

INTEGRATED DIGITAL SERVICES TERMINAL

T1 SYSTEM INTERFACE UNIT CARD

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1. GENERAL

1.01 This practice provides information about the IDST T1 System Interface Unit (TSIU) card (part number 090-52002-02).

1.02 Whenever this practice is reissued, the reason for reissue will be given in this paragraph.

1.03 TSIU cards reside in the TSIU1 and TSIU2 slots of all IDST T1 Shelves.

2. DESCRIPTION

2.01 The TSIU card is the primary controller for the T1 Shelf. The TSIU card provides an interface for data between the DC cards and the TBX card in the Common Equipment Shelf. The TSIU card obtains control information from the MS card in the Com-

mon Equipment Shelf, and controls the DC cards in the T1 Shelf.

2.02 Figure 1 shows the channel data interface between the DC, TSIU, and TBX cards. Each DC card provides 16 bits of serial data for each DS0 or sub-rate channel. The 16 bits are organized as 8 bits of channel data and 8 bits of control information (including parity, path ID, signaling, and framing bits). The data is clocked onto the card at a 3.088-MHz rate.

2.03 The serial data is clocked into an elastic store, which is essentially a serial-to-parallel converter and time-demultiplexer. The data is checked for parity and PID information (the PID is checked with that from the redundant TSIU card), then multiplexed with the trunk/channel conditioning. New parity bits are applied, if applicable, then the signal is clocked out to a TBX card. The recovered T1 clock is sent separately from the data.

2.04 Simultaneously, 16 bits of parallel data are received from the TBX card. Again, the PID and parity bits are checked, and the word is clocked into the parallel-to-serial converter (elastic store) for transmission back to the proper DC card.

2.05 A set of relays (under control of the microprocessor) can switch out any one of the DC cards, replacing it with a spare (if equipped). The TSIU card reports all error indications to the MS card. These errors include loss of DC card, PID, and parity errors in either direction from any of the DS0 channels. T1 faults including red alarm, yellow alarm, and alarm indication signal (AIS) are also reported. The TSIU card can also generate trunk conditioning to notify the network that the channel is in error.

