Swift Futura Hydro

TECHNICAL INFORMATION

Controller Devices

System Processing Unit (SPU)

Description

The system processor 'U1' is based on a highly integrated Intel 20MHZ 16-bit embedded microcontroller using 256K bytes of CMOS nonvolatile memory, 512K bytes of FLASH memory for the program and 128K bytes of EEPROM memory for the SWIFT BIOS. The CMOS memory and a Real Time Clock controller chip is powered by two batteries during power loss. The Lithium batteries have a shelf life of 10 years. Note that the program memory and the system parameters are located in the Flash memory and are not affected by loss of battery power. An SBX expansion port is provided and used for an MG drive system. An optional VGA interface (J3A and J3B) is also provided.

The SPU has a temperature control chip, which will trigger at 140° F (60C). This will cause the cars to stop normally at the nearest floor and open their doors. The service type will be displayed as Overload (Thermal Overload).

The SPU requires only 5VDC to operate (adjust to 5.1VDC on SPU-LINK test points). For MG jobs, an additional +/- 15VDC supply is located in the chassis and provides power for the SBX interface.

SPU Board



J#	PIN	REQ	FUNCTION
JP1	1-2	OUT	186 Watchdog to the SPU watchdog timer
JP2	1	OUT	SBX option 1
	2	OUT	SBX OPTION 2
JP3	1-2	OUT	+12VDC power for Flash memory. DO NOT CONNECT
	2-3	IN	Enables Flash memory paging.
J1	1-2	IN	Software operation strobe to the SPU watchdog timer
J1	2-3	OUT	Diagnostic strobe to the SPU watchdog timer.
			Note: If this jumper is inserted, the SPU <u>will not reboot</u> under certain conditions.
P2	1-2 *		SPU interrupt control matrix.
	thru	IN	Note: * (15-16, 29-30) are OUT (see below)
	47-48	1	
P2	15-30	IN	Wire-wrap: One second clock update
P2	16-29	IN	Wire-wrap: Real Time Clock
P2	49-50	OUT	SPU interrupt control matrix
P3	5-6	IN	Bus Clock. All other jumper on P3 must be removed

Jumper Configuration

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FUNCTION	LOCATION	DEFINITION]
CMOS RAM	U18, U17	Battery-backed CMOS Non Volatile Static Memory	
FLASH	U19, U20	Non Volatile FLASH program and parameter memory	J3
EEPROM	U15, U16	Non Volatile Read Only Memory (System BIOS)	+12V
PALS	U7, U46, U48	Programmable Array Logic	
Power Connector	J3	Power connector: -12V, +12V, COM, COM, +5V, +5V Note: +/- 15VDC for MG SBX-414	+5V +5V
VGA Conn.	J3A, J3B	VGA interface board connector	

Component Identification Table

Table 2

System Processing Unit Link Board (SPU-LINK)



Figure 13-2

The SPU-LINK is mounted on the front of the SPU chassis and provides the communication interface to the "Smart" peripherals. The primary function of the SPU-LINK is to protect and provide the drivers for the communication lines, the DPP interface, and three input and output control ports. It has an RS-232 (P11, DB-9 connector) port to permit communication with a terminal or a PC. Note that the Radio Shack, or other similar terminal PC's used with the SWIFT-5000, can also operate with the **FUTURA** controller (Port Setting: 19,200 Baud, 8-bits and no parity).

Note: The +5VDC SPU supply should be between 5.00 and 5.20 VDC. Test points TP5 (+5V), and TP1 (GND) should be used to check SPU power Supply voltage.



TECHNICAL INFORMATION

SPU-Link LED Indicators

Numerous indicators are provided for quick diagnostics. The following table describes the LED status:

LED STATUS				
NAME	DESCRIPTION			
FLV	at Floor Level			
GPI1	General Purpose Input # 1			
GPI2	Group Comm. handshake			
GPO1	General Purpose Output # 1			
GPO2	Group Comm. handshake. If ON, then this car is in the Group			
+24VPWR	+24V Input (P9 +24V, 24VCOM)			
HC PWR	+24Volt Hall Call interface power (connector P9_VHC , VH+)			

LED STATUS				
NAME	DESCRIPTION			
DPP1	Digital Position Pulse #1 (Input)			
DPP2	Digital Position Pulse #2 (Input)			
EMST	Emergency Stop Output (controls CEN)			
EMSD	Emergency Stop Input (CEN feedback)			
CPU	FLASHING indicates if that the SPU is running.			
V+ PWR	+24V Output (Check F1 if LED is Off)			
HL PWR	+24V for Hall Lanterns (Check F13 if LED is Off)			
TELCO JACK	All LEDs associated with the 8- pin jacks (except HC ports). Check fuses if LED is Off. The input power is from +24VPWR (D30).			
TELCO HC ports	D71 and D72 HC power. Hall Call SMI power. NOTE: Diode D74 prevents reverse voltage to be applied to the HC ports.			

