

Table 1. LS28M 1U Chassis Ch1 AUX Connector Pinout

Ch1 AUX Connector Pin	PCB Pad Identifier	Signal Details	Label Color	Label Text	Cable Type	D-Sub Connector Pin
1	E1	Channel 1 PCM Input	BLU	Ch1 PCM IN (J4-4)	RG174	-
2	E2	Channel 1 Q Clock Output	GRY	Ch1 QCLK OUT (J8-3)	RG174	-
3	E3	Channel 1 Q Data Output	GRY	Ch1 QDAT OUT (J8-4)	RG174	-
4	E4	J12 User Defined I/O (2)	-	-	RG174	D9: 1
13	E13	J12 User Defined I/O (3)	-	-	RG174	D9: 2
20	E20	J8 User Defined Input (20)	WHT	J8 UIN1 (J8-20)	RG174	-
21	E21	J8 User Defined Input (21)	WHT	J8 UIN2 (J8-21)	RG174	-
23	E23	J8 User Defined Output (23)	YEL	J8 UOUT1 (J8-23)	RG174	-
24	E24	J8 User Defined Output (24)	YEL	J8 UOUT2 (J8-24)	RG174	-
5	E5	Channel 1 I Clock (+) Output	-	-	TSP	D15: 1
6	E6	Channel 1 I Clock (-) Output	-	-		D15: 11
7	E7	Channel 1 I Data (+) Output	-	-	TSP	D15: 2
8	E8	Channel 1 I Data (-) Output	-	-		D15: 12
9	E9	Channel 1 Q Clock (+) Output	-	-	TSP	D15: 4
10	E10	Channel 1 Q Clock (-) Output	-	-		D15: 14
11	E11	Channel 1 Q Data (+) Output	-	-	TSP	D15: 5
12	E12	Channel 1 Q Data (-) Output	-	-		D15: 15
18	E18	J12 User Defined I/O (4)	-	-	TSP	D9: 4
19	E19	J12 User Defined I/O (5)	-	-		D9: 5
14-17, 22, 25		Ground	-	-		D9: 6-9 D15: 6-9

Table 2. Assembly BOM

Description	Qty	Manufacturers PN	Manufacturer
Micro-DSUB Aluminum Backshell	2	MEC-28M-01-301-02	Lumistar
MDM 25-pin Female Connector	1	CONN-380-025-213L001	NorComp
MDM 25-pin Female Backshell PCB	1	HARM-3428M0138901	Lumistar
UNC2-56 Thumbscrews	2	NTEC-B71014305	Northern Technologies
BNC Female RG174 Pigtail, 12"	7	LCOM-SP7363	LCOM
Heat-shrink Tubing	AR	(Common Stock)	(Various)
0-80 82-Degree Stainless Steel Screw, Flathead, 0.3125 Length	4	(Common Stock)	(Various)
HD15 Female Connector, Solder Cup	1	CONN-180-015-203L001	NorComp
HD15 Backshell Kit w/Thumbscrews	1	CONN-973-009-10R011	NorComp
1 Ft. Twisted-Shielded Pair, 26AWG, 110 Ohm	5	CABL-55A1121-26-6/9-9	TE/Raychem
D9 Female Connector, Solder Cup	1	CONN-171-009-203L001	NorComp
D9 Backshell Kit w/Thumbscrews	1	CONN-973-009-010R011	NorComp
RG-174 50 Ohm Coax Cable	AR	CABL-RG-174	NorComp

Assembly Notes:

- Place connector identification label on the key side at this location. On the bottom cover place "28U-01-001-02" label.
- Place pigtail identification labels with shown text and colors from table 1 at the locations shown and cover with clear heat shrink.
- Bundle D-Sub cables at approximate 4" intervals to keep cables together.
- Remove plastic thumbscrew covers prior to assembly.
- Table 2 provides assembly component Bill of Materials.
- Label HD15 and D9 backshells as shown.