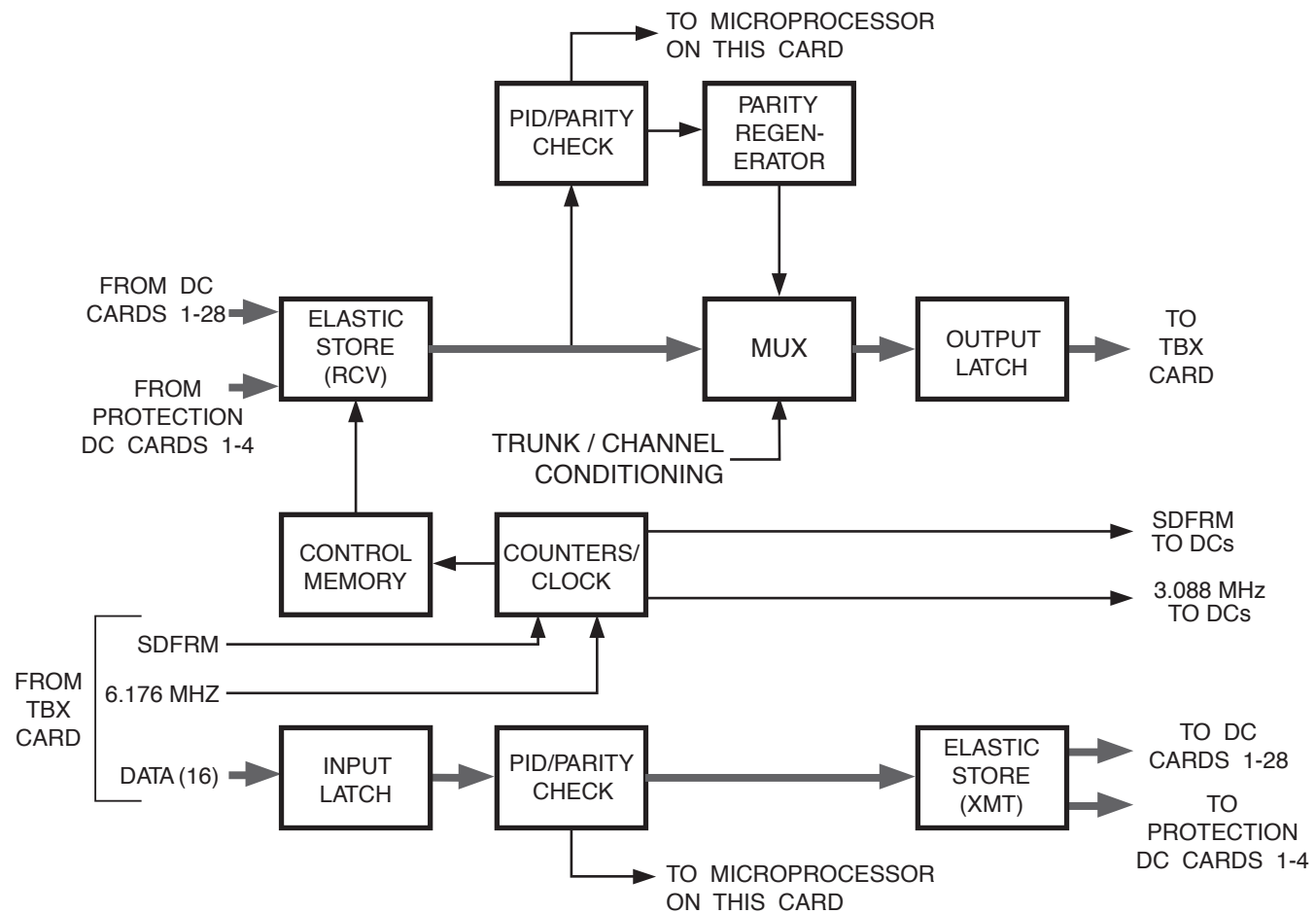


Figure 1. TSIU Card Block Diagram (Datapath)

2.06 Figure 2 shows the control portion of the TSIU card. The microprocessors of both TSIU cards operate simultaneously. However, only one of the processors is in control of the shelf at one time. A housekeeping module contains an arbitration circuit which determines which TSIU card is currently in control. The housekeeping circuit also contains a power-on reset circuit, and watchdog timer to detect gross failures such as power supply out of range, or failed microprocessor.

2.07 The TSIU card microprocessor is an 8-bit Z180 using 32k of RAM for scratchpad and 128k of ROM for program storage. The microprocessors on the redundant TSIU cards exchange control and status information via a serial link.

2.08 The TSIU card is connected to the MS card via a high-speed parallel interface. Data from the MS card to the TSIU card is buffered by a 512-byte FIFO (first-in, first-out) memory. Data from the TSIU card to the MS card is transferred to the output register from the TSIU card's memory, using the DMAC (Direct Memory Access Controller) built into the Z180 microprocessor.

2.09 The T1 Shelf control bus interface includes individual slot-select lines and a common serial bus. The common serial bus shares a clock, and Data In and Data Out signals.

2.10 The TSIU card contains a DC-DC converter which converts -48 volts to +5 volts. Office battery A and B are used (for redundancy) to supply the -48 volts.

3. COMMANDS

3.01 The ENT-EQPT command enters the TSIU card into the IDST database as follows:

```
ENT-EQPT::TSIU-x:<ctag>::::;
```

where x is 1 through 8 (1 or 2 in T1 Shelf 1, 3 or 4 in T1 Shelf 2, 5 or 6 in T1 Shelf 3, and 7 or 8 in T1 Shelf 4).

3.02 The RST-EQPT command puts the TSIU card in service as follows:

```
RST-EQPT::TSIU-x:<ctag>::;
```

where x is 1 through 8 (1 or 2 in T1 Shelf 1, 3 or 4 in T1 Shelf 2, 5 or 6 in T1 Shelf 3, and 7 or 8 in T1 Shelf 4).

3.03 The RMV-EQPT command removes the TSIU card from service as follows:

```
RMV-EQPT::TSIU-x:<ctag>::  
[<mode>],;
```

where x is 1 through 8 (1 or 2 in T1 Shelf 1, 3 or 4 in T1 Shelf 2, 5 or 6 in T1 Shelf 3, and 7 or 8 in T1 Shelf 4), and <mode> is NORM (default) or FRCD (forced).