Table 3

SPU-Link Input / Output Interface

The following table describes the I/O interface:

FUNCTION	TB Marking	I/O	VOLT	DEVICE	DESCRIPTION
FLV	FLV+, FLV-	Input	24VDC	U5	At Floor Level. Signal from the CPT.
EM Stop	EMST+, EMST-	Output	24VDC	U6, Q1	Emergency stop control from the SPU. Located in the control line of the CEN contactor.
EM Slowdown	EMSD+	Input	24VDC	U4	Emergency stop in the CEN control line. Indicates that a device has shut the car down.
GPI1	GPI1+, GPI1-	Input	24VDC	U3	General Purpose Input
GPI2	GPI2+, GPI2-	Input	24VDC	U2	General Purpose Input
GPO1	GPO1+,GPO1-	Output	24VDC	U7, Q2	General Purpose Output
GPO2	GPO2+,GPO2-	Output	24VDC	U8, Q3	General Purpose Output

Table 4

SPU-Link Communication Ports

The SPU LINK has six discrete communication channels routed to twenty physical ports. These ports are available from an 8-pin TELCO connector or from a removable screw type terminal block to be used with twisted pair communication cables. The following table describes the communication channels and their associated ports:

	сом	PORT	DEVICES	TERMINATION	PROTECTION	CONTROLLER FUNCTION
RS 232	1	P11	U27 (235CPG)	none	D44-D51	Human Interface
стб	2	P17	Rx: U22 (75176) Tx: U21 (75176)	J14 (+) J15 (T) J13 (-)	D59+, D60 D58+, D57	Car To Group Communication. Links all the cars for dispatching functions. Note: <i>P16 (TELCO) port is used for</i> <i>diagnostic purpose.</i>
LOCAL	5	P3, P4, P5, P6, P7, P8	Rx: U18 (75176) Tx: U17 (75176)	J5 (+) J6 (T) J4 (-)	D26+, D27 D25+, D24	HYC, MRC, GP2
DRIVE	3	P13	Rx: U26 (7601) Tx: U16 (75176)	J17 (+) J16 (T) J18 (-)	D65+,D66 D64+,D63	Isolated Digital Drive Comm. Not Used on Hydro Controllers
CAR LOCAL	6	P20, P21, P22, P23, P24	Rx: U20 (75176) Tx: U15 (75176)	J23 (+) J24 (T) J22 (-)	D79+, D80 D78+, D77	TOC, COP, CC1, POS, HL (smi)
CAR Remote	6	P25	Rx: U25 (7601) Tx: U19 (75176)	J29 (+) J28 (T) J30 (-)	D91+, D92 D90+, D89	Isolated Car communication to the CPT or the CDP boards. TOC, EPU-COP, EPU-(CC1-CC4), FUTURA PI
нс	4	P14, P15 P18	Rx/Tx: U14 (75176)	J8 (+) J7 (T) J9 (-)	D62+, D61	Half Duplex Hall Call communication. Interconnects all the cars with the Hall Call interface. The VGA communication adapter also plugs on this bus.
HL	6	P19	Rx/Tx: U23 (75176)	J26 (+) J27 (T) J25 (-)	D82+,D81	Half Duplex Hall Lantern communication

Table 5

+24VDC Power "P9"

Car functions: The SPU-LINK distributes the 24VDC power to all the SMI interface ports, to the I/O interface (V+ & VC) and to the Hall Lantern interface (HLC & HL+). The 24VDC local car power is connected to connector P9-1&2 (+24V & 24V COM) at the factory.

Group functions: According to the job configuration, the group 24VDC power is connected to P9-3&4 (VHC & VH+) and is distributed to the Hall Call (HC) ports.

