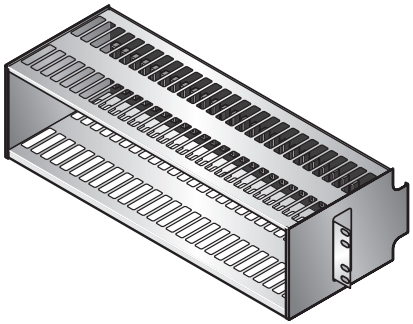
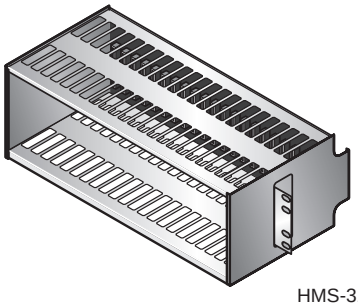
HiGain

QUICK INSTALLATION GUIDE



HMS-317



HMS-318

HMS-317 List 2 and HMS-318 List 2
Product Catalog: 150-1128-02, 150-1129-02
CLEI: T1MFUR04, T1MFVS04

REVISION HISTORY OF THIS GUIDE

Issue	Release Date	Revisions Made
01	May 23, 1996	Initial release
02	July 26, 1999	Corrected backplane nomenclature
03	February 1, 2002	ADC rebranding
04	March 29, 2002	Corrected rear view drawing of the HMS-318

similar damages. This disclaimer of liability applies to all products, publications and services during and after the warranty period.

USING THIS GUIDE

Two types of messages, identified by icons, appear in the text.

Notes contains information about special circumstances.

Cautions indicate the possibility of personal injury or equipment damage.

UNPACK AND INSPECT YOUR SHIPMENT

Upon receipt of the equipment:

- Unpack each container and inspect the contents for signs of damage. If the equipment has been damaged in transit, immediately report the extent of damage to the transportation company and to ADC DSL Systems, Inc. Order replacement equipment, if necessary.
- Check the packing list to ensure complete and accurate shipment of each listed item. If the shipment is short or irregular, contact ADC DSL Systems, Inc. as described in “Appendix B - Product Support” on page 21. If you must store the equipment for a prolonged period, store the equipment in its original container.

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OVERVIEW

This practice provides installation instructions for the HiGain® Management Shelf, HMS-317 List 2 and the HMS-318 List 2.

PRODUCT DESCRIPTIONS

The HMS-317 and HMS-318 shelves (Figure 1) are 5.22 inches high x 12 inches deep (13.26 cm x 30.48 cm) exclusive of mounting brackets. The brackets have adjustable mounts that allow the shelf penetration to conform to existing equipment. Differences between the two models are:

- The HMS-317 houses a maximum of 28 line units and one HiGain Management Unit, HMU-319, in its 23-inch chassis.
- The HMS-318 houses a maximum of 22 line units and one HMU-319 in its 19-inch chassis.