Lumistar Inc.
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Title:
LS-28-1U Chassis Channel 1 AUX Cable Assembly

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User Defined IO Assignments

Signal Mnemonic	Connector Pin	Signal Description - Input	Signal Description - Output	Signal Direction	Signal Characteristics
J12UIO1	J12-2	Ch1 External Clock In +	Ch1 Clock Out +	Input/Out	RS422
		PCM Encoder1 Clock In +	Simulator1_TXD1 Clock Out +	Input/Out	RS422
		Trigger1 In +	Slave1 Clock Out +	Input/Out	RS422
		AUX1 Clock In +	Combiner Clock Out +	Input/Out	RS422
J12UIO2 (*)	J12-3	Ch1 External Clock In -	Ch1 External Clock Out -	Input/Out	RS422
		PCM Encoder1 Clock In -	Simulator1_TXD1 Clock Out -	Input/Out	RS422
		Trigger1 In -	Slave1 Clock Out -	Input/Out	RS422
		AUX1 Clock In -	Combiner Clock Out -	Input/Out	RS422
J12UIO3	J12-4	Ch1 External Data In +	Ch1 Data Out +	Input/Out	RS422
		PCM Encoder1 Data In +	Simulator1_TXD1 Data Out +	Input/Out	RS422
		Trigger2 In +	Slave1 Data Out +	Input/Out	RS422
		AUX1 Data In +	Combiner Data Out +	Input/Out	RS422
J12UIO4 (*)	J12-5	Ch1 External Data In -	Ch1 Data Out -	Input/Out	RS422
		PCM Encoder1 Data In -	Simulator1_TXD1 Data Out -	Input/Out	RS422
		Trigger2 In -	Slave1 Data Out -	Input/Out	RS422
		AUX1 Data In -	Combiner Data Out -	Input/Out	RS422

(*) – These signals are idle (unused) when signals utilize RS422 transceivers. These signals work in combination with the signals above.

Signal Mnemonic	Connector Pin	Signal Description	Signal Direction	Signal Characteristics
J8UIO1	J8-20	Ch1 External Clock In	Input	5V TTL
		PCM Encoder1 Clock In	Input	5V TTL
		Trigger1 In	Input	5V TTL
		AUX1 Clock In	Input	5V TTL
J8UIO2	J8-21	Ch1 External Data In	Input	5V TTL
		PCM Encoder1 Data In	Input	5V TTL
		Trigger2 In	Input	5V TTL
		AUX1 Data In	Input	5V TTL
J8UIO3	J8-23	Combiner Clock Out	Output	5V TTL
		Simulator1_TXD1 Clock Out	Output	5V TTL
		Slave1 Clock Out	Output	5V TTL
		AUX1 Clock Out	Output	5V TTL
		Simulator1_TXD1 Strobe Out	Output	5V TTL
		Decom1 Strobe Out	Output	5V TTL
		Simulator1_TXD1 Strobe Out_N	Output	5V TTL
		Decom1 Strobe Out_N	Output	5V TTL
J8UIO4	J8-24	Combiner Data Out	Output	5V TTL
		Simulator1_TXD1 Data Out	Output	5V TTL
		Slave1 Data Out	Output	5V TTL
		AUX1 Data Out	Output	5V TTL
		Simulator1_TXD1 Strobe Out	Output	5V TTL
		Decom1 Strobe Out	Output	5V TTL
		Simulator1_TXD1 Strobe Out_N	Output	5V TTL
		Decom1 Strobe Out_N	Output	5V TTL

