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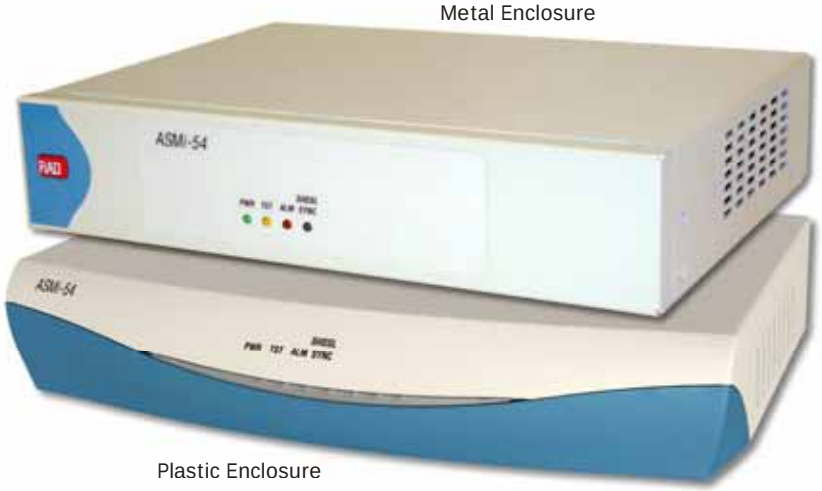
Data Sheet

ASMi-54

SHDSL.bis Modem



Metal Enclosure

Plastic Enclosure

Rail-mount
Metal Enclosure

Access with Ethernet Ring capabilities

- SHDSL.bis managed modem operating at full-duplex data rates of up to 5.7 Mbps over 2-wire and 22.8 Mbps over 8-wire lines
- Dual Bearer mode for E1 and Ethernet HDLC
- SHDSL bonding – for EFM: PAF according to IEEE802.3 (with Ethernet only), for HDLC: M-Pair according to G.991.2
- SHDSL ITU-T G.991.2 and ETSI 101524 compliance
- 4-port 10/100BaseT interface with integrated switch
- Ethernet service over 2W/4W/8W of up to 22.8 Mbps in Multipoint, Point-to-Point, Daisy Chain and Ring topologies

RAD
data communications
The Access Company

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ASMi-54
SHDSL.bis Modem

ASMi-54 is a simple, cost-effective, dedicated managed SHDSL.bis modem that extends the range of high-speed services over existing copper pairs.

The modem supports a variety of topologies which extends up to 4 E1 and 4 ETH ports with integrated switch to the DSL line.

ASMi-54 operates in the following topologies:

- Point-to-point –extending traffic on 4 Ethernet links at rates of up to 22.8 Mbps in addition to one or four E1 ports.
- Multipoint – each ASMi-54 operates with four ASMi-54L modems to enable extension of E1 and Ethernet traffic, while connectivity towards the IP network can be either copper or fiber, using an SFP transceiver.
- Daisy chain and Ring topologies – ASMi-54 enables service resiliency and protection by implementing the ITU-T G.8032 ETH ring protection switching standard for bandwidth of up to 11.4 Mbps.

In addition, the modem also features line probing according to G.991.2. When enabled, the SHDSL interface adapts its rate to the condition of the line (noise, loop attenuation, etc.). When disabled, the SHDSL line operates at a fixed rate selected by the user.

ASMi-54 can operate as a CO device or a CPE device according to user configuration.

EFM BONDING

EFM bonding on the Ethernet interface ensures that a failure or addition of a link does not drop the traffic being transmitted over the other wires in the group. The capacity of the group does not decrease when a new link is added at a lower rate.

The modem transports Ethernet point-to-point at the rate of up to 22.8 Mbps using EFM bonding technology, which enables each link to synchronize at a different rate (see *Figure 1*).

Note: *Ethernet versions only, not on Daisy-chain, Multipoint and Ring topologies.*

ETHERNET SUPPORT

ASMi-54 features up to four Ethernet 10/100BaseT ports with half/full-duplex autonegotiation and flow control. Fault propagation enables the unit to shut down the Ethernet user port when an SHDSL line failure is detected. LANs are connected by bridging.

