SINUMERIK 850
Function blocks for the
130 W-B and 150 S PLCs

SINUMERIK

SINUMERIK

SINUMERIK 850
Function blocks for the
130 W-B and 150 S PLCs

Configuring Instructions
Package 3: Serial interface IM 512

Edition June 1987

SINUMERIK®-Documentation

Key to editions

The following editions were published prior to this edition.

Listed in the "Revisions" column are the sections which have been amended in relation to the previous edition.

Edition	Order No.	Revisions
06.87	E80850-D3-X-A1-7600	New edition
06.87	**E80850-D3-X-N1-7600**	**Correction Sheet 3-3**

Contents

Application notes for the package:
"Serial interface module 512"

1.1 Overview of the IM 512

1.2 Mode of operation

1.3 Presetting the channels and queues

1.4 Job processing when queues are used

1.5 Job processing with direct entry

1.6 Computer link

1.7 Assignments and programming of the
    condition code

1.1 Overview of the IM 512

In conjunction with the corresponding standard
function blocks, the 512 interface module serves
as an interface for data transfer between
programmable logic controllers and higher
level computers (as a point-to-point link), as
well as for connecting page printers and DDTs.

This allows interactive operation between
various automation levels in a system; the task
specific to the link, i.e. transferring and
processing of great data volumes, is handled
independently by the IM 512.

When standard peripheral devices are
connected (page printer or DDT)
communication is established between the
system operator and the programmable logic
controller; this allows, for example, monitoring
of the system states, the specification of
setpoint values and extensive fault outputs.

Hardware requirements:

a) For the 150S
    - The following are available as slots for the
      IM512:
    - Central unit
      Slot 127 with 137
    - Central expansion unit
      Slot   77   with   87
              97   with   107
              117 with   127

b) For the 130WB
    - PLC CPU 6ES5 921-3WB12
    - Jumper A-J (W1) must be open on the
      130WB CPU
    - The following are available as slots for
      the IM512:
      - Integrated PLC
        3rd slot after multiport RAM for basic
        module

    - External PLC (dual PLC)
      Slot 40 for basic module
      Slot 50 for expansion module

1.2 Mode of operation

The interface between the programmable logic
controller and the IM 512 is located in a
permanently assigned memory area in the
prgrammable logic controller. This area is
known as the interface data area or system
transfer area, and is subdivided into 8 channels.

The jobs for the IM 512 are entered in this area
by the user program, via the corresponding
standard function blocks. The IM 512 scans the
interface data area cyclically for jobs using
direct memory access (DMA).

In general, for a computer or when standard
peripheral devices are connected, the data
traffic in communication between
programmable logic controllers can be initiated
in two ways:

-   Central initiative
    The request is issued by the user program.

-   Peripheral intitative
    In this case the connected device initiates
    the process.

Jobs initiated centrally can be handled in two
basic ways:

-   Entry via queues
-   Direct entry

Data traffic with a page printer or DDT requires
the following auxiliary data structures:

-   Name list
-   Format list
-   Assignment list (if applicable)
-   Raw data (if applicable)

These auxiliary data structures are stored in
data blocks. The lists are described in the
operating instructions of the IM 512.

1.3 Presetting the channels and queues

In the cold start branch, presetting of the
interface must be initiated and monitored, the
interface data area (i.e. channels) and, where
applicable, queues must be cleared and preset
for the user:

FB190: SST:VOA   Initiation of presetting and
                  synchronization of the
                  interface with the PLC;
                  monitoring of interface
                  reaction time.

FB191:   SST:VOK   The logic channels are established in the interface data area and assigned the device-related (identifiers, type of connected device, number of the interface on the interface module). Each connected device occupies one of four interfaces and requires that a channel be assigned. The channels must be established individually, with a block call for each channel.

FB192:   SST:VOW   The necessary identifiers are entered (number of the corresponding channel, type of connected device) in the data blocks provided for the queue.
The queues must be established inidvidually, with a block call for each queue. The data blocks intended must be present.

FB193:   SST:VOE   Completion of presetting activities and, if desired, entering of devices for system messages.

The order of block calls is mandatory.

When the basic program is used, the presetting blocks are called conditionally in OB 20 if the basic package is not provided.
When the IM512 is used in conjunction with Package 4 (computer link) the job for the presetting blocks can be executed in FB174 RK:FB512, FB174 must then be called in FB2.

1.4 Job processing when queues are used

A queue is used if, over a short period, there are more jobs than the IM 512 can process. It is expedient to create several queues when jobs are to be output according to a classification or set of priorities defined by the user. Up to 5 queues can be created per channel (using function block FB 192, SST:VOW).

A queue can consist of one or more data blocks. Up to 62 jobs for page printers and DDTs, and up to 35 jobs for a computer link can be stored per data block. The full length (256 data words in each case) of the data blocks used must be reserved in the memory of the programmable logic controller.

When a job is entered in the queue via function blocks FB 194 (SST:WEBS) and FB 195 (SST:WERK) steps should be taken to ensure that these blocks are only processed once per job entry. This can be achieved by signal edge evaluation with a conditional block call, for example.

Standard function block FB 196 (SST:WAUS) handles the removal of a job from a queue and entry in the interface data area. This function block can process jobs from queues for printers and VDUs, as well as jobs from queues for a computer link.

If several queues are assigned to one channel, processing of the queues by function block FB 196 (SST:WAUS) must be organized by the user. The function block cannot handle several queues automaticallly.

If, additionally, several blocks of this type are to access one channel, steps must be taken in the user program to ensure that only one single function block for queue removal is active per channel.

If a channel is accessed simultaneously by a function block with queue removal and a function block with direct entry, they coordinate the job processing automatically.

Block parameter ANZ is the condition code for the job processing. The individual bits of these bytes indicate both the sequence timing for job processing and errors detected by the function blocks and the IM 512.

1.5 Job processing with direct entry

Standard function blocks FB 197 (SST:BSDS) and FB 198 (SST:RK) enter a job directly in the interface data area. The user must employ suitable interlocks to prevent simultaneous accessing of a channel by several blocks of this type. Only one block with direct entry may be active per channel at any time.

In the case of simultaneous job initiation, both via program (central initiative) and by peripheral device (peripheral initiative), the peripheral initiative has priority. Jobs initiated in this manner are processed with higher priority.

1.6 Computer link

Jobs initiated centrally and commands initiated by peripheral devices operate with different processing lists. It is therefore possible to process simultaneously (i.e. with the same block-by-block timing) one centrally initiated job and one peripherally initiated job on the computer link channel (quasi full-duplex). The peripherally initiated job has the higher priority here.

If two programmable logic controllers are interconnected, no transmit or receive program is required in the remote PLC; however, the communication channel must be correctly preset.

Upon successful data transfer, the coordination flag is set in the passive PLC. If control of data traffic by the passive PLC is desired, this flag must be scanned and reset by the passive PLC. If the coordination flag remains set in the passive PLC, no further data traffic takes place and the user is informed. If the coordination flag is assigned the parameter 255.255 no flag scan takes place.

1.6.1 Using the IM512 in conjunction with Package 4 (computer link)

With the computer link, message traffic is only achieved by means of direct entry. The result is that not all FBs of this pakckage are used. Two higher-level blocks were therefore created; the following functions are stored in these blocks:
- Presetting of channels (FB174)
- Handling of message traffic (FB175)

The parameters needed for the IM512 must be stored by the user in the described machine data and machine data bits (see block description of FB174 and FB175).

More detailed information and examples can be found in the Operating Instructions for the 512 interface module: Order no. C79000-B8500-C238-5.

1.7 Assignments and programming of the condition code

Block parameter ANZ of FBs 194 - 198 is the condition code for job processing. The individual bits of this byte indicate both the sequence timing for job processing, and errors detected by the function blocks and by the 512 interface module. The bits of the condition code are set dynamically. The assignment then cannot be specified exactly for

- simultaneous multiple entry of a job (via queue and direct),
- simultaneous entry and removal of a job (function blocks SST:WEBS and SST:WAUS operate simultaneously),
- using the condition code for several jobs.

The following can be specified under ANZ as a current block parameter:

IB	Input byte
QB	Output byte
FB	Flag byte
DR	Right data byte
DL	Left data byte

Specification of an I/O byte PB is not allowed. If it is specified anyway, it is treated as an input byte IB (over the range PB 0 to PB 127) or output byte QB (over the range PB 128 to PB 255).

When an input byte IB is output, ensure that it is further processed in the same processing cycle (after function block SST:WEBS), because it will be overwritten at the start of the cycle during loading of the process image.

Specification of a data byte (DR, DL) under ANZ relates to the data block called before the call for function block SST:WEBS (see example above).

Bit No.:

| 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | ANZ

Hardware error in interface module or PLC

Programming error

Operator error

Software error

(Queue in clear mode; entry attempt is rejected)

Signal edge flag for job processing (Queue is cleared)

Job will be processed by interface module (Job is entered in the interface data area)

Job is entered in the interface data area (Job is entered in the queue)
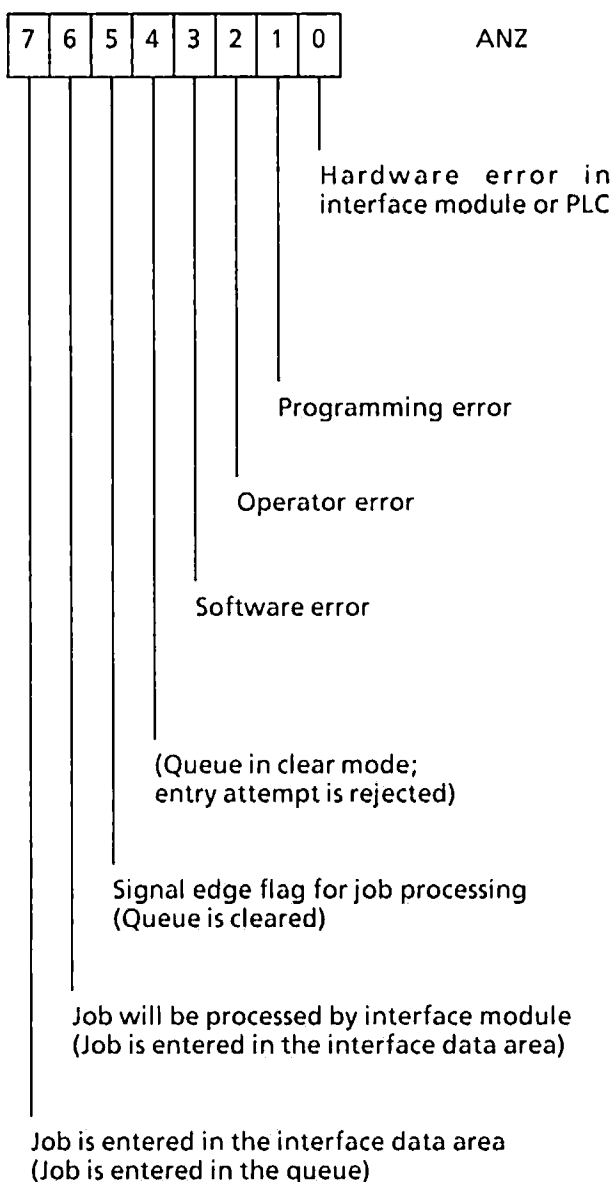
The description in parentheses applies to the processing of queue jobs.

1.7.1 With queue processing, the individual bits have the following assignments:

Condition code Bit No.: 7 6 5 4 3 2 1 0	Remarks
0 0 0 0 0 0 0 0	Initial state
1 0 0 0 0 0 0 0	After job entry in the queue. As long as the channel is blocked, e.g. by direct entry, this bit pattern is retained.
1 1 0 0 0 0 0 0	The job entered in the interface data area is processed by IM 512. If no errors occur, correct termination takes place with
0 0 0 0 0 0 0 0	the bit combination:

If errors are detected during an attempt to enter in the queue, the following is indicated:

Error	
Parameter error Queue overflow Queue in clear mode	Output PAFE Output WUE Bit 4 of the condition code

1.7.2 For job processing with direct entry, the individual bits have the following assignments:

Condition code Bit No.: 7 6 5 4 3 2 1 0	Remarks
0 0 1 0 0 0 0 0	Initial state; input ANST is at logic 0 (triggerable)
1 0 0 0 0 0 0 0	Input ANST has changed from logic 0 to 1; a check has been made to establish whether an entry in the interface data area is possible; the entry in the interface data area then takes place.
1 1 0 0 0 0 0 0	The job is processed by IM 512; if no errors have occurred, correct termination takes place with the bit combination:
0 0 0 0 0 0 0 0	Input ANST is still at logic 1; a new job can only be initiated when this input is at logic 0.
0 0 1 0 0 0 0 0	(triggerable)

If a channel is accessed simultaneously by a function block with direct entry and a function block with queue removal, they coordinate the job processing automatically.

1.7.3   Entry error in the interface data area

If errors are detected during the attempt to enter in the interface data area, output PAFE is set to logic 1. The exact specification of the error can be found from the condition code.

Condition code Bit No.: 7 6 5 4 3 2 1 0	Errors detected
0 0 0 0 0 0 0 1	An attempt has been made to enter a job with FB 197 (SST:BSDS) in a channel specified as computer link, or with FB 198 (SST:RK) in a channel specified as "BSDS" (printer/DDT).
0 0 0 0 0 0 1 0	The device connected does not correspond to specified device identifier GERK.
0 0 0 0 0 1 0 0	The specified channel has not been preset.
0 0 0 0 1 0 0 0	Presetting was aborted during cold start; the serial interfaces are not operable.
0 0 0 1 0 0 0 0	Presetting was not completed; the serial interfaces are not operable.