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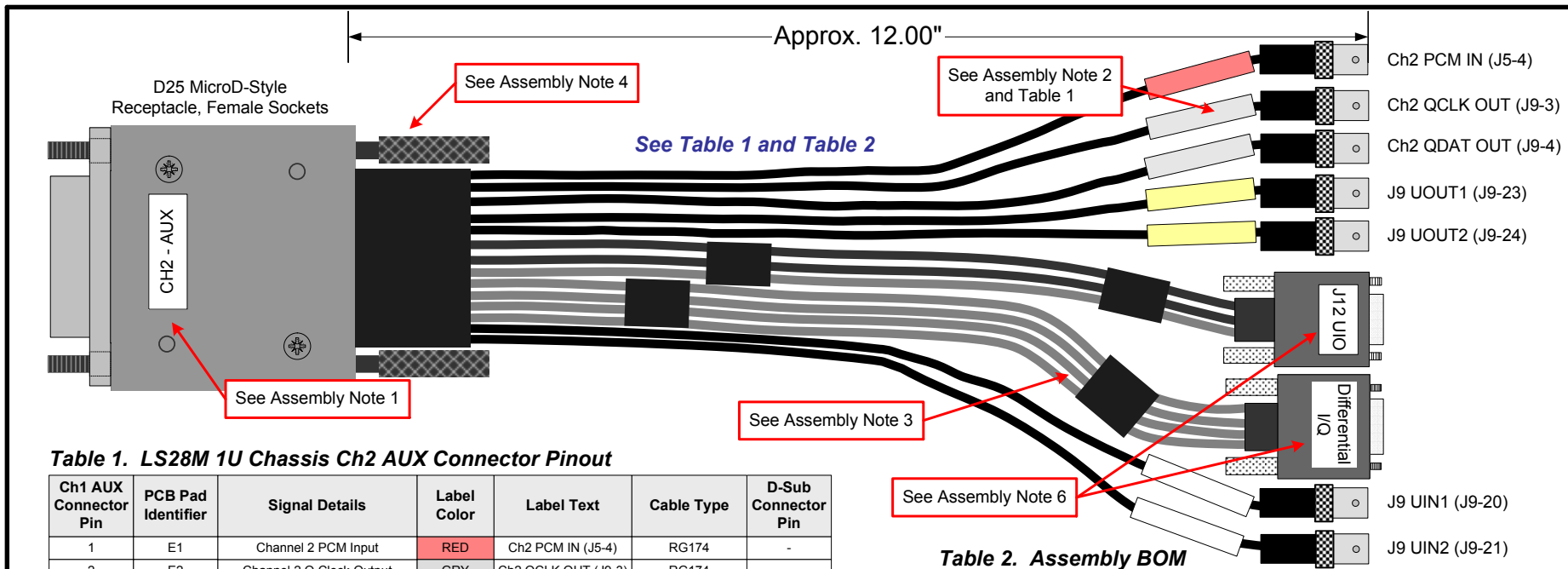


Table 1. LS28M 1U Chassis Ch2 AUX Connector Pinout

Ch1 AUX Connector Pin	PCB Pad Identifier	Signal Details	Label Color	Label Text	Cable Type	D-Sub Connector Pin
1	E1	Channel 2 PCM Input	RED	Ch2 PCM IN (J5-4)	RG174	-
2	E2	Channel 2 Q Clock Output	GRY	Ch2 QCLK OUT (J9-3)	RG174	-
3	E3	Channel 2 Q Data Output	GRY	Ch2 QDAT OUT (J9-4)	RG174	-
4	E4	J12 User Defined I/O (6)	-	-	RG174	D9: 1
13	E13	J12 User Defined I/O (18)	-	-	RG174	D9: 2
20	E20	J9 User Defined Input (20)	WHT	J9 UIN1 (J9-20)	RG174	-
21	E21	J9 User Defined Input (21)	WHT	J9 UIN2 (J9-21)	RG174	-
23	E23	J9 User Defined Output (23)	YEL	J9 UOUT1 (J9-23)	RG174	-
24	E24	J9 User Defined Output (24)	YEL	J9 UOUT2 (J9-24)	RG174	-
5	E5	Channel 2 I Clock (+) Output	-	-	TSP	D15: 1
6	E6	Channel 2 I Clock (-) Output	-	-		D15: 11
7	E7	Channel 2 I Data (+) Output	-	-	TSP	D15: 2
8	E8	Channel 2 I Data (-) Output	-	-		D15: 12
9	E9	Channel 2 Q Clock (+) Output	-	-	TSP	D15: 4
10	E10	Channel 2 Q Clock (-) Output	-	-		D15: 14
11	E11	Channel 2 Q Data (+) Output	-	-	TSP	D15: 5
12	E12	Channel 2 Q Data (-) Output	-	-		D15: 15
18	E18	J12 User Defined I/O (8)	-	-	TSP	D9: 4
19	E19	J12 User Defined I/O (20)	-	-		D9: 5
14-17, 22, 25		Ground	-	-		D9: 6-9 D15: 6-9

