Glass Unpacking Loader SECS/GEM Specification

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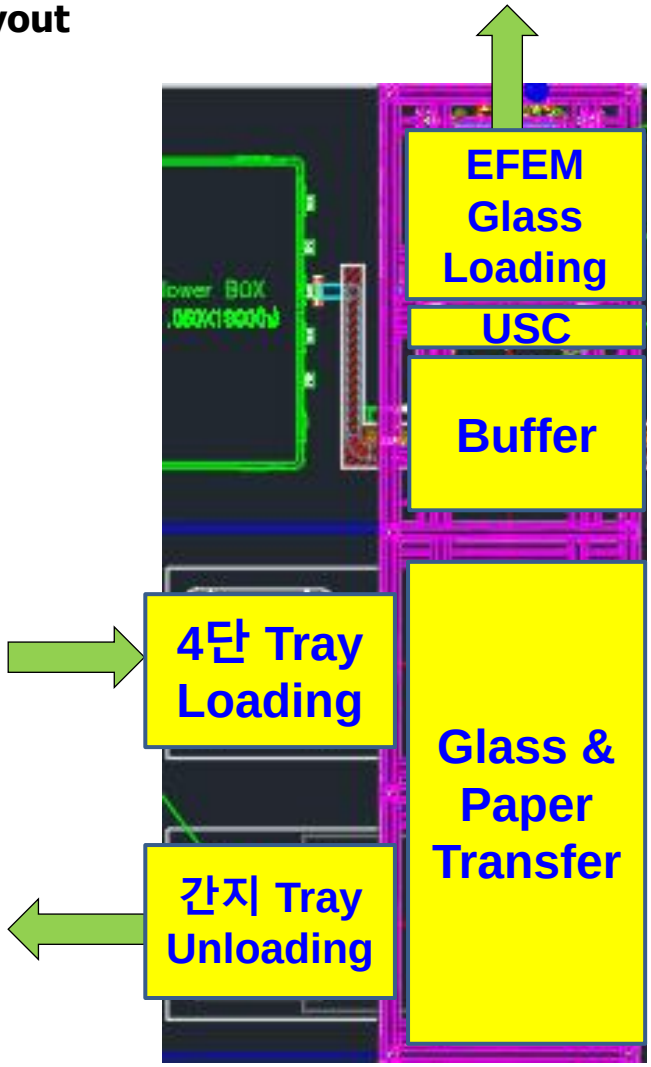
Revision History

Ver	Date	Chapter	Description
1.0.0	2023-04-15		Draft
1.0.1	2023-04-23		Data Item Modify
1.0.2	2023-07-03		시나리오 변경 및 Data 변경
1.0.3	2023-07-06		이벤트 추가 (CEID=1611 GlassStart, 1612 GlassEnd)

CONTENTS

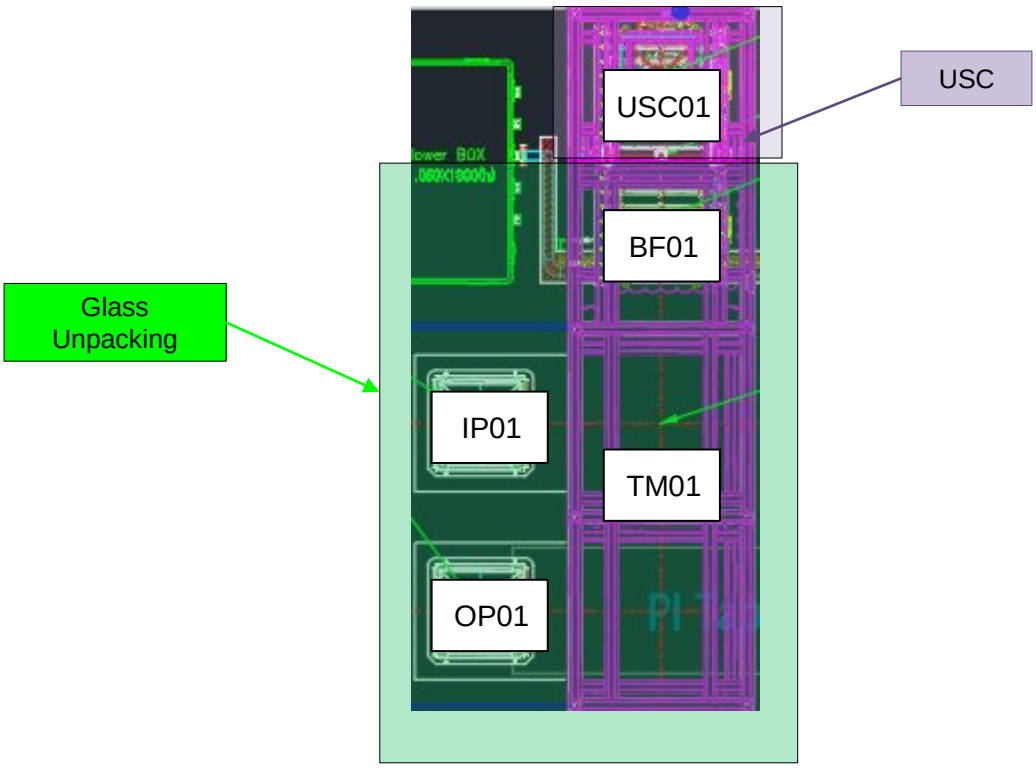
1. Unpacking Loader Equipment Specifications

1.1 Layout



1. 설비 구성
   1) Glass Unpacking Lodaer
   2) Ultra Sonic Cleaner(USC Blow Box 포함)
2. Process
   1) 4단 Tray Loading(Roller 반송)
   2) 간지 이재後 Glass 이재(Tray → Buffer)
   3) Glass Moving (Buffer → USC 설비)
   4) USC 진행後 Glass EFEM Loading(USC 설비 → EFEM)

1.2 Location ID LIST



EQPID	Module	Description	Location ID
AP-MR-01	Tray Input CV	4단 실트레이를 적재할 수 있는 투입 포트로 한 트레이에는 Glass 20장이 담겨 있음	**IP01**
	Tray Output CV	간지, 폐글라스, 빈트레이를 적재하여 배출하는 포트	**OP01**
	Glass&Paper Transfer Unit	Glass, 간지 이재기	**TM01**
	BUFFER CV	Glass 이재기로부터 Glass 를 받아서 USC 로 이동하는 CV	**BF01**
	USC	Ultra Sonic Cleaner	**USC01**

2.1 CEID(Collected Event ID)

2.1.1 CEID LIST(1)

CEID	Event	Description
1001	ControlStateOffline	Equipment control state turn into OFFLINE
1002	ControlStateLocal	Equipment control state turn into ONLINE LOCAL
1003	ControlStateRemote	Equipment control state turn into ONLINE REMOTE
1015	EquipmentConstantChanged	Equipment Constant is changed
1031	AlarmDetected	alarm occurred
1032	AlarmCleared	alarm cleared
1051	EquipmentStateChanged	Equipment State is changed
1061	OperationIDChanged	Events that occur when worker information registered in the HMI is changed
1101	ModuleStart	Glass started operating on module
1102	ModuleEnd	Glass completed operating on module
1201	SubstrateLocationOccupied	Glass loaded into module
1202	SubstrateLocationUnoccupied	Glass ejected into module
1301	WorkStart	Tray의 첫 Glass를 TM01 Arm이 흡착
1311	ProcessStart	Tray의 첫 Glass를 TM01 정위치 이동 완료
1312	ProcessEnd	Tray의 마지막 Glass를 TM01 정위치 이동 완료

2.1 CEID(Collected Event ID)

2.1.1 CEID LIST(2)

CEID	Event	Description
1401	TrayLoadComplete	Tray loaded into input Port
1402	TrayUnloadComplete	Tray loaded into output Port
1403	TrayScrapComplete	Tray Scraped at input Port
1411	TrayIDRead	Tray ID Read
1412	TrayGlassOut	Glass move from Tray To Glass Transfer
1501	PortOutOfService	Port Out Of Service
1502	PortReadyToLoad	Port Ready To Load
1503	PortTransferBolcked	Port Transfer Bolcked (Port loaded Tray)
1504	PortReadyToUnload	Port Ready To Unload
1511	PortStateChange	Port State Change
1601	GlassIDRead	Glass ID Read
1602	GlassScrapComplete	Glass Scrap Complete
1611	GlassStart	Glass loaded into module at USC01
1612	GlassEnd	Glass eject into module at USC01

2.2 EC(Equipment Constant)

2.2.1 EC LIST(1)

ID	Name	Type	Unit	Min	Max	Def	Description
101	EqpName	A		AP-MR-01	AP-MR-01	AP-MR-01	Glass Unpacking Loader Equipment Name
102	SessionID	U2		0	65535	0	HSMS Session ID
103	HsmsLinkTestInterval	U4	sec	10	86400	120	HSMS Link Test Period
104	EstablishCommnucationsTimeout	U4	sec	2	120	10	Timeout for Establish Commnunication Message
105	TimeFormat	U4		0	1	1	0 = 12 bytes format "YYMMDDhhmmss" 1 = 16 bytes format "YYYYMMDDhhmmsscc"
106	T3TimeOut	U4	sec	1	120	45	HSMS T3 Time
107	T5TimeOut	U4	sec	1	240	10	HSMS T5 Time
108	T6TimeOut	U4	sec	1	240	5	HSMS T6 Time
109	T7TimeOut	U4	sec	1	240	10	HSMS T7 Time
110	T8TimeOut	U4	sec	1	240	5	HSMS T8 Time
111	UseS6F1Reply	Bo		false	true	false	true = need S6F1Reply (S6F2)

2.3 SVID(State Variable ID)

2.3.1 SVID LIST(1)

ID	Name	TYPE	Description
200	CommState	U4	0 = Undefined 1 = Disabled 2 = Enabled / Not Communicating 3 = Equipment-Initiated Connect / Wait Delay 4 = Equipment-Initiated Connect / Wait CRA 5 = Host-Initiated Connect / Wait CR from Host 6 = Communicating
201	ControlState	U4	1 = Equipment-Offline 2 = Attempt Online 3 = Host Offline 4 = Online-Local 5 = Online-Remote
202	PreviousControlState	U4	Previous Control state
203	EqpState	U4	1 = Idle 2 = Run 3 = Maintenance 4 = Down
204	PreviousEqpState	U4	Previous Eqp State
205	UserId	A	userId (current)
206	PreviousUserId	A	last userid
210	EventsEnabled	L	L,n n = # of events enabled 1.<CEID_1> … n.<CEID_n>
211	AlarmsEnabled	L	L,n n = # of alarms enabled 1.<ALID_1> … n.<ALID_n>
212	AlarmsSet	L	L,n n = # of alarms setted 1.<ALID_1> … n.<ALID_n>
220	MDLN	A	"Unpacker" Equipment Model Type. Same data as returned by S1,F2
221	SOFTREV	A	Software revision code.