1.7.4   Error messages of the IM 512

If errors are detected during job processing by the IM 512, output PAFE remains at logic 0. The condition code then has the following assignments (with ANST parameter as input):

Condition code Bit No.: 7 6 5 4 3 2 1 0	Errors detected
0 1 0 0 0 0 0 1	FEH1: Hardware fault in programmable logic controller or IM 512
0 1 0 0 0 0 1 0	FEH2: Programming error
0 1 0 0 0 1 0 0	FEH3: Operator error
0 1 0 0 1 0 0 0	FEH4: Software error

If the ANST parameter is a flag or an output, bit 5 is additionally set in the event of an error.

If a software error is detected (FEH4), the job activity is repeated three times; this is also indicated via the condition code:

Bit No.: 7 6 5 4 3 2 1 0	Activity
1 1 0 0 0 0 0 0	First attempt
1 1 0 0 1 0 0 0	Terminated with FEH4 Wait 1 second
1 1 0 0 0 0 0 0	First repetition
1 1 0 0 1 0 0 0	Terminated with FEH4 Wait 1 second
1 1 0 0 0 0 0 0	Second repetition
1 1 0 0 1 0 0 0	Terminated with FEH4 Wait 1 second
1 1 0 0 0 0 0 0	Third repetition
0 1 0 0 1 0 0 0	Final termination with FEH4

Contents

2.1 Explanations of FB designations

FB call	Parameter	Type of parameter	Allowed actual parameter
FB Name §I,.. ─┤ ├─ Q,.. I,BI-Q ─┤ ├Q- Q,BI I,BI -/ ─┤ ├I- Q,BI D,.. ─┤ DO ─┤ T ─┤ C ─┤ $F ... ─┤ ├$F ... $DW... ─┤ ├$DW... *F ... ─┤ ├$F ... *DW... ─┤ ├$DW... ├% 1 ├% v1	I Input Q Output	BI Operand with bit address BY Operand with byte address W Operand with word address	I n.m Input Q n.m Output F n.m Flag IB n Input byte QB n Output byte FB n Flag byte DL n Data byte, left DR n Data byte, right PB n I/O byte IW n Input word QW n Output word FW n Flag word DW n Data word PW n I/O word
	DO Block call	Not applicable	DB n Data block FB n Function block PB n Program block SB n Sequence block
	T Timer	Not applicable	T n No. of timer
	C Counter	Not applicable	C n No. of counter
	D Data	KM Binary pattern, 16 positions KY Two absolute values in bytes form 0 to 255 KH Hexadecimal number, max. of 4 positions KS Two alphanumeric characters KT Time value (1.0 to 999.3) KC Count value (0 to 999) KF Fixed point number (-32768 to + 32767)	
	I, BI -- I, BI -Q I, BI -/ §I,.. -- $... -- *... --	Input signal, statically effective Input signal which is acknowledged by the FB Input signal whose rising edge is evaluated No DW allowed as parameter Input signal which must be applied before the FB call Defined input signal which need not be applied, e.g. NC signal	
	-- Q, BI Q- Q, BI I- Q, BI -- $... -- *... - % 1 - % v1	Output signal, statically effective Output signal which must be acknowledged by the user Output signal which is only emitted for the duration of one cycle (pulse output) Output signal on defined flag or data word which can be evaluated immediately after the FB Defined output signal, e. g. NC signal Error no. ACCU2 for system stop (STS); ACCU 1 FB no. Additional specification of no. of the interface byte in the high-byte ACCU2	

2.2 Overview of the PLC interface

2.2.1 Inputs

IB	0	Alarm inputs
	⋮	Physical interface (Input modules)
	63	
	64	I module 1
	⋮	
	72	I module 2
	⋮	
	80	I module 3
	⋮	
	88	I module 4
	⋮	
	96	Auxiliary flags, i.e. dynamically assignable e.g. by interface signals
	⋮	
	127	
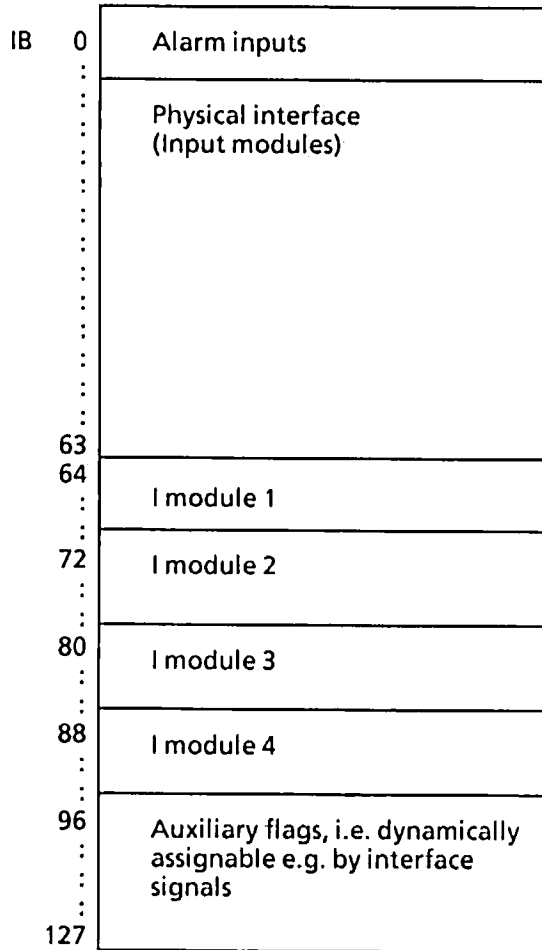
Note:

Inputs from address range 64-95 which are not assigned to input modules can be used as auxiliary flags, as can address range 96-127.

Caution:

With the 150S/U as PLC the auxiliary flag area and the area which is not assigned to input modules may only be used as a temporary flag area.

2.2.2 Outputs

```
QB  0 │ Physical interface
     : │ (Output modules)
     : │
     : │
     : │
     : │
     : │
     : │
     : │
     : │
     : │
     : │
 63    │
 64    ├─────────────────────────
     : │ O module 1
 68    ├─────────────────────────
     : │ O module 2
 72    ├─────────────────────────
     : │ O module 3
 76    ├─────────────────────────
     : │ O module 4
 80    ├─────────────────────────
     : │ Auxiliary flags, i.e. dynamically
     : │ assignable e.g. by interface
     : │ signals
     : │
127    └─────────────────────────
```
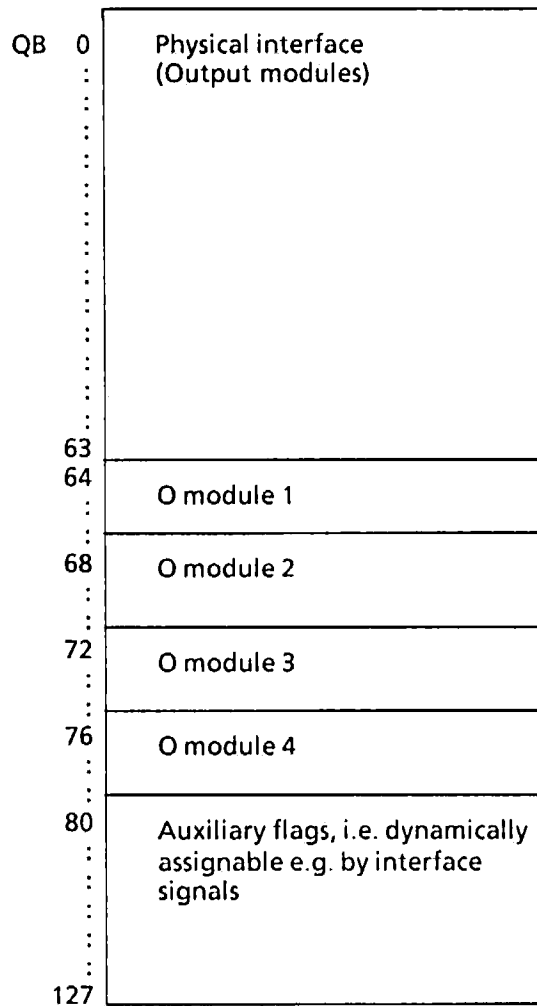
Note:

Outputs from address range 64-80 which are not assigned to output modules can be used as auxiliary flags, as can address range 80-127.

Caution:

With the 150S/U as PLC the auxiliary flag area and the area which is not assigned to output modules may only be used as a temporary flag area, i.e. for intermediate results.

2.2.3 Flags, timers, counters, data formats

```
FB    0  ┌─────────────────────────────────┐
         │ Basic signals                   │
      :  │                                 │
     24  │                                 │
     25  ├─────────────────────────────────┤
         │ Auxiliary flags, i.e. dynami-   │
      :  │ cally assignable by interface   │
      :  │ signals                         │
      :  │ e.g. interface   Channel   1    │
      :  │                  Channel   2    │
      :  │                  etc.           │
     99  ├─────────────────────────────────┤
    100  │ Free for user                   │
      :  │                                 │
      :  │                                 │
      :  │                                 │
      :  │                                 │
      :  │                                 │
    199  ├─────────────────────────────────┤
    200  │ (Reserved for function blocks)  │
         │        (See note)               │
      :  │                                 │
    224  │   Saved area for process        │
         │   interrupts and timeouts       │
      :  │                                 │
    225  └─────────────────────────────────┘
```

Notes:

1. The interface signals from data blocks can be copied into flag area FB25 - FB99 by means of function blocks FB70 and FB71 to simplify programming.
    FBs 70 and 71 are contained in FB Package 0.

2. Flag area 200-255 is saved by the basic program if a process interrupt (OB2) or timeout (OB10) occurs. When the corresponding program has ended, the flag area is reloaded.

    This flag area can also be utilized by the user for intermediate results.

Caution: Flag area FB 200-223 is also partly used by SIMATIC FBs.

Times: Time   TO used

Counters: Counter   CO used

Data formats: All word-oriented interface signals are output and input as fixed-point numbers.

2.2.4 Data blocks

The data blocks from DB 150 onwards can be assigned by the user. The distribution of the remaining DBs can be found in the following summary.

DB No.	DB Designation	DB Name	Package
0	ADR-LIST	Block address list	BS
1	FuLL-DB	Filler DB for basic program, EPROM module	GP
2	NS INT 1	Internal interface, Part 1	GP
3	NS INT 2	Internal interface, Part 2	GP
4	NS INT 3	Internal interface, Part 3	GP
5	NS INT 4	Internal interface, Part 4	GP
6	NS INT 5	Internal interface, Part 5	GP
7	NS INT 6	Internal interface, Part 6	GP
8	NS INT 7	Internal interface, Part 7	GP
9	NS INT 8	Internal interface, Part 8	GP
10	NS KN 1	Interface NC Channel 1	GP
11	NS KN 2	Interface NC Channel 2	GP
12	NS KN 3	Interface NC Channel 3	GP
13	NS KN 4	Interface NC Channel 4	GP
14	NS KN 5	Interface NC Channel 5	GP
15	NS KN 6	Interface NC Channel 6	GP
16	NS KN 7	Interface NC Channel 7	GP
17	NS KN 8	Interface NC Channel 8	GP
18			RV
19			RV
20			RV
21			RV
22			RV
23			RV
24			RV
25			RV
26	DBKL EG	Cmd list, computer link input, std. messages	4
27	DBKL AG	Cmd list, computer link output	4
28	UHR - RAM	DB for FB 199 RAM	3
29	UHR - EPR	DB for FB 199 EPROM	3
30	DEC MFU	Decoded M functions (list)	GP
31	SPI SIG	Interface for spindle-related signals	GP
32	ACHS SIG	Interface for axis-related signals	GP
33	IOSY- SDB	Control data block IOSY	5
34	E-PUF RK	Input buffer for computer link	4
35	A-PUF RK	Output buffer for computer link	4
36	DUE NC	Interface for NC data transfer, COM<->PLC	GP
37	SER SCH.	Interface for serial interface	GP
38	NS RK	Interface for computer link	4
39	RK-FD	Fixed data for computer link	4
40	NS BEDT.	Interface, operator panel	GP
41			RV
42			RV
43			RV
44			RV
45			RV
46			RV

Abbreviations:	AW	User block
	BS	Operating system
	GP	Basic program
	RV	Reserved, package assignment open

2.2.4 Data blocks

DB No.	DB Designation	DB Name	Package
47			RV
48	NS COM	Interface for communication area	GP
49			RV
50	E : PLC I	Input signals from PLC I	GP
51	A : PLC I	Output signals to PLC I	GP
52	E : PLC II	Input signals from PLC II	GP
53	A : PLC II	Output signals to PLC II	GP
54			RV
55			RV
56			RV
57			RV
58	MELD	Interface for general messages	GP
59			RV
60	MDG WO	MD basic program, words	GP
61	MDF WO	MD function blocks, words	RV *
62	MDA WO	MD user, words	GP
63	MDG BI	MD basic program, bits	GP
64	MDF BI	MD function blocks, bits	GP *
65	MDA BI	MD user, bits	GP
66	SEG WO	SE basic program, words	GP *
67	SEF WO	SE function blocks, words	GP *
68	SEA WO	SE user, words	GP
69	SEG BI	SE basic program, bits	GP *
70	SEF BI	SE function blocks, bits	GP *
71	SEA BI	SE user, bits	GP
72	DB ZW 1	DB status word 1 for basic program	GP
73	DB ZW 2	DB status word 2 for basic program	GP
74	LSER	List for serial interface	GP
75	DB RK	Aux. data block for computer link	GP
76	CL800	List CL800 for data transfer, NC <-> PLC	GP
77	DB FM/BM	DB status words, FM/OM	GP
78	PSP NC-PLC	Buffer, NC-PLC communication	GP
79	QUIT FMBM	Acknowledgement signals, FM/OM	GP
80	LMDKN 1	List for M decoding, NC Channel 1	AW
81	LMDKN 2	List for M decoding, NC Channel 2	AW
82	LMDKN 3	List for M decoding, NC Channel 3	AW
83	LMDKN 4	List for M decoding, NC Channel 4	AW
84	LMDKN 5	List for M decoding, NC Channel 5	AW
85	LMDKN 6	List for M decoding, NC Channel 6	AW
86	LMDKN 7	List for M decoding, NC Channel 7	AW
87	LMDKN 8	List for M decoding, NC Channel 8	AW
88	IOSY-SP	Transmit buffer IOSY	5
89	IOSY-EP	Receive buffer IOSY	5
90	E-PUF CT	Input buffer, code carrier	6
91	A-PUF CT	Output buffer, code carrier	6
92	DBKL E	Command list, code carrier input	6
93	DBKL A	Command list, code carrier output	6
94			RV