The internal forwarding of Ethernet traffic can be configured by:

- Specifying the ports (a mode identified as ***unaware*** in accordance with Metro Ethernet Forum (MEF) standards). In this mode, all the Ethernet traffic reaching one of the ports is forwarded to the other port, and vice versa
- Using VLANs for classification (a mode identified as ***aware*** in accordance with Metro Ethernet Forum (MEF) standards). In this mode, Ethernet traffic reaching one of the ports is forwarded to another port in accordance with its VLAN identifier.

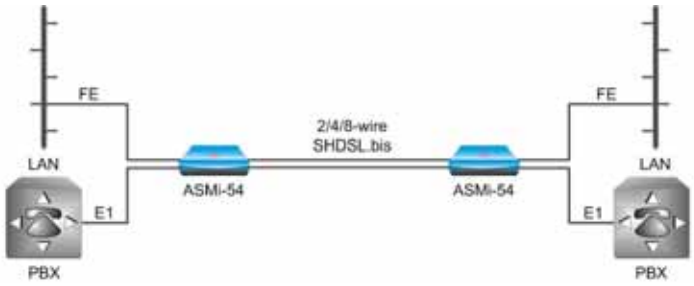

Figure 1. Multiplexing Services over SHDSL

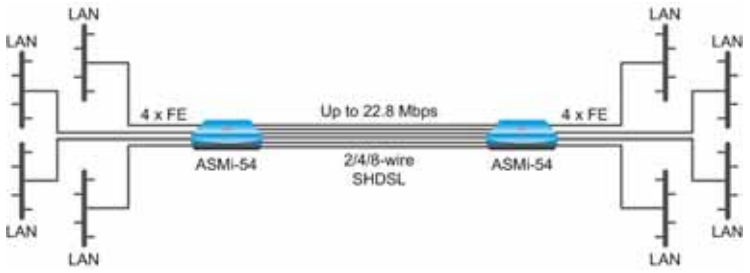

Figure 2. Fast Ethernet Services over SHDSL Supporting EFM

QUALITY OF SERVICE

The 802.1D DSCP schemes allow users to define different QoS levels according to application requirements.

The modem implements the IEEE's 802.1q standards to provide VLAN-tagging with four levels of prioritization, enabling carriers to offer differentiated Ethernet services. VLAN tagging can also be employed to separate traffic, ensuring transparency of the customer traffic and bolstering security of management traffic. The user can activate or deactivate the priority mechanism, and each priority (VLAN priority, DSCP) can be configured and mapped to one of four priority queues.

MANAGEMENT

The ASMi-54 unit can be managed using the following connections:

- Local RS-232 terminal
- Telnet server, SNMP (Ver.1)
- Web-based management application
- Inband management with or without dedicated VLAN.

Up to eight SHDSL repeaters can be installed in-line to increase the operation range of E1- and Ethernet-based modems.

PHYSICAL

ASMi-54 is available with several power options:

- AC/DC wide range (100 to 240 VAC, -48 to -60 VDC nominal)
- 24 VDC
- Via power feeding of DC voltage over the SHDSL line (4-wire and 8-wire Ethernet versions only).

The 2-wire and 4-wire devices are supplied in plastic enclosures, while the 8-wire device is supplied in a metal enclosure. A metal rail-mount enclosure is available for 2-wire and 4-wire Ethernet-over-SHDSL devices. The plastic and metal enclosures are available in extended temperature versions (by special request).

Modems with metal and plastic enclosures can be mounted alone or in pairs in a 19-inch rack using RAD's optional mounting kits. Units in metal enclosure can also be mounted in an 8.5-inch rack (see *Ordering*).