2.3 SVID(State Variable ID)

2.3.1 SVID LIST(2)

ID	Name	TYPE	Description
11001	Temp_Sensor_1	F4	Main Control Panel sensor temperature.
11002	Main_power_voltage	F4	Main power part valtage.
11003	Travel_servo_torque	F4	Travel servo motor torque
11004	Travel_servo_speed	F4	Travel servo motor speed
11005	Hoist#1_servo_torque	F4	Hoist#1 servo motor torque
11006	Hoist#1_servo_speed	F4	Hoist#1 servo motor speed
11007	Hoist#2_servo_torque	F4	Hoist#2 servo motor torque
11008	Hoist#2_servo_speed	F4	Hoist#2 servo motor speed

2.3 SVID(State Variable ID)

2.3.1 SVID LIST(3)

ID	Name	TYPE	Description
20001	IP01_PortTransferState	U2	0 = None 1 = OutOfService 2 = TransferBlocked 3 = ReadyToLoad 4 = ReadyToUnload
20002	IP01_PortState	U2	Port의 사용 여부로 USC/ Arm/ BCR 등의 문제가 발생될 경우 투입을 제어하기 위해 Disable 상태가 될수 있음 0 = Disable / 1 = Enable
20003	IP01_PortType	U2	1 = IN
20004	IP01_TrayID	A	Tray ID for IP01
20011	OP01_PortTransferState	U2	0 = None 1 = OutOfService 2 = TransferBlocked 3 = ReadyToLoad 4 = ReadyToUnload
20012	OP01_PortState	U2	Port의 사용 여부로 USC/ Arm/ BCR 등의 문제가 발생될 경우 투입을 제어하기 위해 Disable 상태가 될수 있음 0 = Disable / 1 = Enable
20013	OP01_PortType	U2	2 = OUT
20014	OP01_TrayID	A	Tray ID for OP01
20101	TM01_GlassID	A	Glass ID for TM01
20102	TM01_PortID	U2	Tray PortID for TM01
20103	TM01_TrayID	A	Tray ID for TM01
20104	TM01_SlotNo	U2	Tray SlotNo for TM01
20105	TM01_LotID	A	LotID for TM01
20201	BF01_GlassID	A	Glass ID for BF01
20202	BF01_PortID	U2	Tray PortID for BF01
20203	BF01_TrayID	A	Tray ID for BF01
20204	BF01_SlotNo	U2	Tray SlotNo for BF01
20205	BF01_LotID	A	LotID for BF01
20301	USC01_GlassID	A	Glass ID for USC01
20302	USC01_PortID	U2	Tray PortID for USC01
20303	USC01_TrayID	A	Tray ID for USC01
20304	USC01_SlotNo	U2	Tray SlotNo for USC01
20305	USC01_LotID	A	LotID for USC01

2.4 Report of Collection Events

2.4.1 DVID LIST(1)

ID	Name	TYPE	Description
301	ALCD	Bi	Alarm code byte
302	ALID	U4	AlarmID of the most recent alarm to change state.
303	ALTX	A	AlarmText of the most recent alarm to change state
304	ECID	U4	Equipment Constant ID
305	ECNAME	A	Equipment Constant Name
306	ECV	Any	Equipment Constant Value
310	ModuleID	A	Substrate Location ID
311	GlassID	A	Substrate ID
312	PortID	U2	Tray Port ID
313	TrayID	A	Tray Carrier ID
314	SlotNo	U2	Tray Slot No
315	IDReadStatus	U2	0 = Success 1 = Failure
316	PortTransferState	U2	1 = OutOfService 2 = TransferBlocked 3 = ReadyToLoad 4 = ReadyToUnload
317	PortState	U2	0 = Disable 1 = Enable
321	WorkID	A	S3F41을 내린 후, S2F41로 WORK_START Command를 내릴 때,
322	PreviousGlassID	A	S3F41로 전송된 Glass ID
323	LotID	A	S3F41로 전송된 Lot ID

2.5 Report of Collection Events

2.5.1 RPTID/CEID/VID List(1)

CEID	RPTID	VID	Contents
1001 1002 1003			**ControlStateOffline**
			ControlStateLocal
			ControlStateRemote
	101	201	ControlState
		202	PreviousControlState
1015			**EquipmentConstantChanged**
	102	304	ECID
		305	ECNAME
		306	ECV
1031 1032			**AlarmDected**
			AlarmCleared
	103	310	ModuleID
		301	ALCD
		302	ALID
		303	ALTX
1051			**EquipmentStateChanged**
	104	203	EqpState
		204	PreviousEqpState
1061			**OperationIDChanged**
	105	205	UserId
		206	PreviousUserId
1101 1102			**ModuleStart**
			ModuleEnd
	106	310	ModuleID
1201 1202			**SubstrateLocationOccupied**
			SubstrateLocationUnoccupied
	107	310	ModuleID
		311	GlassID

2.5 Report of Collection Events

2.5.1 RPTID/CEID/VID List(2)

CEID	RPTID	VID	Contents
1301 1311 1312			**WorkStart**
			ProcessStart
			ProcessEnd
	108	310	ModuleID
		312	PortID
		313	TrayID
		321	WorkID
1401 1402 1403			**TrayLoadComplete**
			TrayUnloadComplete
			TrayScrapComplete
	109	312	PortID
		313	TrayID
1411			**TrayIDRead**
	110	312	PortID
		313	TrayID
		315	IDReadStatus
1412			**TrayGlassOut**
	111	312	PortID
		313	TrayID
		314	SlotNo
		322	PreviousGlassID
		323	LotID

2.5 Report of Collection Events

2.5.1 RPTID/CEID/VID List(3)

CEID	RPTID	VID	Contents
1501 1502 1503 1504			**PortOutOfService**
			PortTransferBolcked
			PortReadyToLoad
			PortReadyToUnload
	112	312	PortID
		316	PortTransferState
1511			**PortStateChange**
	113	312	PortID
		317	PortState
1601			**GlassIDRead**
	114	310	ModuleID
		311	GlassID
		322	PreviousGlassID
		315	IDReadStatus
1602			**GlassScrapComplete**
	115	310	ModuleID
		311	GlassID
1611 1612			**GlassStart**
			GlassEnd
	116	310	ModuleID
		311	GlassID
		312	PortID
		313	TrayID
		314	SlotNo
		323	LotID

3. SECS-II Message Summary

Message	Direction	Description	Note
S*F0	Host ↔ EQ	Abort Transaction	
S1F1	Host ↔ EQ	Are You There Request(R)	
S1F2	Host ↔ EQ	On-Line Data(D)	
S1F3	Host → EQ	Selected equipment status request	
S1F4	Host ← EQ	Selected Equipment status Data	
S1F11	Host → EQ	Status variable name-list request	
S1F12	Host ← EQ	Status Variable name-list reply	
S1F13	Host ↔ EQ	Establish communication request	
S1F14	Host ↔ EQ	Establish communication request Ack	
S1F15	Host → EQ	Request Off-line	
S1F16	Host ← EQ	Request Off-line Acknowledge	
S1F17	Host → EQ	Request On-line	
S1F18	Host ← EQ	Request On-line Acknowledge	
S2F13	Host → EQ	Equipment constant request	
S2F14	Host ← EQ	Equipment constant data	
S2F15	Host → EQ	New equipment constant send	
S2F16	Host ← EQ	New equipment constant Ack	
S2F17	Host ↔ EQ	Date and time request	
S2F18	Host ↔ EQ	Date and time data	
S2F23	Host → EQ	Trace Initialize Send	
S2F24	Host ← EQ	Trace Initialize Acknowledge	
S2F25	Host → EQ	Loop-back diagnostic request	
S2F26	Host ← EQ	Loopback Diagnostic Data	
S2F29	Host → EQ	Equipment constant name-list request	
S2F30	Host ← EQ	Equipment Constant Name-list	
S2F31	Host → EQ	Date and time send	
S2F32	Host ← EQ	Data and Time Set Acknowledge	

3. SECS-II Message Summary

Message	Direction	Description	Note
S2F33	Host → EQ	Define Report	
S2F34	Host ← EQ	Define Report Acknowledge	
S2F35	Host → EQ	Link event report	
S2F36	Host ← EQ	Link event report acknowledge	
S2F37	Host → EQ	Enable/disable event report	
S2F38	Host ← EQ	Enable/disable event report acknowledge	
S2F41	Host → EQ	Host command send	
S2F42	Host ← EQ	Host command acknowledge	
S2F49	Host → EQ	Enhanced Remote Command Extension (ERC)	
S2F50	Host ← EQ	Enhanced Remote Command Ack. (ERCA)	
S5F1	Host ← EQ	Alarm report send	
S5F2	Host → EQ	Alarm report send acknowledge	
S5F3	Host → EQ	Enable/disable alarm send	
S5F4	Host ← EQ	Enable/disable alarm acknowledge	
S5F5	Host → EQ	List alarms request	
S5F6	Host ← EQ	List alarms data	
S5F7	Host → EQ	List enabled alarm request	
S5F8	Host ← EQ	List enabled alarm data	
S6F1	Host ← EQ	Trace Data Send	
S6F2	Host → EQ	Trace Data Acknowledge	
S6F11	Host ← EQ	Event report send	
S6F12	Host → EQ	Event report acknowledge	
S9F1	Host ← EQ	Unrecognized device ID	
S9F3	Host ← EQ	Unrecognized stream type	
S9F5	Host ← EQ	Unrecognized function type	
S9F7	Host ← EQ	Illegal data	
S9F9	Host ← EQ	Transaction timer timeout	
S9F11	Host ← EQ	Data too long	

3. SECS-II Message Summary

Message	Direction	Description	Note
S10F3	H → E	Terminal displaysingle	
S10F4	H ← E	Terminal displaysingle acknowledge	

4. SECS Message Stream & Functions

4.1 Operational Concept

4.1.1 Data Format Length

I1 - Integer 1 Byte : From _128 to +127
I2 - Integer 2 Bytes : From _32,768 to +32,768
I4 - Integer 4 Bytes : From _2,157,483,648 to +2,157,483,648
I8 - Integer 8 Bytes : From _9,223,372,036,854,775,808 to +9,223,372,036,854,775,808
U1 - Unsigned 1 Bytes : From 0 to 255
U2 - Unsigned 2 Bytes : From 0 to 65,535
U4 - Unsigned 4 Bytes : From 0 to 4,294,967,295
U8 - Unsigned 8 Bytes : From 0 to 18,446,744,073,709,551,615
F4 - 4-byte floating point : From -3.40282347E+38F to 3.40282347E+38F
F8 - 8-byte floating point : From -1.7976931348623157E+308 to 1.7976931348623157E+308
Boolean : "False" or "True"

A[자릿수] - ASCII : Ex) a~z, A~Z, 0~9, _, space, (,), etc

4. SECS Message Stream & Functions

4.2 STREAM 1

■ S1, F1 Are You There Request (H ↔ E)

Description
Establishes that the SECS-II link is operational and that the host and machine are online. The machine responds with its model number and software revision. The host responds with a null list. The equipment may use this message when using SECS-I as a "heartbeat" to detect communication failures. The equipment also uses this message in the Control State model when attempting to go online
Structure
Header only

■ S1, F2 On-line Data (H ← E)

Structure		
L , 2 1. <A MDLN> 2. <A SOFTREV>		
Dictionary		
MDLN	Equipment ModelType, 6bytes max	Same data as returned by S1, F2
SOFTREV	Software revision code 6 bytes maximum	

■ S1, F2 On-line Data (H → E)

Structure
L , 0

■ S1, F3 Selected Equipment Status Request (H → E)

Structure		
L , n 1. <U4 SVID> … n. <U4 SVID>		
Dictionary		
SVID	Status variable ID	Status variables may include any parameter that can be sampled in time such as temperature or quantity of a consumable.