Table 2. Assembly BOM

Description	Qty	Manufacturers PN	Manufacturer
Micro-DSub Aluminum Backshell	2	MEC-28M-01-301-02	Lumistar
MDM 25-pin Female Connector	1	CONN-380-025-213L001	NorComp
MDM 25-pin Female Backshell PCB	1	HARM-3428M0138901	Lumistar
UNC2-56 Thumbscrews	2	NTEC-B71014305	Northern Technologies
BNC Female RG174 Pigtail, 12"	7	LCOM-SP7363	LCOM
Heat-shrink Tubing	AR	(Common Stock)	(Various)
0-80 82-Degree Stainless Steel Screw, Flathead, 0.3125 Length	4	(Common Stock)	(Various)
HD15 Female Connector, Solder Cup	1	CONN-180-015-203L001	NorComp
HD15 Backshell Kit w/Thumbscrews	1	CONN-973-009-10R011	NorComp
1 Ft. Twisted-Shielded Pair, 26AWG, 110 Ohm	5	CABL-55A1121-26-6/9-9	TE/Raychem
D9 Female Connector, Solder Cup	1	CONN-171-009-203L001	NorComp
D9 Backshell Kit w/Thumbscrews	1	CONN-973-009-010R011	NorComp
RG-174 50 Ohm Coax Cable	AR	CABL-RG-174	NorComp

Assembly Notes:

- 1.) Place connector identification label on the key side at this location. On the bottom cover place "28U-01-002-02" label.
- 2.) Place pigtail identification labels with shown text and colors from table 1 at the locations shown and cover with clear heat shrink.
- 3.) Bundle D-Sub cables at approximate 4" intervals to keep cables together.
- 4.) Remove plastic thumbscrew covers prior to assembly.
- 5.) Table 2 provides assembly component Bill of Materials.
- 6.) Label HD15 and D9 backshells as shown.

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Title:
LS-28-1U Chassis Channel 2 AUX Cable Assembly