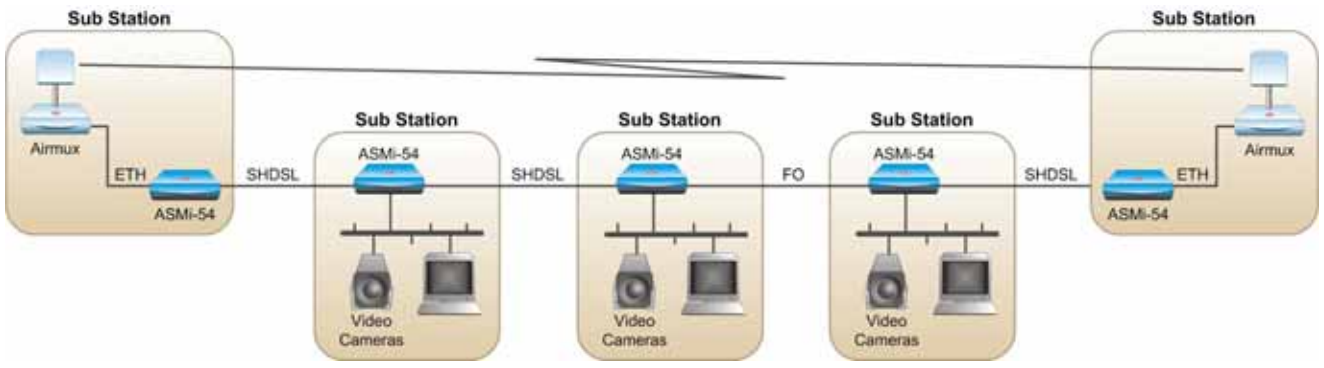

Figure 3. Daisy-Chain over any Infrastructure

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ASMi-54
SHDSL.bis Modem

Specifications

SHDSL INTERFACE

Number of Ports
2

Line Type
Symmetrical PSD
2/4/8-wires unconditioned dedicated line (twisted pair)

EFM Bonding
Per IEEE802.3ah and ITU-T G.991.2 (Ethernet versions only)

Line Coding
16 or 32 TC-PAM

Frame Size
EFM: 1580 bytes
HDLC: 1530 bytes (while working with E1 or repeaters)

Line Rate
EFM: 192 to 5696 kbps in steps of n x 64 kbps for each 2-wires
HDLC: 192 to 22784 kbps in steps of n x 64 where n = 89/178/356 for 2W/4W/8W

Range

Typical Ranges
(26 AWG, noise-free)

Data Rate	2-wire	
[kbps]	[km]	[miles]
192	6.6	4.1
1536	4.9	3.0
2048	4.5	2.8
4096	3.2	2.0
4608	3.0	1.9
5696	2.6	1.6

Impedance
135Ω

Connectors
2-wire/4-wire: 1 x RJ-45
8-wire: 2 x RJ-45

Compliance
ITU-T G.991.2, ETSI TS 101524

E1 INTERFACE

Number of Ports
1 or 4

Coding
HDB3

Line Impedance
120Ω, balanced
75Ω, unbalanced (via adapter cable)

Jitter Performance
As per ITU G.823

Connectors
RJ-45

Diagnostics
Local analog loopback
Remote digital loopback

ETHERNET INTERFACE

Number of Ports
4 copper
3 copper + 1 fiber optic
2 copper + 2 fiber optic

Interfaces
10/100BaseT
100BaseFx

Connectors
n x RJ-45
n x SFP

Frame Size
2048 bytes

CONTROL PORT

Interface
V.24/RS-232

Type
DCE

Format
Asynchronous; 8 bits, 1 stop bit, no parity

Data Rate
9.6, 19.2, 115.2 kbps

Connector
9-pin, D-type, female

INDICATORS

Front Panel
PWR (green) –
On: power supply is on

TST (yellow) –
On: a test is active

ALM (red) –
On: a new alarm is detected in the alarm buffer

SHDSL SYNC (green/red) –
Green on: at least one line is synchronized and can pass data
Green flashing: no line is synchronized and at least one line is in training process
Red: no line is synchronized, in training process

Rear Panel
Ethernet Ports LINK/ACT (per port)

ACT (yellow) –
Flashing: Ethernet traffic on the port

LINK (green) –
On: Ethernet port link is up
Off: No Ethernet link on the port

E1 LOC (red) –
On: Loss of signal or sync loss (framed mode only) or unframed AIS is received on the E1 port