4. SECS Message Stream & Functions

■ S1, F4 Selected Equipment Status Data(H ← E)

Structure		
L , n 1. <* SV> n. <* SV>		
Note		
A zero-length U1 for SV means that the SVID does not exist.		
Dictionary		
SV	Status variable value	

■ S1, F11 Status Variable Namelist Request ((H → E)

Description		
A request from the host to the machine to report the name and units of certain status variables, in the order requested.		
Structure		
L , n 1. <U4 SVID> … n. <U4 SVID>		
Dictionary		
SVID	Status variable ID	Status variables may include any parameter that can be sampled in time such as temperature or quantity of a consumable.

4. SECS Message Stream & Functions

■ S1, F12 Status Variable Namelist Reply(H ← E)

Structure		
L , n 1. L , 3 1. <U4 SVID> 2. <A SVNAME> 3. <A UNITS> … n. L , 3 1. <U4 SVID> 2. <A SVNAME> 3. <A UNITS>		
Dictionary		
SVID	Status variable ID	Status variables may include any parameter that can be sampled in time such as temperature or quantity of a consumable.
SVNAME	Status Variable Name	
UNITS	Units Identifier	As allowed by SEMI E5 Section 12.

■ S1, F13 Establish Communications Request(H ↔ E)

Structure
L , 0

■ S1, F14 Establish Communications Request Acknowledge(H ↔ E)

Structure		
L , 2 1. <Bi COMMACK> 2. L , 0		
Dictionary		
COMMACK	Establish Communications Acknowledge Code, 1 byte	0 = Accepted 1 = Denied, Try Again 2-63 Reserved

4. SECS Message Stream & Functions

■ S1, F13 Establish Communications Request(H ↔ E)

Description		
Initiate an attempt to establish a SECS-II communications link at a logical level on power-up or after a break in the link. It is the first message sent after either of the above conditions. If no response is received from the host, the machine will periodically send a S1F13 message until a S1F14 with the correct COMMACK is received.		
Structure		
L , 2 1. <A MDLN> 2. <A SOFTREV>		
Dictionary		
MDLN	Equipment ModelType, 6bytes max	Same data as returned by S1, F2
SOFTREV	Software revision code 6 bytes maximum	

■ S1, F14 Establish Communications Request Acknowledge(H ↔ E)

Structure		
L , 2 1. <Bi COMMACK> 2. L , 2 1. <A MDLN> 2. <A SOFTREV>		
Dictionary		
COMMACK	Establish Communications Acknowledge Code, 1 byte	0 = Accepted 1 = Denied, Try Again 2-63 Reserved
MDLN	Equipment ModelType, 6bytes max	Same data as returned by S1, F2
SOFTREV	Software revision code 6 bytes maximum	

4. SECS Message Stream & Functions

■ S1, F15 Off-line Control State Request(H → E)

Description
The host requests that the equipment transition to the OFF-LINE state.
Structure
Header only

■ S1, F16 Off-line Control State Acknowledge(H ← E)

Structure		
1. <Bi OFLACK>		
Dictionary		
COMMACK	Establish Communications Acknowledge Code, 1 byte	0 = Accepted 1 = Denied, Try Again 2-63 Reserved

■ S1, F17 On-line Control State Request(H → E)

Description
The host requests that the equipment transition to the ON-LINE state.
Structure
Header only

■ S1, F18 On-line Control State Acknowledge(H ← E)

Structure		
1. <Bi OFLACK>		
Dictionary		
COMMACK	Establish Communications Acknowledge Code, 1 byte	0 = Accepted 1 = Denied, Try Again 2-63 Reserved

4. SECS Message Stream & Functions

4.3 STREAM 2

■ S2, F13 Equipment Constant Request (H → E)

Description		
A request from the host to report the value of certain equipment constants in a predefined order.		
Structure		
L , N 1. <U4 ECID> … n. <U4 ECID>		
Dictionary		
ECID	Equipment Constant ID	

■ S2, F14 Equipment Constant Data(H ← E)

Structure		
L , N 1. <* ECV> … n. <* ECV>		
Dictionary		
ECV	Equipment Constant Value	

■ S2, F15 New Equipment Constant Send (H → E)

Description		
Host updates the values of specified EC. If the host returns a non-zero EAC the equipment will not change the value of any ECID specified in the S2F15 body.		
Structure		
L , n 2. L , 2 <U4 ECID> <* ECV> … n. L , 2 <U4 ECID> <* ECV>		
Dictionary		
ECID	Equipment Constant ID	
ECV	Equipment Constant Value	

4. SECS Message Stream & Functions

■ S2, F16 New Equipment Constant Acknowledge (H ← E)

Structure		
<Bi EAC>		
Dictionary		
EAC	Equipment acknowledge code, 1 byte	0 = Acknowledge 1 = Denied. At least one constant does not exist 2 = Denied. Busy 3 = Denied. At least one constant out of range >3 = Other equipment-specific error 4-63 Reserved

■ S2, F17 Date and Time Request (H ↔ E)

Description
The host requests that the equipment transition to the OFF-LINE state.
Structure
Header only

■ S2, F18 Date and Time Data (H ↔ E)

Structure		
<A TIME>		
Note		
A zero-length item means no time exists.		
Dictionary		
TIME	Time of day, 12 or 16 bytes NOTE 4: The 16-byte format is currently optional. After January 1, 1998, the 16-byte format shall be required on new and updated implementations. Support for the 12-byte format shall be supported as a configurable option using the equipment constant TimeFormat. This is a format requirement only and does not imply either precision or accuracy.	If 12 bytes the format is YYMMDDhhmmss YY = Year 00 to 99 MM = Month 01 to 12 DD = Day 01 to 31 hh = Hour 00 to 23 mm = Minute 00 to 59 ss = Second 00 to 59 If 16 bytes the format is YYYYMMDDhhmmsscc YYYY = Year 0000 to 9999 MM = Month 01 to 12 DD = Day 01 to 31 hh = Hour 00 to 23 mm = Minute 00 to 59 ss = Second 00 to 59 cc = Centisecond 00 to 99

4. SECS Message Stream & Functions

■ S2, F23 Trace Initialize Send (H → E)

Description		
The host requests a time driven trace of specified status variables. If TOTSMP is zero, the machine will cancel an existing trace with the given TRID.		
Structure		
L , 5 1. <U4 TRID> 2. <A DSPER> 3. <U4 TOTSMP> 4. <U4 REPGSZ> 5. L , N 1. <U4 SVID> … 1. <U4 SVID>		
Dictionary		
TRID	Trace request ID	
DSPER	Data sample period. DSPER has two allowable formats:	Format 1: hhmmss, 6 bytes Format 2: hhmmsscc, 8 bytes Where “hh” is hours, “mm” is minutes, “ss” is seconds’ and “cc” is centiseconds. Equipment shall either (1) support only Format 1, or (2) support both Format 1 and Format 2. Equipment shall document which formats it accepts. Equipment which supports Format 2 need not necessarily support a minimum DSPER of 1 centisecond, nor a trace resolution of 1 centisecond, but equipment suppliers shall document its trace performance limits.
TOTSMP	Total samples to be made	
REPGSZ	Reporting group size	
SVID	Status variable ID	Status variables may include any parameter that can be sampled in time such as temperature or quantity of a consumable.

■ S2, F24 Trace Initialize Acknowledge (H ← E)

Structure		
<Bi TIAACK>		
Dictionary		
TIAACK	Equipment acknowledgement code, 1 byte	0 = Everything correct 1 = Too many SVIDs 2 = No more traces allowed 3 = Invalid period >3 = Equipment-specified error 4-63 Reserved

4. SECS Message Stream & Functions

■ S2, F25 Loop-back Diagnostic Request (H ↔ E)

Description		
A diagnostic message for checkout of protocol and communication circuits. The message sent is echoed back.		
Structure		
<* ABS>		
Dictionary		
ABS	Any binary string	

■ S2, F26 Loop-back Diagnostic Data (H ↔ E)

Structure		
<** ABS>		
Dictionary		
ABS	Any binary string	

■ S2, F29 Equipment Constant Name list Request (H → E)

Description		
A request from the host to the equipment to retrieve information regarding the specified equipment constants. A zero length list (n = 0) means to send information for all ECID.		
Structure		
L , n 1. <U4 ECID> … n. <U4 ECID>		
Dictionary		
ECID	Equipment Constant ID	

4. SECS Message Stream & Functions

■ S2, F30 Equipment Constant Name list (H ← E)

Structure

```
L , n
        1.  L , 6
                1.  <U4  ECID>
                2.  <A  ECNAME>
                3.  <*  ECMIN>
                4.  <*  ECMAX>
                5.  <*  ECDEF>
                6.  <A  UNITS>
        …
        n.  L , 6
                1.  <U4  ECID>
                2.  <A  ECNAME>
                3.  <*  ECMIN>
                4.  <*  ECMAX>
                5.  <*  ECDEF>
                6.  <A  UNITS>
```

Note

Zero length ASCII items for ECNAME, ECMIN, ECMAX, ECDEF and UNITS indicates that the ECID does not exist.

Dictionary

ECID	Equipment Constant ID	
ECNAME	Equipment constant name	
ECMIN	Equipment constant minimum value	
ECMAX	Equipment constant maximum value	
ECDEF	Equipment constant default value	
UNITS	Units Identifier	As allowed by SEMI E5 Section 12.

4. SECS Message Stream & Functions

■ S2, F31 Date and Time Set Request (H → E)

Description		
The host instructs the equipment to set its time base to the specified value.		
Structure		
<A TIME>		
Dictionary		
TIME	Time of day, 12 or 16 bytes NOTE 4: The 16-byte format is currently optional. After January 1, 1998, the 16-byte format shall be required on new and updated implementations. Support for the 12-byte format shall be supported as a configurable option using the equipment constant TimeFormat. This is a format requirement only and does not imply either precision or accuracy.	If 12 bytes the format is YYMMDDhhmmss YY = Year 00 to 99 MM = Month 01 to 12 DD = Day 01 to 31 hh = Hour 00 to 23 mm = Minute 00 to 59 ss = Second 00 to 59 If 16 bytes the format is YYYYMMDDhhmmsscc YYYY = Year 0000 to 9999 MM = Month 01 to 12 DD = Day 01 to 31 hh = Hour 00 to 23 mm = Minute 00 to 59 ss = Second 00 to 59 cc = Centisecond 00 to 99

■ S2,F32 Date and Time Set Acknowledge (H ← E)

Structure		
<Bi TIACK>		
Dictionary		
TIAACK	Equipment acknowledgement code, 1 byte	0 = Everything correct 1 = Too many SVIDs 2 = No more traces allowed 3 = Invalid period >3 = Equipment-specified error 4-63 Reserved

4. SECS Message Stream & Functions

■ S2, F33 Define Report (H → E)

Structure
L , 2 1. <U4 DATAID> 2. L , a 1. L , 2 1. <U4 RPTID> 2. L , b 1. <U4 VID> … b. <U4 VID> … a. L , 2 1. <U4 RPTID> 2. L , c 1. <U4 VID> … c. <U4 VID>
Note
A zero-length list following DATAID deletes all report definitions and associated links. See S2, F35. A zero-length list following RPTID deletes report type RPTID. All CEID links to this RPTID are also deleted.

