2.6	11.5
POD-H-FEM-H-P7	7.0 x 1.3 x 17.8	177 x 31.8 x 452.5	5.7	2.6	8
POD-H-FEM-H-P8(S8)	7.0 x 1.3 x 17.8	177 x 31.8 x 452.5	5.7	2.6	8
POD-H-FEM-H-C	7.0 x 1.3 x 17.8	177 x 31.8 x 452.5	5.7	2.6	8
POD-H-FEM-H-P	7.0 x 2.5 x 17.8	177 x 63.8 x 452.5	5.7	2.6	9
POD-H-FEM-H-A	7.0 x 1.3 x 17.8	177 x 31.8 x 452.5	7.7	3.5	9.5
POD-H-FEM-H-W	7.0 x 1.3 x 17.8	177 x 31.8 x 452.5	5.7	2.6	6
POD-H-FEM-H-B	7.0 x 1.3 x 17.8	177 x 31.8 x 452.5	5.7	2.6	6
POD-H-FEM-L-B	7.0 x 1.3 x 17.8	177 x 31.8 x 452.5	5.7	2.6	7.5

© KMW USA Inc.
1818 E. Orangethrope Ave, Fullerton, CA 92831
Tel. +1 (714) 515-1100
www.kmwcomm.com

2.1.6.3 RF port and LED

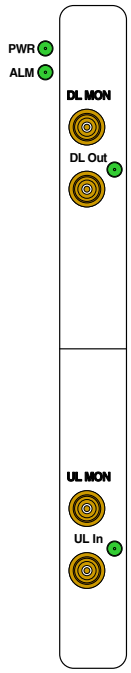
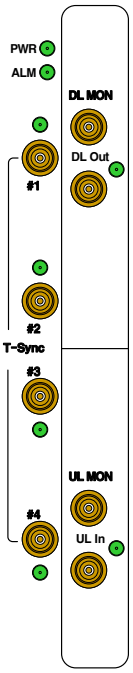
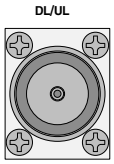
	H-FEM-L-7/P7/P8/S8/C/P/A/W	H-FEM-L-B
Front Panel		
Rear Panel		

Figure 2-25 POD-H-FEM-H-x RF port and LED

- RF Ports
  - DL/UL, UL-Div
    - > Linked to BTS RF ports
    - > When the RF port linked to BTS is duplex port, connect to DL/UL
    - > When the RF ports linked to BTS are TX/RX port, connect DL/UL to TX port and UL Div to RX port.
    - > Connector Type
      - ▪ Mini DIN Female for DL/UL port
      - ▪ SMA Female for UL div port
  - Connector Type: SMA DL MON, UL MON
    - > Used to monitor DL input or UL output
    - > Connector Type: SMB-L Female
  - DL OUT, UL IN
    - > DL OUT: DL output port, Linked to H-COM or H-DTM
    - > UL IN: UL input port, Linked to H-COM or H-DTM
    - > Connector Type: SMB-L Female

- LED

Table 2-15 POD-H-FEM-H-x LED Operation

		Specifications
PWR	Solid Green	When power is on.
	Off	When power is off.
ALM	Off	When H-FEM-H-x has no alarms.
	Solid Yellow	When H-FEM-H-x has minor alarm.
	Solid Red	When H-FEM-H-x has major alarm.
DL Out	Blink Green	At the cable connection guide, green led blinks to indicate which RF ports should be connected to.
UL In	Blink Green	
T-sync #1~#4	Blink Green	

2.1.6.4 Communication port

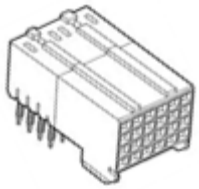


Figure 2-26 Communication Port

- This port provides communication path between H-FEM-H-x and H-SCM through backboard of H-SRU.
- +24V DC is provided through this communication port from backboard of H-SRU.
- H-FEM-H-x acquires ID information such as Rack ID, Sub rack ID and Slot ID through this communication port. The IP address of H-FEM-H-x is assigned automatically using the acquired ID information.