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User Defined IO Assignments

Signal Mnemonic	Connector Pin	Signal Description - Input	Signal Description - Output	Signal Direction	Signal Characteristics
J12UIO5	J12-6	Ch2 External Clock In +	Ch2Clock Out +	Input/Out	RS422
		PCM Encoder2 Clock In +	Simulator2_TXD2 Clock Out +	Input/Out	RS422
		Trigger3 In +	Slave2 Clock Out +	Input/Out	RS422
		AUX2 Clock In +	Combiner Clock Out +	Input/Out	RS422
			Simulator1_TXD1 Clock Out+	Input/Out	RS422
			Simulator1_TXD1 Strobe Out +	Input/Out	RS422
J12UIO6 (*)	J12-18	Ch2 External Clock In -	Ch2 External Clock Out -	Input/Out	RS422
		PCM Encoder2 Clock In -	Simulator2_TXD1 Clock Out -	Input/Out	RS422
		Trigger3 In -	Slave2 Clock Out -	Input/Out	RS422
		AUX2 Clock In -	Combiner Clock Out -	Input/Out	RS422
			Simulator1_TXD1 Clock Out -	Input/Out	RS422
			Simulator1_TXD1 Strobe Out -	Input/Out	RS422
J12UIO7	J12-8	Ch2 External Data In +	Ch2 Data Out +	Input/Out	RS422
		PCM Encoder2 Data In +	Simulator1_TXD1 Data Out +	Input/Out	RS422
		Trigger4 In +	Slave2 Data Out +	Input/Out	RS422
		AUX2 Data In +	Combiner Data Out +	Input/Out	RS422
			Simulator1_TXD1 Data Out+	Input/Out	RS422
			Decom1 Strobe Out +	Input/Out	RS422
J12UIO8 (*)	J12-20	Ch2 External Data In -	Ch2 Data Out -	Input/Out	RS422
		PCM Encoder2 Data In -	Simulator2_TXD2 Data Out -	Input/Out	RS422
		Trigger4 In -	Slave2 Data Out -	Input/Out	RS422
		AUX2 Data In -	Combiner Data Out -	Input/Out	RS422
			Simulator1_TXD1 Data Out -	Input/Out	RS422
			Decom1 Strobe Out -	Input/Out	RS422

(*) – These signals are idle (unused) when signals utilize RS422 transceivers. These signals work in combination with the signals above.

Signal Mnemonic	Connector Pin	Signal Description	Signal Direction	Signal Characteristics
J9UIO1	J9-20	Ch2 External Clock In	Input	5V TTL
		PCM Encoder2 Clock In	Input	5V TTL
		Trigger3 In	Input	5V TTL
		AUX2 Clock In	Input	5V TTL
J9UIO2	J9-21	Ch1 External Data In	Input	5V TTL
		PCM Encoder2 Data In	Input	5V TTL
		Trigger4 In	Input	5V TTL
		AUX2 Data In	Input	5V TTL
J9UIO3	J9-23	Simulator1_TXD1 Clock Out_N	Output	5V TTL
		Simulator2_TXD2 Clock Out	Output	5V TTL
		Slave2 Clock Out	Output	5V TTL
		AUX2 Clock Out	Output	5V TTL
		Simulator2_TXD2 Strobe Out	Output	5V TTL
		Decom2 Strobe Out	Output	5V TTL
		Simulator2_TXD2 Strobe Out_N	Output	5V TTL
		Decom2 Strobe Out_N	Output	5V TTL
		Simulator1_TXD1 Data Out_N	Output	5V TTL
J9UIO4	J9-24	Simulator2_TXD2 Data Out	Output	5V TTL
		Slave2 Data Out	Output	5V TTL
		AUX2 Data Out	Output	5V TTL
		Simulator2_TXD12 Strobe Out	Output	5V TTL
		Decom2 Strobe Out	Output	5V TTL
		Simulator2_TXD2 Strobe Out_N	Output	5V TTL
		Decom2 Strobe Out_N	Output	5V TTL