Dictionary		
DATAID	Data ID	
RPTID	Report ID	
VID	Variable ID	

■ S2, F34 Define Report Acknowledge (H ← E)

Structure		
<Bi DRACK>		
Dictionary		
DRACK	Define Report Acknowledge Code, 1 byte	0 = Accept 1 = Denied. Insufficient space 2 = Denied. Invalid format 3 = Denied. At least one RPTID already defined 4 = Denied. At least VID does not exist >4 = Other errors 5-63 Reserved

4. SECS Message Stream & Functions

■ S2, F35 Link Event Report (H → E)

Description		
The host links Report IDs (RPTID) to Collection event IDs (CEID). These linked event reports default to "disabled" upon linking. That is, the occurrence of an event would not cause the report to be sent until enabled. See S2, F37 for enabling events.		
Structure		
L , 2 1. <U4 DATAID> 2. L , a 1. L , 2 1. <U4 CEID> 2. L , b 1. <U4 RPTID> … b. <U4 RPTID> … a. L , 2 1. <U4 CEID> 2. L , c 1. <U4 RPTID> … c. <U4 RPTID>		
Note		
A zero-length list following CEID deletes all report links to that event.		
Dictionary		
DATAID	Data ID	
CEID	Collected event ID	
RPTID	Report ID	

■ S2, F36 Link Event Report Acknowledge (H ← E)

Structure		
<Bi DRACK>		
Dictionary		
DRACK	Define Report Acknowledge Code, 1 byte	0 = Accept 1 = Denied. Insufficient space 2 = Denied. Invalid format 3 = Denied. At least one RPTID already defined 4 = Denied. At least VID does not exist >4 = Other errors 5-63 Reserved

4. SECS Message Stream & Functions

■ S2, F37 Enable/Disable Event Report (H → E)

Description		
Host requests to enable or disable reporting for a list of Collection events (CEID).		
Structure		
L , 2 1. <Bo CEED> 2. L , n 1. <U4 CEID> … n. <U4 CEID>		
Note		
A zero-length list (n = 0) means all CEID.		
Dictionary		
CEED	Collection event or trace enable/disable code, 1 byte	FALSE = Disable TRUE = Enable
CEID	Collected event ID	

■ S2, F38 Enable/Disable Event Report Acknowledge (H ← E)

Structure		
<Bi ERACK>		
Dictionary		
ERACK	Enable/Disable Event Report Acknowledge Code, 1 byte	0 = Accepted 1 = Denied. At least one CEID does not exist >1 = Other Errors 2-63 Reserved

4. SECS Message Stream & Functions

■ S2, F41 Host Command Send(H → E)

Description		
The host sends a request to the equipment to perform the specified command with the relevant parameters.		
Structure		
L 2 1. <A RCMD> 2. L , 1 1. L , 2 1. <A CPNAME> 2. <A CPVAL>		
Dictionary		
RCMD	Remote command code or string	
CPNAME	Parameter name	
CPVAL	Command Parameter Value.	

4. SECS Message Stream & Functions

■ S2, F42 Host Command Acknowledge (H ← E)

Structure		
L , 2 1. <Bi HCACK> 2. L , n 1. L , 2 1. <A CPNAME> 2. <* CEPACK> … n. L , 2 1. <A CPNAME> 2. <* CEPACK>		
Dictionary		
HCACK	Host Command Parameter Acknowledge Code, 1 byte	0 = Acknowledge, command has been performed 1 = Command does not exist 2 = Cannot perform now 3 = At least one parameter is invalid 4 = Acknowledge, command will be performed with completion signaled later by an event 5 = Rejected, Already in Desired Condition 6 = No such object exists 7-63 Reserved
CPNAME	Recipe name	
CEPACK	Command Enhanced Parameter cknowledge. If a specific value of CPNAME is defined to have a CEPVAL that is a LIST, then CEPACK shall have the same structure as the corresponding list format of CEPVAL as used in S2,F49. Otherwise CEPACK will be a 1 byte integer. Enumerated:	0 = No error 1 = Parameter name (CPNAME) does not exist 2 = Illegal value specified for CEPVAL 3 = Illegal format specified for CEPVAL 4 = Parameter name (CPNAME) not valid as used 5-63 Reserved

4. SECS Message Stream & Functions

■ S2, F49 Enhanced Remote Command Extension (ERC) (H → E)

Description		
The host requests an object to perform the specified remote command with its parameters		
Structure		
L 4 1. <A DATAID> 2. <A OBJSPEC> 3. <A RCMD> 4. L , n # of Parameter Groups 1. L , 2 1. <A CPNAME> 2. <CEPVAL> 2. L , 2 1. <A CPNAME> 2. <CEPVAL> : : n. L , 2 1. <A CPNAME> 2. <CEPVAL>		
Dictionary		
DATAID	Data ID	
OBJSPEC	A text string that has an internal format and that is used to point to a specific object instance. The string is formed out of a sequence of formatted substrings, each specifying an object's type and identifier. The substring format has the following four fields: object type, colon character ':', object identifier, greater-than symbol '>' where the colon character ':' is used to terminate an object type and the greater than symbol '>' is used to terminate an identifier field. The object type field may be omitted where it may be otherwise determined. The final '>' is optional.	
RCMD	Remote command code or string	
CPNAME	Parameter name	
CEPVAL	Command Parameter Value.	

4. SECS Message Stream & Functions

■ S2, F50 Enhanced Remote Command Ack. (ERCA) (H ← E)

Structure		
L , 2 1. <Bi HCACK> 2. L , n # of Parameter Groups 1. L , 2 1. <A CPNAME> 2. <* CEPACK> : : n. L , 2 1. <A CPNAME> 2. <* CEPACK>		
Dictionary		
HCACK	Host Command Parameter Acknowledge Code, 1 byte	0 = Acknowledge, command has been performed 1 = Command does not exist 2 = Cannot perform now 3 = At least one parameter is invalid 4 = Acknowledge, command will be performed with completion signaled later by an event 5 = Rejected, Already in Desired Condition 6 = No such object exists 7-63 Reserved
CPNAME	Recipe name	
CEPACK	Command Enhanced Parameter cknowledge. If a specific value of CPNAME is defined to have a CEPVAL that is a LIST, then CEPACK shall have the same structure as the corresponding list format of CEPVAL as used in S2,F49. Otherwise CEPACK will be a 1 byte integer. Enumerated:	0 = No error 1 = Parameter name (CPNAME) does not exist 2 = Illegal value specified for CEPVAL 3 = Illegal format specified for CEPVAL 4 = Parameter name (CPNAME) not valid as used 5-63 Reserved

4. SECS Message Stream & Functions

4.4 STREAM 3

■ S3, F41 Work Order Request (H → E)

Description
host에서 work관련 모든 정보 message

Structure

```
L , 3
 1.  <A  'WorkOrder'>
 2.  <A  EQPID>
 3.  <L [1]
      1.  <L [2]
           1.  <A [1] '0'>  ---------- job 순서
           2.  <L [1]
                1.  <L [6]
                     1.  <L [2]
                          1.  <A [10] 'sorterType'>  ---------- sorter 종류
                          2.  <A>
                         >
                     2.  <L [2]
                          1. <A [8] 'inPortId'>
                          2. <A [1] '1'>   ---------- in port id
                         >
                     3.  <L [2]
                          1. <A [8] 'inCarrId'>
                          2. <A [6] 'CST022'>   ---------- in carrier id
                         >
                     4.  <L [2]
                          1. <A [9] outPortId'>
                          2. <A [1] '2'>   ---------- out port id
                         >
                     5.  <L [2]
                          1. <A [9] outCarrId'>
                          2. <A [6] 'CST011'>   ---------- out carrier id
                         >
                     6.  <L [1]
                          1. <L [2]
                             1.  <L [2]
                                  1.  <A [4] 'PPID'>
                                  2.  <A [6] 'RCP001'>   ---------- ppid
                                 >
                             2.  <L [2]
                                  1.  <A  'SLOT_DATA'>   ---------- slot정보(slot count로 list구성)
                                  2.  <L [n] slot count
                                     1.  <L [7]
                                        1.  <L [2]
                                           1.  <A [12] 'inCarrSlotNo'>
                                           2.  <A [1] '6'>   ---------- in carrier slotno
                                            >
```

4. SECS Message Stream & Functions

```
                2.  <L [2]
                    1.  <A [10] 'manualInsp'>
                    2.  <A [1] 'N'>   ---------- 자주검사여부
                     >
                3.  <L [2]
                    1.  <A [10] 'prodMtrlId'>
                    2.  <A [9] 'GLASS_006'>   ---------- glass id
                     >
                4.  <L [2]
                    1.  <A [9] 'slotState'>
                    2. <A [1] '1'>   ---------- slot state
                     >
                 5.  <L [2]
                    1. <A [13] 'outCarrSlotNo'>
                    2. <A [1] '6'>   ---------- out carrier slotno
                     >
                 6.  <L [2]
                    1.  <A [5] 'lotId'>
                    2.  <A [13] 'LOT_230217005'>   ---------- lot id
                     >
                  7.  <L [2]
                    1.  <A [8] 'mtrlFace'>
                    2.  <A [3] 'TBT'>   ---------- top/bottom여부(TTT:top, TBT:bottom)
                      >
                   >
                 >
               >
             >
           >
         >
       >
     >
   >
 >
```

Dictionary		
EQPID	장비아이디	'AP-MR-01'
slot count	Tray 1개 당 Glass 20개	

■ S3, F42 Work Order Request Acknowledge (H ← E)

Structure		
<Bi ACKC5>		
Dictionary		
ACKC5	Acknowledge code, 1 byte	0 = Accepted >0 = Error, not accepted 1-63 Reserved

4. SECS Message Stream & Functions

4.5 STREAM 5

■ S5, F1 Alarm Report Send (H ← E)

Description		
This message is sent whenever an alarm changes states to "Set" or "Clear"		
Structure		
L , 3 1. <Bi ALCD> 2. <U4 ALID> 3. <A ALTX>		
Dictionary		
ALCD	Alarm code byte	bit 8 = 1 means alarm set bit 8 = 0 means alarm cleared bit 7-1 is alarm category 0 = Not used 1 = Personal safety 2 = Equipment safety 3 = Parameter control warning 4 = Parameter control error 5 = Irrecoverable error 6 = Equipment status warning 7 = Attention flags 8 = Data integrity >8 = Other categories
ALID	Alarm identification	
ALTX	Alarm text limited to 40 characters	

■ S5, F2 Alarm Report Acknowledge (H → E)

Structure		
<Bi ACKC5>		
Dictionary		
ACKC5	Acknowledge code, 1 byte	0 = Accepted >0 = Error, not accepted 1-63 Reserved

4. SECS Message Stream & Functions

■ S5, F3 Enable/Disable Alarm Send (H → E)

Description		
This message enables or disables an alarm from being reported to the host. Some alarms (safety related) are not controllable in this way.		
Structure		
L , 2 1. <Bi ALED> 2. <U4 ALID>		
Dictionary		
ALED	Alarm enable/disable code, 1 byte	bit 8 = 1 means enable alarm bit 8 = 0 means disable alarm
ALID	Alarm identification	

■ S5, F4 Enable/Disable Alarm Acknowledge (H ← E)

Structure		
<Bi ACKC5>		
Dictionary		
ACKC5	Acknowledge code, 1 byte	0 = Accepted >0 = Error, not accepted 1-63 Reserved

4. SECS Message Stream & Functions

■ S5, F5 List Alarms Request (H → E)

Description		
The host requests the equipment to send information on currently defined alarms.		
Structure		
<U4 ALID1, . . ., ALIDn>		
Note		
A zero-length item (n = 0) means send all possible alarms regardless of the state of ALED.		
Dictionary		
ALID	Alarm identification	