2.1.6.5 Alarms

Table 2-16 POD-H-FEM-H-x - Alarms

Alarm Name	Description	Remedy	Alarm Severity	LED color
High Temperature	Temperature too high	Check environment	Major	Red
	Temperature high		Minor	Yellow
Low Temperature	Temperature too low		Minor	Yellow
Downlink High Input Power	RF signal too high	Check H-FEM downlink input level/ attenuator configuration/ALC status	Major	Red
	RF signal high		Major	Yellow
Uplink High Output Power	RF signal too high	Check H-FEM uplink input level/ attenuator configuration/ALC status	Major	Red
	RF signal high		Major	Yellow
Downlink Low Input Power	RF signal too low	Check H-FEM downlink input level/ attenuator configuration/RF cabling	Minor	Yellow
Link	Communication fail	Check pin of communication port/ assigned IP address	Major	Yellow
Freeze	The final stage of Shutdown process	Check if shutdown process is going again after reset	Major	Red
Downlink ALC Activation	ALC activation	Check H-FEM downlink input level/ attenuator configuration	Warning	Yellow
Sync fail (H-FEM-L-B only)	No TDD sync signal is acquired	Check H-FEM downlink signal input received from BTS	Major	Yellow

2.1.7 POD-H-COM-8

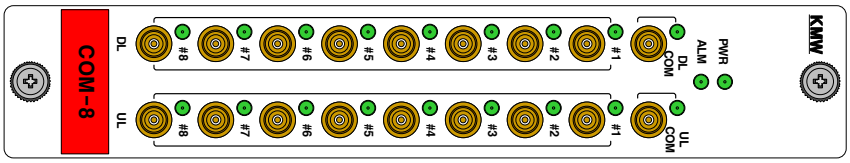


Figure 2-27 POD-H-COM-8

2.1.7.1 Functions and features

- Combines DL output signals received from H-FEM and transfers to H-DTM, or H-HOM
- Receives UL signal from H-DTM, or H-HOM and distributes to H-FEM
- Control Power Ratio for multiple H-FEM with same frequency band to share DL output power at RU
- ALC function for DL/UL Path
- To minimize negative effects by unused input/output ports such as the degradation of VSWR or isolation between ports, the unused ports can be switched into 50 ohm termination by user.
- When any one sector or DAS system needs low power RU less than 4, H-COM can be connected to H-HOM-L directly without H-DTM.
  - > In this case, the attenuator in the common path of H-COM should add 15dB attenuation using web based GUI to compensate the loss of H-DTM..

2.1.7.2 Specifications

- Frequency range: 600~2700MHz
- Maximum RF Power: -10dBm@DL, -25dBm@UL
- Size, weight, and power consumption : refer to Table 2-1

2.1.7.3 RF port and LED

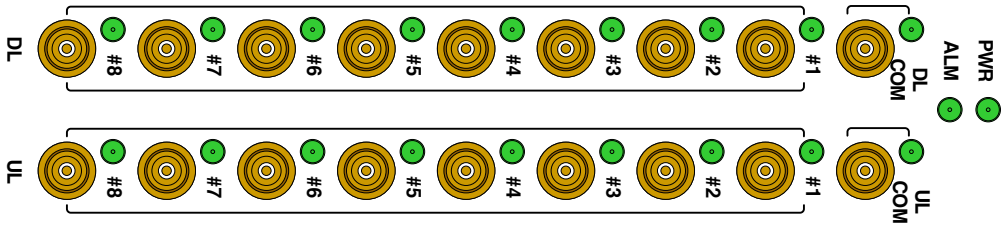


Figure 2-28 POD-H-COM-8 RF port and LED

- RF Port
  - DL #1 ~ #8
    - > Receives downlink signal from up to 8 H-FEM
    - > Connected to DL output port of H-FEM
    - > Connector Type: SMB-L Female
  - DL COM
    - > Combines inputted downlink signals from DL #1 to DL #8 and outputs to H-DTM or H-HOM
    - > Connected to DL input port of H-DTM, or H-HOM
    - > Connector Type: SMB-L Female
  - UL COM
    - > Receives uplink signal from H-DTM or H-HOM
    - > Connected to UL output port of H-DTM, or H-HOM
    - > Connector Type: SMB-L Female
  - UL #1 ~ #8
    - > Divides inputted uplink signals from UL COM port and outputs to H-FEM