Encoder Interface "P2"

Car Position Transducer (CPT): The DPP signals, DPP1 and DPP2, are sent from the car top position reader and must be shielded at P2-1 (SHIELD). These signals are in quadrature and are used to locate the car and to calculate the velocity (DPP1), and to determine the car direction (DPP2). Indicator LEDs are provided. Note that the voltage level at this connector is 5VDC.

SPU-Link Control Panel

The Control Panel interface port (P12) interconnects to the push-button/LED PC board via a flat cable type connector. To insert the cable, the top portion of the connector must be pulled to permit the ribbon cable (with the blue plastic facing down) to be inserted. The top portion is then pushed-back to squeeze the ribbon cable and provide the connection. The following table describes the control panel operation:

Control Panel Operation							
PB NAME	PB FUNCTION	LED	LED FUNCTION				
SPU	STM: Setup Mode commands on Inspection. Press SPU until the Display LED turns Green (3 sec), then release and press the Display button momentarily. The Display button will alternately flash Red/Green.	OFF RED GREEN	Invalid Condition Power Up or Reset (SPU not running) Normal Operation				
DISPLAY	Rotate the motor room diagnostic screen from car to car (x) to group.	OFF RED/ GREEN	Normal Condition Flashing Red/Green: Special operation during inspection. See SPU PB function				
DISCONNECT	Changes the car service from Normal to Door Disconnect to Group Disconnect back to Normal	OFF RED RED	Doors are normal operation One flash: Door Disconnect Operation Doors will not open and car will only respond to car calls Two rapid flashes: Group disconnect Car will only respond to car calls and door will open and close normally				
RESET	Reset the Counterweight Derailment Reset Earthquake latch Reset Gate/Lock Fault Reset Rope Gripper	OFF RED RED RED RED	Normal One flash: Counterweight derailment Two flashes: Earthquake Three flashes: Gate/Lock Fault On Steady: Rope Gripper Fault				

Table 6

ELEVATOR

Serial Module Interface (SMI & SMIC)

The SMI and SMIC boards are always used in pairs, permitting an interface with 24 I/O circuits. The SMI connects to the communication link via an 8-pin TELCO connector (P4). This connector provides the serial communication transmit and receive signals as well as the 24VDC power.

The SMI can accept all of the I/O functions. It can be used with dedicated functions or with general purpose optional features.

Serial Module Interface I/O Base Board (SMI)

The I/O modules plug in directly in the sockets provided at each module M1 through M24. Each I/O module has both input connections brought to the terminal block. Refer to the SMI data sheets for TB/Module pin relationship. No addressing is required on the SMI. The addressing is performed on its controller, the SMIC. The 5VDC power required for the I/O modules and the SMIC controller is provided by a high performance isolated DC-DC converter located at "U1" (HDF-2405). The isolated converter plugs-in at U1.

Card guides are provided to hold and secure the SMIC.

	¢¢¢	ı ¢¢	HDF-2405 U1	1
1	M1	• :	• M13	25
3	M2	•	•M14	27
5	МЗ	•	• M15	20
-	M4	● P5	•M16	31
9	M5	•	• M17	33
11	M6	•	• M18	35
13	M7	•	• M19	32
15	M8	•	• M20	36
17	M9	•	• M21	41
10	M10	•	• M22	43
21	M12	•	• M23	45 46
23	M13	•	• M24	47
	()	1		

SMI Board

Figure 13-3

CEC: [v. 01.01]

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Serial Module Interface Controller Board (SMIC)

The SMIC is based on a highly integrated 8052 type microcontroller. It interconnects to the SMI via "P1". Two LEDs are provided to indicate: D1 (red LED) a reset condition which occurs at power-up or a watchdog timer reset, and D2 (green LED) which pulses when the micro-controller is communicating.



SMIC Board

Figure 13-4

The following table lists the jumper configuration for the SMIC board.

J#	PIN	REQ	FUNCTION	
J1	1-2 3-4 5-6	OUT OUT OUT	Termination Common Termination +5V Termination	
J1	7-8 9-10 11-12 13-14 15-16 17-18	Refer to SMI Data Sheets	Address 32 Address 16 Address 8 Address 4 Address 2 Address 1	
J2	1-2 2-3	Refer to SMI Data Sheets	Module 17 Normal mode Module 17 gated by module 6	
J3	1-2 2-3	Refer to SMI Data Sheets	Module 19 Normal mode Module 19 gated by module 8	

Table 7