■ S5, F6 List Alarms Data (H ← E)

Structure		
L , m 1. L , 3 1. <Bi ALCD> 2. <U4 ALID> 3. <A ALTX> … m. L , 3 1. <Bi ALCD> 2. <U4 ALID> 3. <A ALTX>		
Note		
If m = 0, no response can be made. A zero-length item returned for ALCD or ALTX means that value does not exist.		
Dictionary		
ALCD	Alarm code byte	bit 8 = 1 means alarm set bit 8 = 0 means alarm cleared bit 7-1 is alarm category 0 = Not used 1 = Personal safety 2 = Equipment safety 3 = Parameter control warning 4 = Parameter control error 5 = Irrecoverable error 6 = Equipment status warning 7 = Attention flags 8 = Data integrity >8 = Other categories
ALID	Alarm identification	
ALTX	Alarm text limited to 40 characters	

4. SECS Message Stream & Functions

■ S5, F7 List Alarms Request (H → E)

Description
List alarms which are enabled.
Structure
Header only

■ S5, F8 List Alarms Data (H ← E)

Structure		
L , m 1. L , 3 1. <Bi ALCD> 2. <U4 ALID> 3. <A ALTX> … m. L , 3 1. <Bi ALCD> 2. <U4 ALID> 3. <A ALTX>		
Note		
If m = 0, no response can be made. A zero-length item returned for ALCD or ALTX means that value does not exist.		
Dictionary		
ALCD	Alarm code byte	bit 8 = 1 means alarm set bit 8 = 0 means alarm cleared bit 7-1 is alarm category 0 = Not used 1 = Personal safety 2 = Equipment safety 3 = Parameter control warning 4 = Parameter control error 5 = Irrecoverable error 6 = Equipment status warning 7 = Attention flags 8 = Data integrity >8 = Other categories
ALID	Alarm identification	
ALTX	Alarm text limited to 40 characters	

4. SECS Message Stream & Functions

4.6 STREAM 6

■ S6, F1 Trace Data Send (H ← E)

Description		
Trace Samples configured with S2, F23 messages are sent to the host in these messages.		
Structure		
L , 4 1. <U4 TRID> 2. <U4 SMPLN> 3. <A STIME> L, n 1. <* SV> … n. <* SV>		
Dictionary		
TRID	Trace request ID	
SMPLN	Sample number	
STIME	Sample time, 12 or 16 bytes. NOTE 3: The 16-byte format is currently optional. After January 1, 1998, the 16-byte format shall be required on new and updated implementations. Support for the 12-byte format shall be supported as a onfigurable option using the equipment constant TimeFormat. This is a format requirement only and does not imply either precision or accuracy.	If 12 bytes the format is YYMMDDhhmmss YY = Year 00 to 99 MM = Month 01 to 12 DD = Day 01 to 31 hh = Hour 00 to 23 mm = Minute 00 to 59 ss = Second 00 to 59 If 16 bytes the format is YYYYMMDDhhmmsscc YYYY = Year 0000 to 9999 MM = Month 01 to 12 DD = Day 01 to 31 hh = Hour 00 to 23 mm = Minute 00 to 59 ss = Second 00 to 59 cc = Centisecond 00 to 99
SV	Status variable value	

■ S6, F2 Trace Data Acknowledge (H → E)

Structure		
<Bi ACKC6>		
Dictionary		
ACKC6	Acknowledge code, 1 byte	0 = Accepted >0 = Error, not accepted 1-63 Reserved

4. SECS Message Stream & Functions

■ S6, F11 Event Report Send (H ← E)

Description
The machine sends a defined, event linked and enabled group of reports to the host on a linked event. This is a message that possibly requires a preceding S6, F5/F6 multiblock enquire/grant transaction.
Structure
L , 3 1. <U4 DATAID> 2. <U4 CEID> 3. L , a 1. L , 2 1. <U4 RPTID> 2. L , b 1. <*V> … b. <*V> … a. L , 2 1. <U4 RPTID> 2. L , c 1. <*V> … c. <*V>
Note
If there are no reports linked to the event a "null" report is assumed. A zero-length list for # of reports (a = 0) means there are no reports linked to the given CEID.

Dictionary		
DATAID	Data ID	
CEID	Collected event ID	
RPTID	Report ID	
V	Variable data	

■ S6, F12 Event Report Acknowledge (H → E)

Structure		
<Bi ACKC6>		
Dictionary		
ACKC6	Acknowledge code, 1 byte	0 = Accepted >0 = Error, not accepted 1-63 Reserved

4. SECS Message Stream & Functions

4.7 STREAM 9

■ S9, F1 Unrecognized Device ID (H ← E)

Description		
Device ID specified in block header is not defined in the machine.		
Structure		
<Bi MHEAD>		
Dictionary		
MHEAD	SECS message block header associated with message block in error	

■ S9, F3 Unrecognized Stream Type (H ← E)

Description		
Machine does not recognize the stream type in the message block header.		
Structure		
<Bi MHEAD>		
Dictionary		
MHEAD	SECS message block header associated with message block in error	

■ S9, F5 Unrecognized Function Type (H ← E)

Description		
Machine does not recognize the stream type in the message block header.		
Structure		
<Bi MHEAD>		
Dictionary		
MHEAD	SECS message block header associated with message block in error	

4. SECS Message Stream & Functions

■ S9, F7 Illegal Data (H ← E)

Description		
This error signifies that the stream and function were correctly interpreted but the associated data was not.		
Structure		
<Bi MHEAD>		
Dictionary		
MHEAD	SECS message block header associated with message block in error	

■ S9, F9 Transaction Timer Timeout (H ← E)

Description		
This error specifies that a transaction / receive timer has timed out and the transaction aborted. The host system should respond to this message in a suitable manner to keep the system operational		
Structure		
<Bi MHEAD>		
Dictionary		
MHEAD	SECS message block header associated with message block in error	

■ S9, F11 Data Too Long (H ← E)

Description		
The machine has been sent more data than it can handle.		
Structure		
<Bi MHEAD>		
Dictionary		
MHEAD	SECS message block header associated with message block in error	

4. SECS Message Stream & Functions

4.8 STREAM 10

■ S10, F3 Terminal Display (Single) (H → E)

Description		
The host requests a text message be displayed on the machine.		
Structure		
L , 2 1. <Bi TID> 2. <A TEXT>		
Dictionary		
TID	Terminal number, 1 byte	0 = Single or main terminal >0 = Additional terminals at the same equipment
TEXT	A single line of characters	

■ S10, F4 Terminal Display (Single) Acknowledge (H ← E)

Structure		
<Bi ACKC10>		
Dictionary		
ACKC10	Acknowledge Code, 1 byte	0 = Accepted for display 1 = Message will not be displayed 2 = Terminal not available 3-63 Reserved

5. SCENARIO

5.1 Message Scenario

■ Host Attempts to Establish Communications

Comment	Host	Equipment	Comment
Establish Communications	S1, F13 →		
			Communications state is enabled (any substate)
		← S1, F14	Reply COMMACK = Accept and Communications state = COMMUNICATING

■ Equipment Attempts To Establish Communications and Host Acknowledges

Comment	Host	Equipment	Comment
			Communications State = NOT COMMUNICATING
		← S1, F13	[LOOP] [LOOP] -- SEND Establish Communications Request
Establish Communications Acknowledge	S1, F14 →		[IF] S1, F14 received without timeouts [THEN] exit loop -- SEND [ELSE] Delay for interval in EstablishCommunications Timeout [ENDIF] [END_LOOP]--SEND [IF] COMMACK = Accept [THEN] Communications state = Communicating exit loop -- [ELSE] Reset timer for delay, and delay for interval specified in EstablishCommunications Timeout [ENDIF] [END_LOOP]

5. SCENARIO

■ Equipment Receives S1, F14 From Host Before Sending S1, F14

Comment	Host	Equipment	Comment
			Communications State = NOT COMMUNICATING
		← S1, F13	Establish Communications Request
Establish Communications Request	S1, F13 →		
Reply COMMACK = Accept	S1, F14 →		S1, F14 received from Host and Communications established* and Communications state = COMMUNICATING
		← S1, F14	Reply COMMACK = Accept*

■ Equipment Sends S1, F14 To Host Before Receiving S1, F14

Comment	Host	Equipment	Comment
			Communications State = NOT COMMUNICATING
		← S1, F13	Establish Communications Request
Establish Communications Request	S1, F13 →		
Reply COMMACK = Accept		← S1, F14	Reply COMMACK = Accept* Communications established** and Communications state = COMMUNICATING
	S1, F14 →		S1, F14 received from Host

5. SCENARIO

■ Collection Event Reporting Set-up

Comment	Host	Equipment	Comment
Send report definitions	S2, F33 →		DATAIDs, RPTIDs and VIDs received
		← S2, F34	DRACK* = 0 the reports are OK
[ENDIF]			
Link reports to events	S2, F35 →		CEIDs and the corresponding RPTIDs are received
		← S2, F36	LRACK = 0 the event linkages are acceptable.
Enable specific collection events	S2, F37 →		Enable/disable codes (CEEDs) and the respective event reporting CEIDs received.
		← S2, F38	ERACK = 0 OK, will generate the specified reports when the appropriate collection events happen.

5. SCENARIO

■ Request Equipment Status Report

Comment	Host	Equipment	Comment
Host requests report of selected status variable values.	S1, F3 →		
		← S1, F4	Equipment responds with the requested status variable data.

■ Request Equipment Status Variable Namelist

Comment	Host	Equipment	Comment
Host requests equipment to identify selected status variables.	S1, F11 →		
		← S1, F12	Equipment responds with the requested status variable descriptions.