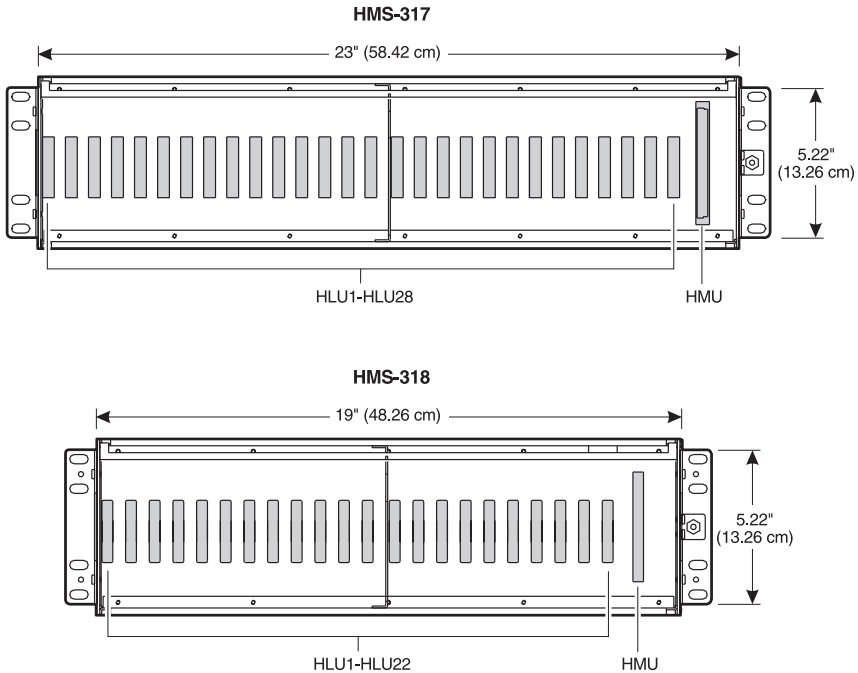


Figure 1. *Front Views of HMS-317 and HMS-318*

Both connectors and wire-wrap pins are provided for connecting to the DSX/G.703 and HDSL spans (see "Signal and Pin Assignments" on page 11).

SHELF CONNECTIONS

Each shelf provides power (TB1) and alarm (TB2) connections, with backplane communications between the HMU slot and the other card slots (Figure 2 and Figure 3).

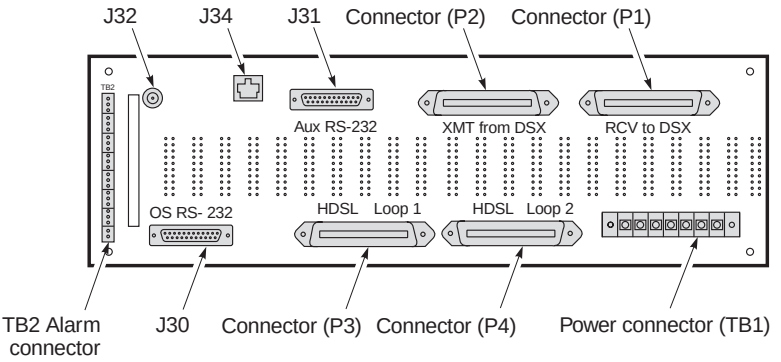


Figure 2. *Rear View of the HMS-317*

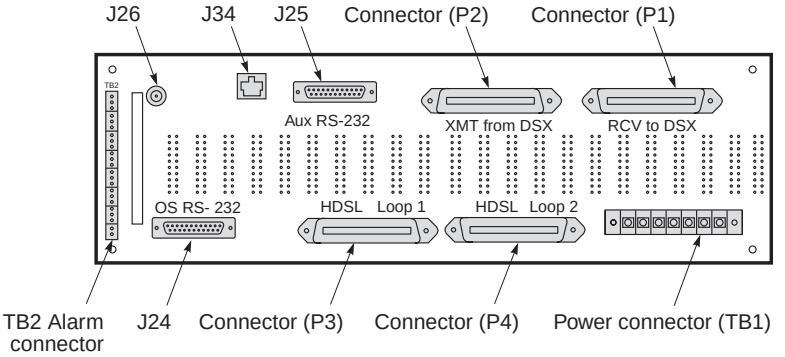


Figure 3. *Rear View of the HMS-318*

DSX-1 AND HDSL CONNECTIONS USING PLUG IN CONNECTORS

The rear of each shelf includes four male 50-pin (HMS- 318) or 64-pin (HMS-317) Amphenol-type connectors for DSX/G.703 (P1 and P2) and HDSL Span (P3 and P4). These provide Tip and Ring connections for all cards in the shelf. The mating female connectors are:

- 50 Pin: AMP Kit No. 2-29913-1 for 24–26 AWG
- 64 Pin: AMP Style RP No. 2-5522771 for 24–26 AWG cables and RS No. 552307-1 for 22 AWG cables

DSX-1 AND HDSL WIRE WRAP CONNECTORS

DSX/G.703 and HDSL connections can also be made to the individual card connectors through wire-wrap pins (0.045-inch square/1.14 mm). Straps for cable dressings and a protective Lexan rear cover are provided.
Figure 4 on page 6 shows the line unit slot pinouts on the HMS backplane.