E1 REM (red) –
On: Remote alarm is received on the E1 port

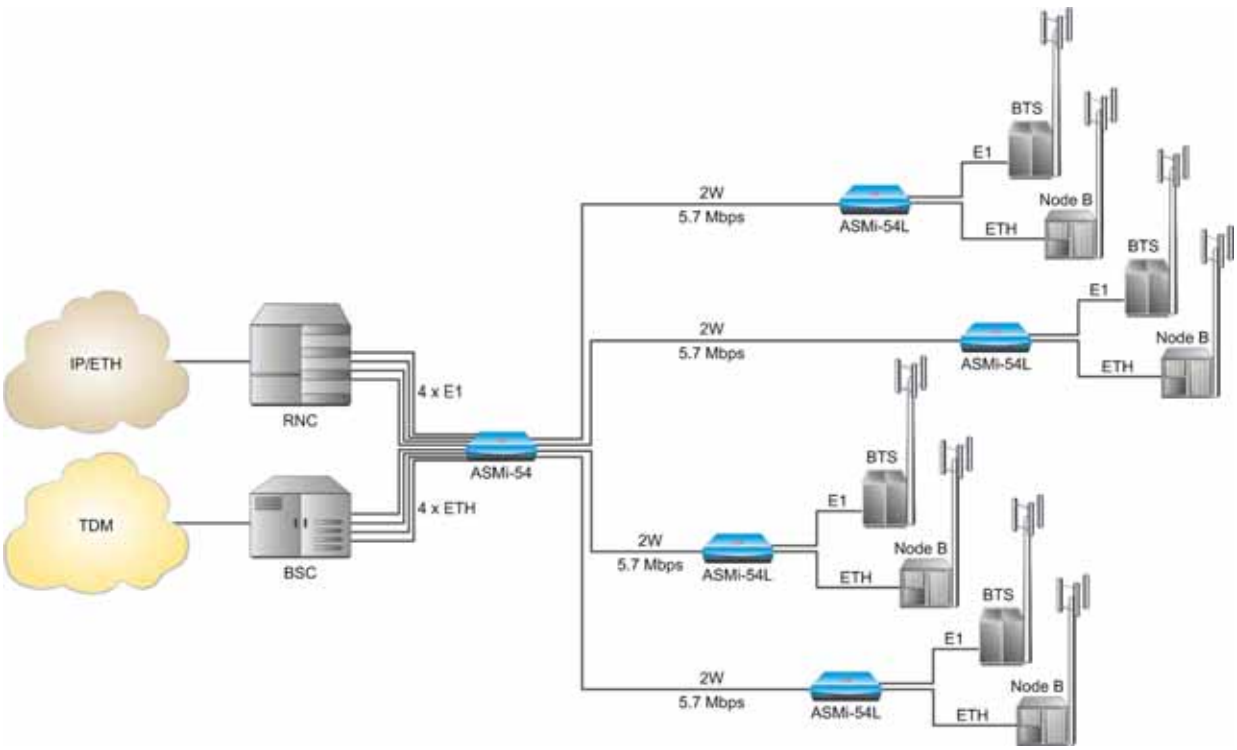

Figure 5. Connecting Co-located 2G/3G Base Stations using ASMi-54 Modems over Copper Lines

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ASMi-54
SHDSL.bis Modem

GENERAL

Power Supply

Wide-range AC/DC: 100 to 240 VAC, -48 to -60 VDC nominal
DC: 24 VDC nominal
Remote power feeding: via SHDSL line, 120 VDC maximum (4-wire and 8-wire Ethernet versions only)

Timing

For CO:
Internal – derived from the modem
External – derived from E1 port
For CPE:
Receive – derived from the SHDSL line

Performance Monitoring

SHDSL and E1 statistics collection

Physical

Plastic enclosure:
Height: 43.7 mm (1.7 in)
Width: 217 mm (8.5 in)
Depth: 170 mm (6.7 in)
Weight: 0.6 kg (1.3 lb)

Metal enclosure:
Height: 43.7 mm (1.7 in)
Width: 215.5 mm (8.5 in)
Depth: 153 mm (6.0 in)
Weight: 0.7 kg (1.5 lb)

Rail-mount metal enclosure:
Height: 150 mm (5.9 in)
Width: 70 mm (2.8 in)
Depth: 163 mm (6.4 in)
Weight: 0.9 kg (1.9 lb)

Environment

Temperature: 0° to 50°C (32° to 122°F)
Extended temperature (4 x ETH interface version only): -20° to 70°C (-4° to 158°F)
Humidity: Up to 90%, non-condensing