5. SCENARIO

■ Enable/Disable Alarms

Comment	Host	Equipment	Comment
Enable/Disable Alarm	S5, F3 →		
		← S5, F4	Acknowledge

■ Enable/Disable Alarms

Comment	Host	Equipment	Comment
Request alarm data/text	S5, F5 →		
		← S5, F6	Send alarm data/text

■ Enable/Disable Alarms

Comment	Host	Equipment	Comment
Request enabled alarms	S5, F7 →		
		← S5, F8	Send alarm data/text

■ Send Alarm Report

Comment	Host	Equipment	Comment
		← S5, F1	Send alarm report (if enabled)
Acknowledge	S5, F2 →		
		← S6, F11	Send event report (if enabled)
Acknowledge	S6, F12 →		

5. SCENARIO

■ Host sends a remote command message

Comment	Host	Equipment	Comment
Host Command Send	S2, F41 →		Remote Command Message
		← S2, F42	Host Command Acknowledge
		← S6, F11	[IF] Command Accepted (HCACK = 0 or 4) [THEN] State change or other collection event Occurrence
Event Report Acknowledge	S6, F12 →		

■ Host sends a remote command message

Comment	Host	Equipment	Comment
Host sends equip-ment constants.	S2, F15 →		
		← S2, F16	EAC = 0 equipment sets constants

■ Host Equipment Constants Request

Comment	Host	Equipment	Comment
Host constant request	S2, F13 →		
		← S2, F14	Equipment constant data, see note below

5. SCENARIO

■ Host Equipment Constant Namelist Request

Comment	Host	Equipment	Comment
Host constant namelist request	S2, F29 →		
		← S2, F30	Equipment

■ Operator Changes Equipment Constant

Comment	Host	Equipment	Comment
			Operator changes equipment constant at equipment operator console.
		← S6, F11	Equipment reports equipment constant change.
Host acknowledges event	S6, F12 →		

■ Material Movement

Comment	Host	Equipment	Comment
			Material is sent or received at an equipment port.
		← S6, F11	Send Collection event to host
Host acknowledges	S6, F12 →		

5. SCENARIO

■ Terminal Services

Comment	Host	Equipment	Comment
Host sends textual information to equipment for display to the operator on terminal x.	S10, F3 →		
		← S10, F4	Equipment acknowledges request to display text (equipment sets unrecognized message indicator).
			Operator indicates message recognition (equipment clears unrecognized message indicator).
		← S6, F11	Message recognition event. (see Event Data Collection for details).
Host acknowledges Optional:	S6, F12 →		

5. SCENARIO

Comment	Host	Equipment	Comment
Host sends textual information to equipment for display to the operator on terminal x.	S10, F3 →		
		← S10, F4	Equipment acknowledges request to display text (equipment sets unrecognized message indicator).
Host sends textual information to equipment for display to the operator on ter-minal x. This message overwrites the first one sent by the host since it is still unrecognized.	S10, F3 →		
		← S10, F4	Equipment acknowledges request to display text (equipment sets unrecognized message indicator).
			Operator indicates message recognition. (Equipment clears unrecognized message indicator).
		← S6, F11	Message recognition event
Host acknowledges	S6, F12 →		

5. SCENARIO

■ Equipment Requests TIME (Optional Scenario)

Comment	Host	Equipment	Comment
		← S2, F17	Equipment requests a time value from the host.
Host responds with a TIME value	S2, F18 →		Equipment sets its internal time reference to the value of TIME received from the host.

■ Host Instructs Equipment to Set Time

Comment	Host	Equipment	Comment
Host instructs equip-ment to set its time.	S2, F31 →		
		← S2, F32	The equipment sets its internal time reference to the value of TIME received from the host and acknowledges completion.

■ Host Requests Equipment's Current Time Value

Comment	Host	Equipment	Comment
Host requests equipment time..	S2, F17 →		
		← S2, F18	Equipment returns its internal time reference value to the host.

5. SCENARIO

■ Host Accepts ON-LINE

Comment	Host	Equipment	Comment
			Operator actuates ON-LINE switch when equipment OFF_LINE state is active.
		← S1, F1	Equipment request ON-LINE.
Host grants ON-LINE	S1, F2 →		
		← S6, F11	"Control State LOCAL (or REMOTE)" collection event.
Acknowledge	S6, F12 →		

■ Host Denies ON-LINE

Comment	Host	Equipment	Comment
			Operator actuates ONLINE switch when equipment OFF_LINE state is active.
		← S1, F1	Equipment requests ON-LINE.
Host denies ON-LINE	S1, F0 →		

■ Operator Sets OFF-LINE

Comment	Host	Equipment	Comment
			Operator actuates OFFLINE switch when equipment ON_LINE state is active.
		← S6, F11	"Equipment request OFF-LINE" event.
Acknowledge	S6, F12 →		

5. SCENARIO

■ Operator Sets REMOTE

Comment	Host	Equipment	Comment
		← S6, F11	Operator sets switch from LOCAL to REMOTE. "Control State REMOTE" event..
Acknowledge	S6, F12 →		

■ Operator Sets LOCCAL

Comment	Host	Equipment	Comment
`		← S6, F11	Operator sets switch from REMOTE to LOCAL. "Control State LOCAL" event..
Acknowledge	S6, F12 →		

■ Host Sets OFF-LINE

Comment	Host	Equipment	Comment
Host request OFF-LINE.	S1, F15 →		
			[IF] Equipment is OFF-LINE
		← S1, F0	[THEN] Equipment does not process requests.
			[ELSE] Equipment ON-LINE
		← S1, F16	Equipment acknowledges request and transitions to OFF-LINE.
		← S6, F11	"Equipment OFF-LINE" event.
Acknowledge	S6, F12 →		
			[END_IF]

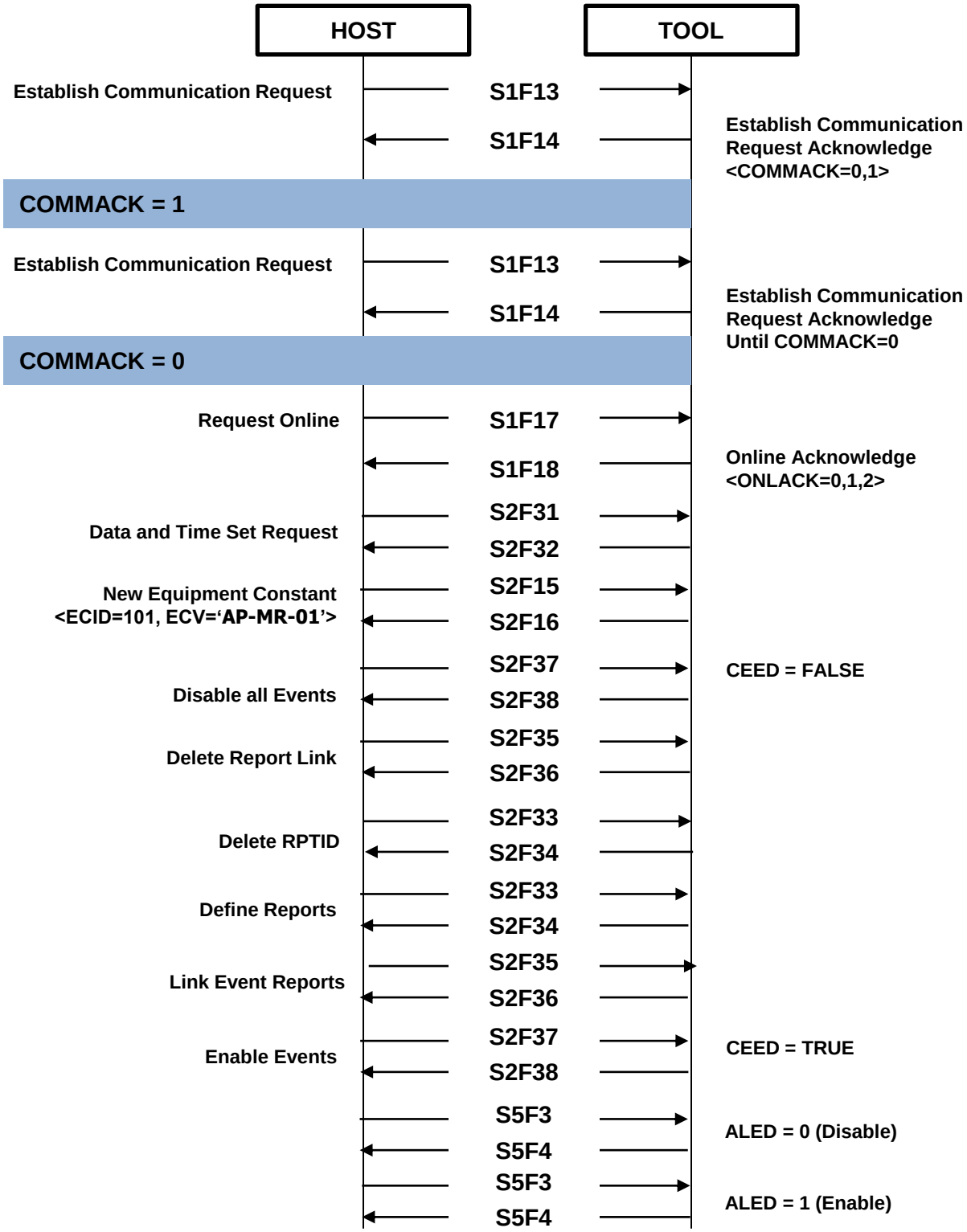
5. SCENARIO

■ Host Sets OFF-LINE

Comment	Host	Equipment	Comment
Host requests ON-LINE.	S1, F17 →		
			[IF] Equipment is HOST OFF-LINE state not active.
		← S1, F18	[THEN] Equipment denies request (ONLACK = 0).
			[ELSE] Equipment HOST OFF-LINE state is active.
		← S1, F18	Equipment acknowledges request (ONLACK = 0).
		← S6, F11	"Control state LOCAL (or REMOTE)" event.
Acknowledge	S6, F12 →		
			[END_IF]