> Connected to UL input port of H-FEM
> Connector Type: SMB-L Female

- LED

Table 2-17 POD-H-COM-8 LED Operation

		Specifications
PWR	Solid Green	When power is on.
	Off	When power is off.
ALM	Off	When POD-H-COM-8 has no alarms.
	Solid Yellow	When POD-H-COM-8 has minor alarm.
	Solid Red	When POD-H-COM-8 has major alarm.
DL #1 ~ #8	Blink Green	At the cable connection guide, green led blinks to indicate which RF ports should be connected to.
DL COM	Blink Green	
UL #1 ~ #8	Blink Green	
UL COM	Blink Green	

2.1.7.4 Communication port

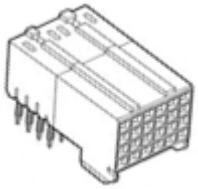


Figure 2-29 Communication Port

- This port provides communication path between H-COM-8 and H-SCM through backboard of H-SRU.
- +24V DC is provided through this communication port from backboard of H-SRU.
- H-COM-8 acquires ID information such as Rack ID, Sub rack ID and Slot ID through this communication port. The IP address of H-COM-8 is assigned automatically using the acquired ID information.

2.1.7.5 Alarms

Table 2-18 POD-H-COM-8 - Alarms

Alarm Name	Description	Remedy	Alarm Severity	LED color
High Temperature	Temperature too high	Check environment	Major	Red
	Temperature high		Minor	Yellow
Low Temperature	Temperature too low		Minor	Yellow
Link	Communication fail	Check pin of communication port/ assigned IP address	Major	Yellow
Downlink ALC Activation	ALC activation	Check H-COM-8 downlink input level/ attenuator configuration	Warning	Yellow

2.1.8 POD-H-DTM-8x8

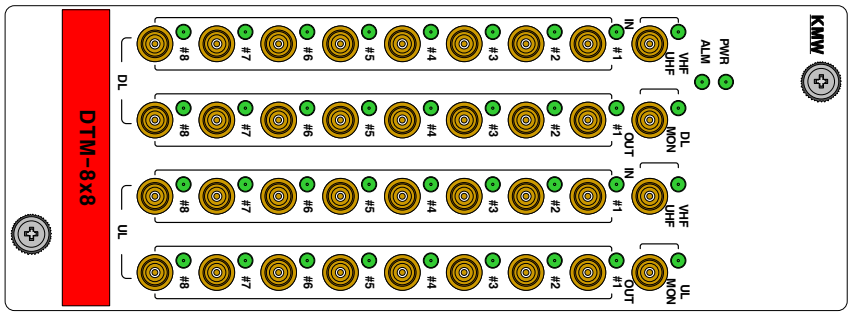


Figure 2-30 POD-H-COM-8

2.1.8.1 Functions and features

- Receives downlink signals from up to 8 H-COM. After then, it combines and distributes them to up to 8 H-HOM.
- Receives uplink signals from up to 8 H-HOM. After then, it combines and distributes them to up to 8 H-COM.
- Combines or distributes VHF, UHF signals
- To minimize negative effects by unused input/output ports such as the degradation of VSWR or isolation between ports, the unused ports can be switched into 50 ohm termination by user
- Support Monitoring Port(DL path/UL Path)
- When any one sector or DAS system needs low power RU less than 4, H-COM can be connected to H-HOM-L directly without H-DTM.
  - > In this case, the attenuator in the common path of H-COM should add 15dB attenuation using web based GUI to compensate the loss of H-DTM.

2.1.8.2 Specifications

- Frequency range: VHF, UHF, 600~2700MHz
- Maximum RF Power: -25dBm@DL, -15dBm@UL
- Size, weight, and power consumption : refer to Table 2-1

2.1.8.3 RF port and LED

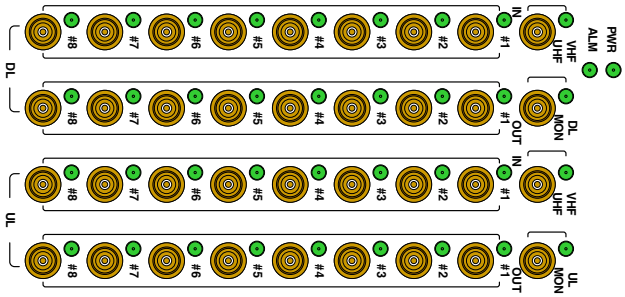


Figure 2-31 POD-H-DTM-8x8 RF port and LED

- RF Port
  - DL IN #1 ~ #8
    - > Receives downlink signal from H-COM, H-STM or H-OIM.
    - > Connected to DL output port of H-COM, H-STM or H-OIM
    - > Connector Type: SMB-L Female
  - DL OUT #1 ~ #8
    - > Combines inputted downlink signals from DL IN #1 to DL IN #8 and outputs to H-HOM