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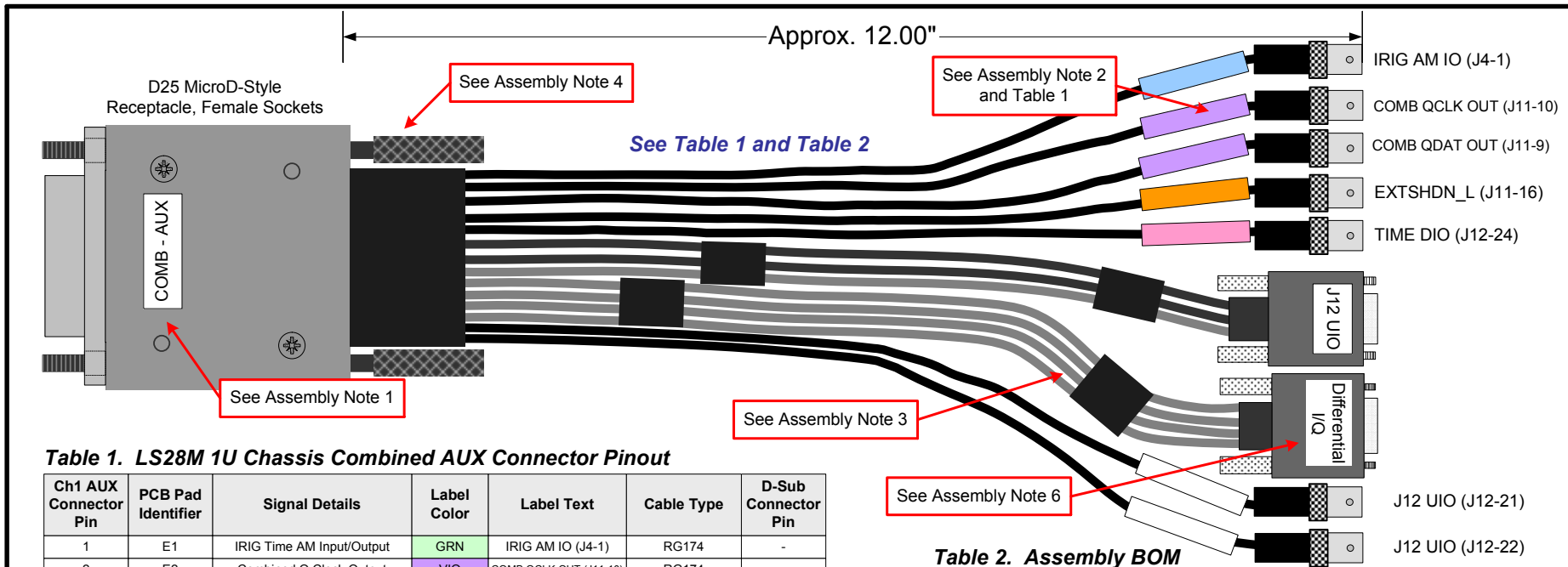


Table 1. LS28M 1U Chassis Combined AUX Connector Pinout

Ch1 AUX Connector Pin	PCB Pad Identifier	Signal Details	Label Color	Label Text	Cable Type	D-Sub Connector Pin
1	E1	IRIG Time AM Input/Output	GRN	IRIG AM IO (J4-1)	RG174	-
2	E2	Combined Q Clock Output	VIO	COMB QCLK OUT (J11-10)	RG174	-
3	E3	Combined Q Data Output	VIO	COMB QDAT OUT (J11-9)	RG174	-
4	E4	J8 User Open/Collector Out (13)	-	-	RG174	D9: 1
13	E13	J9 User Open/Collector Out (13)	-	-	RG174	D9: 2
20	E20	J12 User Defined I/O (21)	WHT	J12 UIO (J12-21)	RG174	-
21	E21	J12 User Defined I/O (22)	WHT	J12 UIO (J12-22)	RG174	-
23	E23	External Shutdown Input	ORG	EXTSHDN_L (J11-16)	RG174	-
24	E24	Time 1PPS Input/Output	PNK	TIME DIO (J12-24)	RG174	-
5	E5	Combined I Clock (+) Output	-	-	TSP	D15: 1
6	E6	Combined I Clock (-) Output	-	-		D15: 11
7	E7	Combined I Data (+) Output	-	-	TSP	D15: 2
8	E8	Combined I Data (-) Output	-	-		D15: 12
9	E9	Combined Q Clock (+) Output	-	-	TSP	D15: 4
10	E10	Combined Q Clock (-) Output	-	-		D15: 14
11	E11	Combined Q Data (+) Output	-	-	TSP	D15: 5
12	E12	Combined Q Data (-) Output	-	-		D15: 15
18	E18	J12 User Defined I/O (10)	-	-	TSP	D9: 4
19	E19	J12 User Defined I/O (12)	-	-		D9: 5
14-17, 22, 25		Ground	-	-		D9: 6-9 D15: 6-9