* Not used at present
Free for user from DB 150

Abbreviations:
AW   User block
BS   Operating system
GP   Basic program
RV   Reserved, package assignment open

2.2.4 Data blocks

DB No.	DB Designation	DB Name	Package
95			RV
96	RK:PARTR	Parameter list for test trace	4
97	RK:DBTR	Trace DB for link 0	4
98	RK:ZVZL	Additional links: Assignment list	4
99	RK:KLEAN	Command list input for user messages	4
100		DB for serial transfer	ST
101	RK:AN-E	RK user interface, input	4
102	RK:AN-A	RK user interface, output	4
103	ZWSP-WZD	Buffer for tool data input	4
104			
105			
106			
107			
108			
109			
110			
111			
112			
113			
114			
115			
116			
117			
118			
119			
120			
121			
122			
123			
124			
125			
126			
127			
128			
129			
130			
131			
132			
133			
134			
135			
136			
137			
138			
139			
140			
141			
142			
143			
144			
145			

* Not used at present
Free for user from DB150

Abbreviations:
AW   User block
BS   Operating system
GP   Basic program
RV   Reserved, package assignment open

2.2.5 Function blocks

The function blocks from FB200 can be assigned by the user. The assignments of the remaining blocks to the FB packages can be found in the following summary.

FBNo.	FB Designation	FB Name	Package	Flags used < FW 224
0	PROZ.-AL	User block for process interrupts	AW	
1	ZEIT-AL	User block for timeouts	AW	
2	WIED:-ANL	User block to start OB 20, 21, 22	AW	
3	KANAL-FB	PLC<->NC, channel-oriented	GP	
4	A:NC<>PLC	PLC<->NC, axis-oriented	GP	
5	SP:NC-PLC	PLC<->NC, spindle-oriented	GP	
6	NC<->PLC	Data transfer NC/PLC	GP	
7	T:PC><2	Interchange of static signals PLC1 <-> PLC2	GP	
8	BED-TAFE	Operator panel signal	GP	
9	EINR-DBK	Establish DB in communication RAM	GP	
10	E-ROUTIN	Individual routines	GP	
11	EINR-DB	Establish data blocks	GP	
12	NC<->PCZ	Data transfer NC/PLC, time-controlled	GP	
13	UP:FB012	Subroutine FB12	GP	
14	BEF:DL/R	Opcode DL/DR from no. NSBY	GP	
15	FB006/Z	Subroutine FB6 time-controlled	GP	
16	UP:FB019	Subroutine FB19	GP	
17	STATUS	PLC status channel	GP	
18	SERIELL	FB for serial interface	GP	
19	UP:FB006	Subroutine FB6	GP	
20	M-DEKOD	M decoding	GP	
21	M-LOES	Clear M signals	GP	
22	UP:FB023	Subroutine FB23	GP	
23	UP:61/62	Subroutine FB61/62	GP	
24	ANZ-BIB	Display library numbers	GP	
25	W-ANLAUF	Warm restart, block	GP	
26	GST:NCPC	Initial status, data transfer NC/PLC	GP	
27	KANAELE	Evaluation, NC channels	GP	
28	ACHSEN	Evaluation, axes	GP	
29	SPINDEL	Evaluation, spindles	GP	
30	MUL:16	Multiply 2 binary-coded numbers, 16 bits each	0	
31			RV	
32	DIV:16	Division, 2 binary-coded numbers, 16 bits each	0	
33	DIV:32	Division, 2 binary-coded numbers, 32 bits each	0	
34	UP 3	Subroutine FB33 (130WB)	0	
	H.-MERK	Load auxiliary flags (150S/U)	GP	
35	DIV/100	Divide by 100	0	
36	ADD:32	Addition of 2 binary-coded numbers	0	
37	SUB:32	Subtraction of 2 binary-coded numbers	0	
38			RV	
39	DUAL/BCD	Code conversion binary/BCD, 3 decades	0	
40	COD:16	Convert a fixed point binary number (16 bits) to a BCD number	0	
41	COD:32	Convert a fixed point binary number (32 bits) to a BCD number	0	

FBNo.	FB Designation	FB Name	Package	Flags used < FW 224
42	COD:B4	Convert a BCD number (4 decades) to a fixed point binary number	0	
43	COD:B8	Convert a BCD number (8 decades) to a fixed point binary number	0	
44			RV	

Abbreviations: AW   User block   RV   Reserved, package
                       GP   Basic program   assignment open

2.2.5 Function blocks

FB No.	FB Designation	FB Name	Package
45	GST-FM/BM	Initial status, error messages/operator messages	0
46	UP:54/55	Subroutine FB54, FB55	0
47	PSP:FMBM	Buffer, error/operator messages	0
48	FMBM:HSG	Auxiliary signals for error/operator messages	0
49	UP:57/58	Subroutine FB57, FB58	0
50	UP:FB49	Subroutine FB49	0
51	UP:FB45	Subroutine FB45	0
52	DIALOG:Z	Display interactive line	0
53	UP:63/64	Subroutine FB63/64	0
54	FM-ANZ	Display error messages	0
55	BM-ANZ	Display operator messages	0
56	MG-ANZ	Display message groups	0
57	FM-ABFR	Scan for error messages	0
58	BM-ABFR	Scan for operator messages	0
59	MG-ABFR	Scan message groups	0
60	BLOCK-TR	Block transfer	GP
61	NCD-LESE	Read NC data	GP
62	NCD-SCHR	Write NC data	GP
63	PCD-LESE	Read PLC data from PLC I/PLC II	0
64	PCD-SCHR	Write PLC data to PLC I/PLC II	0
65			RV
66			RV
67	T:RI->ACH	Transfer direction keys (850T) to axes	0
68			RV
69	G-DECOD	Preparatory function decoding	0
70	T:NS->EAM	Transfer interface DB to I/O/M	0
71	T:EAM->NS	Transfer I/O/M to interface DB	0
72	T:NCK->DB	Transfer NC channel -> DB channel	0
73	T:DB->NCK	Transfer DB channel -> NC channel	0
74	T:SPI->DB	Transfer spindle -> DB spindle	0
75	T:DB->SPI	Transfer DB spindle -> spindle	0
76	T:ACH->DB	Transfer axis -> DB axis	0
77	T:DB->ACH	Transfer DB axis -> axis	0
78	T:MS->KN	Transfer MSST -> NC channel	0
79	T:MS->ACH	Transfer MSST -> DB axis (850M)	0
80	OB0	Basic program OB0	GP
81	OB2	Basic program OB2	GP
82	OB10	Basic program OB10	GP
83	PAR-FEHL	Parameter error check FB70/71	0
84	PAR-AEND	Parameter change, subroutine FB86	GP
85	LDW-PRUF	Read DW and check if DB present	GP
86	STAT-KAN	Status channel, subroutine FB17	GP
87	OB40	Basic program OB40 (stop loop for 130DW)	GP
	RH-MERK	Save auxiliary flags for 150S/U	GP
88	PC/PC-KO	Data transfer PLC <-> PLC via FBs	0
89			RV
90			RV
91	AK2:V/R	Sequencer, forwards/backwards	0
92	AK3:AUT	Sequencer, automatic	0
93	ALS:V/R	Sequencer, forwards/backwards Graph 5	0
94	ALS:AUT	Sequencer, automatic Graph 5	0

Abbreviations:
AW   User block   RV   Reserved, package assignment still open
GP   Basic program   WF   WF 625;

2.2.5 Function blocks

FB No.	FB Designation	FB Name	Package
95	RK:S850	Computer link, data from/to process computer	4
96	RK:ANWE	User messages	4
97	RK:UP095	Command interpreter subroutine	4
98	RK:WZDDB	Computer link, read tool data from magazine DBs	4
99	RK:WZDLS	Computer link, read tool data	4
100	RK:GLOBA	Global functions	4
101	RK:MELDG	Messages to FLR	4
102	RK:NCDAT	NC programs/data from/to FLR	4
103	RK:NCDIO	Initiate transfer of NC progs/data	4
104	RK;WZABF	Tool scan	4
105	RK:WZB/E	Load/unload magazine	4
106	RK:UP096	Computer link, subroutine for FB096	4
107	RK:UPM	Subroutine for op. message and op. interrupts	4
108	RK:UPWZD	Subroutine for tool scan and tool load/unload	4
109	RK:AG	Subroutine for PLC/oriented functions	4
110	SUCH	Search for word	0
111	WZ AUS:RE	Tool selection for lathes (turret)	1
112	WZ AUS:F	Tool selection for milling machines	1
113	WZ AUS:B	Tool selection for loading station	1
114	SUCH:WZ	Search for tool	1
115	WZ AUS:HG	Tool selection, background magazine	1
116		Measurement	1
117			RV
118			RV
119			RV
120	RI-AUS 1	Direction selection for tool magazine	1
121	RI-AUS 2	Direction selection for tool magazine as NC auxiliary axis	1
122			RV
123	AKTDW6-7	Update DW6/DW7 tool management	1
124			RV
125	WZ-UML 1	Relocate tool 1	1
126	WZ-UML 2	Relocate tool 2	1
127	WZ-UML 3	Relocate tool 3	1
128	UP-UML	Subroutine for tool relocation	1
129			RV
130	MAG-LAD 0	Load magazine 0	1
131	MAG-ENTL	Unload magazine	1
132	MAG-LAD 3	Load magazine 3	1
133			1
134			RV
135	WZ-WECHS	Tool change message to NC	1
136	WZ-SPERR	Tool lockout	1
137			RV
138			RV
139			RV
140	STAZ	Tool life monitoring	1
141			RV
142	STUECKZA	Quantity check	1
143			2
144			2

Abbreviations:
AW User block
GP Basic program
RV Reserved, package assignment still open
WF WF 625;

2.2.5 Function blocks

FB No.	FB Designation	FB Name	Package
145			2
146			2
147			2
148			2
149			2
150	FIFO 3	Buffer (FIFO)	1
151			2
152			2
153	EINLESEN	Read tool data into buffer	1
154			2
155			2
156			2
157		Reserved for tool withdrawal	RV
158		Reserved for tool withdrawal	RV
159		Reserved for tool withdrawal	RV
160	DATANWF	Data transfer WF	WF
161	EING-WF	Entries WF	WF
162	DIV:15	Divider /15	WF
163	WZ-WF	Tool selection WF	WF
164	BLIND:WF	Dummy selection WF	WF
165			WF
166			WF
167	RK:ZV512	Additional connections IM512	4
168	RK:TRACE	Computer link, trace buffer for test	4
169	RK:VB535	Computer link: Preset CP535	5
170	RK:ZV535	Additional connection CP535	5
171	VER-CDTR	Initialize for code carriers PLC1/PLC2	6
172	ENT-CDTR	Unload via code carrier	6
173	BEL-CDTR	Load via code carrier	6
174	RK:VB512	Computer link: Preset IM512	3
175	RK:xxxxx	Computer link: Frame FB IM512 or CP535 xxxxx = IM512/CP535	3/5
176	AP-VOR	User program preset	ST
177	AP-GRUND	User program basic overhead	ST
178	AP-TRADA	User program transparent data interchange	ST
179	AP-BYST	User program transfer/read byte string	ST
180	SEND	Send	HT
181	RECEIVE	Receive	HT
182	FETCH	Fetch	HT
183	RESET	Reset	HT
184	CONTROL	Scan	HT
185	SYNCHRON	Synchronize	HT
186	AP-GRUND	User program basic overhead (EPROM-capable)	ST
187			RV
188	AN:VB512	Preset: User-oriented connections IM512	AW
189	SST:SYS	System block for interface mod. IM512	3

Abbreviations:

	AW	User block
	GP	Basic program
	RV	Reserved, package assignment still open
	WF	WF 625;
	HT	Standard handling blocks of SIMATIC (only for 150S/U)
	ST	"Serial transfer" function blocks for computer link with CP535 (only for 150S/U)

2.2.5 Function blocks

FB No.	FB Designation	FB Name	Package
190	SST:VOA	Presetting: Start	3
191	SST:VOK	Presetting: Channels	3
192	SST:VOW	Presetting: Queue	3
193	SST:VOE	Presetting: End	3
194	SST:WEBS	Queue entry for printer or data display terminal	3
195	SST:WERK	Queue entry for computer link	3
196	SST:WAUS	Removal from queue	3
197	SST:BSDS	Direct entry for printer or data display terminal	3
198	SST:RK	Direct entry for computer link	3
199	SST:UHR	Time and date	3

Free for user from function block No. FB 200.
Function blocks located in SINUMERIK block packages and which are not
required by the user, can be used by him for his own blocks.