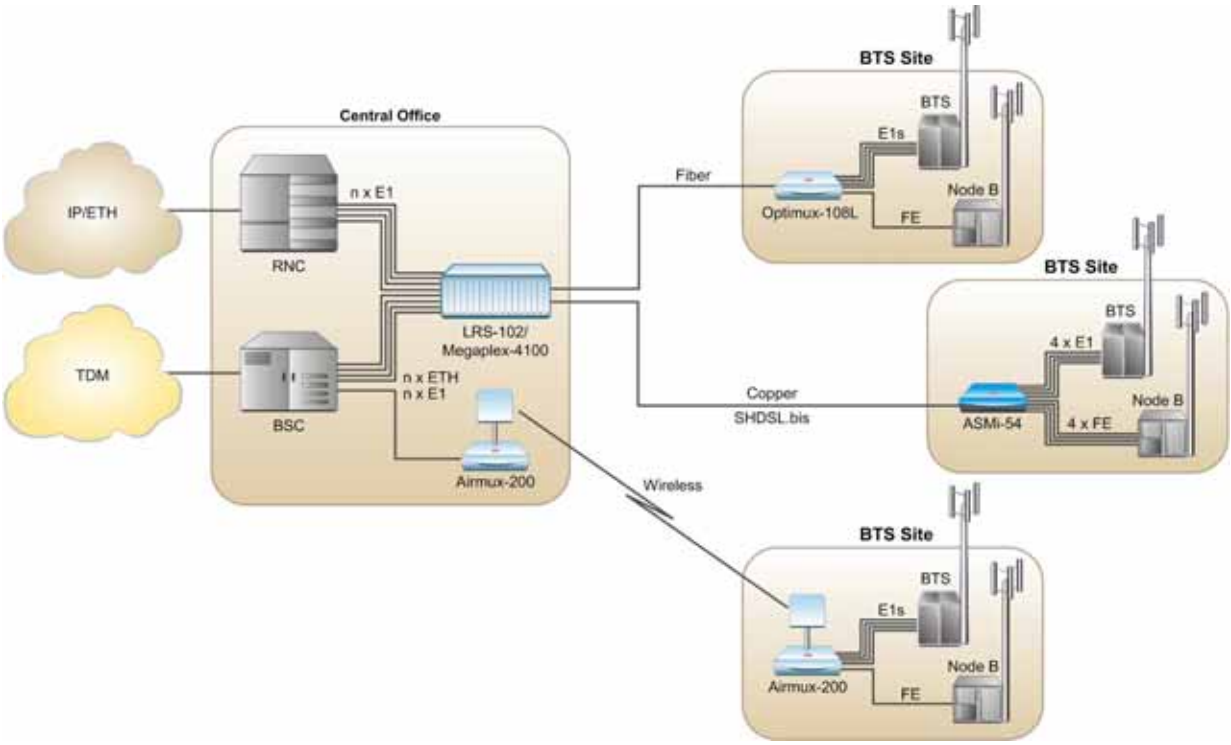

Figure 6. Connecting Co-located 2G/3G Base Stations using Fiber Optic, Copper and Wireless Connections

Ordering

STANDARD CONFIGURATIONS

ASMi-54/4E1/4ETH/8W

ASMi-54/4ETH/8W/1NULL3UTP

ASMi-54/4ETH/8W/M

ASMi-54/4ETH/8W/D

SPECIAL CONFIGURATIONS

ASMi-54/$/@/#/^/*/%/~

Legend

$ Optional DC power supply (*Default= wide-range AC/DC power supply*):

- **24V** 24 VDC
- **PF** Remote Power feed (for ETH services only)

@ User interface (Default=no E1 interface):

- **E1** Single E1 port
- **4E1** Four E1 ports

Ethernet interface (mandatory):

- **4ETH** Four-port ETH module (Default=4 x RJ-45 connectors)

^ Extended temperature for device with 4 ETH interfaces (Default=0° to 50°C/32° to 122°F):

- **ETR** -20° to 70°C (-4° to 158°F)