5. SCENARIO

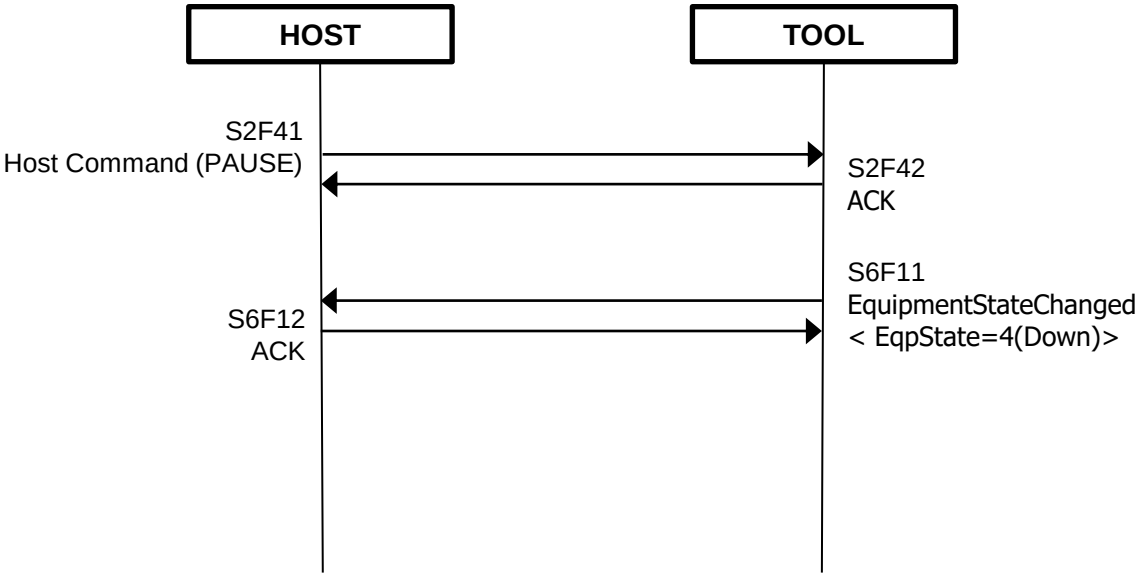
5.2 Connection Establishment Scenario



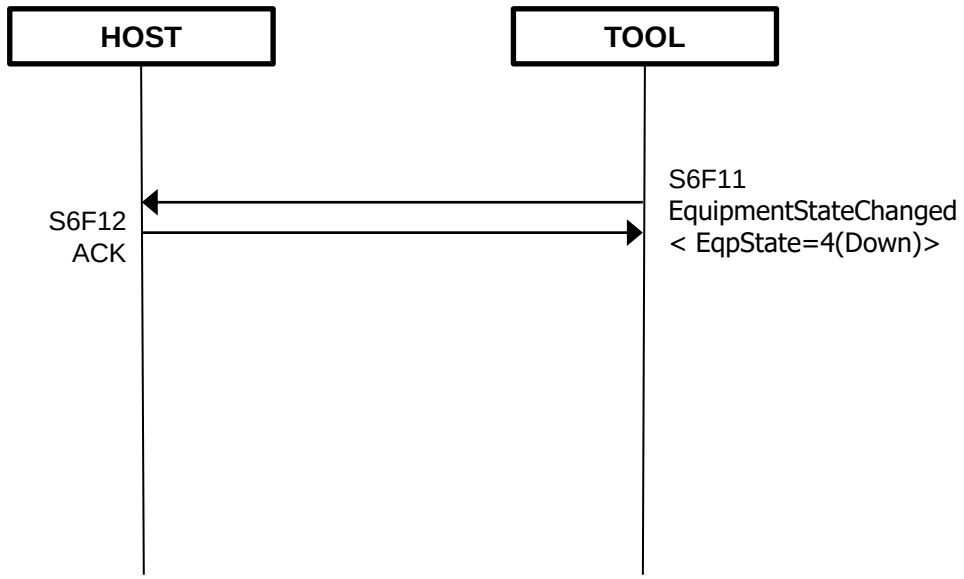
5. SCENARIO

5.3 Remote Command Scenario

■ **PAUSE Command (by Host)**

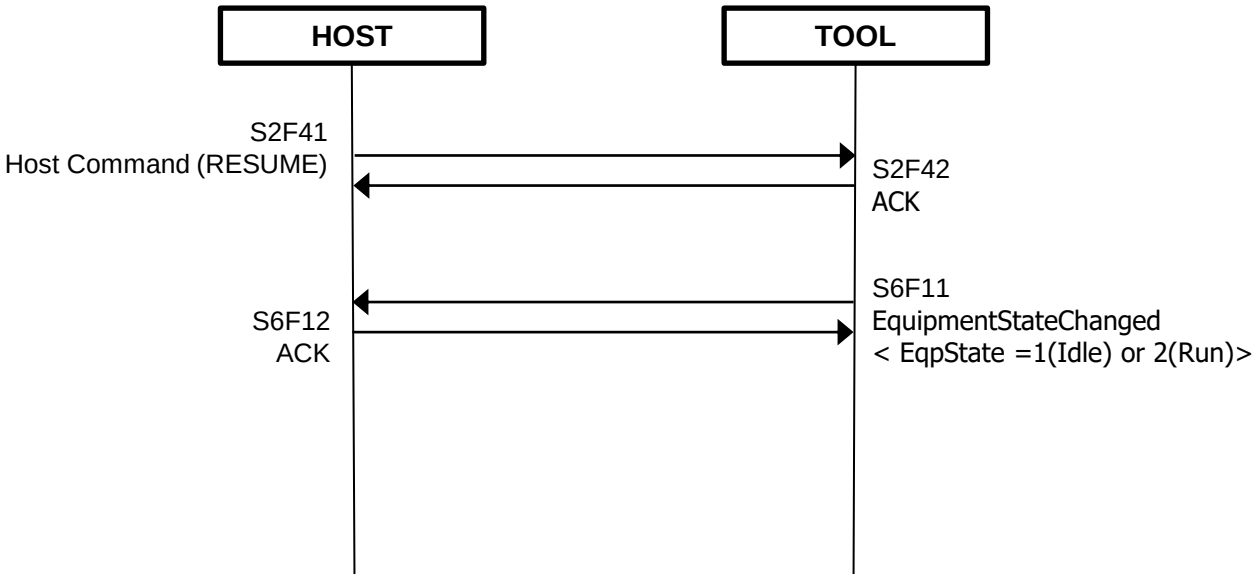


■ **PAUSE Command (by Equipment)**

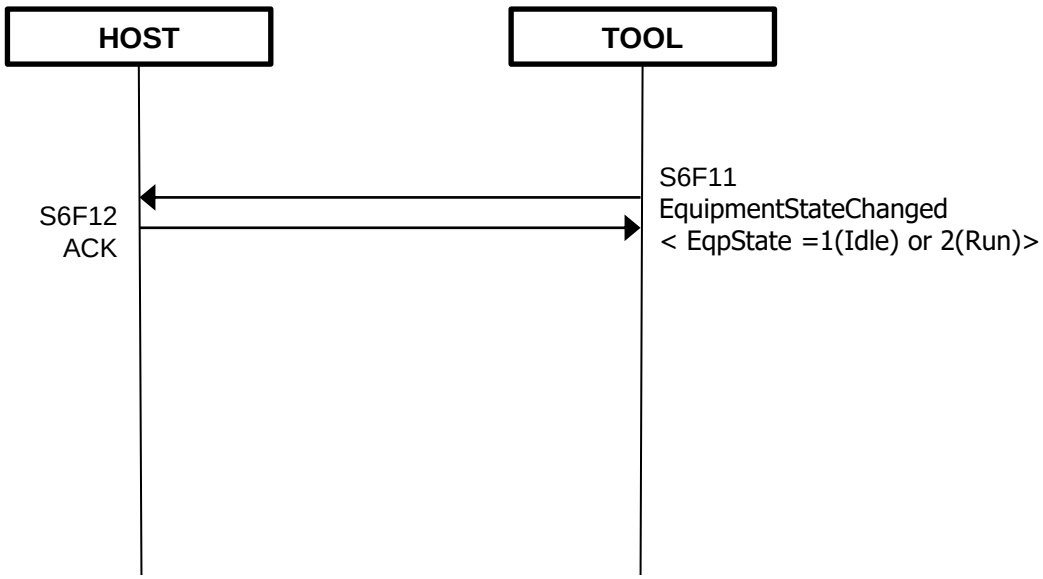


5. SCENARIO

■ **RESUME Command (by Host)**

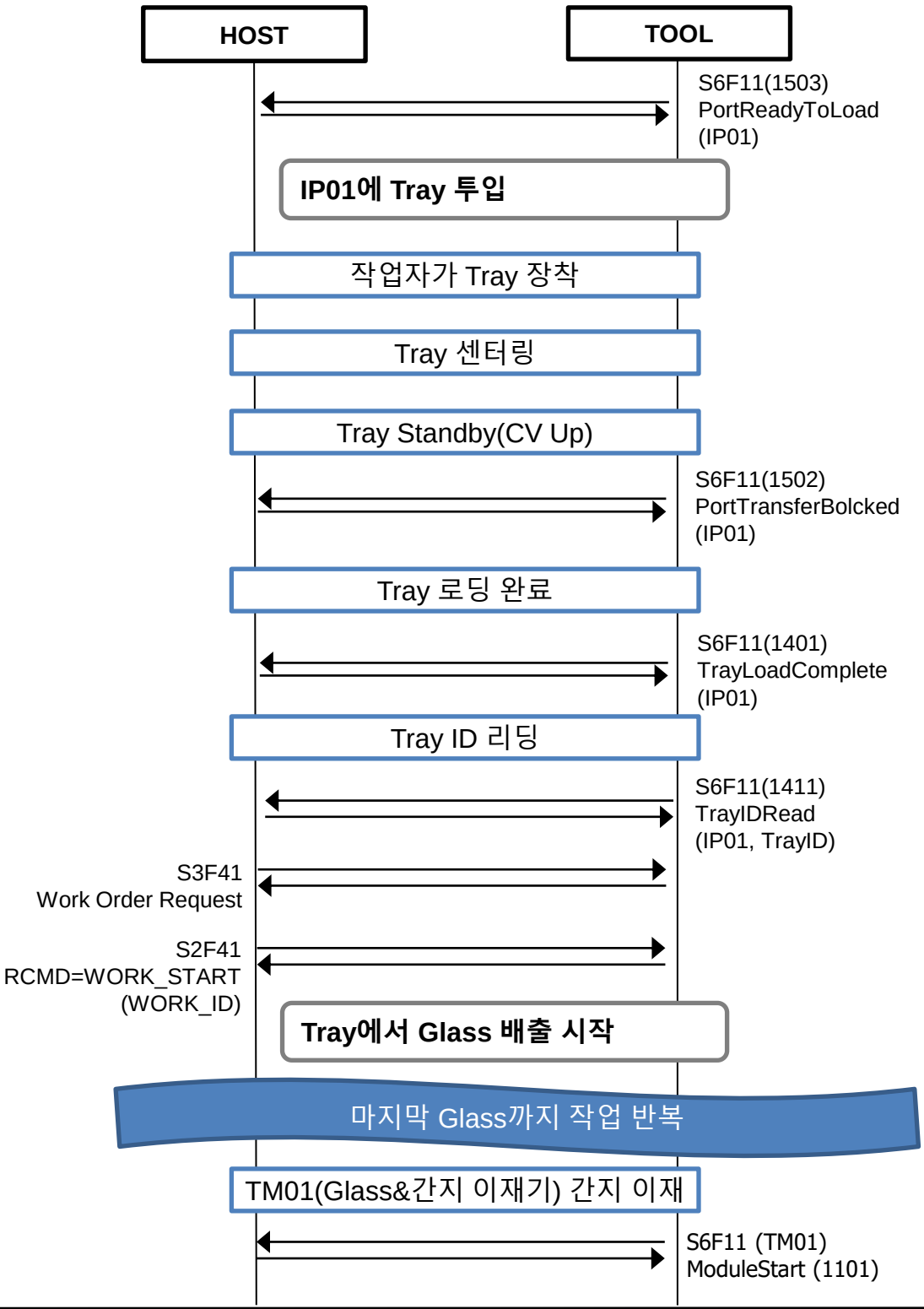


■ **RESUME Command (by Equipment)**

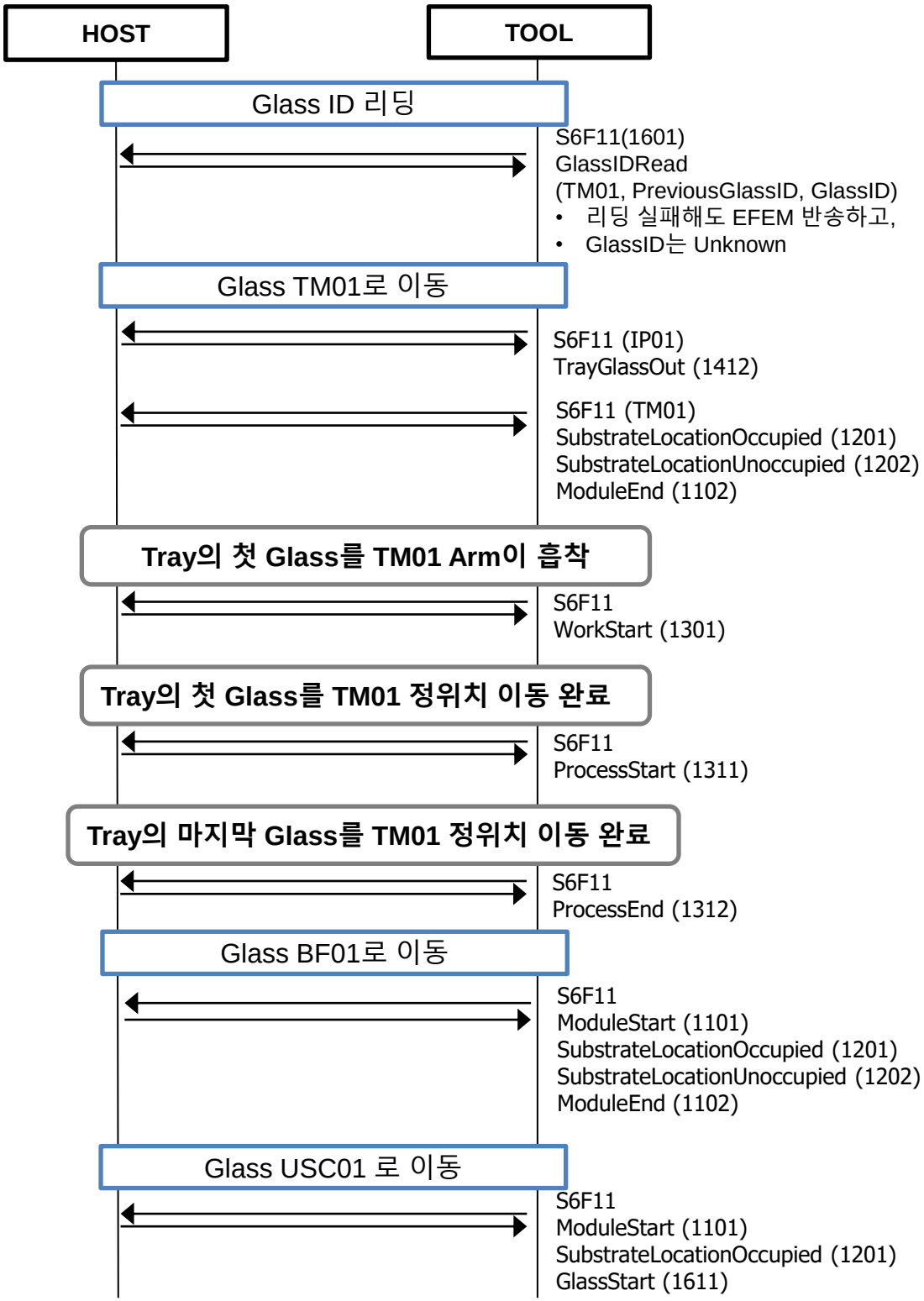


5. SCENARIO

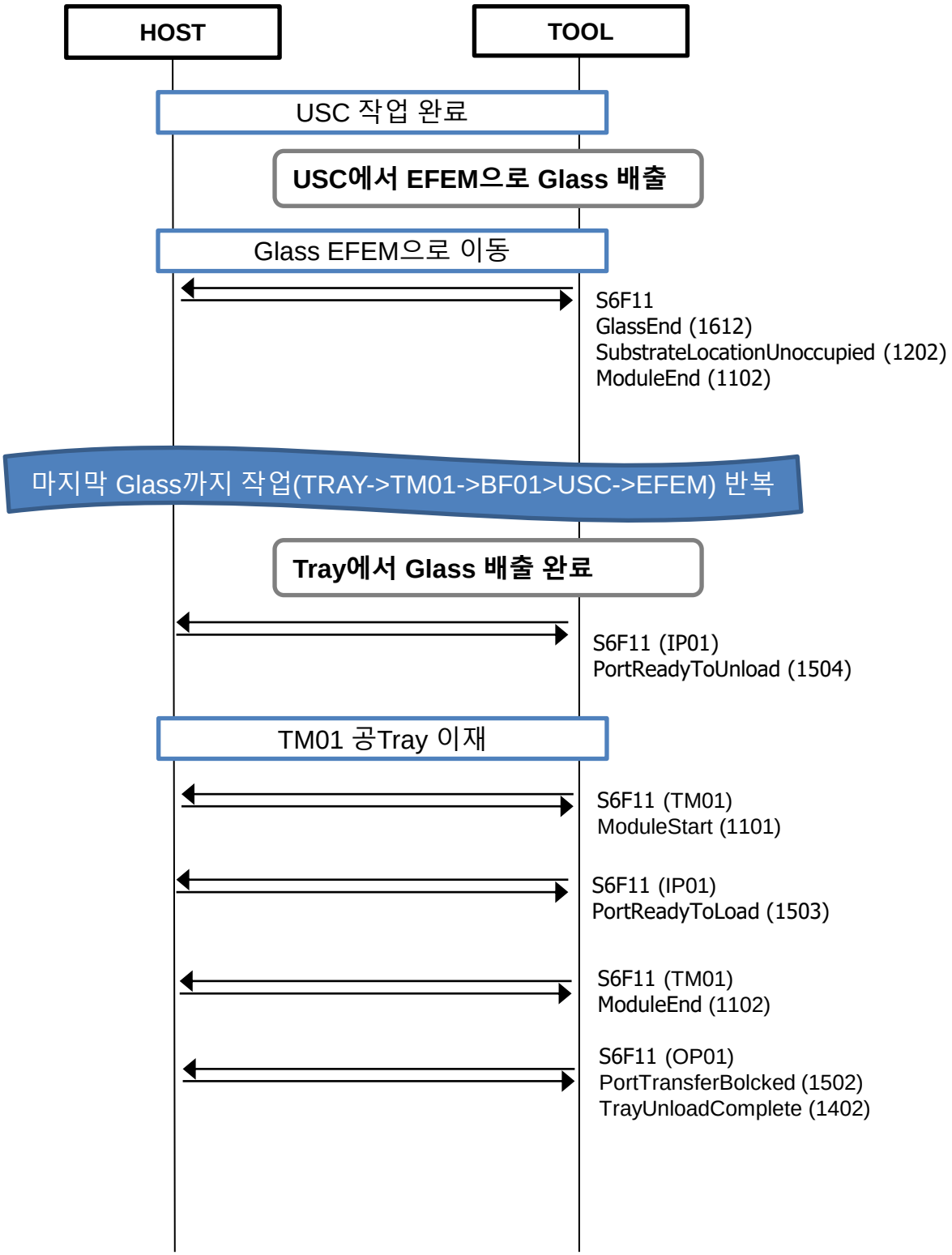
5.4 Normal Scenario



5. SCENARIO

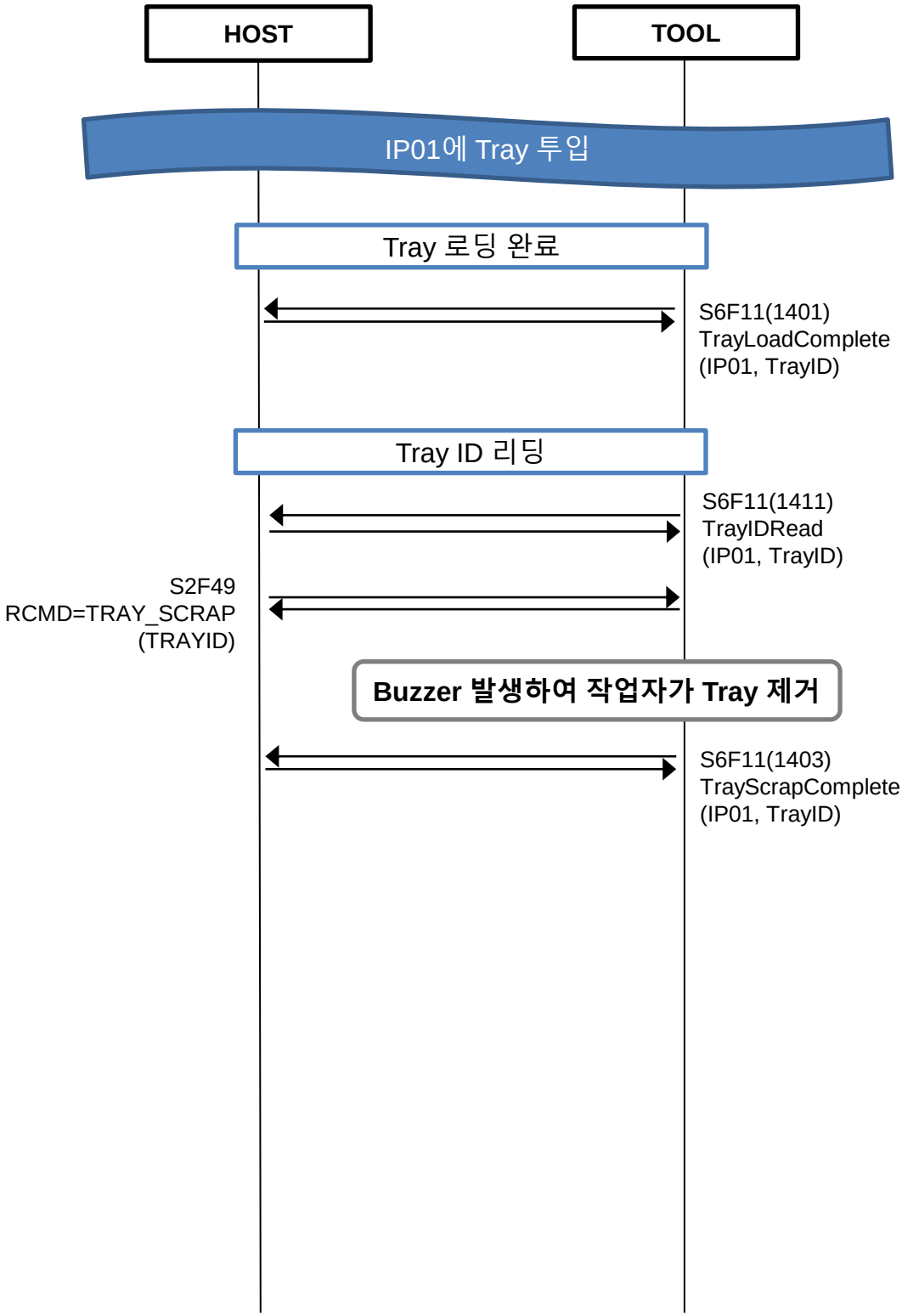

HOST
TOOL
Glass ID 리딩
S6F11(1601)
GlassIDRead
(TM01, PreviousGlassID, GlassID)
• 리딩 실패해도 EFEM 반송하고,
• GlassID는 Unknown
Glass TM01로 이동
S6F11 (IP01)
TrayGlassOut (1412)
S6F11 (TM01)
SubstrateLocationOccupied (1201)
SubstrateLocationUnoccupied (1202)
ModuleEnd (1102)