  - > Connected to DL input port of H-HOM
  - > Connector Type: SMB-L Female
- UL IN #1 ~ #8
  - > Receives uplink signal from up to 8 H-HOM
  - > Connected to UL output port of H-HOM
  - > Connector Type: SMB-L Female
- UL OUT #1 ~ #8
  - > Combines inputted uplink signals from UL IN #1 to UL IN #8 and outputs to H-COM, H-STM or H-OIM
  - > Connected to UL input port of H-COM, H-STM or H-OIM
  - > Connector Type: SMB-L Female

- LED

Table 2-19 POD-H-DTM-8x8 LED Operation

		Specifications
PWR	Solid Green	When power is on.
	Off	When power is off.
ALM	Off	When POD-H-DTM-8x8 has no alarms.
	Solid Yellow	When POD-H-DTM-8x8 has minor alarm.
	Solid Red	When POD-H-DTM-8x8 has major alarm.
DL IN #1 ~ #8	Blink Green	At the cable connection guide, green led blinks to indicate which RF ports should be connected to.
DL OUT #1 ~ #8	Blink Green	
UL IN #1 ~ #8	Blink Green	
UL OUT #1 ~ #8	Blink Green	

2.1.8.4 Communication port

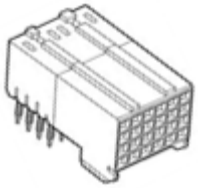


Figure 2-32 Communication Port

- This port provides communication path between H-DTM-8x8 and H-SCM through backboard of H-SRU.
- +24V DC is provided through this communication port from backboard of H-SRU.
- H-DTM-8x8 acquires ID information such as Rack ID, Sub rack ID and Slot ID through this communication port. The IP address of H-DTM-8x8 is assigned automatically using the acquired ID information.

2.1.8.5 Alarms

Table 2-20 POD-H-DTM-8x8 - Alarms

Alarm Name	Description	Remedy	Alarm Severity	LED color
High Temperature	Temperature too high	Check environment	Major	Red
	Temperature high		Minor	Yellow
Low Temperature	Temperature too low		Minor	Yellow
Link	Communication fail	Check pin of communication port/ assigned IP address	Major	Yellow
Downlink ALC Activation	ALC activation	Check H-DTM downlink input level/ attenuator configuration	Warning	Yellow

2.1.9 POD-H-HOM-L

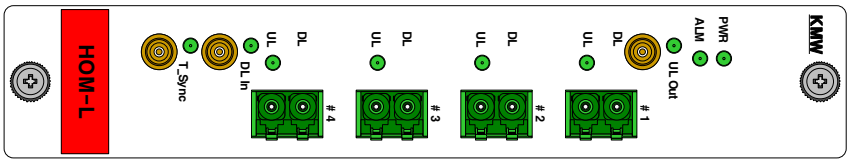


Figure 2-33 POD-H-HOM-L

2.1.9.1 Functions and features

- Converts Downlink RF signal into optical signal and transfers to low power Remote Unit with less than 1W.
- Converts Uplink optic signal received from low power Remote Unit to RF signal and transfers to H-COM, H-STM, or H-DTM.
- Compensates optic loss between HOM-L and low power Remote unit.
- For 2.6G TDD operation, TDD synchronization signal received from H-FEM-B is transferred to low power Remote unit via H-HOM-L.
- Communicates with low power Remote unit by PLC modem.