  ***Note**: For 8W/M and 8W/D options ETR is -20° to 65°C (-4° to 149°F).*

***** SHDSL interface:

- **2W** 2-wire (1 pair) (*For plastic enclosure option only*)
- **4W** 4-wire (2 pairs) (*For plastic enclosure option only*)
- **8W** 8-wire (4 pairs) (*For plastic enclosure with 4ETH + 4E1 options or for metal enclosure only*)
- **8W/D** 8-wire (4 pairs), with daisy-chain/ring capabilities (4W on each side) (*For ETH option only*)

  ***Note:** No EFM support.*
- **8W/M** *8-wire (4 pairs), with multipoint capabilities (For ETH option only)*

  ***Note:** No EFM support.*

***Note:** Compliant with NEBS for Ethernet services in temperature range -5° to 55°C (23° to 131°F).*

% Enclosure *(Default=plastic enclosure)*:

- **ME** Metal enclosure (*For ETR/8W/D or ETR/8W/M options only*)
- **RAIL** Rail-mount enclosure (*For 4W/ETR Ethernet only models or ETR/8W/M, ETR/8W/D options only*)

~ One or two SFP sockets on the ETH interface (*Default=4 x RJ-45 connectors, no SPF sockets*) (*For the 4ETH/8W/D, 4ETH/8W/M or 4E1/4ETH/8W options only*):

- **1NULL3UTP** SFP socket on Port 1 and 3 UTP ports
- **2NULL2UTP** Two SFP sockets on Ports 1,2 and 2 UTP ports

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Data Sheet

ASMi-54

SHDSL.bis Modem

SUPPLIED ACCESSORIES

Power cord

AC/DC adapter for -48 VDC

OPTIONAL ACCESSORIES

RM-33-2

Hardware kit for mounting one or two plastic ASMi-54 units in a 19-inch rack

RM-35/@

Hardware kit for mounting one or two metal ASMi-54 units in a 19-inch rack

Legend

@ Rack mount kit (Default=both kits):

- **P1** Mounting one unit
- **P2** Mounting two units

WM-35-TYPE4

Hardware kit for mounting 8.5-inch units in metal enclosure

CBL-DB9F-DB9M-STR

Control cable

CBL-RJ45/2BNC/E1

Interface adapter for converting a balanced E1 RJ-45 connector into a pair of BNC unbalanced coaxial connectors

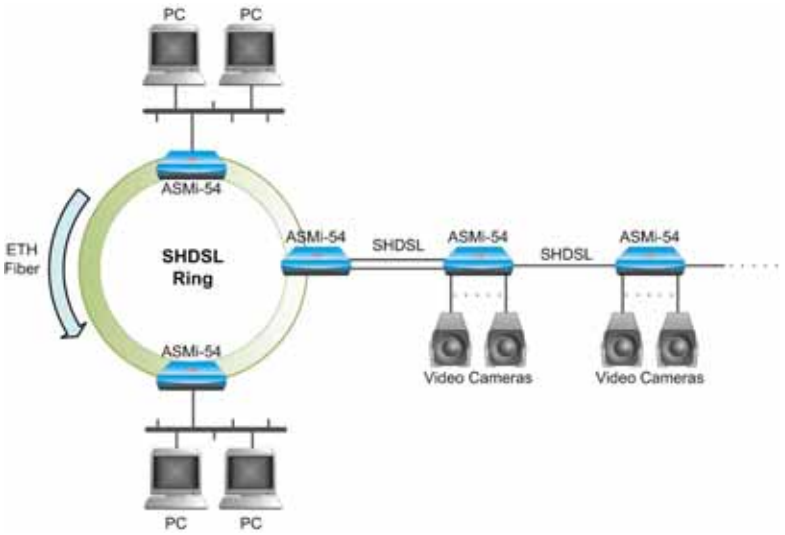

Figure 7. Ring Capabilities

Modem Comparison Chart

	ASMi-52	ASMi-52L	ASMi-54	ASMi-54L	ASMi-54LRT
Max. data rate (Mbps)	2.3/4.6	2.3/4.6	5.7/11/22	5.7/11.4 (11.4/15 per pair with license key)	5.7/11
Interface	V.35, RS-530, X.21, E1, ETH	V.35, X.21, E1, ETH, 4 x ETH	4 x ETH, E1/4 x E1	4 x ETH, E1	4 x ETH, E1
Router					✓
Line	2W/4W	2W/4W	2W/4W/8W	2W/4W	2W/4W/8W

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