3.04 The DLT-EQPT command deletes the TSIU card from the IDST database as follows:

```
DLT-EQPT::TSIU-x:<ctag>::::;
```

where x is 1 through 8 (1 or 2 in T1 Shelf 1, 3 or 4 in T1 Shelf 2, 5 or 6 in T1 Shelf 3, and 7 or 8 in T1 Shelf 4).

4. FACEPLATE INDICATORS

4.01 Figure 3 is a drawing of the TSIU card faceplate indicators.

5. CARD STRAPS

5.01 Figure 4 is a drawing of the TSIU card straps, and their position for normal card operation. All strap positions other than the normal strap positions indicated in the figure are reserved for factory use.

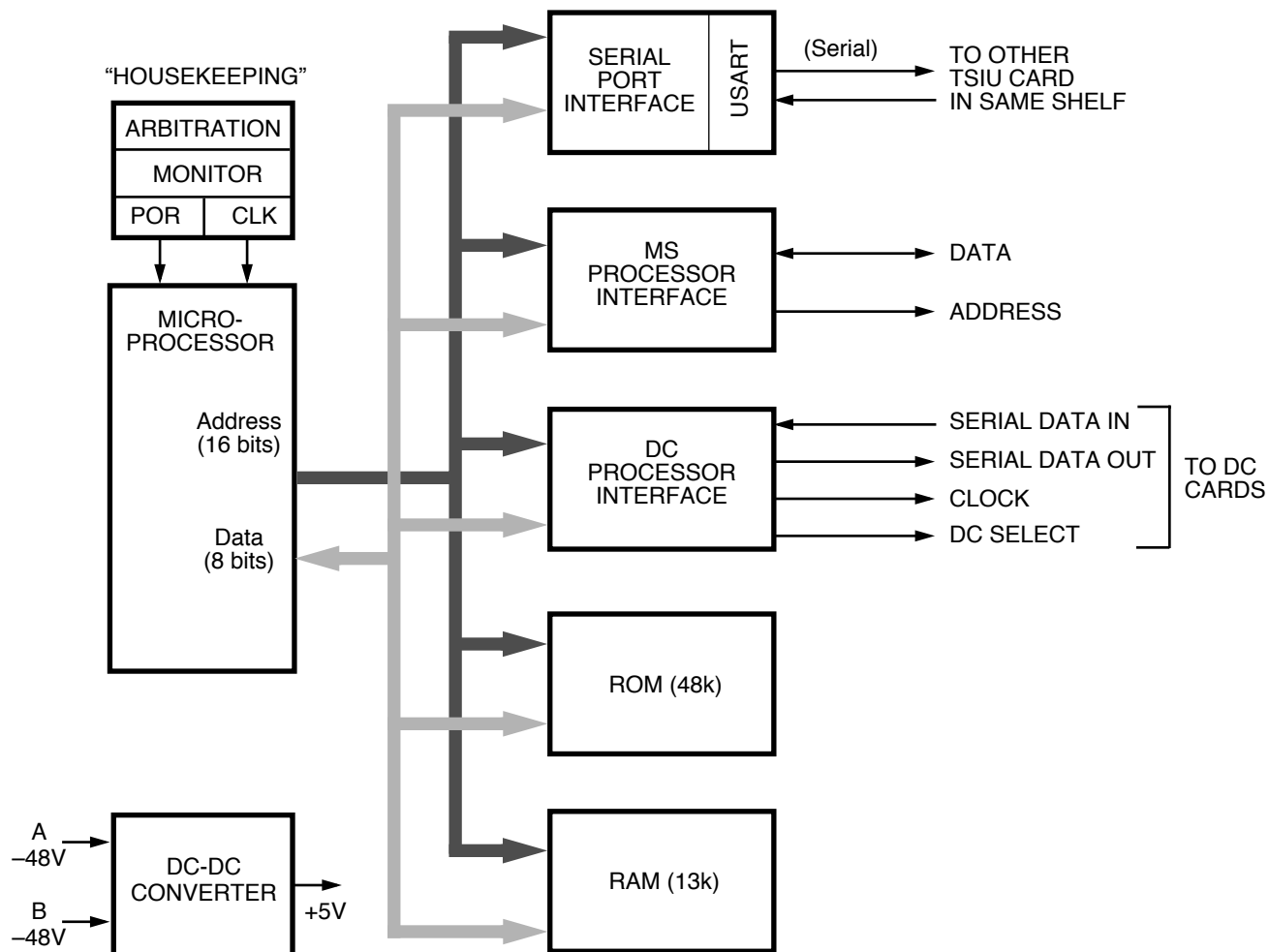