MANAGEMENT ASYNCHRONOUS PORTS

Two backplane RS-232 communication ports, J30 and J31 on the HMS-317 (Figure 2 on page 2) and J24 and J25 on the HMS-318 (Figure 3 on page 2), allow two optional management interfaces to be connected to the HiGain system. Table 1 and Table 2 on page 4 list the pin connections for the DB25 connectors on the backplane.

Table 1. *J30/J24 - OS RS-232 PORT (DTE)*

Pin No.	Signal	Direction
2	Transmit Data (TD)	Out
3	Receive Data (RD)	In
6	Data Set Ready (DSR)	In
7	Ground (GND)	—
20	Data Terminal Ready (DTR)	Out

The HMU-319 requires that DSR be asserted by the connected DCE for communications on this port. The HMU-319 always asserts DTR on this port.

Table 2. *J31/J25 - AUX RS-232 PORT (DTE)*

Pin No.	Signal	Direction
2	Transmit Data (TD)	Out
3	Receive Data (RD)	In
6	Data Set Ready (DSR)	In
7	Ground (GND)	—
20	Data Terminal Ready (DTR)	Out

The HMU-319 requires that DSR be asserted by the connected DCE for communications on this port. The HMU-319 always asserts DTR on this port.

MULTISHELF NETWORK CONNECTOR

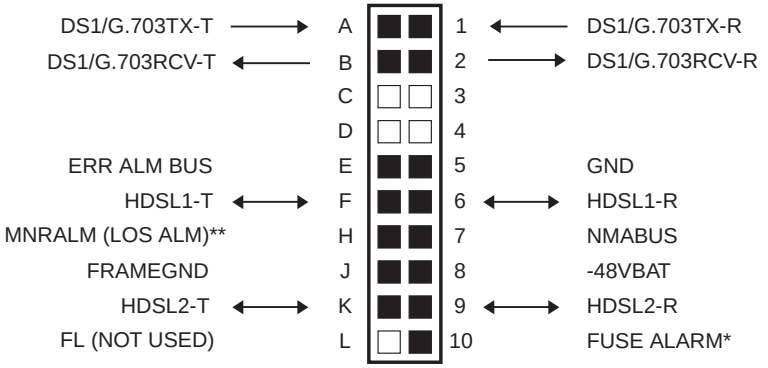
Two backplane connectors, J32 on the HMS-317 and J26 on HMS-318, are available for chaining the management ports of up to 32 shelves together over an integrated LAN. Two other connectors, J34 on both figures, provide a 10BASE-2 and a 10BASE-T (IEEE.802.3) Ethernet LAN (see Figure 2 and Figure 3 on page 2).

Table 3 lists the backplane connectors and terminal strip identities for both shelves. Signal and pin assignments for these connections are listed in Table 4 on page 11 through Table 7 on page 17.

Table 3. *HMS-317 and HMS-318 Connectors*

HMS-317	HMS-318	Connector
P1-P4		Amphenol 64-pin male
	P1-P4	Amphenol 50-pin male
J1-J28	J1-J22	20-pin wire-wrap
J29	J23	DIN 96-pin Female
J30	J24	DB-25 (Female)
J31	J25	DB-25 (Female)
J32	J26	10BASE-2 (BNC)
J34	J34	10BASE-T (RJ45)
TB1	TB1	9-pos. Terminal Block
TB2	TB2	22-pin wire-wrap

Figure 4 shows the line unit slot pinouts on the HMS backplane.