Tray의 첫 Glass를 TM01 Arm이 흡착
S6F11
WorkStart (1301)
Tray의 첫 Glass를 TM01 정위치 이동 완료
S6F11
ProcessStart (1311)
Tray의 마지막 Glass를 TM01 정위치 이동 완료
S6F11
ProcessEnd (1312)
Glass BF01로 이동
S6F11
ModuleStart (1101)
SubstrateLocationOccupied (1201)
SubstrateLocationUnoccupied (1202)
ModuleEnd (1102)
Glass USC01 로 이동
S6F11
ModuleStart (1101)
SubstrateLocationOccupied (1201)
GlassStart (1611)

5. SCENARIO


HOST
TOOL
USC 작업 완료
USC에서 EFEM으로 Glass 배출
Glass EFEM으로 이동
S6F11
GlassEnd (1612)
SubstrateLocationUnoccupied (1202)
ModuleEnd (1102)
마지막 Glass까지 작업(TRAY->TM01->BF01>USC->EFEM) 반복
Tray에서 Glass 배출 완료
S6F11 (IP01)
PortReadyToUnload (1504)
TM01 공Tray 이재
S6F11 (TM01)
ModuleStart (1101)
S6F11 (IP01)
PortReadyToLoad (1503)
S6F11 (TM01)
ModuleEnd (1102)
S6F11 (OP01)
PortTransferBolcked (1502)
TrayUnloadComplete (1402)

5. SCENARIO

5.5 Tray Scrap Scenario



5. SCENARIO

5.6 Glass Scrap Scenario