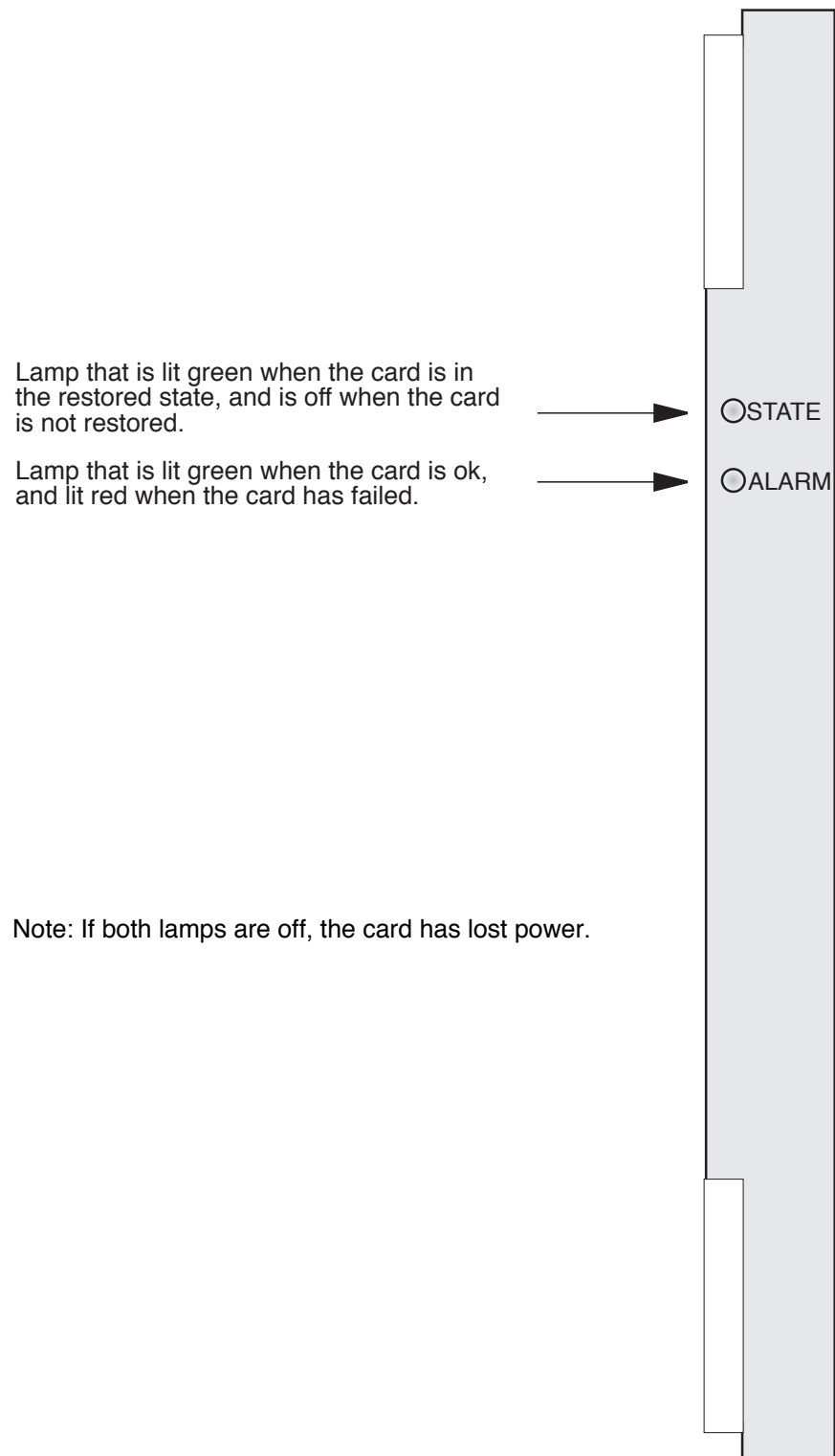
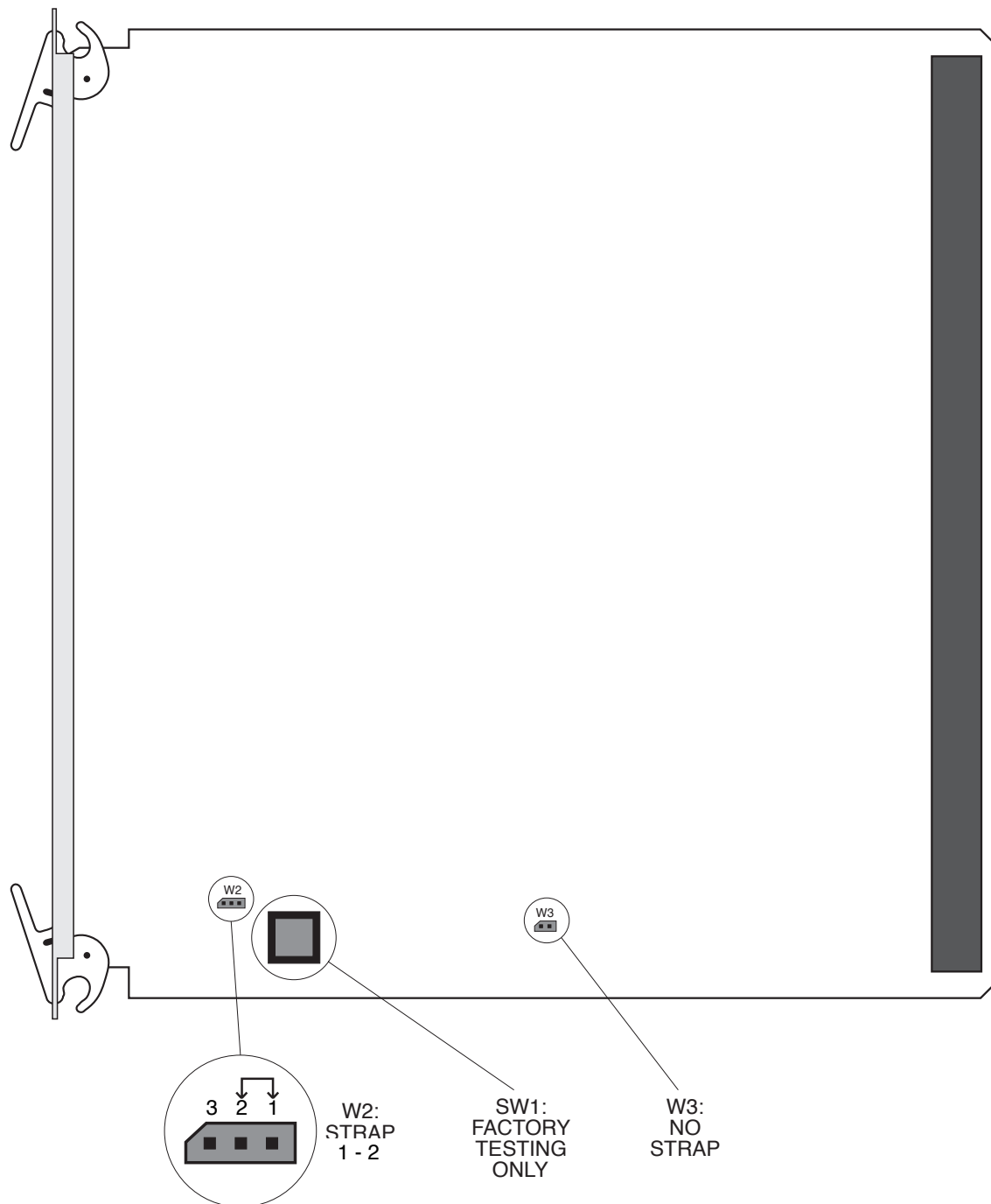


Figure 2. TSIU Card Block Diagram (Control)

**Figure 3. TSIU Card Faceplate Indicators**



Note: Straps are shown in normal operating position. Any change in strap position will affect the operation of this card.

Figure 4. TSIU Card Straps