Exception:
Function block numbers   FB0   to FB2
                           FB45 to FB59
                           and FB88
may not be used by the user.
These function blocks are called directly by the basic program (GP) and need only
be loaded into the PLC by the user if required.

Caution:
1.   It should be noted that interchanging with SINUMERIK blocks is not possible.
     The user must not use a SINUMERIK standard block name, nor may he assign
     a SINUMERIK library number to his user blocks.
2.   Over the range FB0 to FB199 SINUMERIK blocks have absolute priority. If
     SINUMERIK blocks which overlap with user block numbers must be used
     later, the user block numbers must be given new designations.

Abbreviations: AW   User block
                        GP   Basic program
                        RV   Reserved, package assignment still open
   WF   WF 625;

3 Contents:

1. Description

FB174 RK: VB512 and FB175 RK:AS512 have been incorporated in Package 3 to enable the user to select the channel number, interface number, timer for the monitoring time and the procedure of the transfer - without program changes - via machine data.

FB174 RK:VB512 allows channels to be preset for
- Computer link
- Code carriers
- User channels (with FB188 AN:VB512)

Fig. 1 shows the program structure of FB174. The individual functions are selected via FB-MD bits. When selecting the procedure, there is a choice between 3964R with response message and 3964R without response messsage.
When Package 4 is used - "Computer link with IM512" - FB174 must be called unconditionally in FB2 by the user.
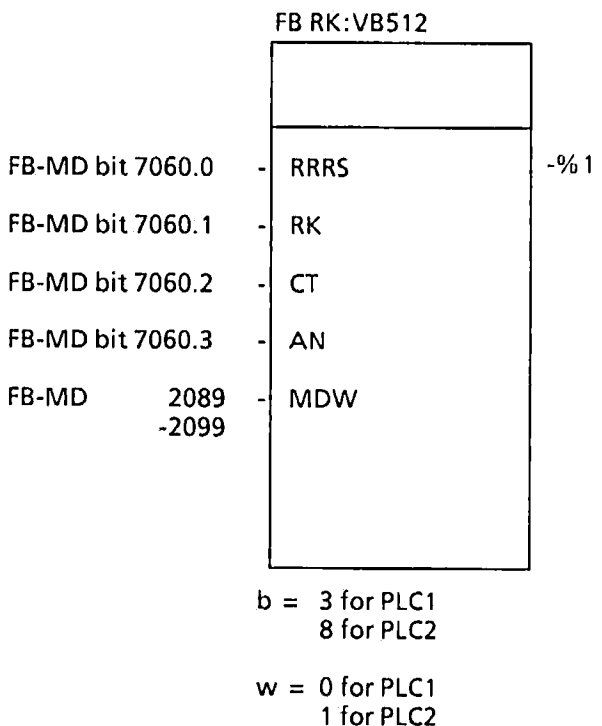
Fig. 1: Program structure of FB174 (computer link: Presetting the IM512)
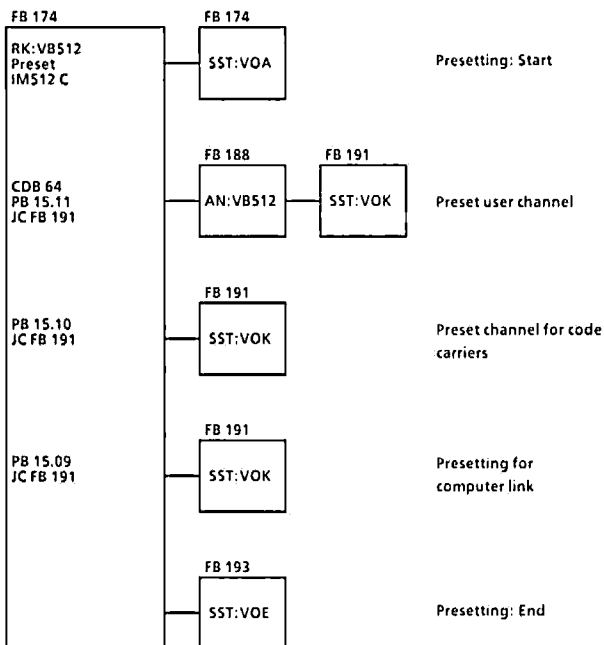
2. Block data

Lib. No.	: E88530-B-5174-A-O (for the 130WB PLC) E88530-B-5174-B-O (for the 150S PLC)
FBs to be loaded	: FB190, FB191, FB193
DBs to be loaded	: None
Type of FB call	: Unconditional in FB2
DBs to be input	: None
FBs to be input	: FB188 if, for example, a terminal is to be connected
Fault messages	: 1: Parameter error with SST:VOE/SST:VOK

3. Block call

FB RK:VB512

FB-MD bit 7060.0 - RRRS   -% 1

FB-MD bit 7060.1 - RK

FB-MD bit 7060.2 - CT

FB-MD bit 7060.3 - AN

FB-MD   2089 - MDW
         -2099

b = 3 for PLC1
    8 for PLC2

w = 0 for PLC1
    1 for PLC2

4. Signal descriptions

FB machine data bits   7030 for PLC1 (= DB064, DL015)
     7080 for PLC2 (= DB064, DL015)

7	6	5	4	3	2	1	0
			CR/S	AN	CT	RK	RR/S

CR/S Procedure for code carrier
    "0" = 3964R with response message
    "1" = 3964R without response message
        (special deliver)

AN   Call user (FB188) in presetting block
    "0" = No
    "1" = Yes

CT   Code carrier yes/no
    "0" = No
    "1" = Yes

RK   Computer link yes/no
    "0" = No
    "1" = Yes

RR/S Procdure for computer link
    "0" = 3964R with response message
    "1" = 3964R without response message
        (special deliver)

MDW FB machine data words
2089-2099 for PLC1 (= DB061, DW089-099)
2189-2199 for PLC2 (= DB061, DW089-099)

TUE   Monitoring time (number of the timer)
SST   Interface number
KANR Channel number
NRBS Interface for output of system messages
     (screen)
ERBS Alternate interface for output of system messages
     (screen)
STPK Slot identifier (for 150S). The slot always relates to the basic module. Computer link and code carrier must be implemented on an interface module when 2 IM512Cs are used.

255 is preset for NRRK and ERRK for the computer link and code carrier, i.e. no system messages with these channels.

If user FB FB188 is not called, 255 is also preset for NRBS and ERBS.

There is no check as to whether interfaces (SST), channels (KANR) or monitoring times (TUE) have double parameters.

In the event of parameter assignment errors (STOE for SST:VOE or PAFE for SST:VOK) FB174 branches to the stop loop.
ACCU1 = 0174
ACCU2 = 0001

DB061

| DW				
89	TUE	for SST:VOA		2X89
90	SST	for SST:VOK	Computer link	2X90
91	KANR	for SST:VOK and SST:RK	Computer link	2X91
92	TUE	for SST:RK	Computer link	2X92
93	SST	for SST:VOK	Code carrier	2X93
94	KANR	for SST:VOK and SST:RK	Code carrier	2X94
95	TUE	for SST:RK	Code carrier	2X95
96	NRBS	for SST:VOE	Display (select)	2X96
97	ERBS	for SST:VOE	Display (select)	2X97
98	STPK	for SST:VOK	Code carrier/computer link	2X98
99	RESERVE			2X99

× = 0 for PLC1 or 1 for PLC2

1. Description

When Package 4 is used - "Computer link with IM 512" - FB175 RK:AS512 must be loaded by the user. The FB is the interface between Package 4 computer link and the IM512; it manages the output of both output buffers DB035 and DB004 of Package 4.

Different locations in DB038 are presented to the user as displays; he can evaluate these:

ANZ   Condition code of FB198 SST:RK
WS/GA WS header/device display of the channel (interface data area)
FM   Fault messages (interface data area)

For the assignment and description of these locations, see FB198 or Operating Instructions of the IM512 (Order No. C79000-B8500-C238-5).

Fig. 2 shows the program structure of FB175.
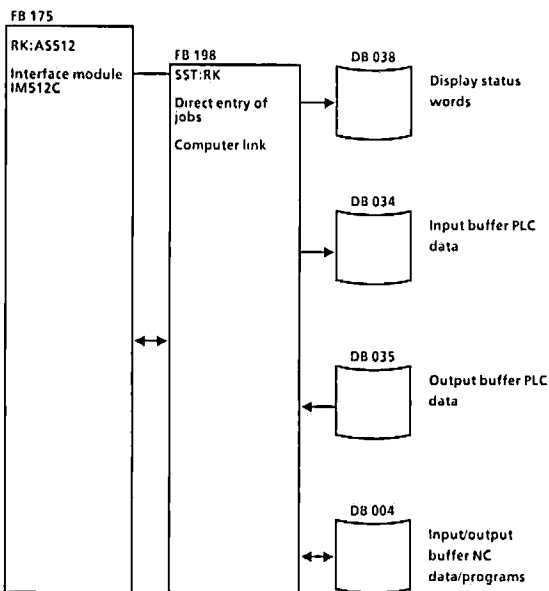
2. Block data

Lib. No.	: E88530-B-5175-A-O (for the 130WB PLC) E88530-B-5175-B-O (for the 150S PLC)
FBs to be loaded	: FB198
DBs to be loaded	: None
Type of FB call	: Unconditional in FB095
DBs to be input	: None
Fault messages	: Condition code

3. Block call
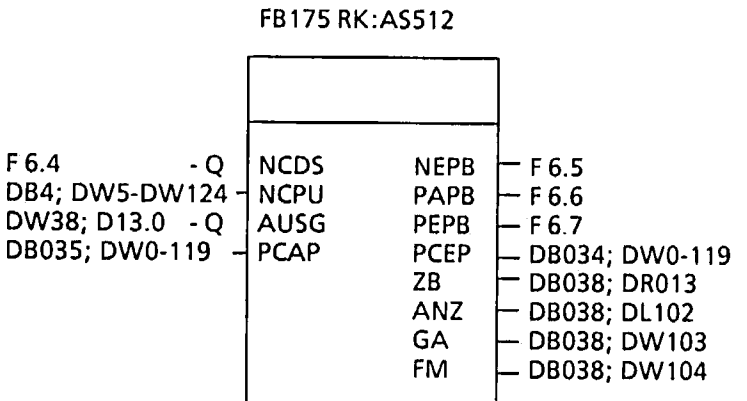
FB175 RK:AS512

If a message cannot be sent to the FLR, FB175 RK: AS512 makes four further attempts to send it.
If these 5 transmission attempts are unsuccessful an error identifier is set.

4. Signal descriptions

If bit AUSG (DO13.0) is set, the complete message is located in the output buffer for PLC data (DB035, DW000-119).

If flag F006.4 (coordination flag, output NC data) is set, the complete message is located in the output buffer (DB004, DW005-124).

NCDS Output request NC data
      Coordination flag, output
      Set: FB RK: NCDAT
      Clear: FB RK: AS512 after output to FLR

NCPU Buffer for NC data (input/output buffer)

AUSG Output request, PLC data
      Set: Standard FBs or user
      Clear: FB RK: AS512 after output to FLR

PCAP Output buffer for PLC data

NEPB Coordination flag, input NC data
      Set: AS512 is message is received from FLR
      Clear: FB RK: AS512 after output to FLR

PAPB Buffer for PLC data output assigned
      Set: Standard FBs or user
      Clear: FB RK: AS512 after output to FLR

PEPB Buffer for PLC data input assigned
      Set: AS512C when message received from FLR
      Clear: FB RK: S850, if FREP = logic 1

PCEP Input buffer for PLC data

ANZ   Condition code byte of FB198 SST:RK (see FB198)

GA   Device pointer of channel (see Operating Instructions of IM512)

FM   Fault messages of channel (see Operating Instructions of IM512)

Assignments of DR013 in DB038 (status byte FB RK:AS512)

7	6	5	4	3	2	1	0
ANST	PAFE	FEHL	PCNC	WORK	MODM	FLAG	AUSG

ANST Interface for FB198
      Set: Upon detection of an output after FEH4, for repeated output until OK
      Clear: If job running

PAFE Interface for FB198

FEHL FEH1-FEH4 indicated in the condition code byte of FB198

PCNC Changeover between PLC and NC buffer output
      Logic 0 -> PLC data will be output
      Logic 1 -> NC data will be output

WORK IM512C processes the job.
      Set: Upon detection of a job
      Clear: If job has been positively terminated

MODM R:MO----M is to be sent. Identifier to indicate that sending is possible in spite of MANU = "1"

FLAG Signal edge flag for bit AUSG. Used in FB095 RK:S850.

AUSG Output request, PLC data
      Set: User or standard FBs
      Clear: When job has been executed

Interface for FB198:

DB038

Channel number (FB machine data)	DW096
Monitoring timer (FB machine data)	DW097
PAR1: Destination (034, 000)	DW098
PAR2: Number of DWs (variable)	DW099
PAR3: Coordination flag (006, 007)	DW100
PAR4: Source (035, 000 or 004, 005)	DW101
ANZ: Condition code	DW102
WS header/device pointers = IDA<18 + 23*KANR>	DW103
Fault messages = IDA<19 + 23*KANR>	DW104

IDA = Interface data area

1. Description

Function block SST-VOA synchronizes the traffic between the 512 interface module and the central processor of the programmable logic controller. The system transfer data area (interface data area) is prepared for entering the function blocks subsequently called.

Function block SST:VOA monitors the start-up of the IM 512. If the IM 512 does not respond to the presetting signal within 10 s, further traffic with the interface module is aborted and a fault message is output.