* FUSE ALARM IS NORMALLY FLOATING (0 TO-80V MAX)
AND AT-48V (10 MA MAX) WHEN ACTIVATED

** MINOR ALARM OUTPUT IS NORMALLY FLOATING (0 TO -60V MAX)
AND AT GND (10 MA MAX, +5 VDC for HLU-319 List 2D) WHEN ACTIVATED

Figure 4. *HLU Slot Pinouts on the HMS Backplane*

POWER DISSIPATION FACTORS

GR-63-CORE limits the maximum dissipation of the HMS shelf, which is a 12-inch (30.48 cm) deep individual CO equipment frame with open-faced mountings and natural convection cooling, to 134.7 Watts per square foot. This equates to 800 watts per bay for a 19” wide rank and 946 watts per bay for a 23” wide rack.

Consult the HLU-319 technical practice to determine the maximum number of slots that can be deployed without affecting this maximum power dissipation density.

Figure 5 shows a typical CO bay layout using the shelves. Heat baffles should be added between every other shelf to help reduce the chimney heating effect.

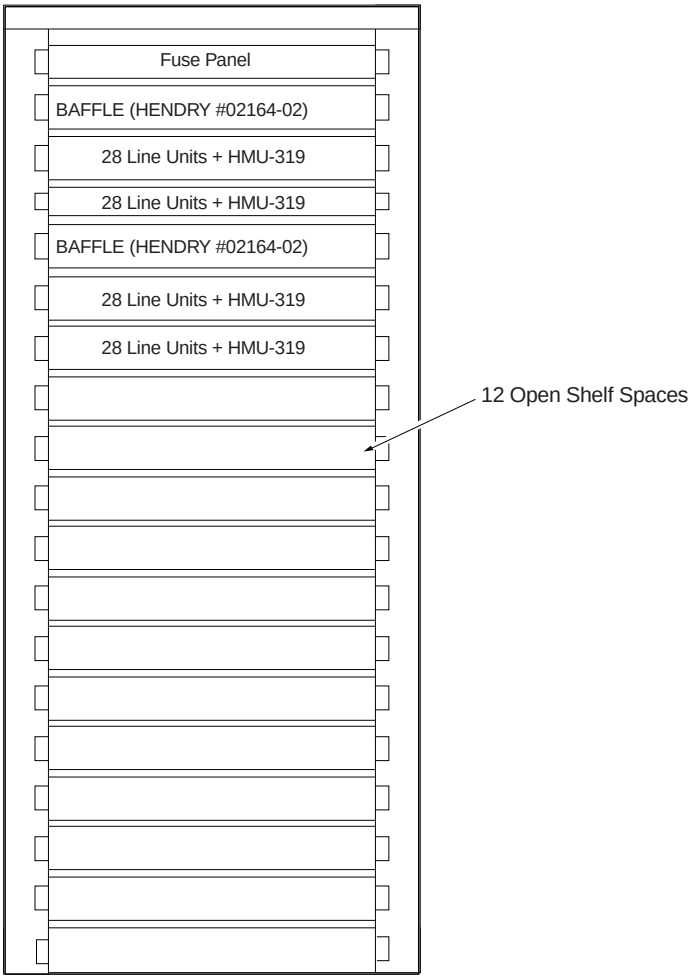


Figure 5. *Central Office Bay Configuration*

INSTALLATION

This section contains site requirements and installation instructions for the HMS-317 List 2 and the HMS-318 List 2.

SITE REQUIREMENTS

Each bus should be fused at 10 Amperes. The following two busses provide the -48 V shelf battery feed:

- -48VA
- -48VB

SHELF INSTALLATION

Use Step 1 through Step 6 on page 10 to install the HMS-317 and the HMS-318:

When mounting the 19" HMS-318 shelf into a 23" rack, reverse the two brackets and attach.