Table 2. Assembly BOM

Description	Qty	Manufacturers P/N	Manufacturer
Micro-DSub Aluminum Backshell	2	MEC-28M-01-301-02	Lumistar
MDM 25-pin Female Connector	1	CONN-380-025-213L001	NorComp
MDM 25-pin Female Backshell PCB	1	HARM-3428M0138901	Lumistar
UNC2-56 Thumbscrews	2	NTEC-B71014305	Northern Technologies
BNC Female RG174 Pigtail, 12"	7	LCOM-SP7363	LCOM
Heat-shrink Tubing	AR	(Common Stock)	(Various)
0-80 82-Degree Stainless Steel Screw, Flathead, 0.3125 Length	4	(Common Stock)	(Various)
HD15 Female Connector, Solder Cup	1	CONN-180-015-203L001	NorComp
HD15 Backshell Kit w/Thumbscrews	1	CONN-973-009-10R011	NorComp
1 Ft. Twisted-Shielded Pair, 26AWG, 110 Ohm	5	CABL-55A1121-26-6/9-9	TE/Raychem
D9 Female Connector, Solder Cup	1	CONN-171-009-203L001	NorComp
D9 Backshell Kit w/Thumbscrews	1	CONN-973-009-010R011	NorComp
RG-174 50 Ohm Coax Cable	AR	CABL-RG-174	NorComp

Assembly Notes:

- 1.) Place connector identification label on the key side at this location. On the bottom cover place "28U-01-003-02" label.
- 2.) Place pigtail identification labels with shown text and colors from table 1 at the locations shown and cover with clear heat shrink.
- 3.) Bundle D-Sub cables at approximate 4" intervals to keep cables together.
- 4.) Remove plastic thumbscrew covers prior to assembly.
- 5.) Table 2 provides assembly component Bill of Materials.
- 6.) Label HD15 and D9 backshells as shown.

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2270 Camino Vida Roble, Suite L
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Title:
LS-28-1U Chassis Combined AUX Cable Assembly

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User Defined IO Assignments

Signal Mnemonic	Connector Pin	Signal Description	Signal Direction	Signal Characteristics
C1EGPIO1	J8-13	Ch1 Open Collector Out	Output	Open/Collector
C1EGPIO9	J9-13	Ch2 Open Collector Out	Output	Open/Collector

Signal Mnemonic	Connector Pin	Signal Description - Input	Signal Description - Output	Signal Direction	Signal Characteristics
J12UIO9	J12-21	Preset Select B0	Ch1 Carrier Lock	Input/Out	5V TTL
		External Status Trigger 1	Ch1 Bit Sync Lock	Input/Out	5V TTL
			Ch1 Signal Quality Lock	Input/Out	5V TTL
			Stream 1 Lock	Input/Out	5V TTL
J12UIO10	J12-22	Preset Select B1	Ch2 Carrier Lock	Input/Out	5V TTL
		External Status Trigger 2	Ch2 Bit Sync Lock	Input/Out	5V TTL
			Ch2 Signal Quality Lock	Input/Out	5V TTL
			Stream 2 Lock	Input/Out	5V TTL
J12UIO11	J12-10	Preset Select B2	Combiner Carrier Lock	Input/Out	5V TTL
		External Status Trigger 3	Combiner Bit Sync Lock	Input/Out	5V TTL
			Combiner Signal Quality Lock	Input/Out	5V TTL
			Stream 3 Lock	Input/Out	5V TTL
J12UIO12	J12-11	Preset Select B3	Time Lock	Input/Out	5V TTL
		External Status Trigger 4	Reference Lock	Input/Out	5V TTL
			Stream 1 Lock	Input/Out	5V TTL
			Stream 2 Lock	Input/Out	5V TTL

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