Function block SST:VOA is called in the cold start branch as the first of the presetting blocks (see Page 1-2).

2. Block data

Lib. No.	:	E88530-B 5190-A-00 (for 130WB)
	:	E88530-B 5190-B-00 (for 150S)
FBs to be loaded	:	FB 190, FB 191, FB 193
DBs to be loaded	:	None
Type of FB call	:	Conditional in FB 2 Load only if FB174 is used
DBs to be output	:	None
Fault messages	:	None

3. Block call

```
            FB SST:VOA
           ┌─────────────┐
I, BY ─────┤ TUE    STOE ├──── Q, BI
           └─────────────┘
```
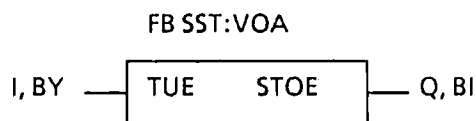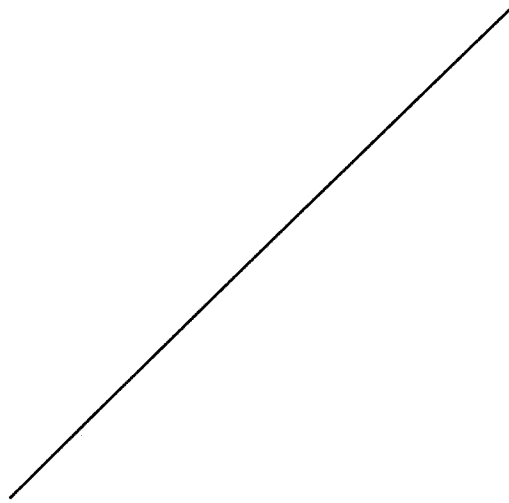
4. Signal description

TUE   Specification of monitoring timer (the duration is permanently set internally)

STOE   Fault message, interface module does not respond within 10 s

1. Description

Function block SST:VOK enters the data for a channel in the interface data area. These data include:

- the device identifier of the connected device;
- the assignment of the physical interface address (location of the connected device) to the logical interface address (channel number);
- specifications of the types, beginnings and lengths of the name lists.

The user specifies these data as block parameters for calling function block SST:VOK.

Function block SST:VOK is called after function block SST:VOA in the cold start branch (see Page 1-2). This function block must be called once per assigned channel, i.e. n-times for n channels used. The channels can be assigned in random order.

Only one channel may be assigned per physical interface. If more than one channel is assigned, the channel number of the last SST:VOK function block to be called is decisive.

2. Block data

Lib. No.	:	E88530-B-5191-A-00 (for 130WB)
	:	E88530-B-5191-B-00 (for 150S)
FBs to be loaded	:	FB190, FB 191, FB 193
DBs to be loaded	:	None
Type of FB call	:	Conditional in FB 2 Load only if FB174 is used
DBs to be input	:	None
Fault messages	:	None

Siemens AG   Order No.: E80850-D3-X-A1-7600

3. Block call

FB SST:VOK

```
D, KS  ─┐ GERK    PAFE ├─ Q, BI
I, BY  ─┤ KANR
I, W   ─┤ SST
D, KY  ─┤ I:AL
D, KF  ─┤ I:AN
D, KF  ─┤ I:LA
D, KY  ─┤ P:AL
D, KF  ─┤ P:AN
D, KF  ─┤ P:LA
D, KY  ─┤ KTAL
D, KF  ─┤ KTAN
D,KF   ─┤ KTLA
```

GERK Identifier of the connected device
   KS = BI   TTY 3913 Printer
   KS = BP   PT8O 3914, 3917, PT88 (dot
              matrix), printers*)
   KS = D4   3974, 3974R Data Display
              Terminal
   KS = D8   3805 to 3830 Data Display
              Terminal
   KS = DM   3974 M Data Display Terminal
   KS = DS   Special driver, printer/DDT
   KS = RK   3964 Computer Link
   KS = R7   3964 Computer Link (7 bit)
   KS = RR   3964 R Computer Link (with
              BCC)
   KS = RS   Special driver, computer link
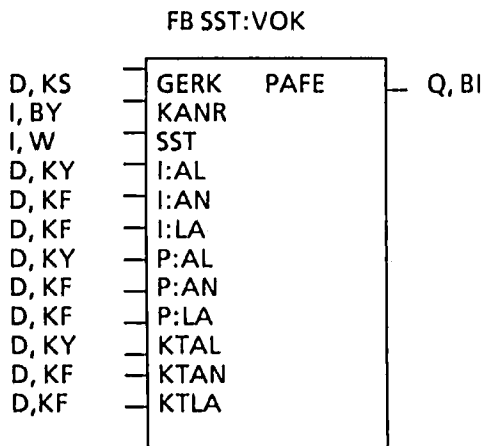
4. Signal descriptions

KANR   Number of the channel to be
       programmed in the interface data
       area (0-7)

SST   Specification of IM 512 interface to
       which the device is connected
          KY = 1 to 5, 0 to 3
                    |
                    | Plug-in connection on
                    | interface modules
                    |
              Location of basic module in
              150S PLC
              For the 130W-B PLC:
              Irrelevant

I:AL   Beginning of name list I
I:AN   Number of list elements I
I:LA   Length of a list element I (number of
       characters)
P:AL   Beginning of name list P
P:AN   Number of list elements P
P:LA   Length of a list element P (number of
       characters)
KTAL   Beginning of name list KT
KTAN   Number of list elements KT
KTLA   Length of a list element KT (number of
       characters)

If the channel serves as a computer link, name
lists are not required and need not be
programmed. In this case the parameters are
assigned the value 0.

PAFE   Parameter assignment error:

   -   if an illegal device identifier is
       entered under GERK;
   -   a non-existent physical interface
       address was entered under SST;
   -   the length of the list element under
       I:LA or P:LA or KTLA exceeds 132
       bytes (characters).

No further processing of the standard
interface by the function blocks takes
place.

*) Note:
The PT80/88 selection is governed by
the parity jumper of the relevant
interface and the printer connected to
the IM 512.
Parity jumper inserted   : PT80
Parity jumper disconnected : PT88

1. Description

Function block SST:VOW assigns up to five queues to one channel. During the function block call, the user determines the number of queues as well as their starting DBs and the number of subsequent DBs by parameter assignment. These specificatio.1s are entered by the function block in the interface data area and the starting DB. The FB identifies the specified DBs as valid queue DBs. When a queue is created, its contents (the jobs) are cleared and all internal pointers are set to their initial states. In the event of a parameter format error, the function block indicates "parameter assignment error".

Function block SST:VOW is only called when the creation of a queue is intended. In the case of direct entry, this function block is not required. It must be called once in the cold start branch (see Page 1-2) per channel with queues, but only after the corresponding SST:VOK function block.

A queue consists of one or more data blocks. This depends on the desired number of jobs for the IM 512 which are to be stored. When a computer link is connected, 35 jobs can be placed per data block; the figure is 62 when a printer or DDT is connected.

The sum of the number of starting data blocks and of the number of subsequent data blocks must be less than 256.

Caution:

All data blocks used for a queue must be reserved with a length of 256 in the memory of the programmable logic controller (full range, DW0 to DW255). The queue ranges must not overlap.

Violation of these rules is not checked by the FB and can result in unexpected errors in the cyclic operation of the PLC at a later time.

2. Block data

Lib. No.	:	E88530-B 5192-A-00 (for 130WB) E88530-B 5152-B.00 (for 150S)
FBs to be loaded	:	FB 190 - FB 193
DBs to be loaded	:	None
Type of FB call	:	Conditional in FB 2
DBs to be input	:	Queues
Fault messages	:	None

3. Block call

FB SST:VOW

```
I, BY    ┌─────────────┐
         │ KANR   PAFE │─ Q, BI
D, KY   ─┤ WS2         │
D, KY   ─┤ WS3         │
D, KY   ─┤ WS4         │
D, KY   ─┤ WS5         │
D, KY   ─┤             │
         └─────────────┘
```
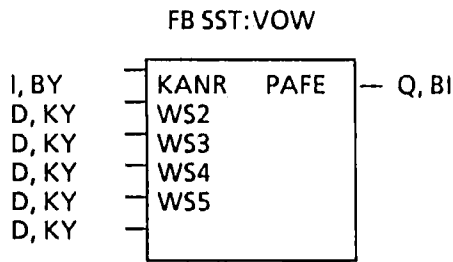
4. Signal description

KANR Number of the channel to be programmed in the interface data area (0-7)

WS1 Start DB and number of subsequent DBs of 1st queue

WS2 Start DB and number of subsequent DBs of 2nd queue

WS3 Start DB and number of subsequent DBs of 3rd queue

WS4 Start DB and number of subsequent DBs of 4th queue

WS5 Start DB and number of subsequent DBs of 5th queue

PAFE Parameter assignment error:

  - if the channel specified under KANR is not correctly preset;
  - if the sum of the two bytes entered under WS1, WS2, WS3, WS4 or WS5 is greater than 255.

  If block parameter PAFE is at logic 1, no further processing of the standard interface by the function blocks takes place.

Parameter assignments:

WS1 KY = 1 to 255, 0 to 254

          └── Number of subsequent data blocks

        └── First data block of queue
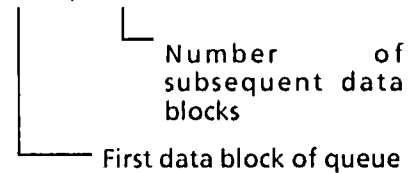
    KY = 0,0 This queue should not be established

WS2
WS3 Assignments as for WS1
WS4
WS5

1. Description

Function block SST:VOE enters in the interface
data area the interface for the device or
replacement device to which system messages
are to be output. The specifications are
programmed by the user with the function block
call.

Function block SST:VOE indicates to the IM 512
that presetting of the interface data area is
completed.

Function block SST:VOE is called in the cold start
branch (see Page 1-2) as the last of the presetting
blocks.

2. Block call

Lib. No.	:	E88530-B 5193-A-00 (for 130WB) E88530-B 5193-B-00 (for 150S)
FBs to be loaded	:	FB 190 - FB 193
DBs to be loaded	:	None
Type of FB call	:	Conditional in FB 2 Load only if FB174 is used
DBs to be input	:	None
Fault messages	:	None

3. Block call

FB SST:VOE

I, W	NRBS
I, W	NRRK
I, W	ERBS
I, W	ERRK
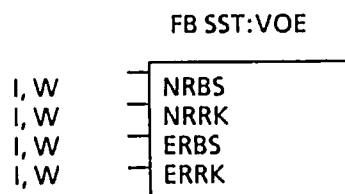
4. Signal description

NRBS Specification of the interface for system messages which are to be output on the printer or DDT

NRRK Interface number for computer link

ERBS Specification of the interface for the substitute output device, printer or DDT

ERRK Specification of the interface for the substitute output device, computer link

If a non-existent interface (e.g. 255) is entered under block parameters NRBS, NRRK, ERBS or ERRK it is interpreted as "no device required".

Parameter assignments

NRBS Ky = x, y

x = 1 to 5
Specification of the plug-in location of the basic module in the 150S PLC is irrelevant for 130W-B.

y = 0 to 3
Specification of the plug-in connection on the interface modules (see description of function block SST:VOR)
NRK
ERBS   Assignments as for NRBS
ERRK

1. Description

Function block SST:WEBS enters an input or output job for a printer or VDU in a queue. Simultaneously, it performs organization of the queue (pointer update, changing over data blocks, etc.).

Function block SST:WEBS may only be processed once per job (e.g. with a conditional call after an edge evaluation of the initiating signal). It is called n-times for n queues.

The following operational states are indicated in the condition code:

1 x 0 0 0 0 0 0   Job entered in queue

0 0 0 1 0 0 0 0   Queue is in clear mode; job rejected

2. Block data

Lib. No.	:	E88530-B 5194-A-00 (for 130WB) E88530-B 5194-B-00 (for 150S)
FBs to be loaded	:	FB 190 - FB 194, FB 196
DBs to be loaded	:	None
Type of FB call	:	Conditional via sig. edge flag
DBs to be input	:	Queues
Fault messages	:	None

3. Block call

FB SST:WEBS

```
DO      ─┤ WB    ANZ ├─ Q, BY
D, KS   ─┤ BEF   WUE ├─ Q, BI
$I, W   ─┤ PAR   PAFE├─ Q, BI
```
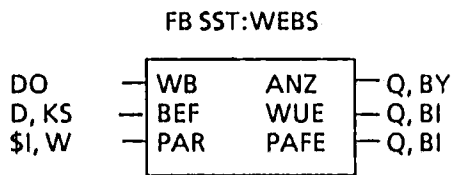
4. Signal descriptions

WB Call for data block with which the queue to be processed begins

BEF Specification of name list containing the list element describing the job

    Z = I: Specification for name list I (Input)

    Z = P: Specificaiton for name list P (Print)

    Z = KT   Specification for name list KT (Short message)

PAR Word in which the number of the list element (of the name list defined under BEF) is located, which is to be processed with the job.

ANZ Condition code

WUE Queue overflow (with logic 1)

- The job is rejected if the queue is already full

PAFE Parameter assignment error

- if a queue which was not created with function block SST:VOW is addressed with this function block under WB;
- the queue specified under WB was not created for a printer or DDT;
- presetting of the interface data area was not correctly completed.

If the current block parameter is specified under PAR as a data word, this specification relates to the data block which was called before the call for function block SST:WEBS.

1. Description

Function block SST:WERK enters an input or output job for a computer link in the queue. Simultaneously, it controls the organization of the queue (pointer update, changing over data blocks, etc.).