1 Attach the mounting brackets to the shelf by aligning them with the four vertical mounting holes.

2 Install the mounting screws (provided) and secure to the CO equipment bay.

3 Connect the HDSL and DSX/G.703 inputs to the shelf using one of the following methods:

a Plug the DSX/G.703 interface cables into P1 and P2 and the HDSL interface cables into P3 and P4 (Figure 2 and Figure 3 on page 2). Span connections are listed in "Signal and Pin Assignments" on page 11. "Standard PIC Color Code" on page 19 contains the standard PIC cable color codes.

b Wire-wrap the DSX/G.703 and HDSL inputs to the appropriate individual card slots. Pin assignments are listed in "Signal and Pin Assignments" on page 11.

4 Connect the power and optional fan inputs to TB1 as shown in Figure 6. Slots 1 through 14 on the HMS-317 (slots 1 through 11 on the HMS-318) are powered by the -48VA bus, and slots 15 through 28 on the HMS-317 (slots 12 through 22 on the HMS-318) are powered by the -48VB bus. The two GND terminals are tied together. The HMU-319 is diode-OR'ed to both power busses, to guard against power failure in the event that one power supply is lost. This feature requires the 2 ground terminals to be tied together on the HMU card.

To avoid voltage differences from building up between the shelf GND bus and the ground pins of the management terminal that connects to the RS-232 ports, connect the shelf Ground (GND) pins and the terminal ground bus to the TB1 FG pin.

The fan terminal of TB1 provides access to the Normal Opening (NO), Form A fan relay contact located on the HMU-319 management unit. A temperature monitor activates this fan relay whenever the shelf temperature goes above 45 °C (±1 °C) and deactivates the relay when the temperature drops below 35 °C (±1 °C). If the temperature goes above 77 °C (±1 °C) a critical alarm is also generated. The critical alarm resets when the temperature drops below 40 °C (±1 °C).

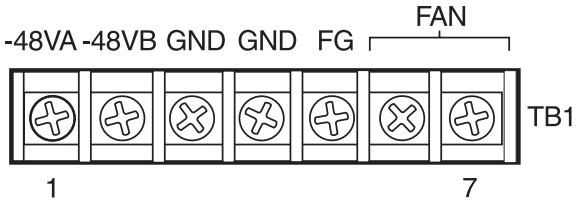


Figure 6. *Terminal Strip TB1*

5 Connect the optional alarm outputs to TB2 as shown in Figure 7.

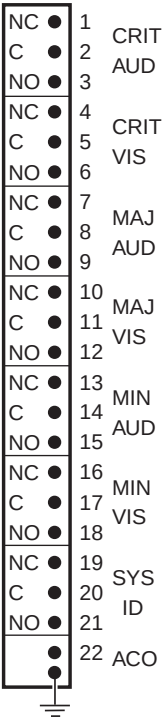


Figure 7. *Terminal Strip TB2, HMU-319 Alarm Outputs*

6 Install the line units and the HMU-319 management unit in the shelf, as described in the applicable practices (see "Appendix B - Product Support" on page 21).

The HCP-322 connector panel can be used with the HMS-318 to provide G.703 (75 Ω or 120 Ω) interface for ELU-319 applications. Refer to the HCP-322 Technical Practice 100-322-100-xx for more details (see "Appendix B - Product Support" on page 21).

SIGNAL AND PIN ASSIGNMENTS

This section includes the following tables of signal and pin assignments.