2.1.9.2 Specifications

- Frequency range: VHF, UHF, 600~2700MHz
- Maximum RF Power: -9dBm@DL, 0dBm@UL
- Size, weight, and power consumption : refer to Table 2-1

2.1.9.3 RF port and LED

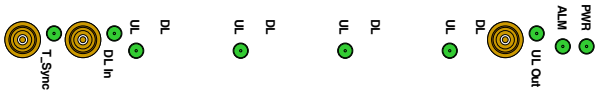


Figure 2-34 POD-H-HOM-L RF port and LED

- RF Port
  - DL IN
    - > Receives downlink signal from H-COM, H-STM or H-DTM.
    - > Connected to DL output port of H-COM, H-STM or H- DTM.
    - > Connector Type: SMB-L Female
  - UL OUT
    - > Outputs uplink signal to H-COM, H-STM or H-DTM
    - > Connected to UL input port of H-COM, H-STM or H-DTM
    - > Connector Type: SMB-L Female
  - T-SYNC IN
    - > Receives TDD synchronization signal from H-FEM-B.
    - > Connected to T-SYNC of H-FEM-B.
    - > Connector Type: SMB-L Female
- LED

Table 2-21 POD-H-HOM-L LED Operation

		Specifications
PWR	Solid Green	When power is on.
	Off	When power is off.
ALM	Off	When POD-H-HOM-L has no alarms.
	Solid Yellow	When POD-H-HOM-L has minor alarm.
	Solid Red	When POD-H-HOM-L has major alarm.

UL #1 ~ #4	Off	When PD fails.
	Solid Yellow	When PD is Normal.
DL IN	Blink Green	At the cable connection guide, green led blinks to indicate which RF ports should be connected to.
UL OUT	Blink Green	
T_Sync	Blink Green	

2.1.9.4 Optic port

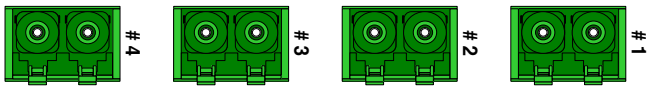


Figure 2-35 optic port

- LD #1 ~ #4
  - Each optic port is connected to one low power Remote Unit.
  - Transfers downlink optic signal to low power Remote Unit.
  - Connector Type: LC APC Female
- PD #1 ~ #4
  - Each optic port is connected to low power Remote Unit.
  - Receives Uplink optic signal from low power Remote Unit.
  - Connector Type: LC APC Female

2.1.9.5 Communication port

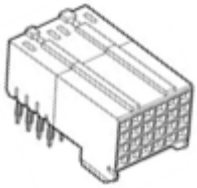


Figure 2-36 Communication Port

- This port provides communication path between H-HOM-L and H-SCM through backboard of H-SRU.
- +24V DC is provided through this communication port from backboard of H-SRU.
- H-HOM-L acquires ID information such as Rack ID, Sub rack ID and Slot ID through this communication port. The IP address of H-HOM-L is assigned automatically using the acquired ID information.

2.1.9.6 Alarms

Table 2-22 POD-H-HOM-L - Alarms

Alarm Name	Description	Remedy	Alarm Severity	LED color
High Temperature	Temperature too high	Check environment	Major	Red
	Temperature high		Minor	Yellow
Low Temperature	Temperature too low		Minor	Yellow
Link	Communication fail	Check pin of communication port/ assigned IP address	Major	Yellow
DL Optic Fail	Downlink LD fail	Check if optic LD fail alarm occurs again after reset.	Major	Yellow
UL Optic Fail	Uplink PD fail	Check optic cable connection with RU	Major	Yellow
UL Optic Loss	Exceed permitted optic loss	Check optic cable connection with RU / clean Optic connector and port	Minor	Yellow

Alarm Name	Description	Remedy	Alarm Severity	LED color
RU Comm. Fail	RU Communication Fail	Check optic cable connection	Minor	Yellow

2.1.10 POD-H-HOM-H

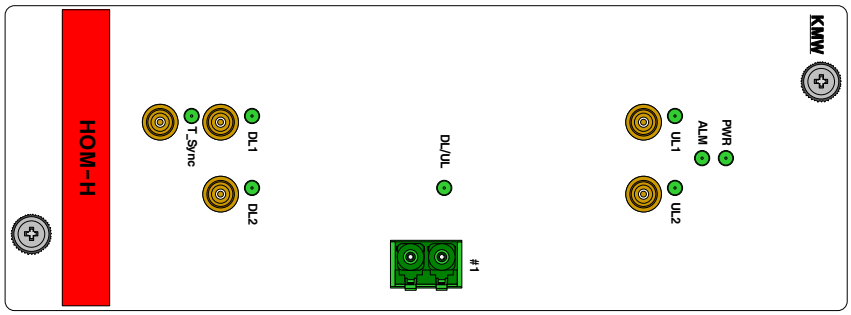


Figure 2-37 POD-H-HOM-H

2.1.10.1 Functions and features

- Converts Downlink RF signal into optical signal and transfers to high power Remote Unit with more than 20W.
- Converts Uplink optic signal received from high power Remote Unit to RF signal and transfers to H-COM, H-STM, or H-DTM.
- Compensates optic loss between HOM-L and high power Remote unit.
- For 2.6G TDD operation, TDD synchronization signal received from H-FEM-B is transferred to high power Remote unit via H-HOM-L.
- Communicates with high power Remote unit by PLC modem.