Function block SST:WERK may only be processed once per job (e.g. with a conditional call after an edge evaluation of the initiating signal). It is called n-times for n queues.

The following operational states are indicated in the condition code:

1 x 0 0 0 0 0 0   Job entered in queue

0 0 0 1 0 0 0 0   Queue is in the clear mode; job rejected

One of the following jobs can be initiated with parameter BEF:

KS = AS   Output of memory contents (with absolute address)
KS = AD   Output from a data block
KS = AE   Output from the process image for inputs
KS = AA   Output from the process image for outputs
KS = AM   Output from the flag area
KS = AZ   Output from counter area
KS = AT   Output from the timer area (times)
KS = ES   Input into the memory (with absolute address)
KS = ED   Input from a data block
KS = EE   Input from the process image for inputs
KS = EA   Input from the process image for outputs
KS = EM   Input from flag area
KS = EZ   Input from counter area (counts)
KS = ET   Input from the timer area (times)

An "output" signifies that data will be output from the programmable logic controller in whose memory the function block is located. With an "input", data are written from the exterior into the programmable logic controller in whose memory the function block is located. The data interchange request is always issued by the "active" programmable logic controller.

2. Block data

Lib.No.   : E88530-B-5195-A-00
                    (for 130WB)
                    E88530-B-5195-B-00
                    (for 150S)

FBs to be loaded : FB190 - FB193, FB195, FB196

DBs to be loaded : None

Type of FB call   : Conditional via signal edge flag

DBs to be input   : Queues
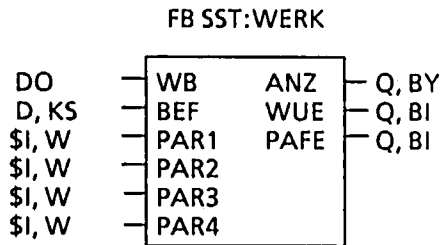
Fault messages   : None

3. Block call

FB SST:WERK

```
DO      ─┤ WB      ANZ ├─ Q, BY
D, KS   ─┤ BEF     WUE ├─ Q, BI
$I, W   ─┤ PAR1   PAFE ├─ Q, BI
$I, W   ─┤ PAR2
$I, W   ─┤ PAR3
$I, W   ─┤ PAR4
```

4. Signal descriptions

WB   Call for the data block with which the queue to be processed begins

BEF   Job specification

PAR1   Word containing the destination or source of the data interchange (depending on direction)

PAR2   Word containing the number of data to be transferred

PAR3   Word in which the parameter of the coordination flag is defined

PAR4   Word containing the source or destination of the data interchange (depending on direction)

ANZ   Condition code

WUE   Queue overflow (with logic 1)

- The job is rejected if the queue is full.

PAFE   Parameter assignment error

- if a queue which was not created with function block SST:VOW is addressed with this function block under WB;
- the queue specified under WB was not created for a computer link;
- presetting of the interface data area (of the channel) was not correctly completed.

If the current block parameter is specified under PAR as a data word, this specification relates to the data block called before the call for function block SST:WEBS.

1. Description

A job located in the queue is entered into the system transfer data area (interface data area) by function block SST:WAUS; the latter also monitors the handling of this job. If a so-called soft transmisssion error is detected (FEH4 e.g. parity or framing), there are three automatic repetitions before job processing is aborted on account of the error.

Function block SST:WAUS must be called unconditionally. It processes both queue jobs for printers or DDTs (which have been entered with function block SST:WEBS (FB 194) and jobs for the computer link (which have been entered with function block SST:WERK (FB 195)).

Function block SST:WAUS is called n-times for n queues. If several queues are assigned to a channel, queue removal must be coordinated by the user.

If block parameter FREI is assigned a logic 1, removal of a job from the queue addressed under WB is locked out. Any job removal still active is completed (with three repetitions if necessary).

If block parameter WLOE is assigned a logic 1, the jobs in the queue addressed under WB are cleared (marked as "processed"). All jobs are cleared if WLE changes from 0 to 1.

In order to avoid excessive loading of the cycle time of the programmable logic controller, only 10 jobs are cleared each time this function block is called. This "clear queue" operational state remains active until all jobs in the specifiedd queue have been cleared. It cannot be interrupted. Job entries in the queue performed by function blocks SST:WEBS and SST:WERK during this time are rejected, and Bit 4 of condition code ANZ is set. A job removal which is still active is completed before clearing (with three repetitions if necessary).

When all jobs have been cleared, a new job can immediately be entered in the queue, even if parameter WLOE is still assigned a 1. This job, however, is immediately cleared again. The user must ensure that no job is enterd as long as WLOE is active.

Block parameter WLE is at logic 1 when the queue addressed under WB is emtpy, i.e. when all the jobs it contains have been processed. The function block output can be used in conjunction with function block input FREI for priority organization of queue processing.

2. Block data

Lib. No.	:	E88530-B 5196-A-00 (for 130WB) E88530-B 5196-B-00 (for 150S)
FBs to be loaded	:	FB190 - FB196
DBs to be loaded	:	None
Type of FB call	:	Unconditional
DBs to be input	:	Queues
Fault messages	:	None

The condition code indicates the operational states of the FB.

3. Block call
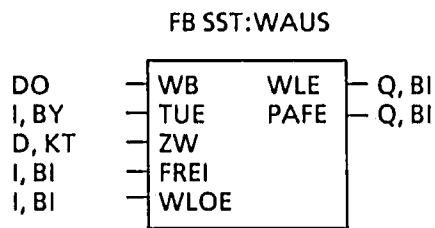
FB SST:WAUS

```
DO      —WB      WLE—  Q, BI
I, BY   —TUE     PAFE— Q, BI
D, KT   —ZW
I, BI   —FREI
I, BI   —WLOE
```

4. Signal descriptions

WB Call for the data block with which the queue to be processed begins

TUE Specification of timer for
- Monitoring the presetting for the IM 512
- Monitoring the interface reaction
- Monitoring the job processing
- Waiting time for repetition

ZW Specification of time for monitoring the duration from entering a job in the interface data area until processing by the IM 512

FREI Bit to inhibit processing

WLOE Bit for clearing the queue (all jobs are marked as "processed").

WLE Queue processed (empty)

PAFE Parameter assignment error

- if presetting of the interface data area was not correctly completed;
- ˙ a queue which was not created with function block SST-VOW is addressed with this function block under WB;
- an entry attempt is made in a channel which was not created with function block SST:VOK.

1. Description

Function SST:BSDS enters an input or output job for a printer or DDT directly in the system transfer data area. Job processing of the 512 interface module is monitored. In the event of an error (only with FEH4) there are three automatic repetitions before job processing is aborted on account of the error. After entry of the job, function block SST:BSDS indicates in a condition code the correct termination of the processing or any error which has occurred. In the event of incorrect parameter assignment for the function block, the "parameter assignment errror" signal is output.

Function block SST:BSDS must be called with an unconditional call so that it is continually processed. The signal initiating the job is applied to an input of the function block. The function block is called once per channel.

2. Block data

Lib. No.	:	E88530-B 5197-A-00 (for 130WB) E88530-B 5197-B-00 (for 150S)
FBs to be loaded	:	FB190, FB191, FB193, FB197
DBs to be loaded	:	None
Type of FB call	:	Unconditional
DBs to be input	:	None
Fault messages	:	None

3. Block call

FB SST:BSDS

```
I, BI    ─┤ANST    PAFE├─ Q, BI
I, BY    ─┤KANR    ANZ ├─ Q. BY
I, BY    ─┤TUE
D, KT    ─┤ZW
D, KS    ─┤BEF
$I, W    ─┤PAR
```
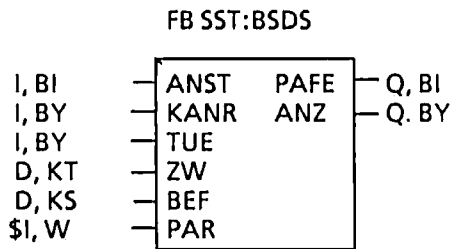
4. Signal descriptions

ANST Initiation of an input or output job when the signal at this input changes from 0 to 1

KANR Number of the channel to be programmed in the ST area
The assignment of the channel to a connected device is achieved with function block SST;VOK

TUE Specification of the timer for

- Monitoring the presetting
- Monitoring the interface reaction
- Monitoring of job processing and of
- the waiting time for repetition

ZW Specification of the time for monitoring the duration from the entry of a job in the interface data area to processing by the IM 512

BEF Specification of the name list containing the list element describing the job

KS = I: Specification for name list I (Input)
KS = P: Specification for name list P (Print)
KS = KT Specification for name list KT (Short message)

PAR Word containing the number of the list element (of the name list defined under BEF) which is to be processed with the job

ANZ Condition code

PAFE Parameter assignment error

- if an entry attempt is made with this function block in a channel not created with function block SST:VOK;
- the desired (preset) device is not connected;
- a job is issued to a channel preset for the computer link;
- presetting of the interface data area was not correctly completed;
- a channel number higher than 3 has been programmed.

1. Description

Function block SST:RK enters a job for a computer link directly into the system transfer data area. Job processing of the 512 interface module is monitored. In the event of an error (only FEH4), there are three automatic repetitions before job processing is aborted on account of the error.

After entry of the job, function block SST:RK indicates in a condition code correct termination of the processing or any error which has occurred. In the event of incorrect parameter assignment for the function block, the "parameter assignment error" signal is output.

Function block SST:RK must be called unconditionally so that it is continually processed. The signal initiating the job is applied to an input of the function block. The function block is called once per channel.

One of the following jobs can be initiated with parameter BEF:

KS = AS	Output of memory contents (with absolute address)
KS = AD	Output from a data block
KS = AE	Output from the process image for inputs
KS = AA	Output from the process image for outputs
KS = AM	Output from the flag area
KS = AZ	Output from the counter area (counts)
KS = AT	Output from the timer area (times)
KS = ES	Input into the memory (with absolute address)
KS = ED	Input from a data block
KS = EE	Input from the process image for inputs
KS = EA	Input from the process image for outputs
KS = EM	Input from the flag area
KS = EZ	Input from the counter area (counts)
KS = ET	Input from the timer area (times)

An "output" signifies that data will be output from the programmable logic controller in whose memory this function block is located. With an "input", data are written from the exterior into the programmable logic controller in whose memory the function block is located. The data interchange request is always issued by the "active" programmable logic controller.

2. Block data

Lib. No.	:	E88530-B 5198-A-00 (for 130WB) E88530-B 5198-B-00 (for 150S)
FBs to be loaded	:	FB190, FB191, FB193, FB198
DBs to be loaded	:	None
Type of FB call	:	Unconditional Load only if FB175 is used
DBs to be input	:	None
Fault messages	:	None

3. Block call

FB SST:RK

```
              ┌──────────────┐
I, BI    ──── │ ANST    PAFE │ ──  Q, BI
I, BY    ──── │ KANR     ANZ │ ──  Q, BY
I, BY    ──── │ TUE          │
D, KT    ──── │ ZW           │
D, KS    ──── │ BEF          │
$I, W    ──── │ PAR1         │
$I, W    ──── │ PAR2         │
$I, W    ──── │ PAR3         │
$I, W    ──── │ PAR4         │
              └──────────────┘
```
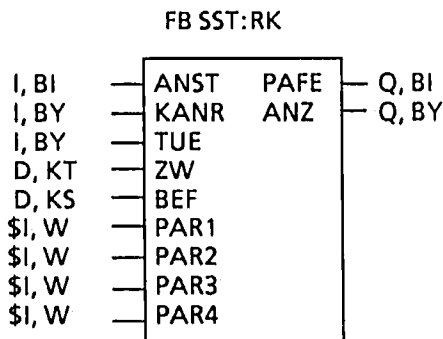
4. Signal descriptions

ANST Initiation of a job when the signal from this input changes from 0 to 1.
Signal ANST is reset by the FB after successful job processing. It must not be initiated again until the triggerable state is indicated in the condition code.

KANR Number of the channel to be programmed in the interface data area. The assignment of the channel to a connected device is achieved with function block SST:VOK.

TUE Specification of the timer for
- Monitoring the presetting
- Montoring the interface reaction
- Monitoring of job processing and of the
- waiting time for repetition

ZW Specification of the time for monitoring the duration from the entry of a job in the interface data area, to processing by the IM 512

BEF Specification of the job

PAR1 Word containing the destination or source of the data interchange (depending on direction)

PAR2 Word containing the number of data to be transferred

PAR3 Word in which the parameter of the coordination flag is defined

PAR4 Word containing the source or destination of the data interchange (depending on direction)

ANZ Condition code

PAFE Parameter assignment error

- if an entry attempt is made with this function in a channel not created with function block SST:VOK;
- the desired (preset) device is not connected;
- a job is issued to a channel preset for printer or DDT;
- presetting of the interface data area has not been correctly completed.

If the current block parameter is specified under PAR as a data word, this specification relates to the data block called before the call for function block SST:WEBS.

1. Description

Function block SST:UHR provides the time of day and the date. It allows the time of day and the date to be entered and corrected once or periodically.

Function block SST:UHR must be processed with the 100 ms timebase.

When the basic program is used, the block is called conditionally in FB1 as a function of F11.2 for the 130WB PLC or F11.4 for the 150S PLC (10 ms timebase), and FB SST:UHR must be called with every 10th run of OB10. For the 150S PLC, FB SST:UHR must be called in OB16.

Function block SST:UHR operates jointly with data block DB28 which is preset accordingly. The time of day and date are stored in it both in binary code and in BCD. The time of day and date are additionally stored in the interface data area.