Table 4. *P1-DSX Receive, Tip and Ring*

Cable Pin Number			Card
HMS-317	HMS-318	Slot	Pin Number
33	26	1	B (Tip)
1	1		2 (Ring)
34	27	2	B
2	2		2
35	28	3	B
3	3		2
36	29	4	B
4	4		2
37	30	5	B
5	5		2
38	31	6	B
6	6		2
39	32	7	B
7	7		2
40	33	8	B
8	8		2
41	34	9	B
9	9		2
42	35	10	B
10	10		2
43	36	11	B
11	11		2
44	37	12	B

Table 4. *P1-DSX Receive, Tip and Ring (Cont.)*

Cable Pin Number			Card
HMS-317	**HMS-318**	**Slot**	**Pin Number**
12	12		2
45	38	13	B
13	13		2
46	39	14	B
14	14		2
47	40	15	B
15	15		2
47	41	16	B
16	16		2
49	42	17	B
17	17		2
50	43	18	B
18	18		2
51	44	19	B
19	19		2
52	45	20	B
20	20		2
53	46	21	B
21	21		2
54	47	22	B
22	22		2
55		23	B
23			2
56		24	B
24			2
57		25	B
25			2
58		26	B
26			2
59		27	B
27			2
60		28	B
28			2

Table 5. *P2-DSX Transmit, Tip and Ring*

Cable Pin Number			Card
HMS-317	HMS-318	Slot	Pin Number
33	26	1	A (Tip)
1	1		1 (Ring)
34	27	2	A
2	2		1
35	28	3	A
3	3		1
36	29	4	A
4	4		1
37	30	5	A
5	5		1
38	31	6	A
6	6		1
39	32	7	A
7	7		1
40	33	8	A
8	8		1
41	34	9	A
9	9		1
42	35	10	A
10	10		1
43	36	11	A
11	11		1
44	37	12	A
12	12		1
45	38	13	A
13	13		1
46	39	14	A
14	14		1
47	40	15	A
15	15		1
47	41	16	A
16	16		1
49	42	17	A
17	17		1

Table 5. *P2-DSX Transmit, Tip and Ring (Cont.)*

Cable Pin Number			Card
HMS-317	**HMS-318**	**Slot**	**Pin Number**
50	43	18	A
18	18		1
51	44	19	A
19	19		1
52	45	20	A
20	20		1
53	46	21	A
21	21		1
54	47	22	A
22	22		1
55		23	A
23			1
56		24	A
24			1
57		25	A
25			1
58		26	A
26			1
59		27	A
27			1
60		28	A
28			1

Table 6. *P3-HDSL Loop 1, Tip and Ring*

Cable Pin Number			Card
HMS-317	HMS-318	Slot	Pin Number
33	26	1	F (Tip)
1	1		6 (Ring)
34	27	2	F
2	2		6
35	28	3	F
3	3		6
36	29	4	F
4	4		6
37	30	5	F
5	5		6
38	31	6	F
6	6		6
39	32	7	F
7	7		6
40	33	8	F
8	8		6
41	34	9	F
9	9		6
42	35	10	F
10	10		6
43	36	11	F
11	11		6
44	37	12	F
12	12		6
45	38	13	F
13	13		6
46	39	14	F
14	14		6
47	40	15	F
15	15		6
47	41	16	F
16	16		6
49	42	17	F
17	17		6

Table 6. *P3-HDSL Loop 1, Tip and Ring (Cont.)*

Cable Pin Number			Card
HMS-317	**HMS-318**	**Slot**	**Pin Number**
50	43	18	F
18	18		6
51	44	19	F
19	19		6
52	45	20	F
20	20		6
53	46	21	F
21	21		6
54	47	22	F
22	22		6
55		23	F
23			6
56		24	F
24			6
57		25	F
25			6
58		26	F
26			6
59		27	F
27			6
60		28	F
28			6

Table 7. *P4-HDSL Loop 2, Tip and Ring*

Cable Pin Number			Card
HMS-317	HMS-318	Slot	Pin Number
33	26	1	K (Tip)
1	1		9 (Ring)
34	27	2	K
2	2		9
35	28	3	K
3	3		9
36	29	4	K
4	4		9
37	30	5	K
5	5		9
38	31	6	K
6	6		9
39	32	7	K
7	7		9
40	33	8	K
8	8		9
41	34	9	K
9	9		9
42	35	10	K
10	10		9
43	36	11	K
11	11		9
44	37	12	K
12	12		9
45	38	13	K
13	13		9
46	39	14	K
14	14		9
47	40	15	K
15	15		9
47	41	16	K
16	16		9
49	42	17	K
17	17		9