2.1.10.2 Specifications

- Frequency range: VHF, UHF, 600~2700MHz
- Maximum RF Power: -9dBm@DL, 0dBm@UL
- Size, weight, and power consumption : refer to Table 2-1

2.1.10.3 RF port and LED

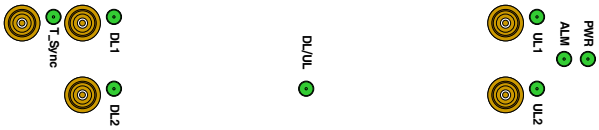


Figure 2-38 POD-H-HOM-H RF port and LED

- RF Port
  - DL 1/DL 2
    - > Receives downlink signal from H-COM, H-STM or H-DTM.
    - > Connected to DL output port of H-COM, H-STM or H- DTM.
    - > Connector Type: SMB-L Female
  - UL 1/UL 2
    - > Outputs uplink signal to H-COM, H-STM or H-DTM
    - > Connected to UL input port of H-COM, H-STM or H-DTM
    - > Connector Type: SMB-L Female
  - T-SYNC IN
    - > Receives TDD synchronization signal from H-FEM-B.
    - > Connected to T-SYNC of H-FEM-B.
    - > Connector Type: SMB-L Female
- LED

Table 2-23 POD-H-HOM-L LED Operation

		Specifications
PWR	Solid Green	When power is on.
	Off	When power is off.
ALM	Off	When POD-H-HOM-H has no alarms.
	Solid Yellow	When POD-H-HOM-H has minor alarm.
	Solid Red	When POD-H-HOM-H has major alarm.
DL/UL	Off	When PD fails.
	Solid Yellow	When PD is Normal.
DL 1/DL 2	Blink Green	At the cable connection guide, green led blinks to indicate which RF ports should be connected to.
UL 1/UL 2	Blink Green	
T_Sync	Blink Green	

2.1.10.4 Optic port

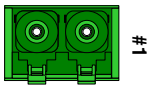


Figure 2-39 optic port

- LD
  - Connected to high power Remote Unit.
  - Transfers downlink optic signal to high power Remote Unit.
  - Connector Type: LC APC Female
- PD
  - Connected to high power Remote Unit.
  - Receives Uplink optic signal from high power Remote Unit.
  - Connector Type: LC APC Female

2.1.10.5 Communication port

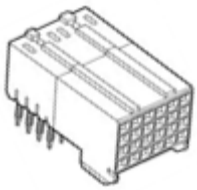


Figure 2-40 Communication Port

- This port provides communication path between H-HOM-H and H-SCM through backboard of H-SRU.
- +24V DC is provided through this communication port from backboard of H-SRU.
- H-HOM-H acquires ID information such as Rack ID, Sub rack ID and Slot ID through this communication port. The IP address of H-HOM-H is assigned automatically using the acquired ID information.

2.1.10.6 Alarms

Table 2-24 POD-H-HOM-H - Alarms

Alarm Name	Description	Remedy	Alarm Severity	LED color
High Temperature	Temperature too high	Check environment	Major	Red
	Temperature high		Minor	Yellow
Low Temperature	Temperature too low		Minor	Yellow

Link	Communication fail	Check pin of communication port/ assigned IP address	Major	Yellow
DL Optic Fail	Downlink LD fail	Check if optic LD fail alarm occurs again after reset.	Major	Yellow
UL Optic Fail	Uplink PD fail	Check optic cable connection with RU	Major	Yellow
UL Optic Loss	Exceed permitted optic loss	Check optic cable connection with RU / clean Optic connector and port	Minor	Yellow
RU Comm. Fail	RU Communication Fail	Check optic cable connection	Minor	Yellow

© KMW USA Inc.
1818 E. Orangethrope Ave, Fullerton, CA 92831
Tel. +1 (714) 515-1100
www.kmwcomm.com