2. Block call

Lib. No.	:	E88530-B 5199-A-00 (for 130WB) E88530-B 5199-B-00 (for 150S)
FBs to be loaded	:	FB199
DBs to be loaded	:	D28
Type of FB call	:	Conditional in FB1
DBs to be input	:	None
Fault messages	:	None

Function block SST:UHR has no block parameters.

DB 28

DW 132	Year	
DW 133	Month	
DW 134	Day	→ Values in binary code
DW 135	Hour	
DW 136	Minute	
DW 137	Second	
DW 138	Second Minute	
DW 139	Hour Day	→ Values in BCD
DW 140	Month Year	

Interface data area

BA253	Second Minute	
BA254	Hour Day	Values in BCD
BA255	Month Year	
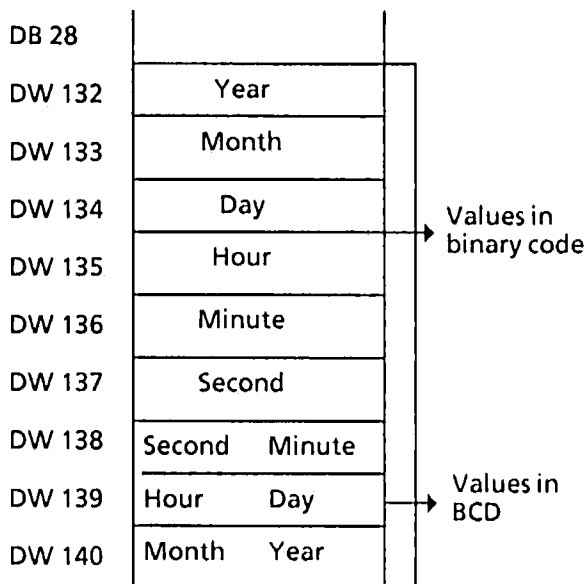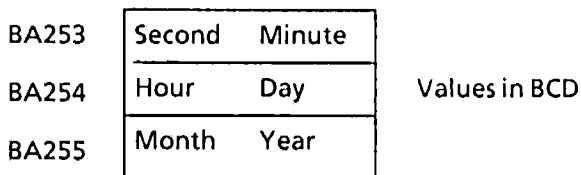
Numeric representation:

15	14	0	
sign.	2^{14} . . .	. . . 2^0	Binary code

15	12	11	8	7	4	3	0	
10^1		10^0		10^1		10^0		BCD
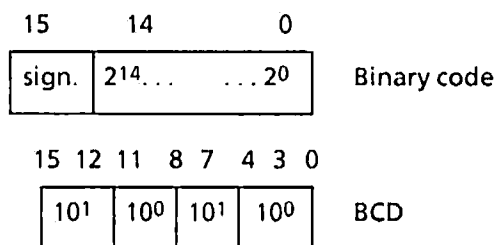
3. Application notes

In order to enter the date and time of day with a programmer, it is necessary to obtain an output of data block DB28, modify the values as shown below and store it in the programmable logic controller again.

The date and time of day are entered as follows:

DW56   KF = (Day)
DW57   KF = (Month)
DW58   KF = (Year)
DW59   KF = (Hour)
DW60   KF = (Minute)
DW61   KH = 0000

With transfer identifier 0000 in data word DW61, the date and time of day are accepted by function block FB199 (SST:UHR) and counting continues.

Input and correction via printer keyboard or DDT:

Standard data block DB28 contains the interface lists required in order to enter and correct the time of day with peripheral initiative. The name list (e.g. as name list P:) must be programmed with function block FB191 (SST:VOK) during presetting of the channel.

Example:

```
      :  JU    FB  191
NAME: SST:VOK
      :  .
         .
         .
      :
P:AL  :      KY = 28.142   Start     : DB28,
                                       DW142
P:AN  :      KF = +2       Number : 2 elements
P:LA  :      KF = +4       Length  : 4 characters
         .
         .
         .
```

The following applies to the start of the format and assignment list:

Name	Format list	Assignment list
DUIN	DB28, DW20	DB28, DW62
DUKO	DB28, DW69	DB28, DW121

In the example, the time of day and the date can be entered as follows via the keyboard of a DDT, for example:

Entry   : P:DUIN
Message : TG.MO.JA ST.MI.00:
Entry   : 01.10.82 08.30.00

The seconds must be entered with 00, otherwise the entry is ignored.

The time of day correction can be +/- 01 to +/-99 minutes. The time of the correction can be selected once or periodically. A complete input of date and time of day achieves a single correction:

Entry   : P:DUKO
Message : TG.MO.JA ST. +/-MI:
Entry   : 01.10.82 12. + 05.

This entry causes the function block to increment the number of minutes by 5 at 12 hours. A periodic correction is achieved by entering 00 at one position of the date (day, month or year). This position is then ignored during the comparison.In order to retard the clock by 1 minute daily at midnight, the following entry is made:

Entry   : P:DUKO
Message : TG.MO.JA ST. +/-MI:
Entry   : 00.00.00.00. - 01
An entry with + - 00 minutes will not be processed.

4 Block data for Package 3

FB No	Name	Block length words	Call length words	Lib. No E88530-B 130WB	Pro-cessing time 130WB	Lib. No E85530-B 150S	Pro-cessing time 150S	Nes-ting depth	FBs called	Assigned variables
174	RK:VB512	131	2	5174-A53	120	5174-B53	120	2	FB190 191 193 188	FB 244-249
175	RK:AS512	123	2	5175-A53	0,9 -3,8	5175-B51	0,9 -3,8	1	FB198	FB 248, 249, 254, 255
189	SST:SYS	156	3	5189-A50	0,1	-	-	0		FW 230
190	SST:VOA	158	4	5190-A51	113	5190-B51	113	1	OB31*1)	FB 255
191	SST:VOK	395	15	5191-A51	1 -0,7	5191-B50	0,4 -0,7	0		
192	SST:VOW	238	9	5192-A51	0,6 -1,8	5192-B50	0,6 -1,8	0		FW 230
193	SST:VOE	92	6	5193-A51	0,5 -1,1	5193-B52	0,5 -1,1	0		
194	SST:WEBS	264	8	5194-A50	1,2	5194-B50	1,2	0		
195	SST:WERK	322	11	5195-A50	1,5	5195-B50	1,6	0		
196	SST:WAUS	865	9	5196-A51	0,8 -4,4	5196-B50	0,8 -4,4	1	FB1891)	FW 230, MB 2555
197	SST:BSDS	608	10	5197-A51	0,8 -4	5197-B50	0,8 -3,4	0		FB 255
198	SST:RK	636	13	5198-A51	0,8 -3,7	5198-B50	0,8 -3,6	0		FB 255
199	SST:UHR	300	2	5199-A50	0,07 -0,8	5199-B51	0,07 -0,8	0		DB28, Z0

* OB 31 is not required
1) With the 130WB PLC

5 Application notes

1st Example: 3974 Data Display Terminal

The PLC initiates an output job which is to be processed immediately by the IM 512.
A measured value is to be displayed on the last line of the 3974 DDT every 2 seconds. System messages are also to be output via the terminal. The date and time are entered as a peripheral initiative via the terminal keyboard.

Output format:
Time Date TEMPERATURE BEARING 1 xxx DEGREES C

Name	:	DB 156
Format list	:	DB 157
Assignment list	:	DB 158
Raw data list	:	DB 159
Condition code	:	FB 112
Aux. flags	:	FB113, FW114
		FW110, FW116, FW118
Measured value	:	DB159/DW3

PB13		(130W-B and 150S)
SEGMENT 1		
	: L	KB1
	: T	FW114
	: AN	T 2
	: S	F 113.3
	: L	KB3
	: T	FB117
	:	
	: JU	FB197
NAME	: SST :	BSDS
ANST	:	F 113.3
KANR	:	FB111
TUE	:	FB117
ZW	:	KT001.2
BEF	:	KSI:
PAR	:	FW114
ANZ	:	FB112
PAFE	:	F 113,4
	:	
	: A	T 2
	: BEC	
	:	
	: L	KT002.2
	: A	T 2
	: SP	T 2
	: AN	T 2
	: SP	T 2
	: BE	
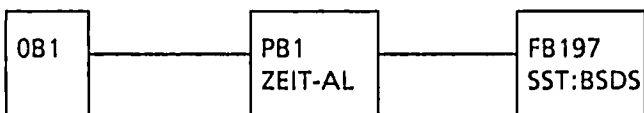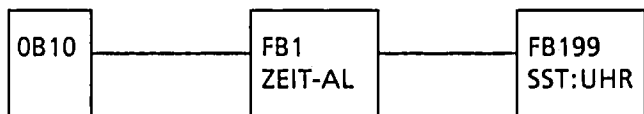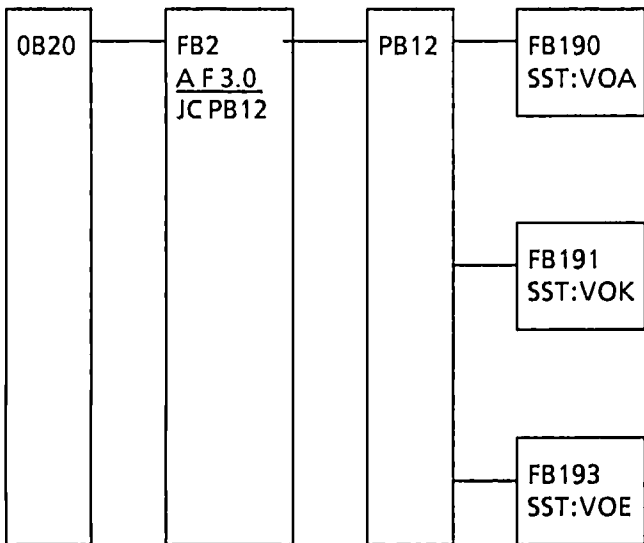
PB12 (130WB)	PB12 (150S)	Name list

PB12 (130WB)

SEGMENT 1
```
        : JU  FB11
NAME    : EINR-DB
DBAN    :    KY28,1
DWNR    :    KF + 152
        : L   KB0
        : T   FW110
        : L   KB1
        : T   FB116
        : L   KHFFFF
        : T   FW118
        : JU  FB60
NAME    : BLOCK-TR
DBQZ    :    KY29,28
DWQ     :    KF + 0
DZ/A    :    KY0,120
        : JU  FB60
NAME    : BLOCK-TR
DBQZ    :    KY29,28
DWQ     :    KF + 120
DZ/A    :    KY120,33
        : JU  FB190
NAME    : SST:VOA
TUE     :    FB116
STOE    :    F 113.0
        : JU  FB191
NAME    : SST:VOK
GERK    :    KSD4
KANR    :    FB111
SST     :    FW110
I:AL    :    KY156,1
I:AN    :    KF + 1
I:LA    :    KF + 2
P:AL    :    KY5,142
P:AN    :    KF + 2
P:LA    :    KF + 4
KTAL    :    KY0,0
KTAN    :    KF + 0
KTLA    :    KF + 0
PAFE    :    F 113.1
        :
        : JU  FB193
NAME    : SST:VOE
NRBS    :    FW110
NRRK    :    FW118
ERBS    :    FW118
ERRK    :    FW118
        : BE
```

PB12 (150S)

SEGMENT 1
```
        : JU  FB11
NAME    : EINR-DB
DBAN    :    KY28,1
DWNR    :    KF + 152
        : L   KY2,0
        : T   FW110
        : L   KB1
        : T   FB116
        : L   KHFFFF
        : T   FW118
        : JU  FB60
NAME    : BLOCK-TR
DBQZ    :    KY29,28
DWQ     :    KF + 0
DZ/A    :    KY0,120
        : JU  FB60
NAME    : BLOCK-TR
DBQZ    :    KY29,28
DWQ     :    KF + 120
DZ/A    :    KY120,33
        : JU  FB190
NAME    : SST:VOA
TUE     :    FB116
STOE    :    F 113.0
        : JU  FB191
NAME    : SST:VOK
GERK    :    KSD4
KANR    :    FB111
SST     :    FW110
I:AL    :    KY156,1
I:AN    :    KF + 1
I:LA    :    KF + 2
P:AL    :    KY5,142
P:AN    :    KF + 2
P:LA    :    KF + 4
KTAL    :    KY0,0
KTAN    :    KF + 0
KTLA    :    KF + 0
PAFE    :    F 113.1
        :
        : JU  FB193
NAME    : SST:VOE
NRBS    :    FW110
NRRK    :    FW118
ERBS    :    FW118
ERRK    :    FW118
        : BE
```

Name list

```
DB156
0 :  KH = 0000;
1 :  KS = F1              Names
2 :  KY = 157,001;        Format start address
3 :  KY = 158,001;        Assignment start
                          address
4 :  KY = 159,003;        Assignment
5 :
```

Format list

```
DB157
0 :  KH = 0000;
1 :  KH = 8190;
2 :  KH = 0B37;
3 :  KH = 2090;
4 :  KH = A190;
5 :  KH = 2090;
6 :  KH = A090;
7 :  KH = 2020;
8 :  KS = TEMPERATURE BEARING 1
9 :  KH = 90B0;
0 :  KH = 0103;
1 :  KH = 0090;
2 :  KS = GRAD C
6 :  KH = 908F;
7 :
```

Assignment list

```
DB158
0 :  KH = 0000;
1 :  KY = 159,003
2 :
```

Raw data list

```
DB159
0 :  KH = 0000;
1 :  KH = 0000;
2 :  KH = 0000;
3 :  KF = + 00095;
4 :
```

FB1 (130W-B)

SEGMENT 1
NAME : ZEIT-AL
```
        : A   F 11.2
        : JC  FB199
NAME    : SST:UHR
        : BE
```

FB1 (150S)

SEGMENT 1
NAME : ZEIT-AL
```
        : A   F 11.4
        : JC  FB199
NAME    : SST:UHR
        : BE
```

0B10, 0B20 from basic package

2nd Example: Computer link

The active PLC initiates a computer job which is to be processed immediately.