Table 7. *P4-HDSL Loop 2, Tip and Ring (Cont.)*

Cable Pin Number			Card
HMS-317	**HMS-318**	**Slot**	**Pin Number**
50	43	18	K
18	18		9
51	44	19	K
19	19		9
52	45	20	K
20	20		9
53	46	21	K
21	21		9
54	47	22	K
22	22		9
55		23	K
23			9
56		24	K
24			9
57		25	K
25			9
58		26	K
26			9
59		27	K
27			9
60		28	K
28			9

Table 8. *Standard PIC Color Code*

Pair Number	Tip	Ring
1	White	Blue
2	White	Orange
3	White	Green
4	White	Brown
5	White	Slate
6	Red	Blue
7	Red	Orange
8	Red	Green
9	Red	Brown
10	Red	Slate
11	Black	Blue
12	Black	Orange
13	Black	Green
14	Black	Brown
15	Black	Slate
16	Yellow	Blue
17	Yellow	Orange
18	Yellow	Green
19	Yellow	Brown
20	Yellow	Slate
21	Violet	Blue
22	Violet	Orange
23	Violet	Green
24	Violet	Brown
25	Violet	Slate
26	White	Blue
27	White	Orange
28	White	Green

APPENDIX A - SPECIFICATIONS

Mounting	STS high-density shelf
Telco Facility	HMS-317 32-pair, male connectors (P3, P4) wire-wrap HMS-318 25-pair, type 57, male connector (P3, P4), wire-wrap
DSX-1	HMS-317: DSX-1 RCV (P1), DSX-1 XMT (P2): 32-pair male connector or wire-wrap HMS-318: DSX-1 RCV (P1), DSX-1 XMT (P2): 25-pair male connector or wire-wrap **Note:** RCV (output toward DSX-1), XMT (input from DSX-1**)**
Power Supply Option	Split or common input power options.
Height	HMS-317 and HMS-318: 5.33 in. (13.26 cm)
Width	HMS-317: 23 in. (58.4 cm) HMS-318: 19 in. (48.06 cm)
Depth	HMS-317 and HMS-318: 11.5 in. (30 cm)
Weight	HMS-317: 11.6 lb (5.36 kg) HMS-318: 9.7 lb (4.4 kg)

APPENDIX B - PRODUCT SUPPORT

ADC Customer Service Group provides expert pre-sales and post-sales support and training for all its products.

Technical support is available 24 hours a day, 7 days a week by contacting the ADC Technical Assistance Center (TAC).

Sales Assistance 800.366.3891 ext. 73000 (USA and Canada) or 952.917.3000 Fax: 952.917.3237	• Quotation Proposals • Ordering and Delivery • General Product Information
Systems Integration 800.366.3891 ext. 73000 (USA and Canada) or 952.917.3000	• Complete Solutions (from concept to installation) • Network Design and Integration Testing • System Turn-Up and Testing • Network Monitoring (upstream or downstream) • Power Monitoring and Remote Surveillance • Service/Maintenance Agreements • Systems Operation
ADC Technical Assistance Center 800.638.0031 (USA and Canada) or 714.730.3222 Fax: 714.730.2400 Email: wsd_support@adc.com	• Technical Information • System/Network Configuration • Product Specification and Application • Training (product-specific) • Installation and Operation Assistance • Troubleshooting and Repair/Field Assistance
Online Technical Support	• www.adc.com/Knowledge_Base/index.jsp
Online Technical Publications	• www.adc.com/library1/
Product Return Department 800.366.3891 ext. 73748 (USA and Canada) or 952.917.3748 Fax: 952.917.3237 Email: repair&return@adc.com	• ADC Return Material Authorization (RMA) number and instructions must be obtained before returning products.
All 800 lines are toll-free in the USA and Canada.	