Three flag words are to be interchanged in both directions, as often as possible. System messages cannot be transferred, and no coordination flag is used.

Auxiliary flags	: MB116, MB119, MW110, MW112, MW120
Transfer parameter	: DB162, DW1 to DW8
Display byte	: FB118
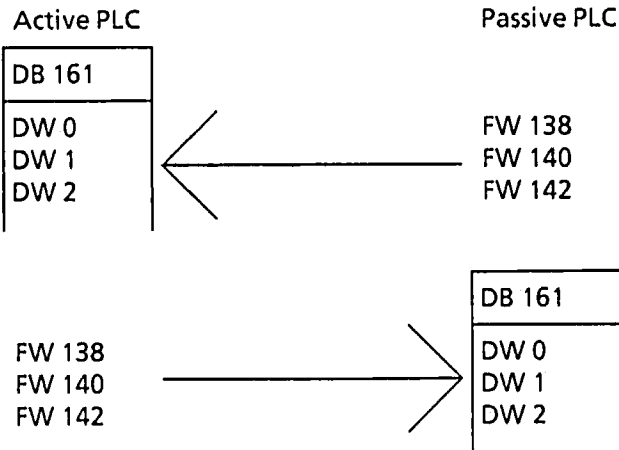
The channel for the computer link must be preset in the passive PLC, but no user program is needed for data traffic because the PLC is the passive link partner.

Active PLC   Passive PLC

The data blocks must be at least 6 data words in length. (DB length is checked in the IM 512.)

PB15

```
SEGMENT 1
                    : C    DB162
                    : L    KB4
                    : T    FW112
                    : A    F 116.1
                    : JC   FB198
         NAME  : SST: RK
         ANST  :      F 116,0
         KANR  :      FB112
         TUE   :      FB113
         ZW    :      KT001.2
         BEF   :      KSEM
         PAR1  :      DW1
         PAR2  :      DW2
         PAR3  :      DW3
         PAR4  :      DW4
         ANZ   :      FB118
         PAFE  :      F 117.2
                    :
                    : AN   F 116.1
                    : JC   FB198
         NAME  : SST: RK
         ANST  :      F 116.0
         KANR  :      FB112
         TUE   :      FB113
         ZW    :      KT001.2
         BEF   :      KSAM
         PAR1  :      DW5
         PAR2  :      DW6
         PAR3  :      DW7
         PAR4  :      DW8
         ANZ   :      FB3
         PAFE  :      F 117.3
                    :
                    : L    FB118
                    : L    KH0020
                    : XF
                    : BEC
                    : S    F 116.0
                    : AN   F 116.1
                    : =    F 116.1
                    : BE
```

PB14(130WB)	PB14(150S)	DB162

```
PB14(130WB)                    PB14(150S)                    DB162

SEGMENT 1                      SEGMENT 1                     0  :  KH = 0000;
            : L    KB0                     : L    KY2,00     1  :  KF = +00138;
            : L    FW110                   : L    FW110      2  :  KF = +00006;
            : L    KB3                     : L    KB3        3  :  KY = 255,255;
            : T    FB119                   : T    FB119      4  :  KY = 161,001;
            : L    KHFFFF                  : L    KHFFFF     5  :  KY = 161,001;
            : T    FW120                   : T    FW120      6  :  KF = +00006;
            : JU   FB190                   : JU   FB190      7  :  KY = 255,255;
     NAME : SST: VOA                NAME : SST: VOA          8  :  KF = +00138;
     TUE    :     FB119             TUE    :     FB119       9  :
     STOE   :     F 117.0           STOE   :     F 117.0
            :                              :
            : JU   FB191                   : JU   FB191
     NAME : SST: VOK                NAME : SST: VOK
     GERK   :     KSRK              GERK   :     KSRK
     KANR   :     FB111             KANR   :     FB111
     SST    :     FW110             SST    :     FW110
     I:AL   :     KY0,0             I:AL   :     KY0,0
     I:AN   :     KF + 0            I:AN   :     KF + 0
     I:LA   :     KF + 0            I:LA   :     KF + 0
     P:AL   :     KY0,0             P:AL   :     KY0,0
     P:AN   :     KF + 0            P:AN   :     KF + 0
     P:LA   :     KF + 0            P:LA   :     KF + 0
     KTAL   :     KY0,0             KTAL   :     KY0,0
     KTAN   :     KF + 0            KTAN   :     KF + 0
     KTLA   :     KF + 0            KTLA   :     KF + 0
     PAFE   :     F 117.1           PAFE   :     F 117.1
            :                              :
            : JU   FB193                   : JU   FB193
     NAME : SST: VOE                NAME : SST: VOE
     NRBS   :     FW120             NRBS   :     FW120
     NRRK   :     FW120             NRRK   :     FW120
     ERBS   :     FW120             ERBS   :     FW120
     ERRK   :     FW120             ERRK   :     FW120
            :                              :
            : BE                           : BE
```

3rd Example: Printouts

The S5 PLC initiates several printouts. Since several printer jobs can be initiated simultaneously but the IM 512 can only process them in succession, the printer jobs are entered in the queue and processed successively according to the transfer rate of the IM 512.

A message is to be output to the PT80 printer when a limit value is exceeded. The limit values are detected via process signals.

Signals from the process:
I 8.0   Pressure Mill 1 upper limit 1
I 9.0   Temperature Mill 1 upper limit 1

Output format:
Time Date UPPER LIMIT 1 PRESSURE MILL 1
Time Date UPPER LIMIT 1 TEMPERATURE MILL 1

Name list	: DB 163
Format list	: DB 164
Assignment list	: -
Raw data list	: -
Display byte	: DB165, DR2
Aux. flags	: FW44, FW46, FW110, FW116, FB115, FW112
Queue	: DB166, DB167, DB168

```
PB17
NETWORK 1
   .C    DB165
   :L    KB6
   :T    FB118
   :JU   PB6
              :A    F 47.0
              :JC   FB194
      NAME  : SST: WEBS
      WB    :      DB166
      BEF   :      KSI:
      PAR   :      DW1
      ANZ   :      DR2
      WUE   :      F 47.1
      PAFE  :      F 47.3
              :R    F 47.0
              :
              :JU   FB196
      NAME  : SST: WAUS
      WB    :      KF + 166
      TUE   :      FB118
      ZWD   :      KT001.1
      FREI  :      F 47.5
      WLOE  :      F 47.4
      WLE   :      F 47.2
      PAFE  :      F 48.6
              :BE
```
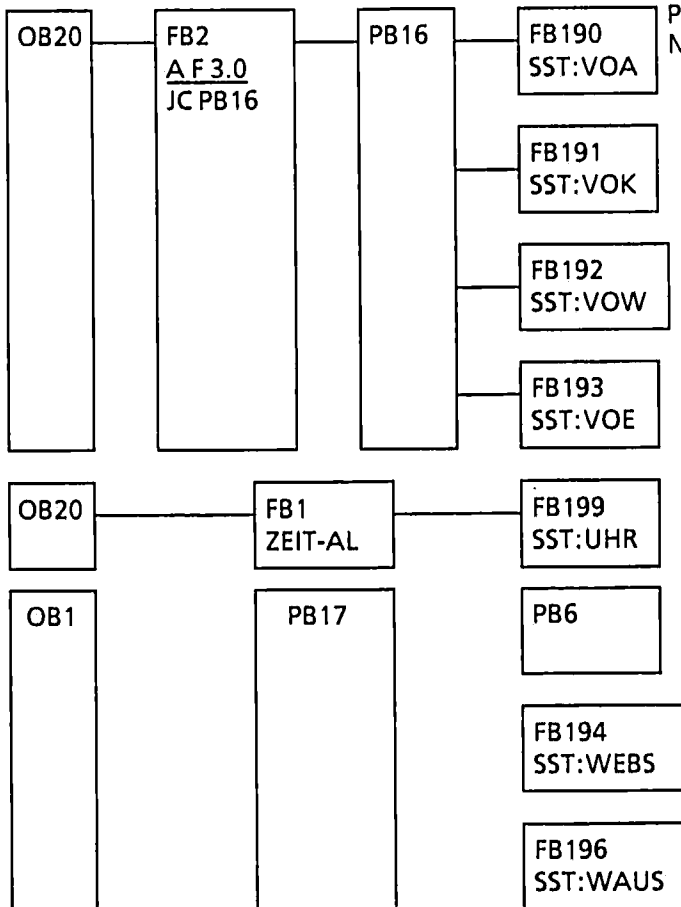
```
PB6
NETWORK 1
   :AN   I 8.0
   :R    F 46.0
   :
   :AN   I 9.0
   :R    F 46.1
   :
   :C    DB165
   :A    I 8.0
   :AN   F 46.0
   :S    F 46.0
   :S    F 47.0
   :L    KF + 1
   :T    DW1
   :BEC
   :
   :A    I 9.0
   :AN   F 46.1
   :S    F 46.1
   :S    F 47.0
   :L    KF + 2
   :T    BW1
   :BE
```

OB20	FB2 A F 3.0 JC PB16	PB16	FB190 SST:VOA
			FB191 SST:VOK
			FB192 SST:VOW
			FB193 SST:VOE
OB20	FB1 ZEIT-AL		FB199 SST:UHR
OB1	PB17		PB6
			FB194 SST:WEBS
			FB196 SST:WAUS

		Name list
PB16(130WB)	**PB16(150S)**	**DB163**

```
PB16(130WB)              PB16(150S)                Name list
                                                   DB163
SEGMENT 1                SEGMENT 1
        : L     KB0              : L     KY2,0        0 :  KH = 0000;
        : T     FW110            : T     FW110        1 :  KY = 164,001;
        : L     KB7              : L     KB7          2 :  KY = 164,001;
        : T     FB116            : T     FB116        3 :  KY = 164,022;
        : L     KHFFFF           : L     KHFFFF       4 :  KY = 164,....;
        : T     FW112            : T     FW112        5 :
        : JU    FB190            : JU    FB190
NAME  : SST: VOA         NAME  : SST: VOA          Format list
TUE   :       FB116      TUE   :       FB116       DB164
STOE  :       F 47.0     STOE  :       F 47.0
      :                        :                     0 :  KH = 0000;
      : JU    FB191            : JU    FB191         1 :  KH = 81A1;
NAME  : SST: VOK         NAME  : SST: VOK          2 :  KH = 9020;
GERK  :       KSBP       GERK  :       KSBP        3 :  KH = 2090;
KANR  :       FB111      KANR  :       FB111       4 :  KH = A090;
SST   :       FW110      SST   :       FW110       5 :  KH = 2020;
I:AL  :       KY163,1    I:AL  :       KY163,1     6 :  KS = UPPER LIMIT 1 - PRESSE
I:AN  :       KF + 2     I:AN  :       KF + 2            MILL 1
I:LA  :       KF + 0     I:LA  :       KF + 0      21 :  KH = 908F;
P:AL  :       KY0,0      P:AL  :       KY0,0       22 :  KH = 81A1;
P:AN  :       KF + 0     P:AN  :       KF + 0      23 :  KH = 9020;
P:LA  :       KF + 0     P:LA  :       KF + 0      24 :  KH = 2090;
KTAL  :       KY0,0      KTAL  :       KY0,0       25 :  KH = A090;
KTAN  :       KF + 0     KTAN  :       KF + 0      26 :  KH = 2020;
KTLA  :       KF + 0     KTLA  :       KF + 0      27 :  KS = UPPER LIMIT 1 -
PAFE  :       F 47.7     PAFE  :       F 47.7            TEMPERATURE MILL 1
      :                        :                   44 :  KH = 908F;
      : JU    FB192            : JU    FB192        45 :
NAME  : SST: VOW         NAME  : SST: VOW
KANR  :       FB111      KANR  :       FB111
WS1   :       KY166,2    WS1   :       KY166,2
WS2   :       KY0,0      WS2   :       KY0,0
WS3   :       KY0,0      WS3   :       KY0,0
WS4   :       KY0,0      WS4   :       KY0,0
WS5   :       KY0,0      WS5   :       KY0,0
PAFE  :       F 47.2     PAFE  :       F 47.2
      :                        :
      : JU    FB193            : JU    FB193
NAME  : SST: VOE         NAME  : SST: VOE
NRBS  :       FW110      NRBS  :       FW110
NRRK  :       FW112      NRRK  :       FW112
ERBS  :       FW112      ERBS  :       FW112
ERRK  :       FW112      ERRK  :       FW112
      :                        :
      : BE                     : BE
```

Siemens AG

E 885
Postfach 4848
D-8500 Nürnberg 1
Fed. Rep. of Germany

Suggestions
Corrections

For Publication/Manual:
SINUMERIK 850
Function blocks for the 130 W-B and
150 S PLCs
Package 3: Serial interface IM 512

Configuring Instructions

Order-No.:   E80850-D3-X-A1-7600
Edition: 06/87

From:

Name

Company/Dept.

Adress

Telephone   /

Should you come accross any printing errors when reading this publication, we would ask you to inform us accordingly, using this form. We would also welcome any suggestions you may have in the way of improvement.

Suggestions and/or corrections

*progress
in automation:
Siemens*