APPENDIX C - ABBREVIATIONS

CI	Customer Interface
CLEI	Common Language Equipment Interface
CO	Central Office
CREM	Customer Remote Loopback
DDS	Digital Data Service
DSX-1	DS-1 Cross-connect frame
ECI	Equipment Catalog Item
HDSL	High-bit-rate Digital Subscriber Line
HDU	HiGain Doubler Unit
HLU	HiGain Line Unit
HMS	HiGain Management Shelf
HMU	HiGain Management Unit
HRE	HiGain Remote Enclosure
HRU	HiGain Remote Unit
LED	Light Emitting Diode
NLOC	Network Local Loopback
NVRAM	Non-volatile Random Access Memory
PIC	Plastic Insulated Conductor
RCV	Receive
RMA	Return Material Authorization
STS	Synchronous Transport System
XMT	Transmit
ZBTS	Zero Byte Timeslot

CERTIFICATION AND WARRANTY

FCC COMPLIANCE

This equipment can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, can 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.

Refer to the installation section of this manual for guidance on: Cabling, correct connections, grounding.

WARRANTY

ADC DSL Systems, Incorporated ("ADC") warrants that, for a period of twelve (12) months from the date of shipment, the hardware portion of its products will be free of material defects and faulty workmanship under normal use. ADC's obligation, under this warranty, is limited to replacing or repairing, at ADC's option, any such hardware product which is returned during the 12-month warranty period per ADC's instructions and which product is confirmed by ADC not to comply with the foregoing warranty.

ADC warrants that, for a period of 90 days from the date of purchase, the software furnished with its products will operate substantially in accordance with the ADC published specifications and documentation for such software. ADC's entire liability for software that does not comply with the foregoing warranty and is reported to ADC during the 90-day warranty period is, at ADC's option, either (a) return of the price paid or (b) repair or replace of the software. ADC also warrants that, for a period of thirty (30) days from the date of purchase, the media on which software is stored will be free from material defects under normal use. ADC will replace defective media at no charge if it is returned to ADC during the 30-day warranty period along with proof of the date of shipment.

The transportation charges for shipment of returned products to ADC will be prepaid by the Buyer. ADC will pay transportation charges for shipment of replacement products to Buyer, unless no trouble is found (NTF), in which case the Buyer will pay transportation charges.

ADC may use reconditioned parts for such repair or replacement. This warranty ***does not*** apply to any product which has been repaired, worked upon, or altered by persons not authorized by ADC or in ADC's sole judgment has subjected to misuse, accident, fire or other casualty, or operation beyond its design range.

Repaired products have a 90-day warranty, or until the end of the original warranty period—whichever period is greater.

ADC DISCLAIMS ALL OTHER WARRANTIES, EITHER EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, WITH RESPECT TO ITS PRODUCTS AND ANY ACCOMPANYING WRITTEN MATERIALS. FURTHER, ADC DOES NOT WARRANT THAT SOFTWARE WILL BE FREE FROM BUGS OR THAT ITS USE WILL BE UNINTERRUPTED OR REGARDING THE USE, OR THE RESULTS OF THE USE, OF THE SOFTWARE IN TERMS OF CORRECTNESS, ACCURACY, RELIABILITY OR OTHERWISE.

MODIFICATIONS

Any changes or modifications made to this device that are not expressly approved by ADC DSL Systems, Inc. voids the user's warranty.

All wiring external to the products should follow the provisions of the current edition of the National Electrical Code.

ADC DSL Systems, Inc.
14402 Franklin Avenue
Tustin, CA 92780-7013
Tel: 714.832.9922
Fax: 714.832.9924

Technical Assistance
Tel: 800.638.0031
Tel: 952.917.3222
Fax: 714.730.2400

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